Overwatch Fire Detection System

Control Panel Hardware Manual

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WARNING

Do not install, maintain, or operate this equipment without reading, understanding, and following the proper Fairmount Automation instructions and manuals, otherwise injury or damage may result.

Before performing maintenance on any Overwatch device, be sure to disconnect all power sources and secure any process/system being monitored and/or controlled (including suppression discharge systems). Adjusting or removing this product while it is in the system may disable fire detection and/or fire suppression and may cause injury and/or damage.

This device should be installed, serviced, and maintained by qualified personnel only. Always remove all power sources before installing the device or removing any protective safety covers. Failure to do so may result in injury and/or damage.

Ensure all environmental, mechanical, and electrical limits are not exceeded during operation, storage, and transportation of Overwatch devices. Failure to do so may result in damage or reduced lifetime of the device.

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1 INTRODUCTION

This document provides installation information regarding Fairmount Automation's *Overwatch Fire Detection System (FDS)* product line. Installation instructions specific to the Fire Alarm Control Panel (FACP) are contained herein for the following part numbers:

Table 1: Fire Alarm Control Panel Part Numbers

Part Number	*Description*
02105-176	Fire Alarm Control Panel, Copper-Copper Ethernet
02105-240	Fire Alarm Control Panel, Fiber-Fiber Ethernet
02105-241	Fire Alarm Control Panel, Copper-Fiber Ethernet

Guidance for planning the overall fire system is also provided.

Installation instructions for other devices or panels in the Overwatch FDS as well as configuration and operations manuals are provided in separate documents. Refer to Section 1.4 for a full list of supplemental documentation.

1.1 Document Conventions

Throughout this document, important information will be highlighted per the following convention:

WARNING: Risk to personal safety. Death or injury may result from not following instructions.

CAUTION: Risk of product damage. Proceed with caution observing the notes provided.

NOTE: Important information pertaining to best practices, special implementation, or other pertinent information to consider.

1.2 Compliance

UL-864 Listed (pending)

MIL-STD-901D for High Impact Shock (pending)

MIL-STD-167B for Vibration (pending)

MIL-STD-461E for Electro-Magnetic Interference (pending)

MIL-STD-1399 300 Power Compatibility (pending)

1.3 Safety Considerations

Information in this manual is to be applied in accordance with NFPA-72 and all local codes applicable to the installation. The intended audience for this information is fire panel planners and installers operating in accordance with all applicable codes and standards.

Follow the instructions in the installation, configuration, and operating manuals to avoid damage to the panel or associated equipment. Do not attempt to install, configure, or operate the equipment until all associated manuals are read in their entirety and understood.

WARNING: Prevent accidental electric shock by properly grounding the panel. The FACP enclosure is grounded through the input power terminal block (Section 4.3.3) and a bolted connection on the upper left mounting foot Figure 1. Make one or both connections.

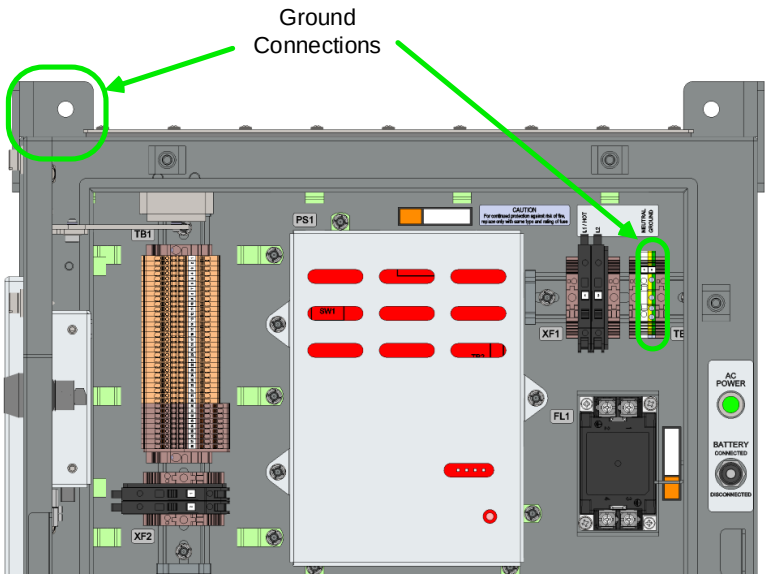


Figure 1: Grounding Locations in Panel

WARNING: High voltage 115VAC connections are located in the regions indicated in Figure 2. Disconnect main AC power feed prior to servicing these regions.

CAUTION: The Control Panel can be powered from multiple sources of power. Do not attempt to service the panel without removing all sources of power.

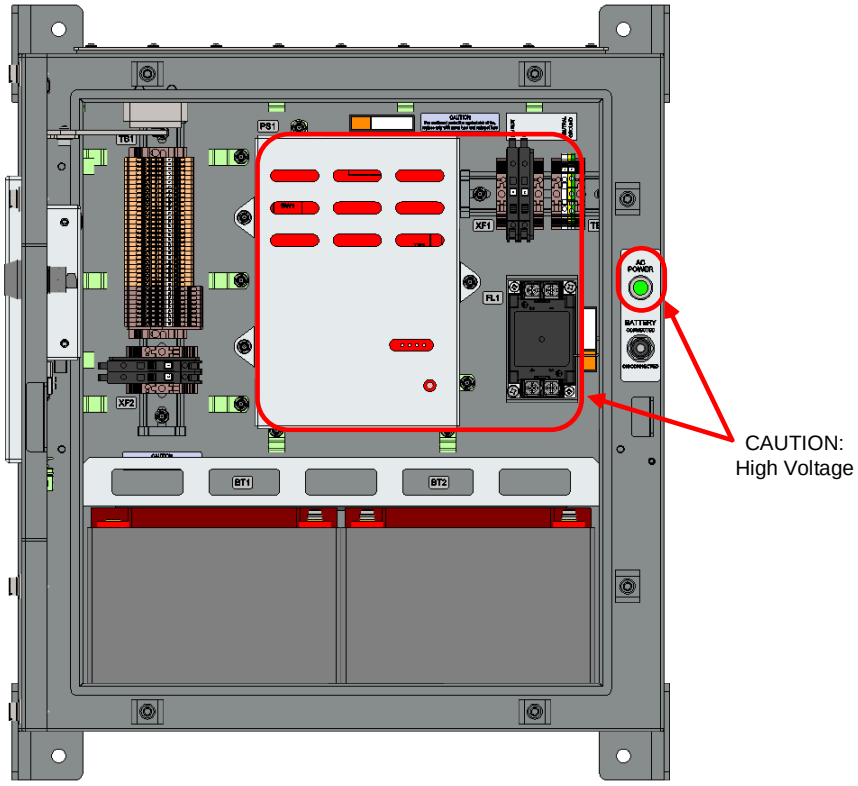


Figure 2: AC High Voltage Locations in Panel

CAUTION: This Control Panel is only to be installed in environments and per instructions contained in this manual. Refer to Appendix A – Product Specifications for all environmental and electrical considerations for operation of the Control Panel.

CAUTION: Fire Alarm Control Panel circuits are identified as Special Application or Regulated in Appendix A – Product Specifications. Special Application circuit implementations are only to be connected with devices identified in the Supported Devices List (Section 1.4). Where supported, Regulated circuit implementations can be connected to UL certified devices meeting the regulated specifications for that circuit.

CAUTION: Care should be taken when touching the panel's all-metal enclosure in high temperature environments. Be aware that the external enclosure temperature can exceed 60° Celsius.

1.4 Overwatch Fire Detection System Documentation

The following documents comprise the set of manuals associated with the Overwatch product line:

PDG-TM-2021/001 - Overwatch Control Panel Hardware Manual (this document)

PDG-TM-2021/002 - Overwatch Annunciator Panel Hardware Manual

PDG-TM-2021/003 - Overwatch Portable Annunciator Panel Hardware Manual

PDG-TM-2021/004 - Overwatch Panel Operators Manual

PDG-TM-2021/005 - Overwatch Configuration Manual

PDG-TM-2021/006 - Overwatch Installation Planning Tool Guide

PDG-TM-2021/007 - Overwatch Contact Input Module Manual

PDG-TM-2021/008 - Overwatch Contact Input / DC Output Module Manual

PDG-TM-2021/009 - Overwatch Contact Input / AC Output Module Manual

PDG-TM-2021/010 - Overwatch AC Input Module Manual

PDG-TM-2021/011 - Overwatch AC Input / AC Output Module Manual

PDG-TM-2021/012 - Overwatch Releasing Abort Switch Module Manual

PDG-TM-2021/013 - Overwatch Releasing Pull Switch Module Manual

PDG-TM-2021/014 - Overwatch Releasing Disable Switch Module Manual

PDG-TM-2021/015 - Overwatch Detector Manual

PDG-TM-2021/016 - Overwatch Intrinsically Safe SLC Interface Manual

PDG-TM-2021/017 - Overwatch SLC Notification Appliance Circuit (NAC) Manual

PDG-TM-2021/018 - Overwatch Notification Appliance Manual

PDG-TM-2021/019 - Overwatch Pull Station Manual

PDG-TM-2021/020 - Overwatch Fixed Heat Detector Manual

PDG-TM-2021/021 - Overwatch Supported Devices List (UL)

PDG-TM-2021/022 - Overwatch Supported Devices List (All)

PP2090/2022/Issue23 - Short-Circuit Isolation Datasheet (from Apollo Fire Detectors, LTD)

Please visit https://www.apollo-fire.co.uk/ for additional information on Apollo Fire Detectors, LTD devices.

2 OVERWATCH FIRE DETECTION SYSTEM OVERVIEW

Figure 3 shows an example architecture using Fairmount Automation's *Overwatch Fire Detection System (FDS)* product line. FDS heat detectors, smoke detectors, combination smoke/heat detectors, flame detectors, sounder modules, I/O modules, and notification appliances connect to Signaling Line Circuits (SLCs). These SLCs can be routed in a Class X loop topology from the FACP to a group of detectors/modules and back to the FACP (Class A and B bus topologies are also supported). SLCs distribute power from the FACP to the attached devices, and also serve as a bi-directional communication channel between the FACP and detectors/modules. Each SLC can accommodate up to 126 XP95 or Discovery (legacy) addressable devices or up to 254 Core Protocol addressable devices.

SLC Notification Appliance Circuits (SLC NACs) connect the SLC to notification appliances through an addressable control module. These appliances are powered from the FACP auxiliary output power. An example Motor Operated Pilot Valve (MOPV) is activated through an AC output and its power monitored by an AC input.

Notification appliances can be directly connected to the panel using its one internal NAC.

The panel also contains one Releasing Actuation Circuit (RAC) to provide a supervised connection to a fire suppression agent actuator. The RAC connection includes functionality to actively monitor the health of an actuator coil.

The FACP processes signals from system input devices to generate warning and/or alarm signals. Those signals are indicated visually and audibly at the FACP operator interface. They can also activate SLC output devices.

The FACP incorporates an internal, rechargeable battery that allows the FACP and attached devices to continue to operate on loss of AC input power. The FACP actively charges its internal battery whenever input power is available.

Annunciator and Portable Annunciator Panels have a user interface and networking capability identical to the FACP but lack I/O interfaces and a local battery backup (backup power can be provided from other sources such as an FACP).

Additionally, each FACP/Annunciator can exchange information (alarms, sensor data, etc.) with any of the following ships supplemental services using one of the many supported common industrial automation protocols or via a custom message format:

- Distributed Control System (DCS),
- Machinery Centralized Control System (MCCS),
- other 3rd party networked equipment (programmable logic controllers, computers, pumps, etc.)

Supported network configurations include support for RS-485 and Ethernet (Copper and/or Fiber) bus topologies as indicated in Appendix A – Product Specifications.

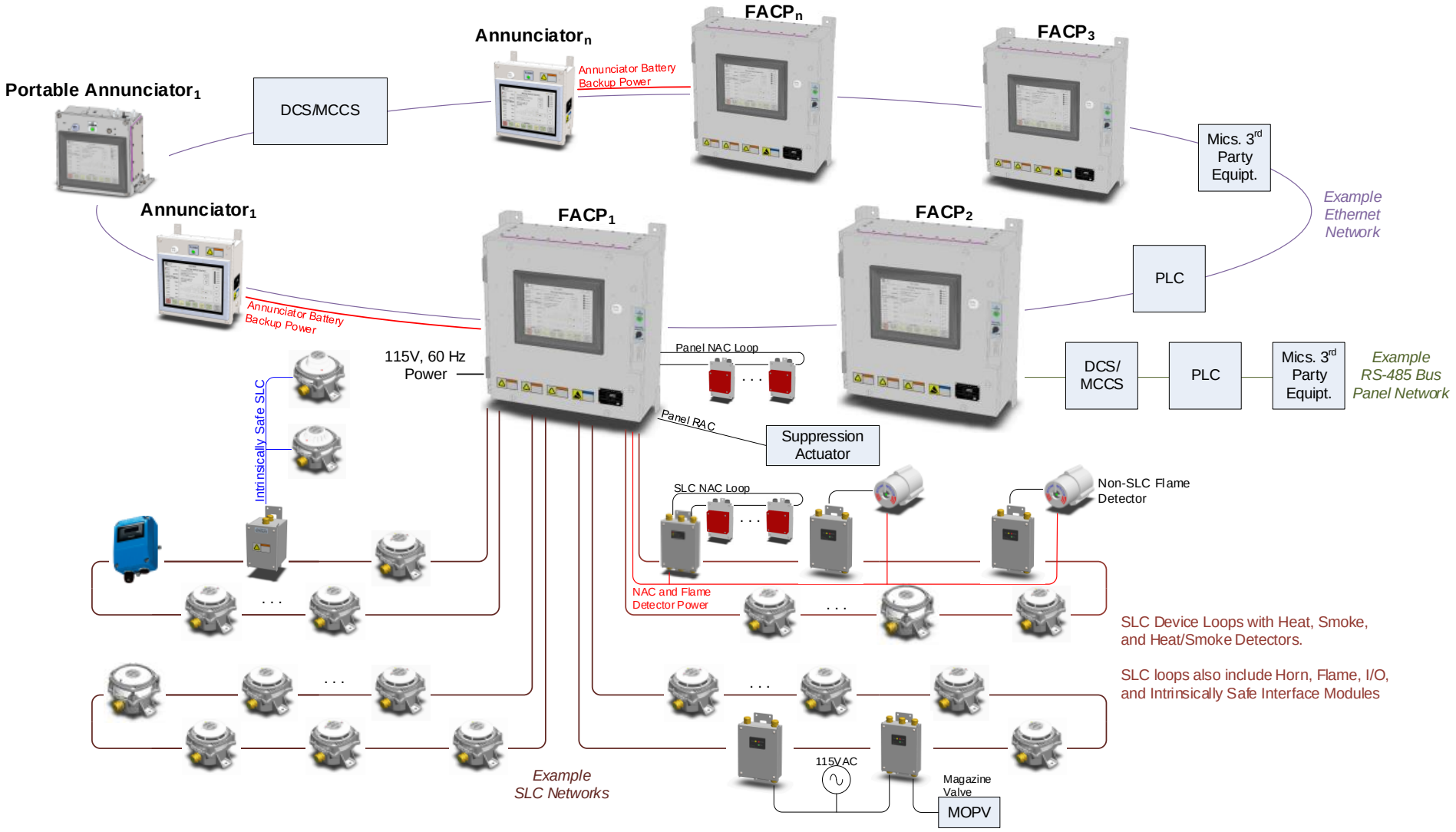


Figure 3: Example Overwatch FDS

2.1 Fire Alarm Control Panel Overview

The Fire Alarm Control Panel (FACP) performs the following functions:

- Powers, monitors, and controls devices connected to each of four signaling line circuits (SLCs) for the primary purpose of initiating a programmed response with detection of fire, smoke, high temperature, and/or off-normal conditions;
- Provides battery back-up power to attached devices in the event of a loss of primary power;
- Monitors itself, the devices on the SLC loops, and (if configured) remote FACP panels for event signals;
- Provides a user interface to visually and audibly interact with an operator;
- Retransmits warning or alarm signals to other devices in the system;
- Records all events in a system log;
- Provides maintenance and administrative functions.

2.1.1 Design & Construction

The FACP consists of the following major components arranged as shown in Figure 4:

- Enclosure
- Control Board and I/O Board
- Power supply, battery charger, and batteries
- User interfaces (touchscreen and panel alert sounder)
- Mechanical and electrical interfaces.

Figure 5 is a block diagram of the FACP that depicts the interfaces between components.

2.1.2 Enclosure

The FACP is housed in a watertight enclosure which contains all the batteries and electronic assemblies. The compartment is outfitted with vents that act to equalize the pressure inside with the ambient environment and prevent hydrogen buildup in the case of battery charging circuit failure. The enclosure is zinc plated and powder coated (IAW MIL-E-917) carbon steel, and all internal and external fasteners used to mount or secure components are passivated corrosion-resisting steel.

2.1.2.1 TS1 Control and I/O Boards

The TS1 Control Board (part of the touchscreen assembly) contains the main system processor with associated volatile and non-volatile memory that together execute the software program required for panel operations. The non-volatile memory stores the configuration files, panel firmware, and system log.

Two Ethernet network ports can be used to communicate with, monitor, and control other panels or remote systems. The TS1 Control Board also contains a touchscreen driver, intrusion detector interface, and an independent sounder circuit.

The TS1 Control and I/O boards interact via a board-to-board interface that allows the main processor to access I/O functionality. The I/O board operates four SLC loops, a notification appliance circuit (NAC), a fire suppression releasing actuator circuit (RAC), and battery backed-up auxiliary power (Aux Pwr) outputs.

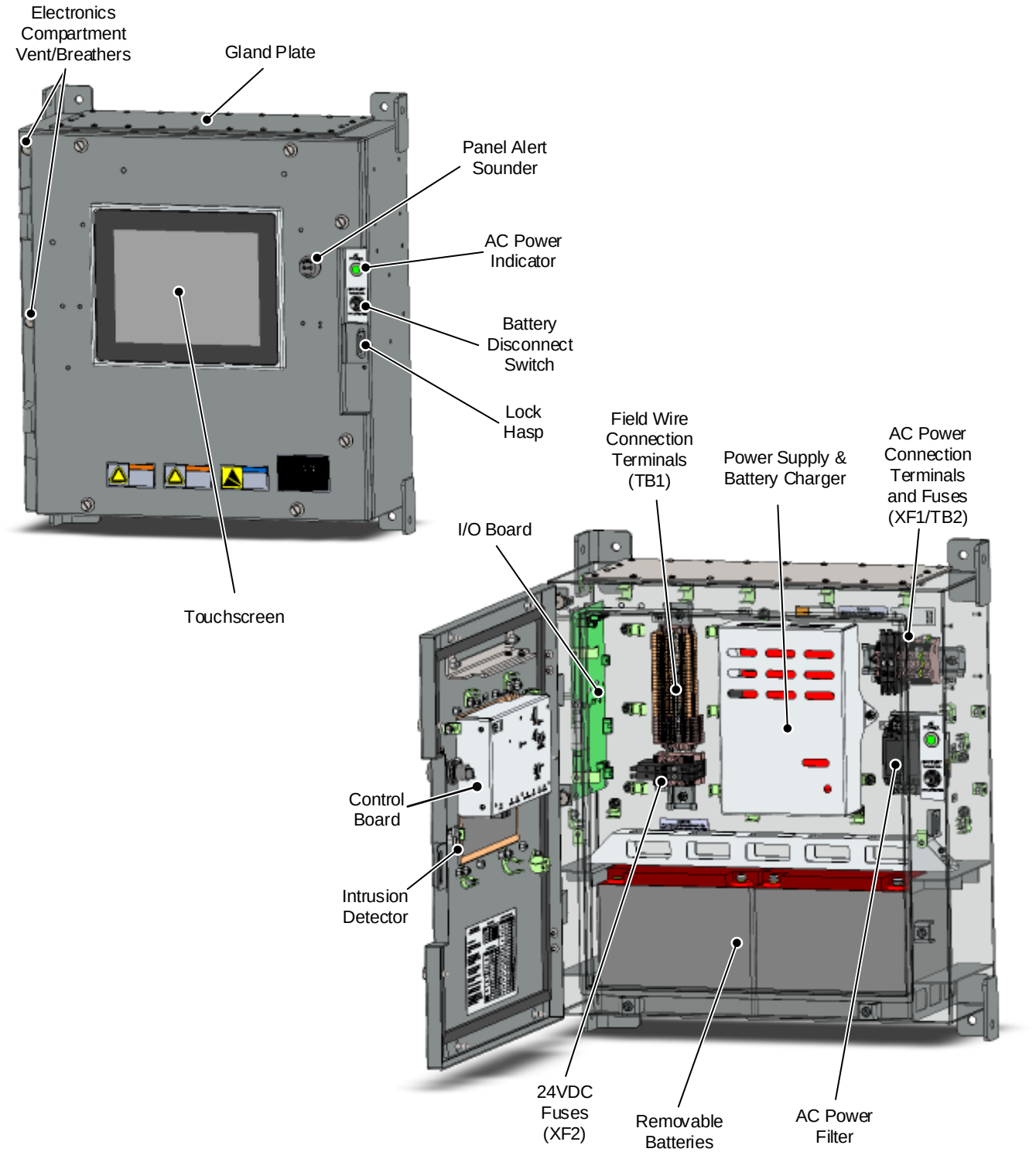


Figure 4: FACP Component Arrangement

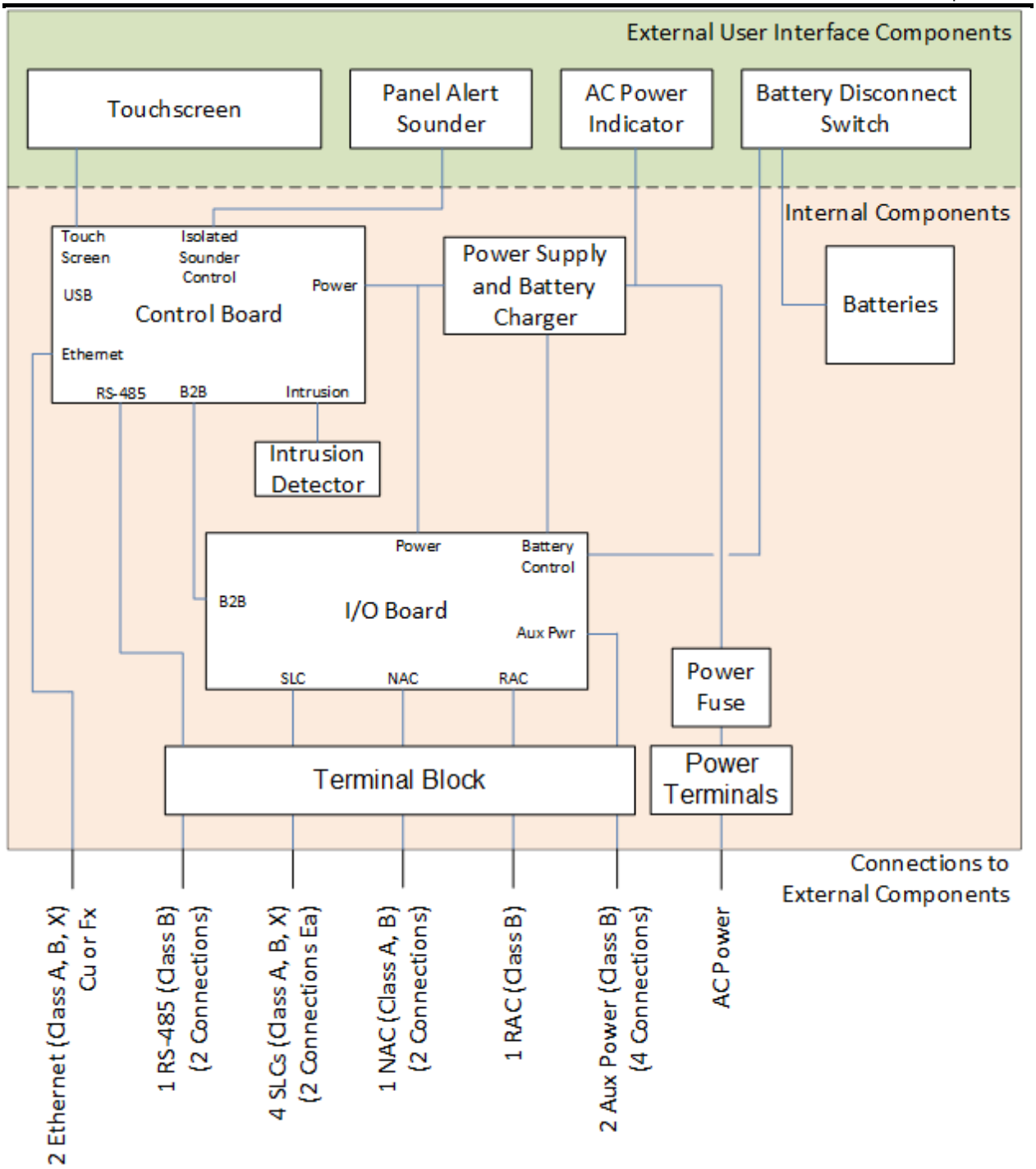


Figure 5: Fire Alarm Control Panel – Block Diagram

2.1.2.2 Power Supply, Battery Charger, and Batteries

The power supply and battery charger convert fused AC input power to supply continuous DC power to FACP circuits from either the primary AC power or internal sealed lead-acid batteries. When AC power is available, the power module actively monitors the health of the batteries and maintains them in a charged state. When AC power is lost, the system will seamlessly draw power from the batteries and continue the supply of power to the FACP internal circuits as well as attached SLC devices, communication networks, NAC, RAC, and Aux Power loads. When primary AC power is restored, the power module resumes supplying DC power and begins charging the batteries.

Multiple battery capacities are available (13 Amp-hour, 28 Amp-hour, or 42 Amp-hour) and should be selected based on the anticipated load on the system.

The FACP batteries can be replaced without needing to secure primary power. A battery disconnect switch located on the front of the panel connects/disconnects the batteries from the power supply and battery charger. To help prevent incorrect hookup, the battery circuit is fused with wires and locations labeled and color coded. In addition, battery terminals are recessed into the cell body in an effort to prevent accidental shorting.

2.1.2.3 User Interface: Controls & Indicators

Controls and indicators are located on the front of the panel and include the following:

1. Touchscreen module
2. Panel alert sounder
3. Battery disconnect switch
4. AC power indicator

The panel's primary operator interface component is a ruggedized 10.4-inch, TFT-LCD touchscreen module. The screen features a dimmable ultra-bright backlight that provides capability for the display to operate in direct sunlight or total darkness. A multi-finger touch panel is included that allows a gloved hand to interact with the display using familiar gestures such as swipe to scroll or pan and tap to select.

The touchscreen indicates warning and alarm signals as well as providing a graphical user interface for acknowledging signals and performing maintenance and administrative functions.

The panel includes a piezoelectric alert sounder (i.e. internal buzzer) that audibly annunciates new warning and alarm events. This device is operated by the control board and produces distinct tones for each type of event.

The battery disconnect switch is a toggle switch that is protected from inadvertent operation by its recessed mounting location. It connects/disconnects the batteries from the power supply and battery charger. The I/O board monitors the position of this switch and generates a trouble event when in the disconnected position.

The power indicator is a green LED indicator located on the front-right of the panel and illuminates when AC input power is supplied.

2.1.2.4 Touchscreen Protective Cover (Option)

An optional temporary touchscreen cover may be installed to protect the screen from damage during periods of heavy work/construction around the panel. The cover is magnetic and snaps into place around the screen. The cover must be removed to use the screen's touch functionality.

2.1.3 Electrical & Electronic Interfaces

2.1.4 Primary Power

The FACP operates from 115VAC 60Hz power.

2.1.5 Communication Network Interfaces

The FACP features both RS-485 and Ethernet communication ports. The two independent Ethernet ports can be individually ordered as copper or fiber and are joined to the FACP microprocessor through a multi-port switch.

Ethernet networks in all topologies provide the capability for inter-panel communication.

The RS-485 and Ethernet networks may also be used to communicate with other systems such as a shipboard machinery control system or 3rd party equipment. The FACP supports many common industrial automation protocols.

2.1.6 SLC Network Interfaces

The FACP can be supplied with up to four SLC networks installed as Class A, B, or X. In Class X configuration, each SLC will have no single point of failure and continue to function in the presence of ground faults, opens, or shorts on the SLC cabling. Each SLC interface can power, monitor, and control addressable devices for identity, faults, alarms, and sensor data. Depending on the detectors used, up to 254 devices can be attached to the loop (legacy detectors support up to 126 devices).

2.1.7 Notification and Releasing Interfaces

The FACP also provides a Notification Alarm Circuit and Releasing Actuation Circuit.

- Notification Alarm Circuit (NAC) with Synchronization – Class A or B interface used to connect to visible and/or audible notification appliances. This interface can drive a variety of notification devices including horns and horn/strobe modules.
- Releasing Actuation Circuit (RAC) – The RAC is a Class B circuit required by UL-864 for *Releasing Service* and specifically designed to interface with an actuator to discharge a fire suppression agent. It provides power, monitors the actuator for integrity, and controls actuation of a DC solenoid or valve. In addition to releasing circuits, the FACP software includes UL-864 approved pre-discharge and discharge configuration settings, operational sequences, and interface elements.

2.1.8 Configuration Software

Configuration of all panels and system components is accomplished using a Microsoft Windows™ operating system based software package called Design Pad.

The software enables the same FACP hardware to be customized for use in many configuration scenarios. Capabilities include:

- Add a custom Graphical System Diagram picture for display on the event screen
- Configuration of all attached devices including type, operational modes, custom pre-alarm and alarm activation thresholds, name/device ID, device location, pin location(s) on Graphical System Diagram picture, custom messages, and more
- Configuration of networks
- Grouping of detectors, devices, and notification appliances into zones that can span networked FACPs
- Silencing of active notification in one or more of the configured zones
- Grouping of networked FACPs for collaboration of panel reset, information display, and acknowledgements with the ability to customize activation and silence of alarm module/internal buzzer and attached notification appliances to remote events
- Role Based Authentication Control (RBAC) security configuration for password protecting various panel actions
- A complete programming environment for creation of custom algorithms which interact with the built-in fire panel functionality. For example, a program can be written that customizes the interface between the fire panel functionality and third party applications including acknowledgement of events, forwarding of alerts and events, sending device data and status, resetting panels, silencing zones, silencing of panel sounder, and much more

2.1.9 Information Assurance and Cyber Security

The FACP includes features specifically designed to reduce the potential for cyber intrusions and that address concerns regarding information assurance.

1. All panels include an internally-mounted intrusion detector to sense when the panel enclosure is opened. When activated, an intrusion event is indicated on all system user interfaces and stored in the log file.
2. All panel access doors include hasps for installation of a locking device to physically prevent access to the internal components of the enclosure.
3. All panels include a ‘Secure Authenticator’ integrated circuit for secure storage and processing of system and device cryptographic keys.
4. All panels include FIPS compliant mechanisms that can validate network attached panels are trusted members of the FDS.
5. Any unused communication ports are disabled or rendered inaccessible.
6. All panels support Role Based Authentication Control (RBAC). RBAC allows the creation of rights, roles, and users to control access. The functionality available to an operator is dictated by the roles assigned to their user account.
7. All user actions, including acknowledgment and maintenance actions, are stored in the non-volatile system log file.
8. The panels may be restored to a known, trusted state. Only authenticated users with configuration rights are permitted to initiate the restoration process. The process incorporates methods for validating software authenticity, integrity, and confidentiality. Initiation of the restoration process will be stored in the system log file.
9. All panels include mechanisms to wipe system and configuration data.

3 PLANNING THE INSTALLATION

The scope of this section pertains to planning the installation of an individual control panel.

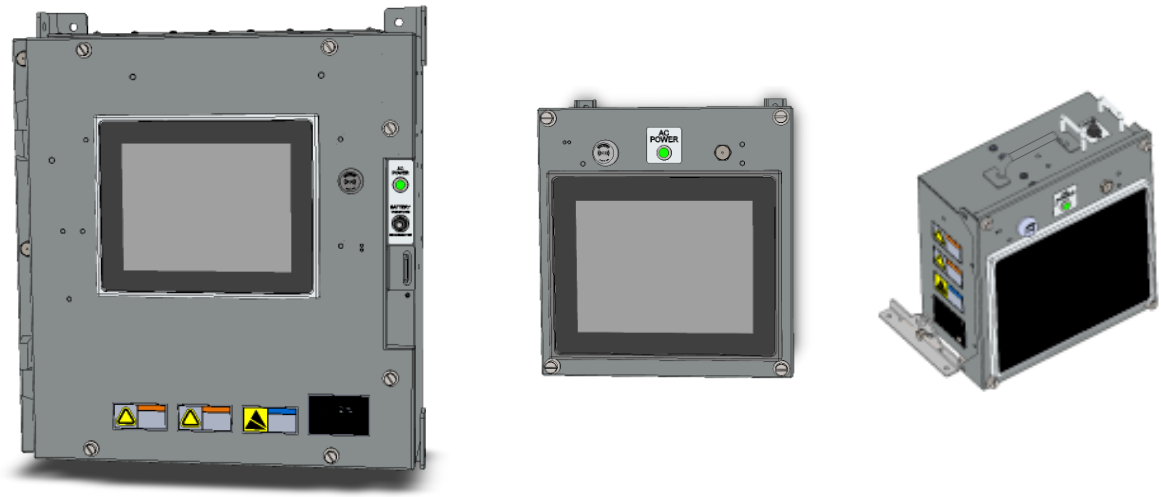
Refer to Appendix A – Product Specifications for detailed mechanical, electrical, and environmental specifications for the FACP and its components.

3.1 Control Panels and Annunciators

There are three types of panels available in an Overwatch FDS (Figure 6):

- **Fire Alarm Control Panels (FACP)** power (including battery backup), maintain, and control a set of field devices for fire alarm operations. Includes a local user interface. Can be networked to other panels or systems.
- **Annunciator Panels** have a user interface and networking capabilities identical to the FACP but lack I/O interfaces and a battery backup.
- **Portable Annunciator Panels** include features which are identical to an Annunciator but is intended for use in a temporary location. These panels can be powered through a standard 115VAC receptacle as opposed to being hard-wired.

NOTE: Backup power provided for annunciator and portable annunciator panels from an FACP will drain the battery more rapidly with higher touchscreen backlight intensity. Configuration settings are available to control that intensity during battery operation. Refer to Section 3.4 for more information.



Control Annunciator Portable Annunciator

Figure 6: Overwatch Family of Panels

3.2 Main Power Supply Feed

The FACP operates from one of the following types of primary AC power:

1. Single-phase, grounded-neutral 115VAC 60Hz power (i.e., neutral tied to chassis/Earth ground)
2. Single-phase, ungrounded 115VAC 60Hz power (i.e., line 1 and line 2 are not tied to chassis/Earth ground) in accordance with MIL-STD-1399 Section 300A.

The supply circuit feeding the panel must be protected with a 20A or smaller breaker / fuse. The power supply cable must be sufficient for the connected circuit and meet applicable codes for the area and installation environment of the Fire Detection System.

3.3 Supported Circuits

This section references Class A, B, and X networks. The capability of each type is as follows:

- Class B:
  - Detect loss of communications and report as trouble
  - Function properly with one ground fault
  - Detects ground and open faults and reports as troubles (does not function with an open circuit)
- Class A:
  - Class B capabilities AND
  - Redundant path or other mechanism that allows network to function with open circuit. Shall also detect and report open trouble.
- Class X:
  - Class A capabilities AND
  - Isolators or other mechanism that allows network to function with a short circuit. Operational capability shall also continue with both an open fault AND ground fault. Shall also detect and report troubles in these fault conditions.

3.3.1 Signaling Line Circuits (SLC)

Network Types Supported: Class A, B, or X

Specifications Link: Signaling Line Circuits

The FACP supports up to 4 addressable SLC loops. Each loop is completely independent of other loops.

All SLC devices should be installed per manufacturer's instructions with the following considerations:

- Group addressing is not supported for sounder control modules.
- Priority setting of "1" should always be set for input modules.

Voltage supplied to power each SLC circuit can be set independently through jumper settings as described in Section 4.3.1. Supported voltages include 24V Unregulated* or 28V. The 24V setting is unregulated on battery and the voltage will fall as the battery voltage droops during loss of primary power. The 28V setting produces a regulated 28V loop voltage.

Providing multiple voltages enables the installer to select between maximizing battery life (24V) or maximizing supported SLC cable length (28V). Use the Installation Planning Tool in Section 3.4 to assist in determining which SLC voltage is appropriate for the physical configuration and devices planned for each SLC loop.

IMPORTANT CAUTION: A 35V SLC circuit voltage setting is available on the panel hardware. This is a planned feature for the future and should not be used. Use of this setting may damage all detectors on the associated SLC.

*When the SLC loop is configured for 24V Unregulated power and battery power is under 21V, open circuit conditions will not be identified. The panel design disables open circuit detection below this threshold to preserve the battery for more critical panel operations until AC power is restored.

A basic wiring example for each type is illustrated in Section 4.3.4.3. Refer to NFPA-72 for detailed network type implementation guidance.

Circuit Wiring

When planning an SLC circuit, the following have physical implications on the loop:

- Wire gauge affects resistance
- Wire length affects resistance
- Isolators affect resistance
- Signaling devices affect current load
    - Including LED operation in alarm
- SLC output voltage affects available power

Given these considerations and the variability in these values across devices, an Installation Planning Tool is provided to assist in designing the circuit. Use the Installation Planning Tool in Section 3.4 to plan out your specific installation.

Table 2 and Table 3 show example systems that can be used to gauge the impact of various devices, settings, and wire types. Table 2 shows Class B systems consisting of Discovery Multi-sensor detectors *without* isolators. Table 3 shows Class X loops consisting of Soteria Multi-sensor detectors *with* built-in isolators. Observe that using isolators on all devices may reduce the maximum length substantially compared to using no isolators.

Table 2: SLC Max Wire Length (feet) For Example Class B Configurations

Number of Discovery 58000-700MAR Multi-Sensors in Loop	Loop Voltage	Number of LEDs on in Alarm	14 AWG	16 AWG	18 AWG	18 AWG 2XSW-1 (MIL)
126	28V	10	11,157	7,075	4,463	4,080
126	28V	2	12,000	10,621	6,700	6,125
126	24V	10	5,078	3,220	2,031	1,857
126	24V	2	7,713	4,892	3,086	2,821
30	28V	10	12,000	12,000	8,216	7,511
30	28V	2	12,000	12,000	12,000	12,000
30	24V	10	9,492	6,020	3,797	3,471
30	24V	2	12,000	12,000	9,583	8,761

Table 3: SLC Max Wire Length (feet) For Example Class X Configurations

Number of Soteria SA5150-750APO Multi-Sensors in Loop	Loop Voltage	Number of LEDs on in Alarm	14 AWG	16 AWG	18 AWG	18 AWG 2XSW-1 (MIL)
126	28V	10	5,485	3,478	2,194	2,006
126	28V	2	8,510	5,397	3,404	3,112
126	24V	10	1,126	714	451	412
126	24V	2	2,549	1,617	1,020	932
30	28V	10	10,567	6,701	4,227	3,864
30	28V	2	12,000	11,051	6,971	6,373
30	24V	10	4,494	2,850	1,798	1,644
30	24V	2	7,723	4,897	3,089	2,824

3.3.1.1 Circuit Isolation

The circuitry on each SLC inside the FACP provides negative leg isolation on each loop independently based on the loop configuration as follows:

- SLC loops configured for class B, internal isolation is disabled.
- SLC loops configured for class A or X, internal isolation is enabled on both the A and B side of the circuit.

NOTE: Isolators must be placed along the loop such that the unit loads of the devices between a set of isolators does not exceed the isolator test current rating. Refer to the Short-Circuit Isolation Datasheet (see Section 1.4 Overwatch Fire Detection System Documentation) to assess the equivalent load for each device between adjacent isolators and their contribution to that segment.

NOTE: UL-864 requires the system be designed such that all devices between any two adjacent isolators or isolating devices be configured in the same fire zone.

3.3.2 Notification

Notification is the process of alerting protected area occupants of fire warnings and/or alarms. *Notification Appliances* (NA) are devices that include horns and possibly strobes that provide audible and visual alerts. *Notification Appliance Circuits* (NACs) are devices that interface and power non-addressable notification appliances.

3.3.2.1 Panel Notification Appliance Circuits

Network Types Supported: Class A or B

Specifications Link: Panel Notification Appliance Circuit

Internal to the FACP is a Notification Appliance Circuit that can interface with supported notification appliances (see Figure 7 for an example). The supported notification appliances that attach to the Panel NAC are classified as special application rating.

For Class B configuration, a 6.8 Ω end-of-line (EOL) resistor is required for supervising the network. When the EOL resistor cannot be detected, a Trouble alarm will be activated on the panel.

A basic wiring example for each type is illustrated in Section 4.3.4.1 Panel Notification Appliance Circuit. Refer to NFPA-72 for detailed network type implementation guidance.

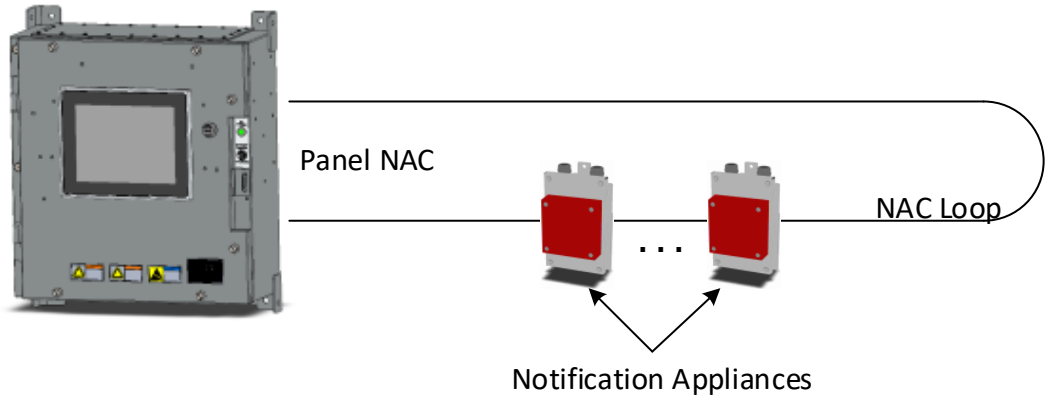


Figure 7: Example Panel Notification Appliance Circuit

The Panel NAC can support up to a 1A current load in alarm with a 10x surge current. Use the Installation Planning Tool in Section 3.4 to assist in planning the circuit implementation.

When determining the maximum wire length for the panel NAC circuit, operational voltage at the last device (16V) with the battery providing a minimum charge (20.4V) is considered (Table 4).

Table 4: Panel NAC Max Wire Length (feet)

Current	*14 AWG*	*16 AWG*	*18 AWG*	*18 AWG 2XSW-1 (MIL)*
100 mA	7463	4733	2985	2729
200 mA	3713	2355	1485	1358
300 mA	2463	1562	985	901
400 mA	1838	1166	735	672
500 mA	1463	928	585	535
600 mA	1213	769	485	444
700 mA	1035	656	414	378
800 mA	901	571	360	329
900 mA	796	505	319	291
1000 mA	713	452	285	261

3.3.2.2 Notification Synchronization

The Panel NAC can provide either built-in Wheelock sync protocol or a steady signal.

When configured to use a steady signal, synchronization is provided and maintained by the notification appliances exclusively.

When configured to use built-in Wheelock sync protocol, the Panel NAC provides synchronization for use with NAC devices listed in the Supported Devices List (Section 1.4).

3.3.2.3 NAC Synchronization Limitations

All notification appliances will synchronize within their respective circuit when installed as specified in this manual. Some will also synchronize strobe and sounder signaling across circuits. Table 5 indicates which circuits can synchronize with one another.

Table 5: Notification Synchronization Across Circuits

	PNAC Wheel	***PNAC Steady***	***SLC1 NA***	***SLC2 NA***	***SLC3 NA***	***SLC4 NA***	***1st SLC NAC***	***2nd SLC NAC***	***2nd Panel***
PNAC Wheel	Yes	***N/A***	Yes	Yes	Yes	Yes	No	No	No
PNAC Steady	***N/A***	Yes	No	No	No	No	No	No	No
SLC1 NA	Yes	No	Yes	Yes	Yes	Yes	No	No	No
SLC2 NA	Yes	No	Yes	Yes	Yes	Yes	No	No	No
SLC3 NA	Yes	No	Yes	Yes	Yes	Yes	No	No	No
SLC4 NA	Yes	No	Yes	Yes	Yes	Yes	No	No	No
1st SLC NAC	No	No	No	No	No	No	Yes	No	No
2nd SLC NAC	No	No	No	No	No	No	No	Yes	No
2nd Panel	No	No	No	No	No	No	No	No	Yes

WARNING: The frequency of strobe flashes can cause serious side effects for persons with certain medical conditions. Refer to NFPA-72 for guidance concerning physical proximity of notification circuits that are not synchronized.

3.3.2.4 SLC Notification Appliances

Network Types Supported: Class A, B, or X

Specifications Link: Signaling Line Circuits

Addressable notification appliances can be installed directly on the SLC loop (Figure 8). SLC notification appliances can be standalone appliances or be paired with detectors in the form of the detector's mounting base.

All SLC notification appliances synchronize their sounder and strobe outputs (as applicable) when activated (see Table 5).

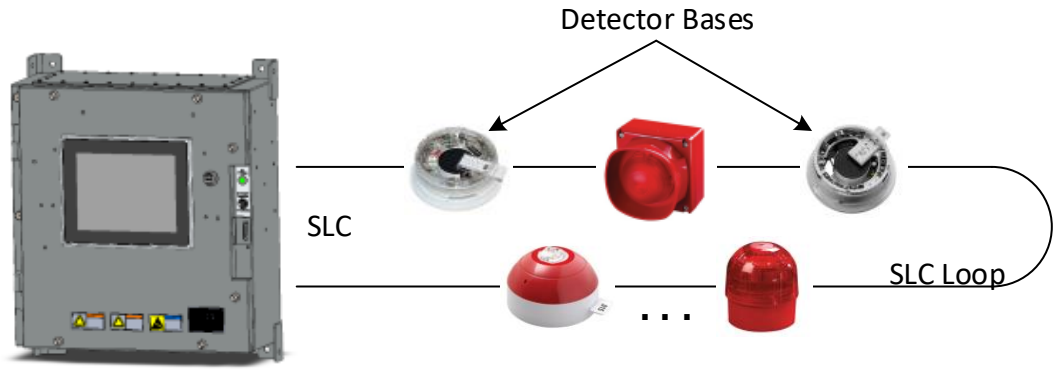


Figure 8: Example SLC Addressable Notification Appliance

3.3.2.5 SLC Notification Appliance Circuits

Network Types Supported: Class A or B

Specifications Link: SLC Notification Appliance Circuit

SLC NACs (Figure 9) are SLC addressable devices that contain a notification appliance circuit. SLC NACs require DSM Sync Modules to synchronize connected notification appliances. Overwatch FDS offers SLC NACs with and without DSM modules. Refer to Section 3.3.2.3 for limitations regarding synchronization outside of the local SLC NAC loop.

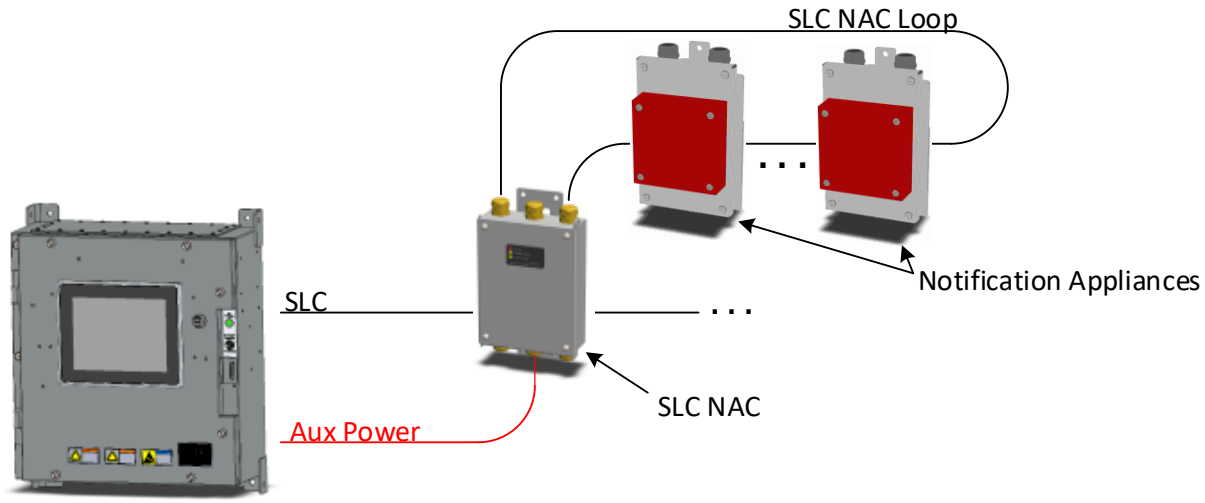


Figure 9: Example SLC Notification Appliance Circuit

NOTE: Apollo Fire Detector SLC Group addressing is not supported for SLC sounder control modules.

SLC NACs (including the DSM Sync Module) are powered by the Auxiliary Power (Aux) circuit. Refer to Section 3.4 (Installation Planning Tool) to plan the loading of the Aux power circuits.

NOTE: When planning the physical location of SLC NAC loops, wire length consideration for the sounder control module on the SLC loop and the wire length of the Aux power feed to the attached NAC circuit must both be considered. Refer to Section 3.3.1 for SLC wiring length and Section 3.4 for Aux power wiring length considerations.

3.3.3 Releasing Actuation Circuit (RAC)

Network Types Supported: Class B

Specifications Link: Releasing Actuation Circuit

The panel contains a Releasing Actuation Circuit that controls a fire suppression agent actuator. The connection from the panel to the actuator is supervised and will actively monitor the health of the actuator coil based on DC resistance.

Examples for wiring the panel to the actuator is illustrated in Section 4.3.4.2 Releasing Actuator Circuit. Refer to NFPA-72 for detailed network type implementation guidance.

Use the Installation Planning Tool in Section 3.4 to assist in planning the circuit implementation.

When determining the maximum wire length for the panel RAC circuit, operational voltage at the last device (16V) with the battery providing a minimum charge (20.4V) is considered (Table 6).

Table 6: Panel RAC Max Wire Length

Current (Amps)	*14 AWG*	*16 AWG*	*18 AWG*	*18 AWG 2XSW-1 (MIL)*
0.5	1940 feet	1230 feet	775 feet	710 feet
1	960 feet	610 feet	380 feet	350 feet
1.5	633 feet	400 feet	250 feet	230 feet

3.3.4 Auxiliary Power (Aux)

Network Types Supported: N/A

Specifications Link: Auxiliary Power

The Auxiliary Power output circuits (Aux) provide power-limited 24VDC for the following applications:

- SLC NAC appliances
- FDS Annunciator and/or Portable Annunciator backup power
- Any 24VDC load requiring up to 1A (regulated)

NOTE: The Aux power circuit IS NOT a supervised circuit. Open circuit conditions may not be recognized by the panel. Note: SLC NACs, Annunciators, and Portable Annunciators will detect loss of Aux power and cause the FDS to generate a trouble.

When planning the Aux power circuits, the following have physical implications on the loop:

- Wire gauge
- Wire length
- Attached device load including:
  - Number of Annunciators and portables
    - Max screen brightness on battery
  - SLC NACs' circuit loads
  - Any other loads attached to the circuit

Use the Installation Planning Tool in Section 3.4 to assist in planning out your specific installation. See Section 4.3.4.4 for example wiring.

Maximum wire length is provided in the following tables for Annunciator and Portable Annunciator panels (Table 7) and SLC NAC circuits (Table 8). Wire lengths are provided in feet based on minimum battery charge of 20.4V and operation voltage at the last device of 16V for SLC NAC circuits.

These lengths are provided for connections directly from the panel to the device indicated. Calculations for wires shared between devices outside of the panel are not provided here.

Table 7: Annunciator Aux Power Max Wire Length (feet)

Current	*14 AWG*	*16 AWG*	*18 AWG*	*18 AWG 2XSW-1 (MIL)*
613 mA	584.5	370.7	233.8	213.7

Table 8: SLC NAC Aux Power Max Wire Length (feet)

Current	*14 AWG*	*16 AWG*	*18 AWG*	*18 AWG 2XSW-1 (MIL)*
100 mA	7489	4749	2995	2738
200 mA	3739	2371	1495	1367
300 mA	2489	1578	995	910
400 mA	1864	1182	745	681
500 mA	1489	944	595	544
600 mA	1239	785	495	453
700 mA	1060	672	424	388
800 mA	926	587	370	339
900 mA	822	521	329	301
1000 mA	739	468	295	270

3.3.5 Ethernet Networking Communication

Network Types Supported: Class A, B, or X

Specifications Link: Ethernet Communications

Two Ethernet networking ports are provided on the FACP for panel-to-panel and panel-to-third party device communications. Each port can be configured to be a copper or fiber (LC or ST) interface at the time it is ordered.

Internal to the FACP circuitry is a three-port managed switch that joins the FACP microprocessor to the two external Ethernet ports. The switch can be managed to achieve various network and security objectives including disabling unused interfaces.

3.3.6 RS-485 Networking Communication

Network Types Supported: Class B

Specifications Link:RS-485 Communications

The FACP includes one RS-485 port with two sets of terminals for field wires to attach (note: two sets of terminals enable the installer to connect an 'in' cable and an 'out' cable). This port includes functionality for a panel-to-third party device connection using one of the supported protocols.

NOTE: FDS Panel-to-Panel communication is not available over RS-485.

3.3.7 Spare Connections

Five spare terminal strips, with three connection points each, are available on TB1 (Figure 4) for use as needed for the installation. They can be used as junction points to connect signals and create circuits. Any circuit that attaches to these blocks must be power limited to maintain UL-864 compatibility. Refer to Figure 36: Power-Limited Terminal Block (TB1) for the location of the spare terminals.

3.4 Installation Planning Tool

With the complexity of considering resistances and circuit loads across the panel, an Installation Planning Tool is provided to assist with the design. The tool provides planning for all loads associated with a single FACP as follows:

- SLC load for each of 4 SLC loops including:
  - Loop voltage
  - Current load of attached addressable SLC devices
    - LED operation in alarm
  - Resistance impact of attached isolators or isolating devices
  - Wire gauge resistance with available length
- Panel Aux load for each of two power Aux circuits including:
  - SLC NAC circuit loads
  - Backup power allocated for Annunciators and Portables
  - Loading for regulated circuit
- Panel NAC load
  - Loading for listed special application devices
  - Loading for regulated circuit
- Panel RAC load
- On Battery operation
  - Setting minimum desired battery voltage and run time
  - FACP, Annunciator and Portable screen brightness

The Installation Planning Tool only provides guidance for planning the electrical side of the FDS installation. Refer to Section 1.4 Overwatch Fire Detection System Documentation for references related to the Installation Planning Tool and other fire system considerations (such as configuration).

4 INSTALLATION

4.1 Components

The Fire Alarm Control Panel is comprised of the following internal components (Figure 10 and Table 9):

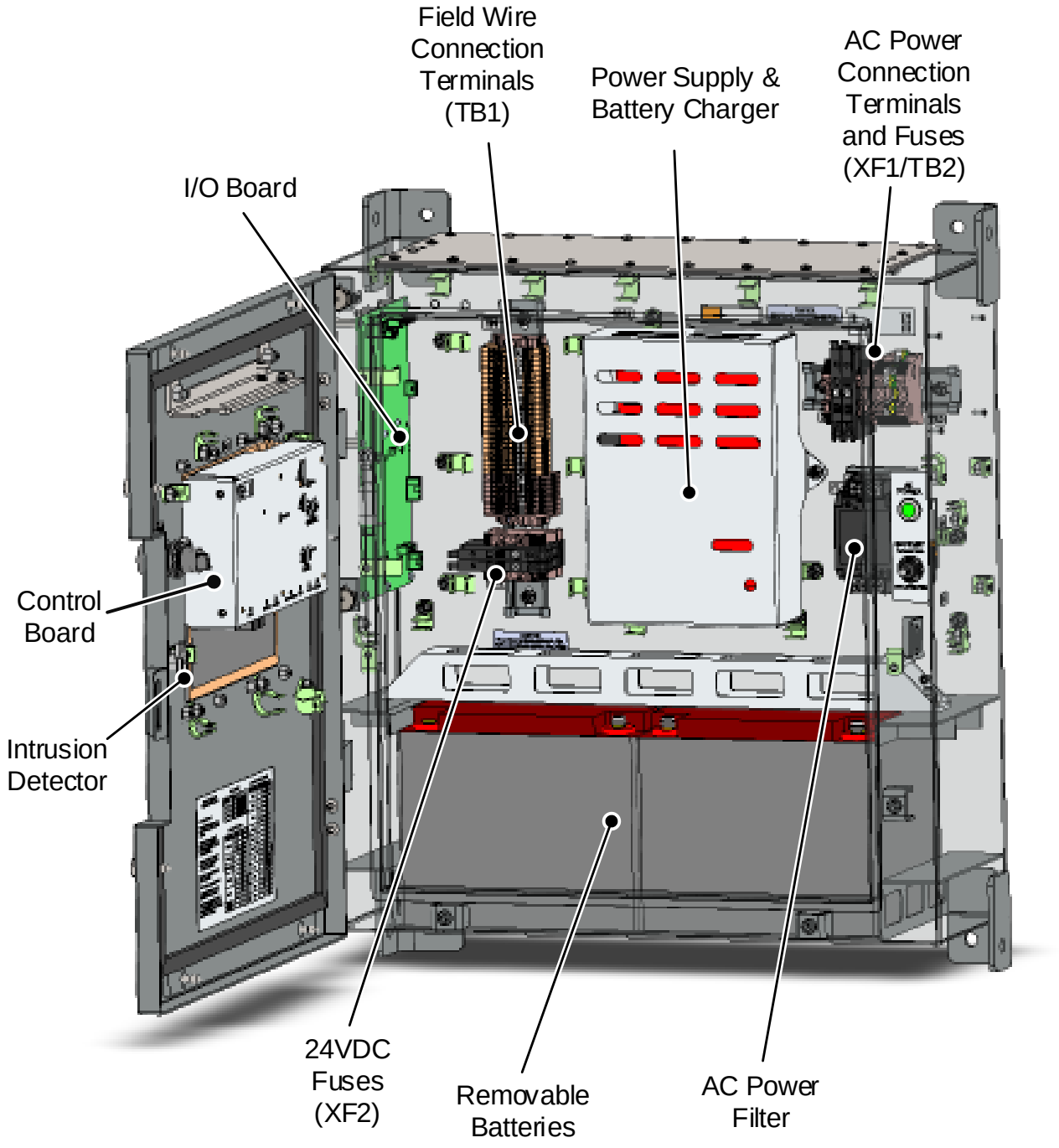


Figure 10: Fire Alarm Control Panel Internal Components

Table 9: Fire Alarm Control Panel (FACP) Internal Components

Component	*Description*	*Section(s)*
TS1 / Control Board	Touchscreen and Main board for processing all Fire Detection System activity, network communication, and system operations	4.3.2 4.3.4.5
I/O Board	Input / output board is the interface between TS1 and all field devices	4.3.1
Field Wire Connection Terminals (TB1)	Terminal block for all power-limited field connections except Ethernet	4.3.4
Power Connection Terminals (XF1 and TB2)	Terminal block for incoming high voltage AC power feed	4.3.3
Cable Gland Plate	Customizable plate for attaching cable glands to pass field wires into the enclosure	4.2.4
DC Fuses	Fuses to protect 24V battery, DC power supply, and 24VDC power distribution circuits	4.3.3.3 4.3.5
AC Fuses	Fuses to protect main AC power circuit	4.3.3.3 4.3.5
Batteries	Battery backup for panel and connected devices	4.1.1 4.2.3
Battery Disconnect Switch	Disconnect switch supporting battery maintenance	4.2.3

4.1.1 Replacement Parts

Table 10: Fire Alarm Control Panel (FACP) Replacement Parts

Description	Supplier	Part Number	Qty Used
AC Input Power Fuse, ¼"x1-¼", 3AB, fast-acting, 5 Amp, 250VAC/125VDC (F1, F2 Figure 32)	LittelFuse	0314005 or equivalent	2
24VDC Battery and Distribution Power Fuse, ¼"x1-¼", 3AB, fast-acting, 10 Amp, 250VAC/125VDC (F3, F4 Figure 33)	LittelFuse	0314010 or equivalent	2
Power Supply Fuse, 30 Amp, 32VDC Mini Blade Fuse, Green, Automotive Style (BAT Figure 35)	LittelFuse	0297030.L or equivalent	1
13Ah Lead Acid Battery	Fairmount Automation	30160-005	2
28Ah Lead Acid Battery	Fairmount Automation	30160-006	2
42Ah Lead Acid Battery	Fairmount Automation	30160-007	2
TS1 / Control Board, Copper-Copper Ethernet	Fairmount Automation	01020-301	1
TS1 / Control Board, Copper-Fiber Ethernet	Fairmount Automation	01020-337	1
TS1 / Control Board, Fiber-Fiber Ethernet	Fairmount Automation	01020-336	1
Power Supply	Fairmount Automation	01020-380	1
I/O Board	Fairmount Automation	11107-100	1
EMI Filter	Fairmount Automation	80000-163	1
Intrusion Sensor	Fairmount Automation	01020-397	1
Panel Sounder	Fairmount Automation	01020-381	1
Battery Disconnect Switch	Fairmount Automation	30070-105	1
AC Power LED	Fairmount Automation	01020-408	1

4.2 Mechanical Installation Detail

4.2.1 Mounting

Refer to the *FACP Enclosure* section in Appendix A – Product Specifications for detailed weight, dimension, and environmental specifications.

The FACP is designed to be mounted using four 3/8” bolts (no bulkhead foundation needed).

Figure 12 is an outline drawing that depicts the mounting, center of mass, and maintenance envelope dimensions.

Lifting points are located at each of the four mounting tabs on the rear corners of the enclosure. These points can be used to assist in de-crating the FACP and installation.

4.2.2 Panel Door

The enclosure’s panel door is secured in place with 6 bolts (2 per non-hinged side) and a hasp that accepts a standard lock for securing physical entry into the FACP.

Opening the door:

To open the door, remove the lock (if attached) and use a 3/8” slotted screwdriver to unscrew all 6 bolts from 3 sides of the door. The bolts are affixed with a retention mechanism so they remain attached to the panel door when fully unthreaded from the enclosure.

Door Stay:

When fully opened, the door-stay pin falls into place on the door guide rail to hold the door open (see Figure 11 below). To close the door, simply pull up on the door-stay pin and close the door.

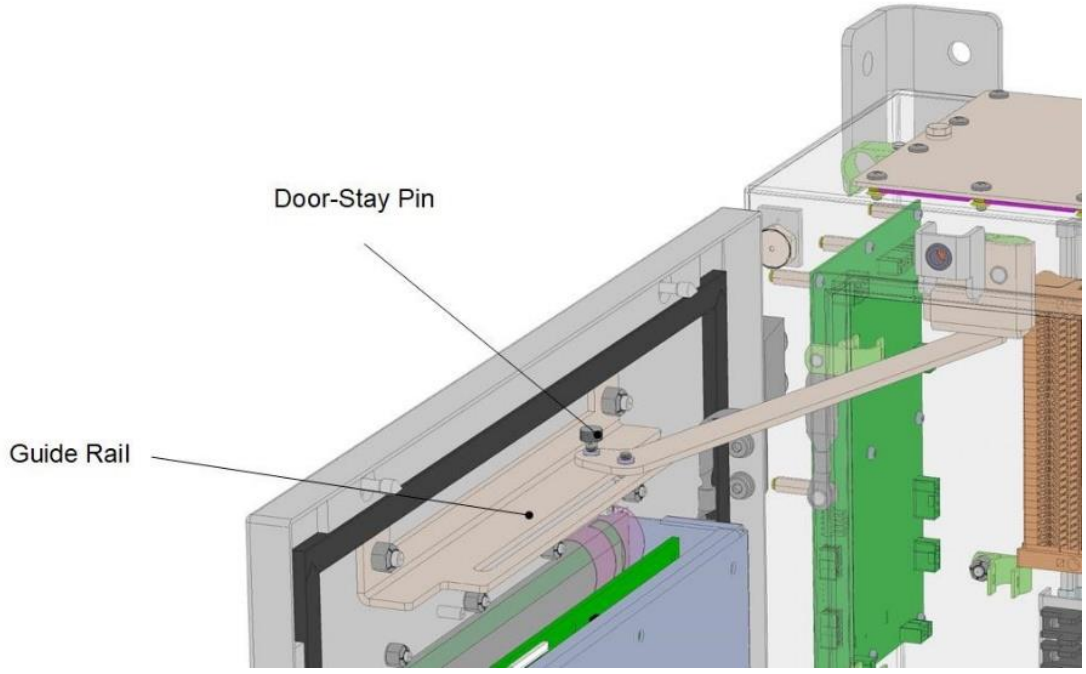


Figure 11: Control Panel Door-Stay Pin

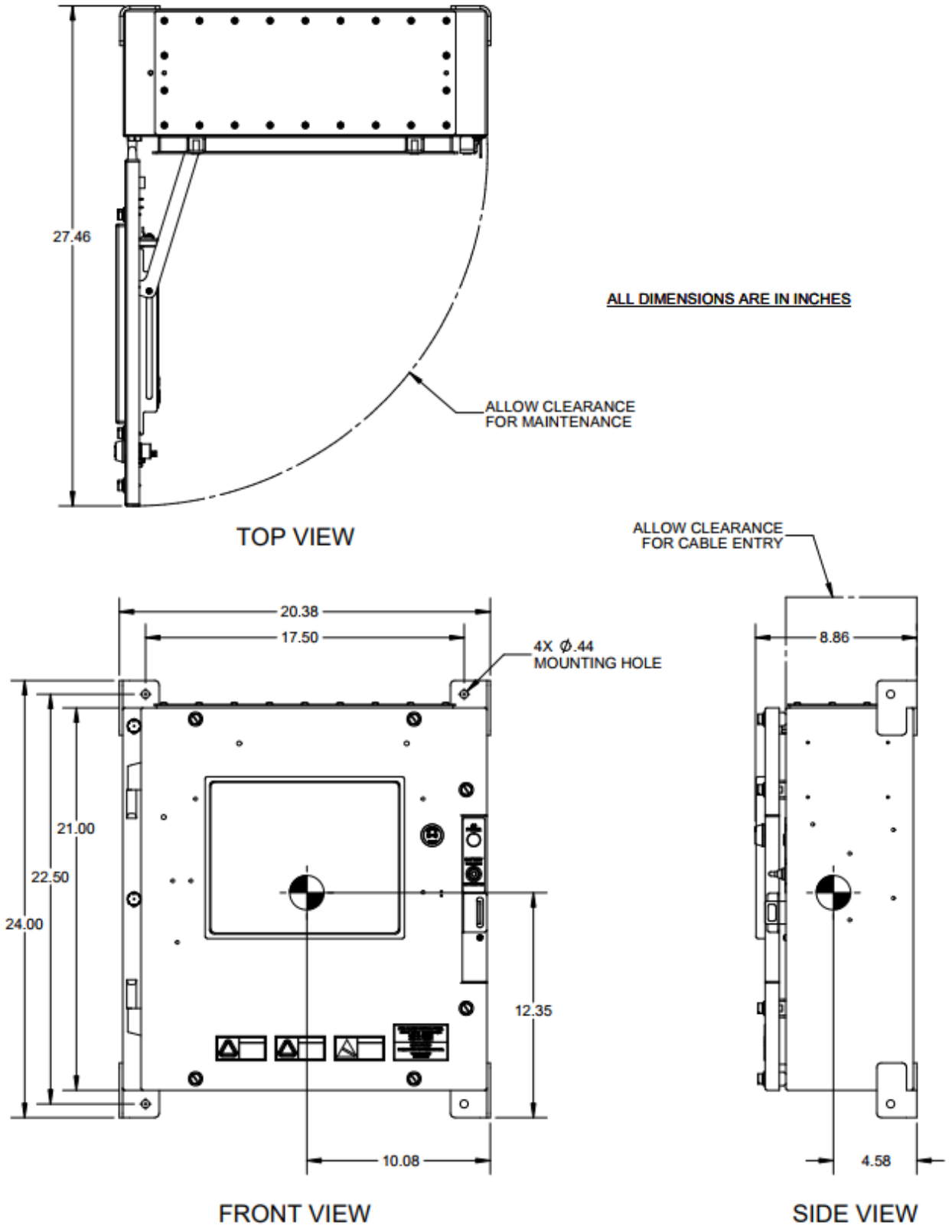


Figure 12: Fire Alarm Control Panel Outline Drawing

Securing the Door:

To secure the door, fully close the door and screw in all 6 bolts:

1. The bolts are designed with a cone point to assist in locating the threads. Thread screws in finger tight
2. Tighten to 10 in-lbs using a 3/8" slotted screwdriver
3. Consider screws are number 1-6 starting at top-left and moving clockwise around door. Tighten in the pattern 3-4-2-5-1-6. Repeat tightening pattern to ensure tightness

If physical security is desired, attach a padlock to the lock hasp on the panel door. The hasp will allow a standard U.S. CID A-A-59486-1 padlock to hang freely and includes a mounting bolt for a lock retention chain. See the hasp opening and hasp pocket dimensions in Figure 13 if an alternate padlock is desired.

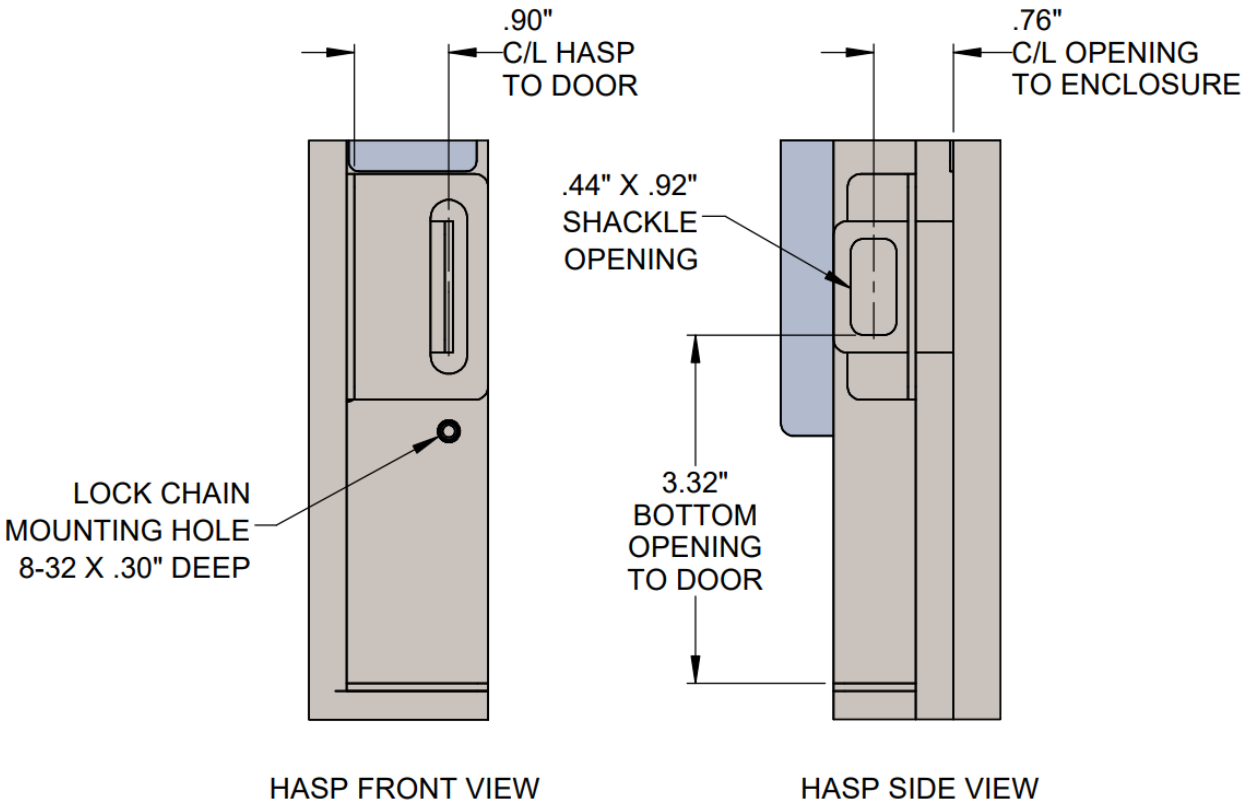


Figure 13: Lock Hasp Dimensions

4.2.3 Battery Installation and Replacement

The FACP requires two Sealed Lead Acid (SLA) batteries and supports batteries with the following Ampere Hour (Ah) rating (see Table 10 for part numbers):

- 13 Ah
- 28 Ah
- 42 Ah

Both batteries must have the same Ah rating.

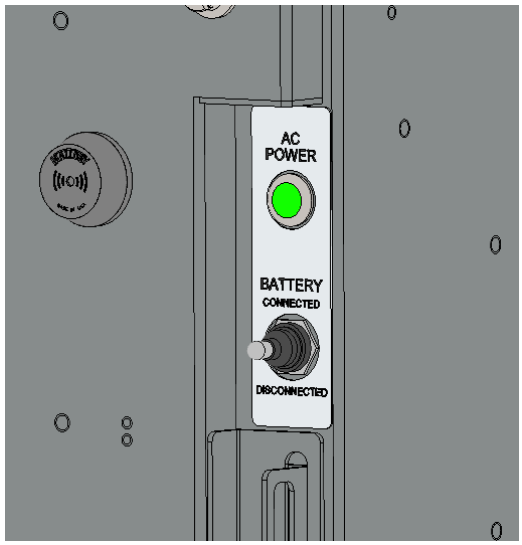


Figure 14: Battery Disconnect Switch

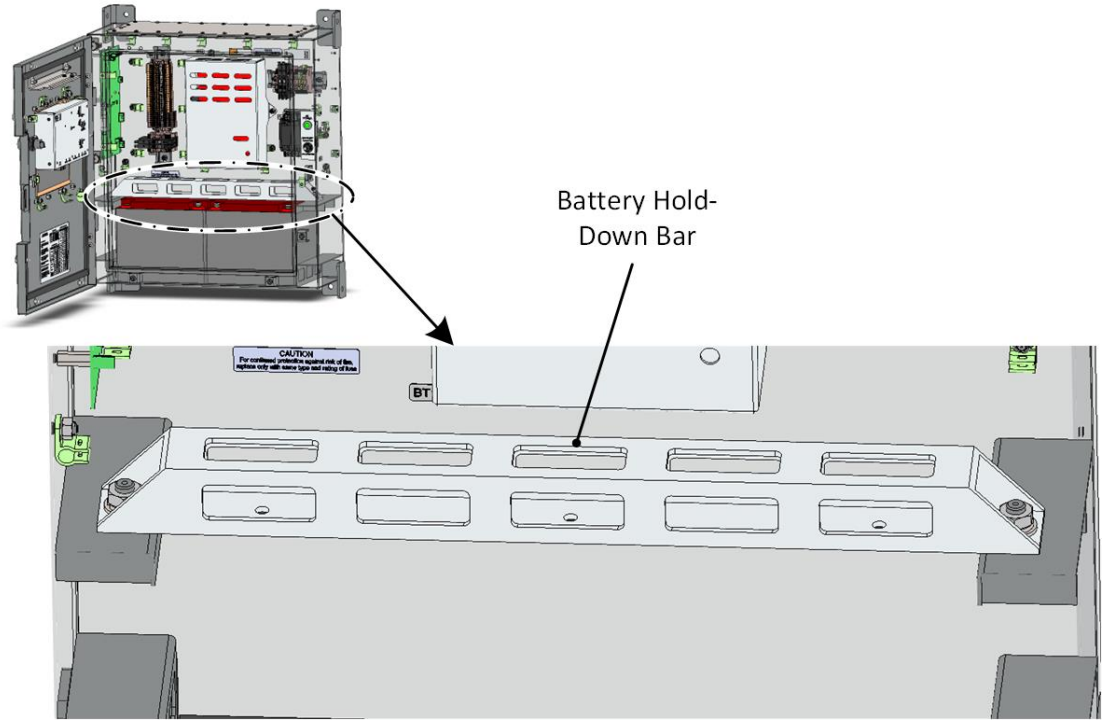


Figure 15: Battery Hold-Down Bar

If 13 Ah or 28 Ah batteries are used in the FACP then a Battery Bar Spacer Adaptor Kit (FA P/N 01020-488) must be installed on the battery hold-down bar prior to battery installation. The kit includes two sets of three nylon spacers: Use 1/8" nylon spacers for the 13Ah battery and ¼" nylon spacers for the 28Ah battery.

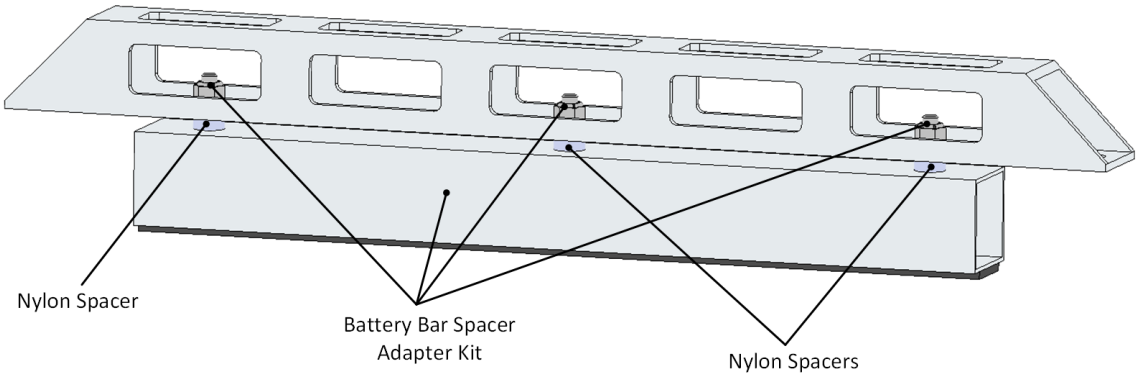


Figure 16: Battery Hold-Down Bar Spacer Adapter Kit

Procedure for battery installation is as follows:

1. Ensure the battery switch (see Figure 4 and Figure 14) is in the ***DISCONNECTED*** position.
2. Place batteries in the bottom of the FACP:
    i. 42 Ah battery: Install each battery with the front facing outward and the red (+) terminals facing toward the right of the FACP (Figure 17).
    ii. 28 Ah battery: Install the batteries with their fronts facing each other in the middle of the enclosure. The battery with the red (+) terminal closest to the enclosure front wall will be the right-most battery in the FACP (Figure 18).
    iii. 13 Ah battery: Install each battery with the front facing outward and batteries positioned 1 ¼" back from the enclosure front face and 2 ¼" from the enclosure back wall. The red (+) terminals will be facing toward the right of the FACP (Figure 19).
3. Use a 4mm hex wrench or socket and install the terminal screws, washers, and battery-to-battery short jumper wire (FA P/N 01020-484):
    i. For the 13Ah and 42Ah battery install the jumper on the middle two terminals (Figure 17 and Figure 19)
    ii. For the 28Ah battery, install the jumper on the rear two terminals (Figure 18).
    iii. Note: the jumper wire, screws, and washers are initially shipped with the panel in a bag tie-wrapped to the battery hold-down bar
4. Use a 4mm hex wrench or socket to install the terminal screw, washer, and battery plus (+) wire labeled BT2(+) to the unconnected red battery terminal (on the right-side). Install the last terminal screw, washer, and battery negative (-) wire labeled BT1(-) to the unconnected black battery terminal (on the left-side). Note: These wires are initially shipped tie-wrapped to the battery hold-down bar; terminal screws and washers are included in the FA P/N 01020-484 kit (see step 3 above).

WARNING: To reduce risk of shorting, ALWAYS connect the red positive (+) battery connection PRIOR TO the negative (-) battery connection. When in the disconnected position, the battery disconnect switch isolates the positive (+) connection of the battery from the panel not the negative (-) side. There is a risk of shorting the battery when using a conductive tool on the positive (+) battery terminal whenever the negative (-) terminal is connected.

5. Place battery hold-down bar onto mounting studs and install two nuts and flat washers on the battery hold-down bar with a 9/16” socket.
6. Flip battery switch to the ***CONNECTED*** position.

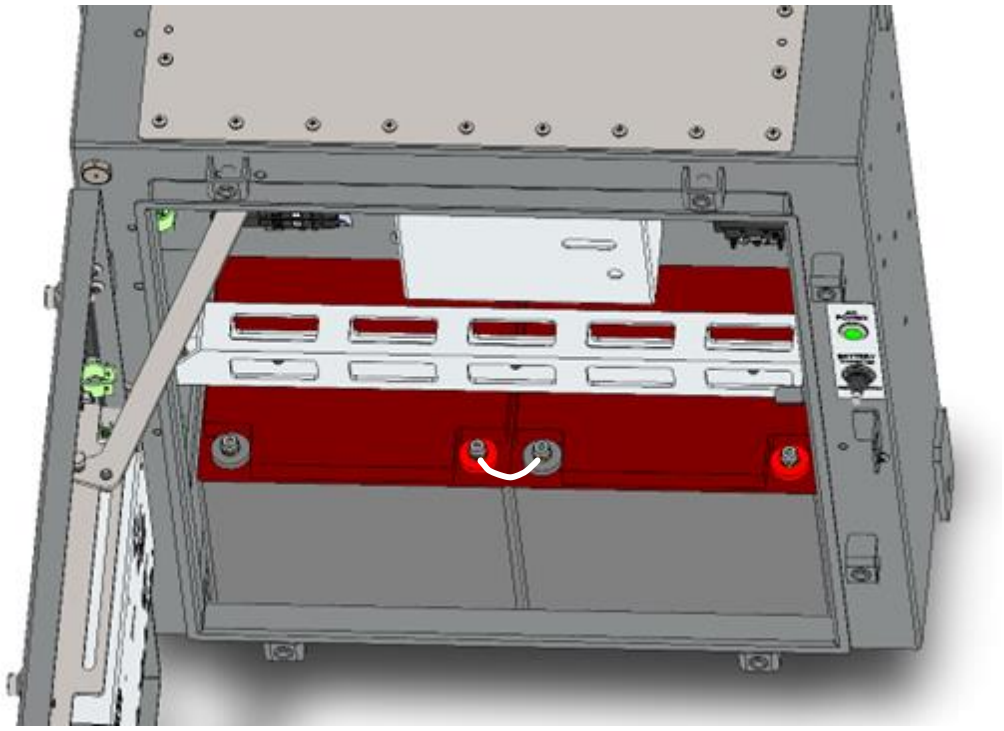
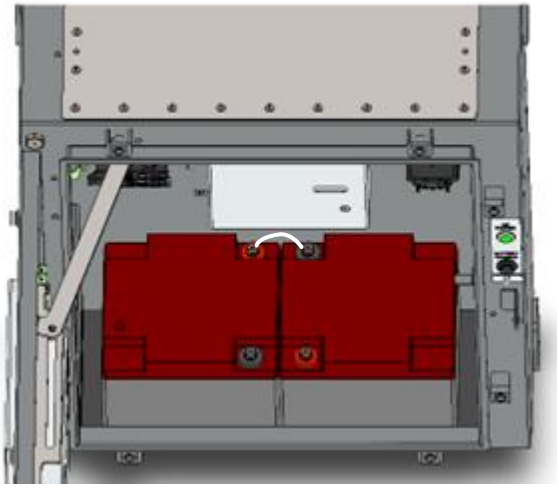
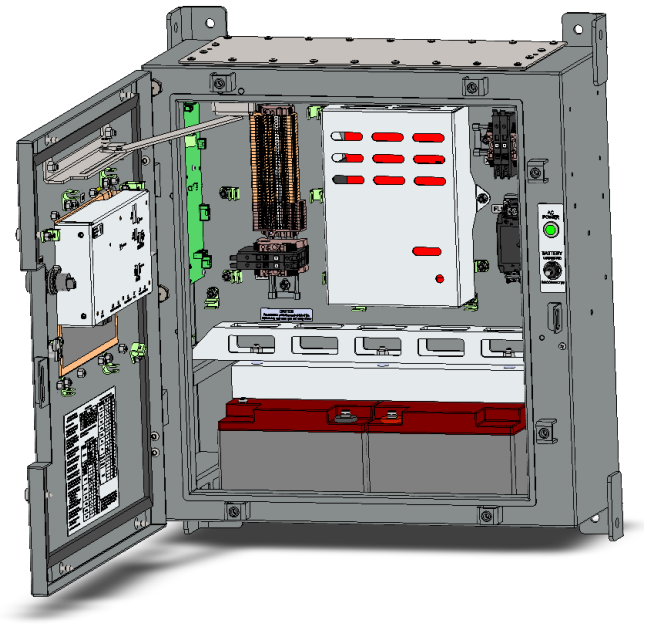


Figure 17: 42Ah Battery Installation with Jumper Wire

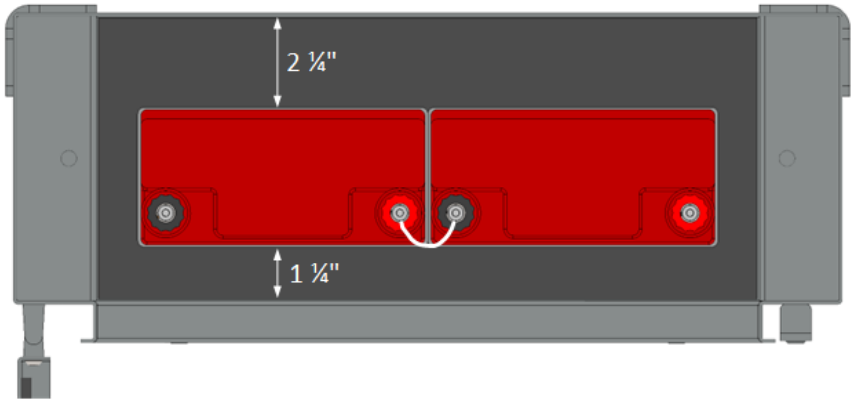


Battery Orientation and Jumper Wire



Batteries with Spacer Hold-Down Bar Installed

Figure 18: 28Ah Battery Installation



Position batteries 1 ¼" from enclosure front wall; 2 ¼" from rear wall. Jumper is shown Installed

Batteries with Spacer Hold-Down Bar and Jumper Installed

Figure 19: 13Ah Battery Installation

Procedure for battery removal is as follows:

1. Set the battery switch (see Figure 4 and Figure 14) to the ***DISCONNECTED*** position.
2. Use a 4mm hex wrench or socket to remove the four terminal screws and battery wires from the negative (-) side of the battery first then the positive (+) side.

WARNING: To reduce risk of shorting, ALWAYS disconnect the negative (-) battery connection PRIOR TO the red positive (+) battery connection. When in the disconnected position, the battery disconnect switch isolates the positive (+) connection of the battery from the panel not the negative (-) side. There is a risk of shorting the battery when using a conductive tool on the positive (+) battery terminal whenever the negative (-) terminal is connected.

3. Remove two nuts and associated flat washers on the battery hold-down bar with a 9/16” socket and remove battery hold-down bar.
4. Remove batteries from FACP using molded handles (for 28 and 42Ah) and dispose of them in accordance with local regulations.

4.2.4 Cable Glands and Plate Installation

All electrical power and signal connections enter the panel through the gland plate (FA P/N 21009-438) on the top of the unit using customer supplied cable glands or conduit. Cable gland cord grips must seal to the environmental rating required for the installation. For installations in an EMI sensitive location (for example, MIL-STD 461) metal EMI cable glands with a 360° shield connection should be used (Figure 20).

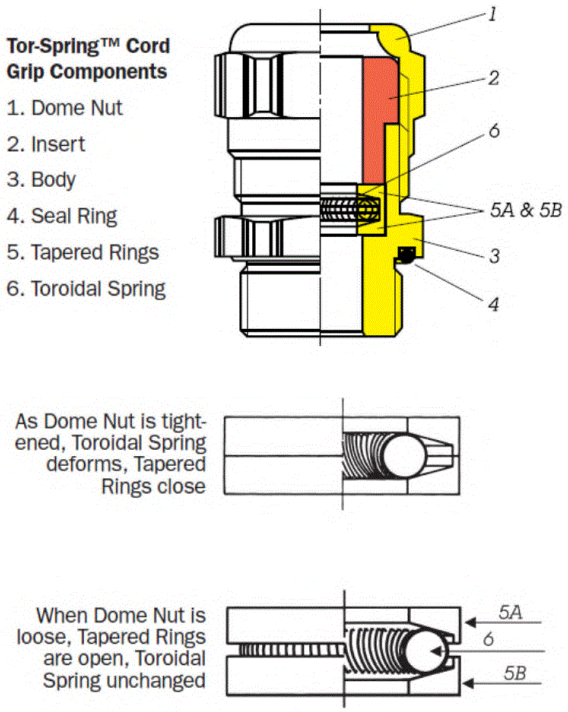


Figure 20: Example Cable Gland (from CONTACLIP Cord Grip Catalog)

The panel is supplied with a blank gland plate intended to be customized by the customer to match the interface requirements for a particular installation. The gland plate is constructed from 14 Gauge (5/64”) stainless steel and secured with #8-32 stainless steel screws. 22 screws are accessible from outside the enclosure with an additional 2 security screws installed from the inside (Figure 21). Use a #2 Philips screwdriver to remove the gland plate for modification.

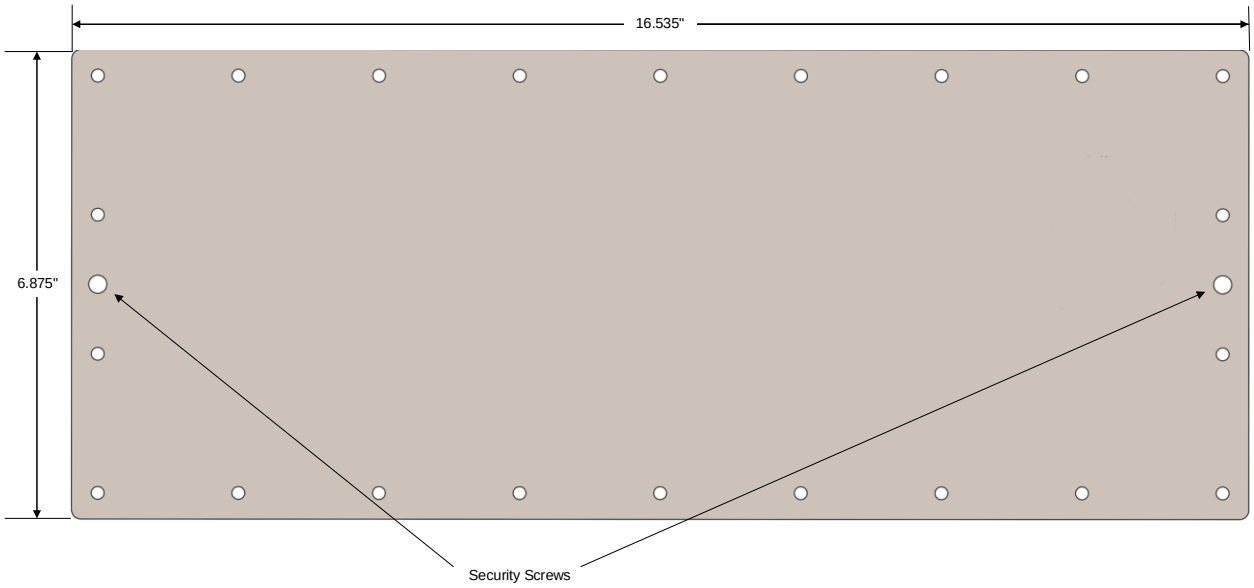


Figure 21: Gland Plate

Regions for installing power-limited cable glands and the high voltage AC power cable gland are provided in Figure 22. When determining location for glands, make sure that any feature of the gland (jam nut, washers, cables, etc.) does not extend outside of the designated area.

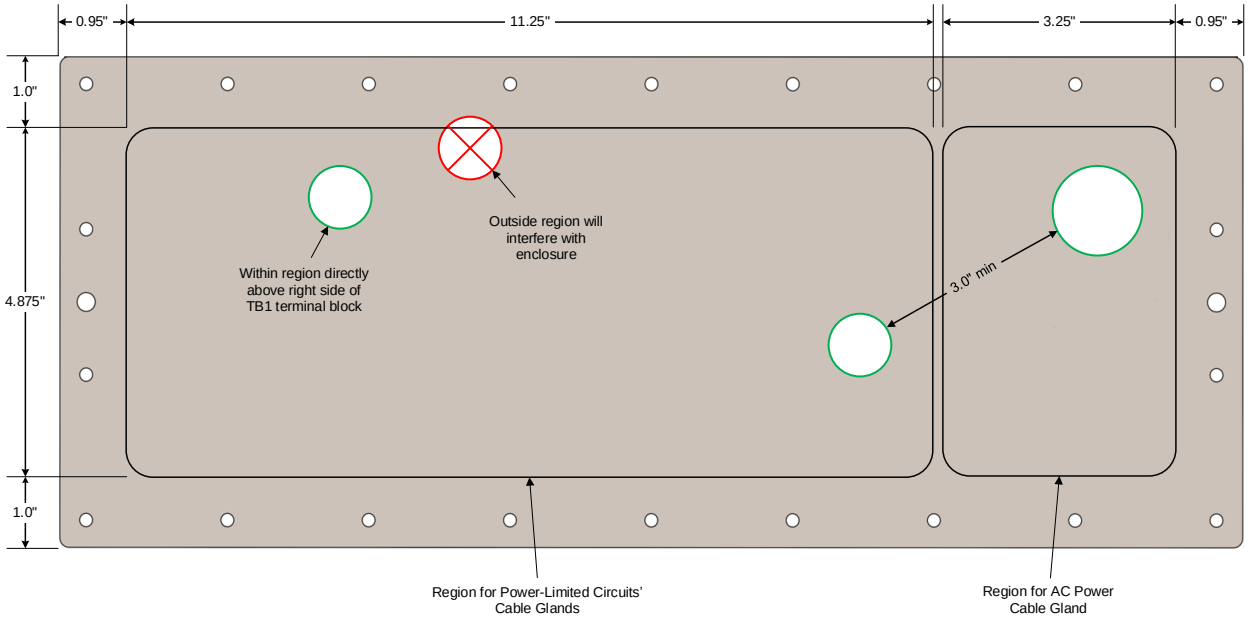


Figure 22: Locations for Cable Glands

WARNING: AC power is not power-limited. Ensure a minimum 3" separation between the high voltage AC power cable gland and next closest power limited cable gland.

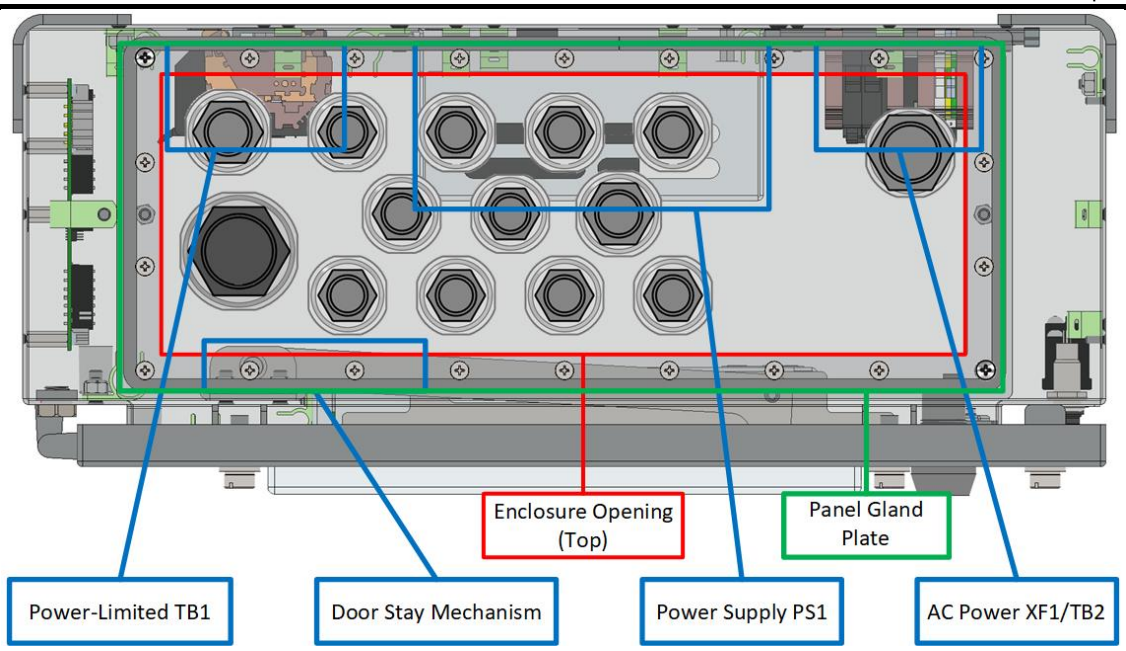


Figure 23: Gland Plate Transparent Top View

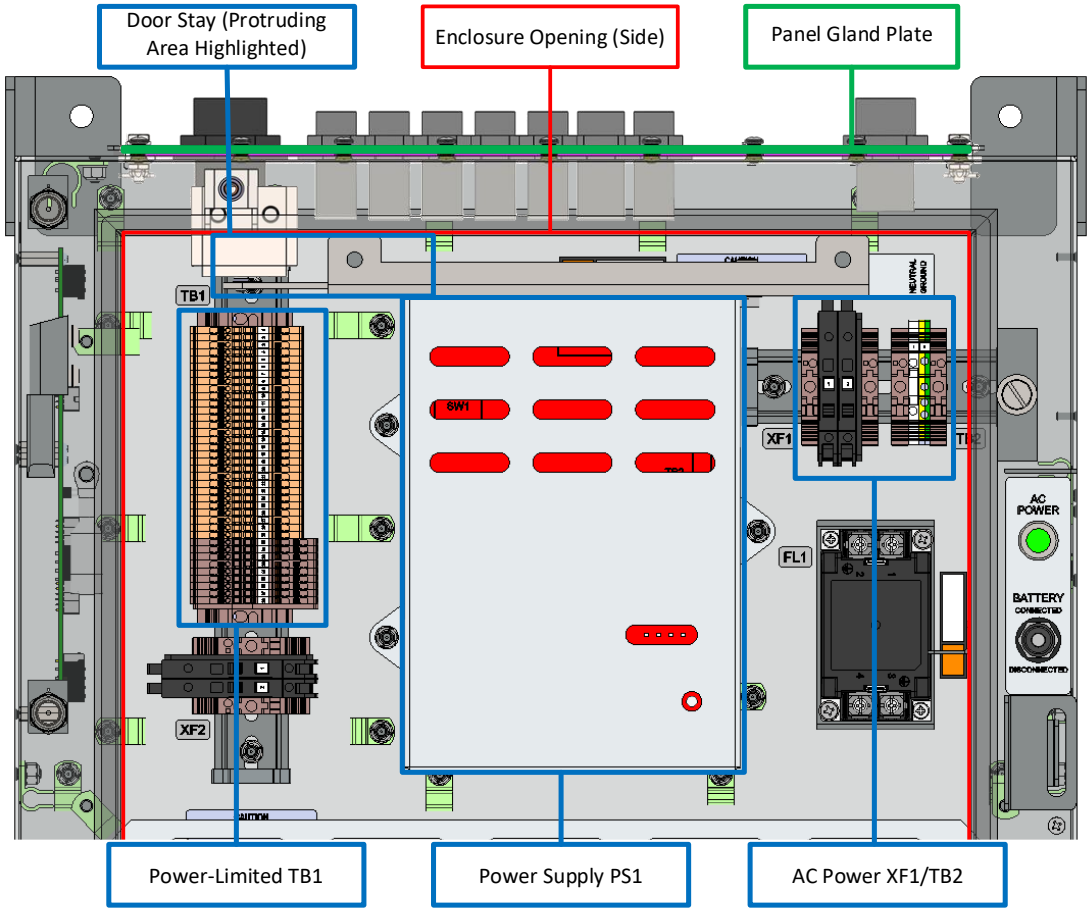


Figure 24: Gland Plate Front View

Care should be taken to ensure cables enter the enclosure closest to their destination and, when routed to their intended connection points, do not interfere with accessing other internal components. Review applicable circuits in Section 4.3.3.1 Supplying Main Power Feed and Section 4.3.4 Field Wiring (Power-Limited) when considering the routing path for each circuit.

A transparent top view of the gland plate mounted on the panel is provided in Figure 23 with a front view shown in Figure 24. Review the location of internal components such as the power-limited (TB1) and AC power (XF1 and TB2) terminal blocks as well as the power supply (PS1) and door stay mechanism when determining where to locate the cable glands and run internal wires.

An example drill pattern is provided in Figure 25.

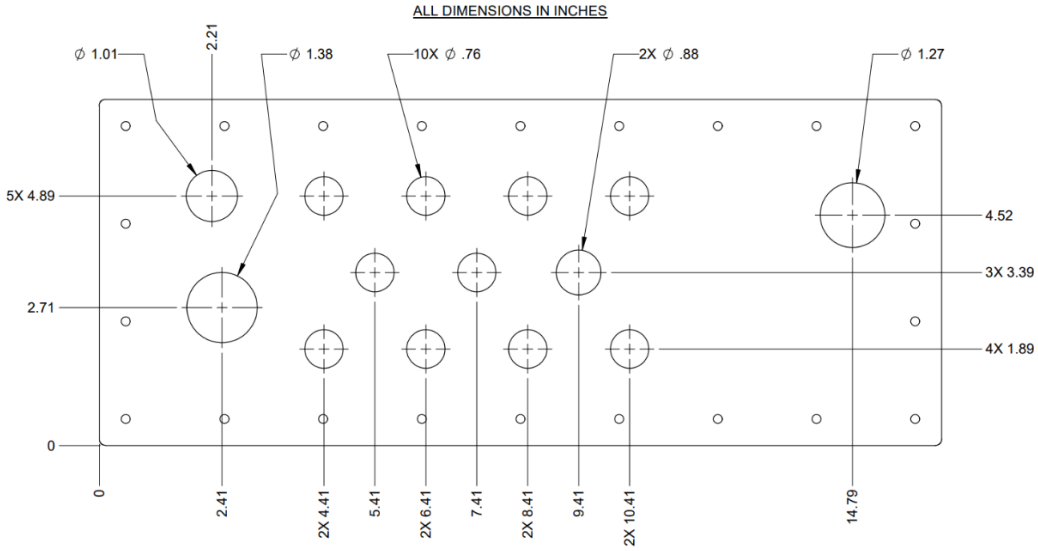


Figure 25: Gland Plate Example Drill Pattern

CAUTION: Use tools appropriate for drilling 14 Gauge (5/64”) stainless steel when customizing the plate. Incorrect tool selection could damage the plate or the tool.

CAUTION: The provided drill pattern is only an example. Individual installations will dictate the number of cable glands, gland sizes, and, to some extent, location on the gland plate.

4.3 Electrical Installation Detail

4.3.1 SLC Loop Voltage Jumper Settings

Communication with SLC loops is provided through the I/O board. Jumpers for each SLC loop are provided on the I/O board as indicated in Figure 26. Refer to Section 3.3.1 to determine which SLC voltage is appropriate for the installation.

CAUTION: The I/O Board is an ESD sensitive device and requires proper ESD handling procedures when changing jumper settings.

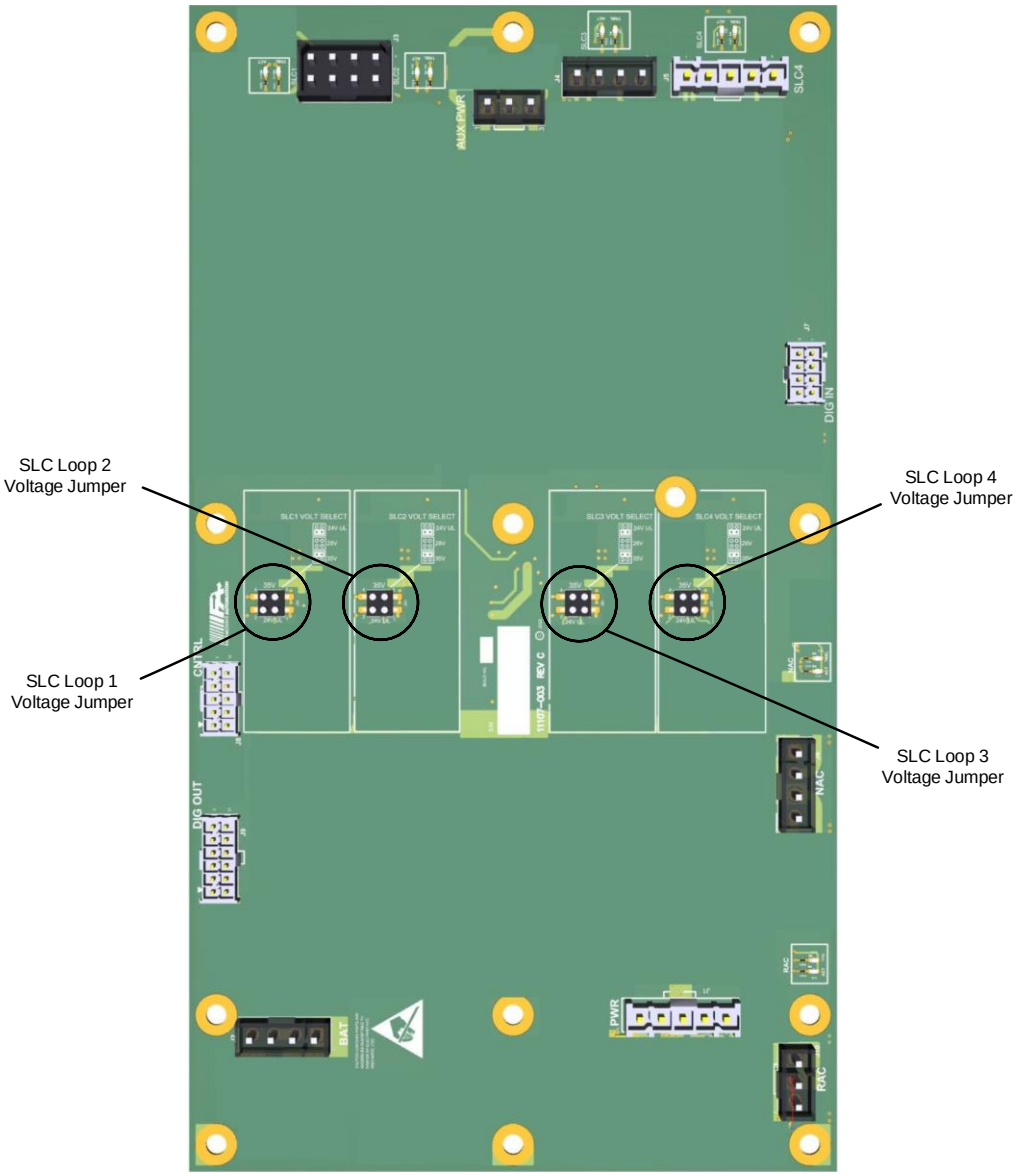


Figure 26: I/O Board (FACP) SLC Loop Jumper Locations

The jumper orientation is the same for each SLC loop. Install the jumper as shown in Figure 27 for the desired SLC output voltage for each loop:

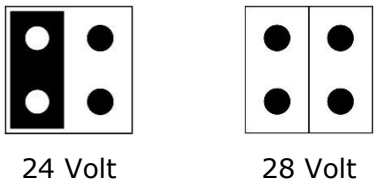


Figure 27: SLC Loop Jumper Settings

4.3.2 TS1 DIP switches

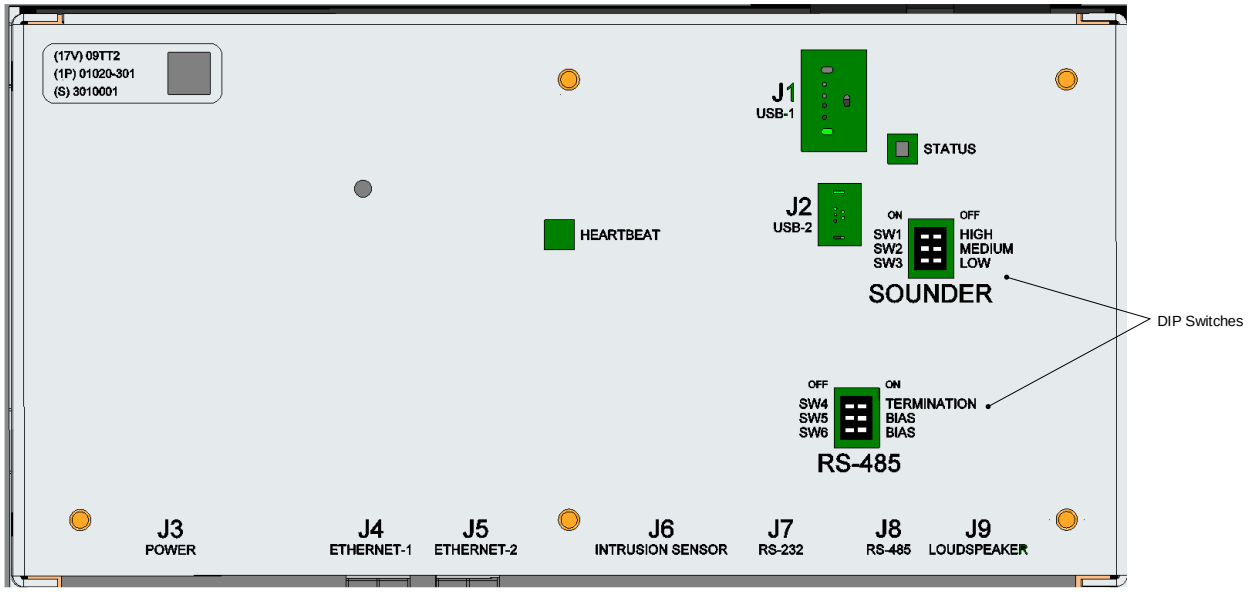


Figure 28: TS1 DIP Switches

There are two switch blocks with switches numbered SW1-3 and SW4-6 on the TS1 Control Board (Figure 28). SW1-3 corresponds with the Sounder Output Selection. SW4-6 corresponds with RS-485 Settings.

Sounder Output Selection

Switches SW1-3 in the top block are set at the factory according to the panel alert sounder that is installed in the panel. The output level and corresponding switch settings are provided in Table 11 below for informational purposes only. These switches are set according to the physical hardware installed at the factory and should not be changed.

Table 11: Panel Alert Sounder Output Level

Panel Type	*Sounder Output*	*HIGH (SW1)*	*MEDIUM (SW2)*	*LOW (SW3)*
Control	75 dB	OFF	ON	OFF
Annunciator	65 dB	OFF	OFF	ON
Portable	80 dB	ON	OFF	OFF

RS-485 Settings

Switches SW4-6 in the bottom block are set according to the RS-485 installation. Refer to Section 4.3.4.5.2 for details connecting and configuring the RS-485 network.

4.3.3 Main Power Supply Circuit

4.3.3.1 Supplying Main Power Feed

Provide the main AC power supply feed as indicated in Section 3.2 Main Power Supply Feed.

High voltage AC power supply cable should enter the top of the enclosure through cable glands on the right side of the gland plate, separate from other power-limited circuits. Refer to Section 4.2.4 Cable Glands and Plate Installation for cable gland considerations.

The AC power connection terminal blocks (XF1 and TB2) location is shown in Figure 29.

Wires enter the top of the XF1 and TB2 terminal connections and are secured in place using screws on the face of the terminal connections as shown.

AC power input connections for grounded power system (i.e., neutral grounded systems) are as follows:

- Black – Hot wire
- White – Neutral wire
- Green/Yellow – Ground wire

AC power input connections for ungrounded power system (i.e., both power wires are ungrounded and supply power) are as follows:

- Black – Line 1
- Black – Line 2
- Green/Yellow – Ground wire

XF1 and TB2 terminals support connections using bare wire (solid or stranded), ferrules, or blades with the properties shown in Table 12. Table 13 shows information related to the clamping screw.

Table 12: Terminal Supported Wire and Terminations

Terminal ID	*Bare Wire Gauge (AWG)*	*Wire Cross Sectional Area (mm^2)*	*Ferrule Cross Sectional Area (mm^2)*	*Blade Size (mm)*
XF1	10 - 16	0.5 - 6	0.5 – 4	0.6 x 3.5
TB2	12 – 16	0.5 - 4	0.5 – 2.5	0.6 x 3.5

Table 13: Terminal Clamping Screw and Tightening Torque

Terminal ID	*Screw Type*	*Tightening Torque (Nm)*
XF1	M3	0.5 – 0.8
TB2	M2.5	0.4 – 0.8

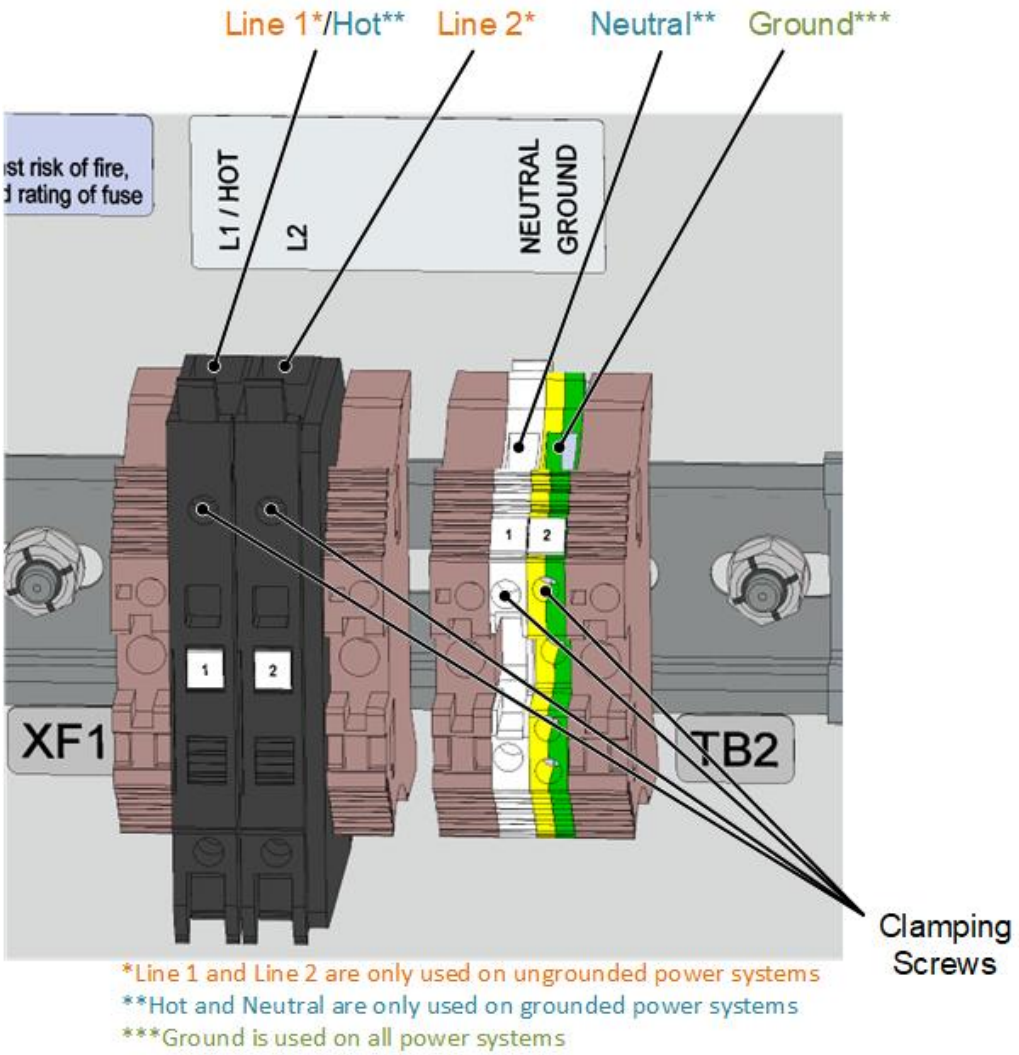


Figure 29: AC Power Terminals (XF1 and TB2)

Proceed as follows to connect field wires to the terminal block:

1. Pass the field wires through the cable glands on the right side of the panel gland plate.
2. Strip the wire back 10mm or terminate with blade or ferrule as described above.
3. Locate the desired connection on the terminal block.
4. Follow the routing pattern indicated in Figure 30. Leave a 6” loop in the cable for strain relief and secure the wires in place with wire ties.
5. Clamp the wire to the terminal with the securing screw.

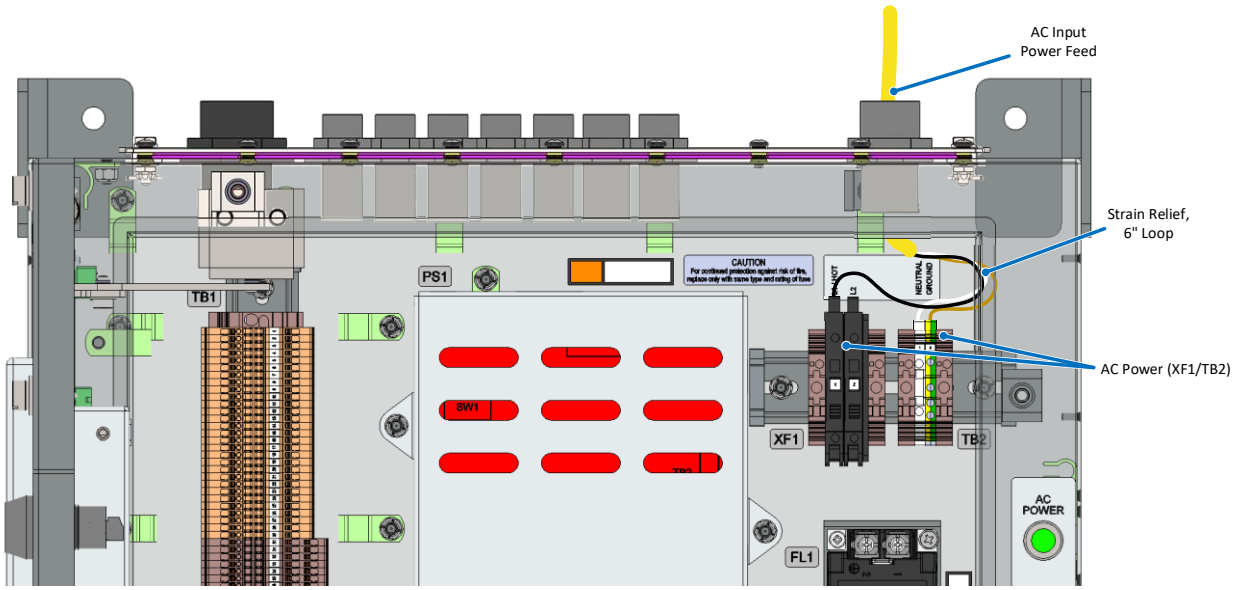


Figure 30: Example Grounded AC Power Wire Routing

WARNING: The FACP enclosure is safety grounded through the TB2 input power terminal block and/or a bolted connection on the upper left mounting foot (Figure 1). Make one or both connections.

4.3.3.2 Power LEDs

Power LEDs are visible through the power supply safety guard as shown in Figure 31.

WARNING: Always confirm absence of AC power with a meter prior to servicing High Voltage AC components (Figure 2).

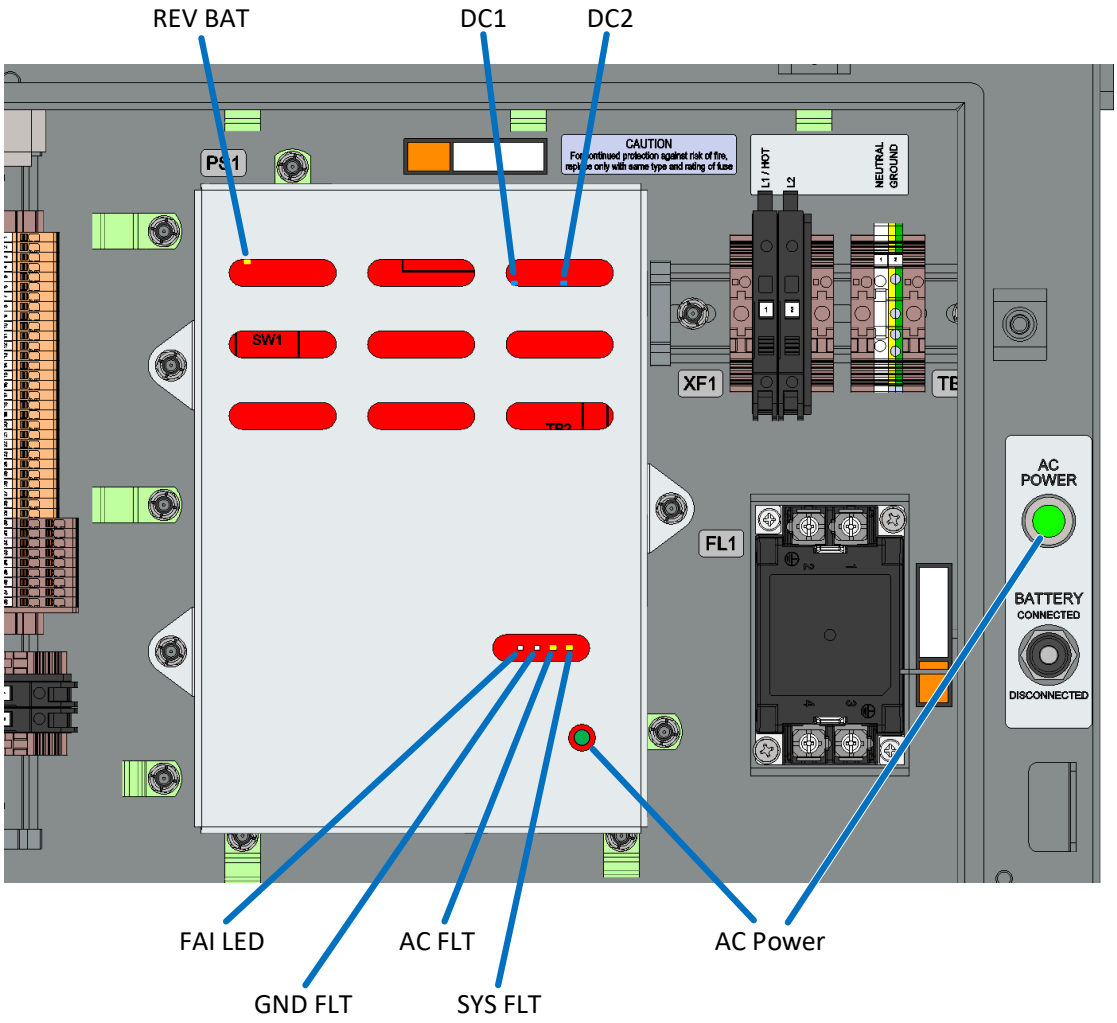


Figure 31: Power LEDs

AC Power:

- Green LED: ON when AC input power is present at the power supply

DC1 and DC2:

- Blue LED: ON when each DC Power tap is providing voltage / power

REV BAT:

- Yellow LED: On when the battery is incorrectly wired in reverse. See Section 4.3.3.3.3 for replacing the battery fuse after this LED is on.

FAI LED:

- Unused: Can be ignored

GND FLT:

- Unused: Ground faults are identified separately and indicated on the Touchscreen

AC FLT

- Yellow LED: ON when AC input voltage is low or missing

SYS FLT

- Yellow LED: ON for the following FAULT conditions:
  - Missing Battery
  - Battery voltage out of range
  - DC output voltage out of range
  - Ruptured fuse (DC1)
  - Internal Fault

4.3.3.3 Replacing Power Fuses

WARNING: Shock hazard! Ensure AC power source is disconnected prior to inspecting or replacing fuses. Service should only be performed by qualified service personnel.

CAUTION: Only replace fuses with type and rating as indicated in Section 4.1.1 Replacement Parts.

CAUTION: Power fuses should not blow under normal operating conditions. Investigate and understand a possible cause for the overcurrent condition before restoring the panel to service.

See Table 10 for replacement fuse part numbers. Perform the following general steps when inspecting and/or replacing any of the power fuses:

1. Flip battery switch to disconnected.
2. Disconnect AC power from FACP. Ensure AC Input Power LEDs (Figure 31) are not illuminated and verify lack of AC voltage with a meter.
3. Inspect and replace fuses as necessary (see sections below for more details).
4. Restore AC input power.
5. Flip battery switch to connected.

4.3.3.3.1 Replacing AC Input Power Fuses

Follow the general steps above; On step 3:

a) Locate the AC input power fuses at XF1 (Figure 10).

b) Open the fuse holder (Figure 32) and remove the fuse (fuse can be removed and installed without tools). Note that grounded power systems only use one power fuse in the L1/HOT position (F1 at XF1-1). L2 fuse (F2 at XF1-2) is only used on ungrounded power systems.
c) Close the fuse holder. Ensure the cover is fully rotated back into place.

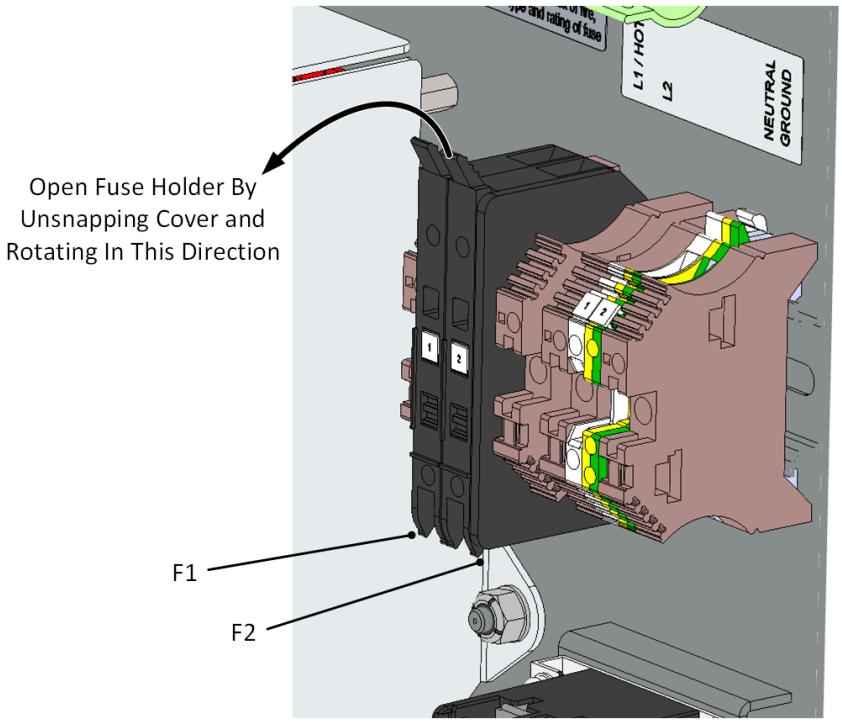


Figure 32: Open Fuse Holder Cover / AC Input Power Fuses (F1 and F2)

4.3.3.3.2 Replacing 24VDC Power Distribution Fuse

Follow the general steps above; On step 3:

a) Locate the 24VDC power distribution fuse F3 at XF2-1 (Figure 10).
b) Open the fuse holder (Figure 33) and remove the fuse (fuse can be removed and installed without tools.)
c) Close the fuse holder. Ensure the cover is fully rotated back into place.

4.3.3.3.3 Replacing 24VDC Battery Power Fuse

Follow the general steps above; On step 3:

a) Locate the 24VDC power distribution fuse F4 at XF2-2 (Figure 10).
b) Open the fuse holder (Figure 33) and remove the fuse (fuse can be removed and installed without tools.)
c) Close the fuse holder. Ensure the cover is fully rotated back into place.

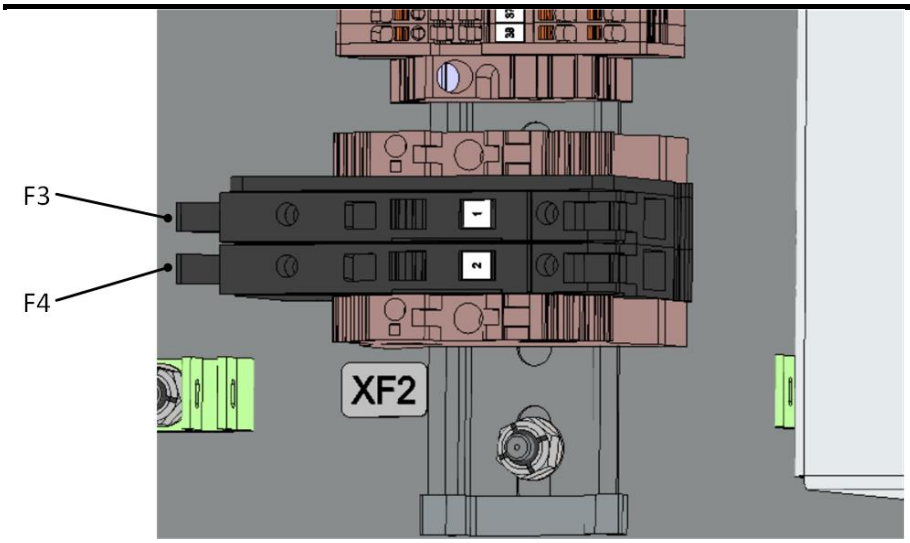


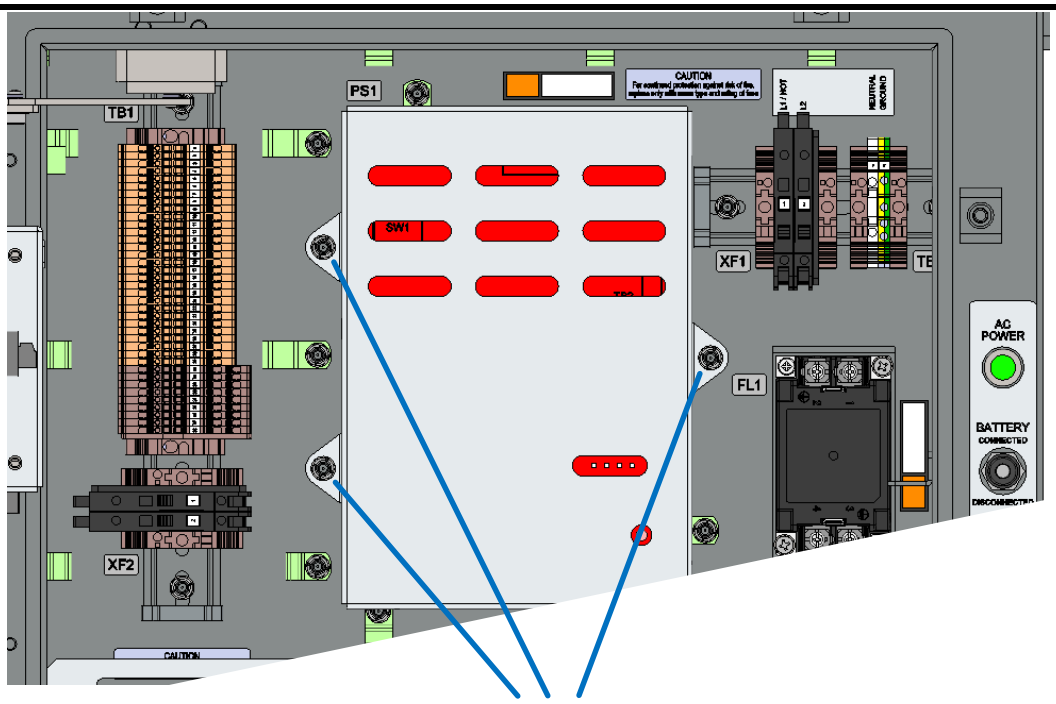
Figure 33: 24VDC Power Distribution (F3) and Battery (F4) Fuses

4.3.3.3.4 Replacing Power Supply Battery Fuse

The power supply has a fuse in series with the battery connection (BAT in Figure 35). The fuse may rupture if there is an issue with the battery circuit. In addition, if the battery is connected in reverse, the REV BAT LED (Figure 31) may illuminate and may also cause the fuse BAT or fuse F4 to rupture.

To replace the fuse, follow the general steps above; On step 3:

a) Remove all three 3/8 nuts and washers that secure the safety cover over the power supply (Figure 34), then remove the cover.
b) Remove and replace Power Supply Battery Fuse (BAT) (Figure 35). The fuse can be removed by pulling the fuse body directly out of the power supply PC board.
c) Re-install power supply safety guard and secure in place with three nuts and washers.



Power Supply Safety Guard Nuts

Figure 34: Power Supply Safety Guard Nuts

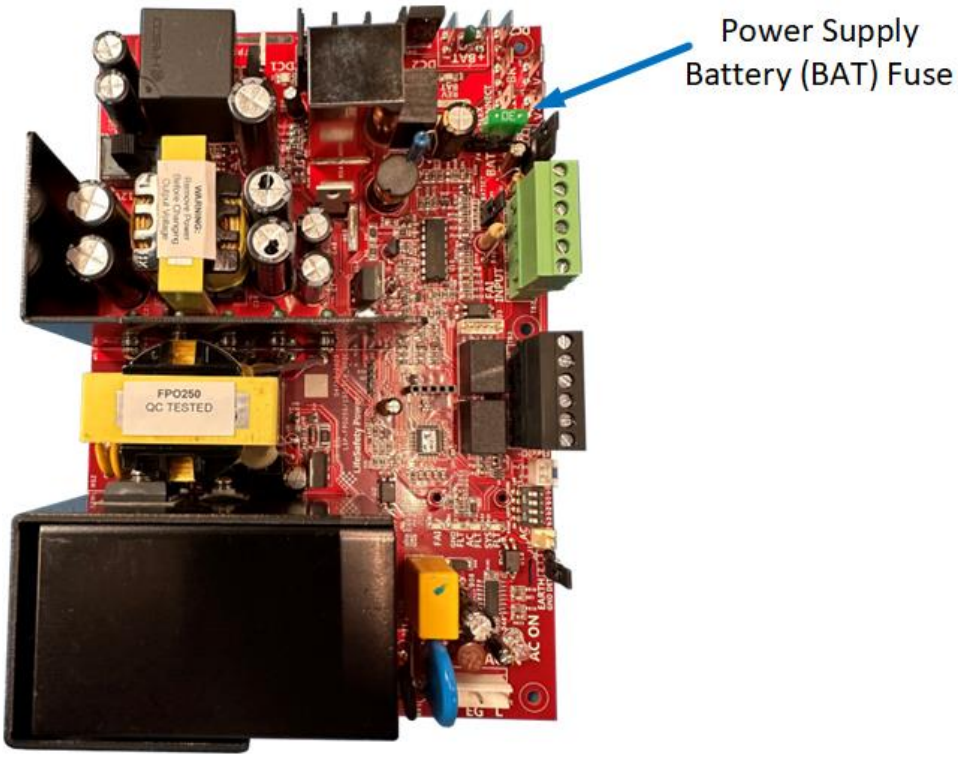


Figure 35: Power Supply Battery (BAT) Fuse

4.3.4 Field Wiring (Power-Limited)

All field circuits are power-limited except for the incoming main AC power circuit. This section focuses on power-limited circuits only. Section 4.3.3 discusses the main AC power circuit.

For power-limited circuits, choose the appropriate fire alarm cable based on the applicable codes for the area and installation environment of the Fire Detection System.

NOTE: All field circuits must be wired in accordance with NFPA-72 and all local codes applicable to the installation. The following sections provide general diagrams illustrating connection points at the control panel and should not be regarded as a complete representation of all field wiring considerations.

The field wire connection terminal block (TB1) location is shown in Figure 36.

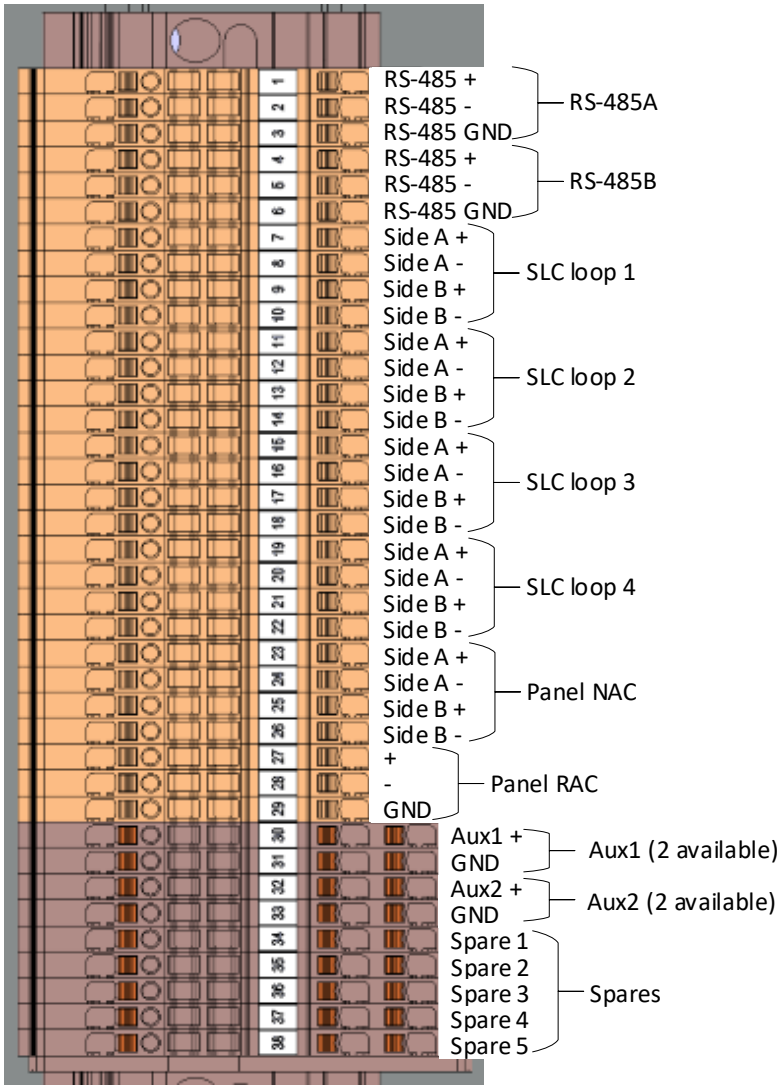


Figure 36: Power-Limited Terminal Block (TB1)

All cables (except Ethernet) terminate at terminal block TB1. Refer to Section 3.3.5 and Appendix A – Product Specifications / Ethernet Communications for specific details regarding Ethernet connections.

The Overwatch Fire Detection Installation Planning Tool (Section 3.4) includes calculations for the following wire gauges for power-limited circuits:

- 14 AWG
- 16 AWG
- 18 AWG (including MIL DTL 24640-16E 2XSW-1)

TB1 terminals support bare wire, ferrule, or blade connections with the following properties:

- Bare Wire:
  - Gauge: 14-26 AWG
  - Stranded/Solid Cross Sectional Area: min: 0.5 mm^2, max: 1.5 mm^2
  - Finely stranded: N/A. Use blade or ferrules
- Blade:
  - Size: 0.4 x 2.0 mm
- Ferrule:
  - DIN 46228/1 (without plastic collar): min: 0.5 mm^2, max: 1.5 mm^2, tube length 6-10mm
  - DIN 46228/4 (with plastic collar): min: 0.5 mm^2, max: 1.0 mm^2, tube length 6-8mm

The TB1 terminal utilizes spring connections with PUSH IN technology. Proceed as follows to connect field wires to the terminal block:

1. Pass the field wires through the cable glands on the left side of the panel gland plate. Refer to Section 4.2.4 Cable Glands and Plate Installation for cable gland details.
2. Prepare the wire for connection to the terminal:
   - If using bare wire, strip the wire back 8mm, or
   - Attach ferrule/blade to wire using manufacturers recommendations.
3. Locate the desired connection on the terminal block (Figure 36).
4. Follow the routing pattern indicated in Figure 37. When the wire is run as desired, secure the wires in place with wire ties.
5. Push the conductor into the designated hole on the right of the TB1 terminal block for each desired power-limited field connection (Figure 38). When using bare untinned stranded wire, use a small screwdriver or other tool to press the orange release mechanism next to the connection, insert the wire into the hole, and then release the screwdriver when the wire is at the desired depth.

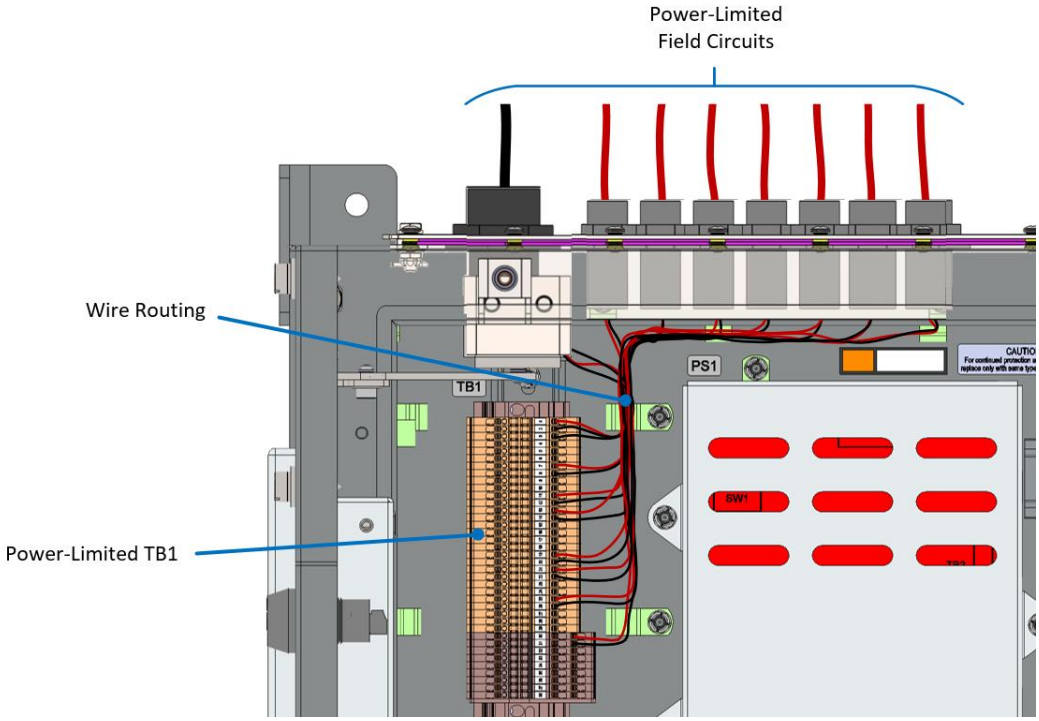


Figure 37: Wire Routing TB1 Connections

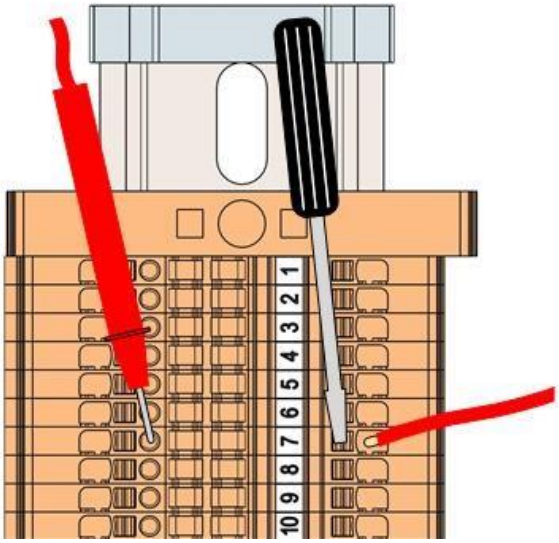


Figure 38: Terminal Block (TB1) Connecting and Testing

To disconnect, use a small screwdriver or other tool to press the orange release mechanism to the left of the connection (see black screwdriver in Figure 38). This will push back the spring and release the wire.

A round meter probe hole is provided just to the left of center for each terminal connection for diagnostic purposes (see red probe in Figure 38).

4.3.4.1 Panel Notification Appliance Circuit

The Panel NAC is rated as dual-rated, power-limited, and supervised. It is 24VDC, 1A either special application or regulated depending on synchronization. Refer to the Supported Device List in Section 1.4 for supported notification appliance models.

To wire the panel NAC circuit, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. Panel NAC cable connections on the TB1 terminal block are provided in Table 14.

Table 14: NAC Connections

TB1 Pin #	*NAC Circuit*
23	Side A +
24	Side A -
25	Side B +
26	Side B -

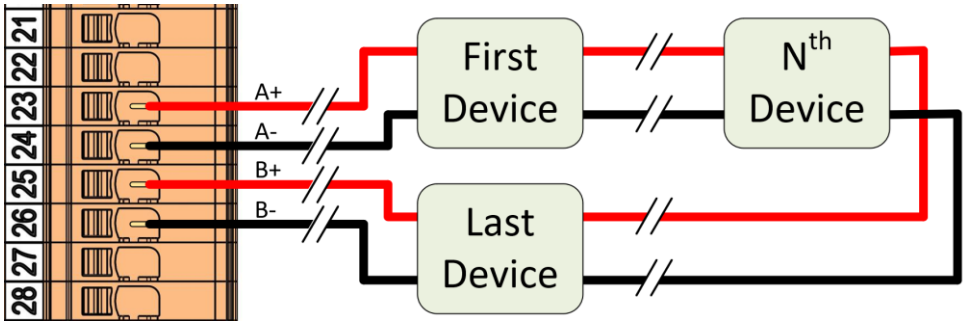


Figure 39: Panel NAC Class A Connections (TB1 23-26)

For Class A configuration, connect Side A pins to one end of the loop and Side B pins to the other end of the loop as indicated in Figure 39.

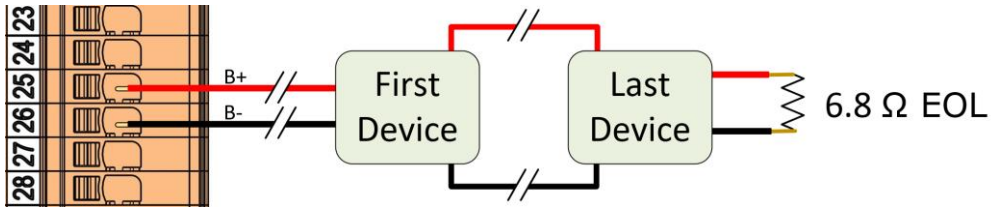


Figure 40: Panel NAC Class B Connections (TB1 25-26)

For Class B configuration, connect only Side B as indicated in Figure 40. Install the 6.8 Ω end-of-line (EOL) resistor after the last network appliance connected to the circuit.

4.3.4.2 Releasing Actuator Circuit

Releasing Actuator Circuit (RAC) is rated as 24VDC, 1A, special application, power-limited, and supervised. Refer to the Supported Device List in Section 1.4 for supported releasing valve/actuator models for special application rating.

To wire the RAC circuit, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. Panel RAC cable connections on the TB1 terminal block are provided in Table 15.

Table 15: RAC Connections

TB1 Pin #	*RAC Circuit*
27	+
28	-
29	GND

Figure 41 shows the typical RAC wiring. The RAC supervising circuit operates by accurately monitoring the coil resistance of the actuator while it is deenergized. The resistance of the connecting cable is nulled through a compensation network created by the three wires. Each of the wires in the cable used to connect the actuator to the panel must be the same gauge and same length to ensure the circuit operates properly.

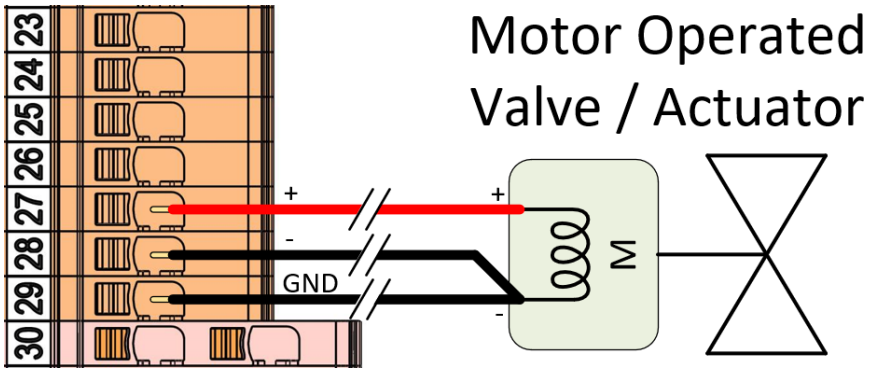


Figure 41: Panel RAC Connections (TB1 27-29)

4.3.4.3 Signaling Line Circuits

All 4 SLC circuits are rated as special application, power-limited, and supervised. Refer to the Supported Device List in Section 1.4 for supported device models for special application rating.

For the Signaling Line Circuit (SLC), overall circuit load will dictate the wire gauge required. Refer to Section 3.4 Installation Planning Tool to determine the necessary gauge of wire to support the desired field configuration.

To wire the SLC loops, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. SLC connections on the TB1 terminal block are provided in Table 16.

Table 16: SLC Connections for All 4 Loops

TB1 Pin #	*SLC Circuits*
7	SLC 1 A +
8	SLC 1 A -
9	SLC 1 B +
10	SLC 1 B -
11	SLC 2 A +
12	SLC 2 A -
13	SLC 2 B +
14	SLC 2 B -
15	SLC 3 A +
16	SLC 3 A -
17	SLC 3 B +
18	SLC 3 B -
19	SLC 4 A +
20	SLC 4 A -
21	SLC 4 B +
22	SLC 4 B -

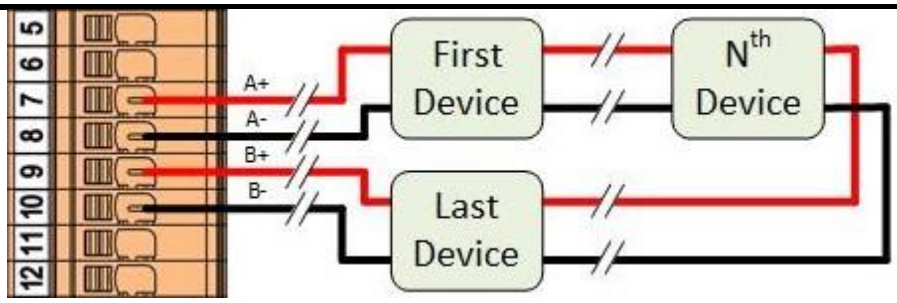


Figure 42: SLC Loop 1 Class A or X Connections (TB1 7-10)

For Class A or X configuration, connect Side A pins to one end of the loop and Side B pins to the other end of the loop as shown in Figure 42. SLC loops 2, 3, and 4 wiring considerations are comparable to SLC loop 1 with a different set of connections for each as indicated in Table 16.

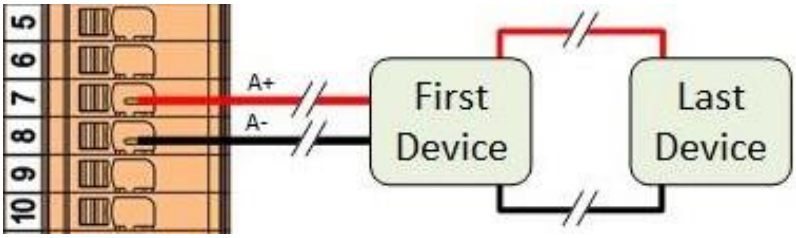


Figure 43: SLC Loop 1 Class B Connections (TB1 7-8)

For Class B configuration, connect only Side A as shown in Figure 43. An end-of-line (EOL) resistor is not necessary as the SLC devices provide internal termination resistance. SLC loops 2, 3, and 4 wiring considerations are comparable to SLC loop 1 with a different set of connections for each as indicated in Table 16.

4.3.4.3.1 SLC NAC Circuit

The SLC circuit supports two different addressable Sounder Control Module (SCM) models which allow for connecting a NAC circuit behind the device. For the purposes of this manual, that NAC circuit will be referred to as the SLC NAC. All devices connected to the SLC NAC are powered by one of the Auxiliary (Aux) power circuits detailed in Section 4.3.4.4.

The SLC NAC is rated as dual-rated, power-limited, and supervised. It is 24VDC, 1A either special application or regulated depending on synchronization. Refer to the Supported Device List in Section 1.4 for supported models.

NOTE: The number of independent SLC NAC circuits that can be supported by the panel is dependent on how the Aux and SLC circuits are loaded. Refer to Section 3.4 Installation Planning Tool for information on calculating Aux circuit loading.

4.3.4.4 Auxiliary Power Output Circuits

Both auxiliary power circuits are rated as dual-rated, power-limited, and supervised**. They are 24VDC, either 1A regulated or 3A special application.

Each Auxiliary Power output circuit (Aux) provides 24VDC power for the following applications:

- SLC Sounder Control Module NAC appliances (refer to the Supported Device List in Section 1.4 for supported models)
- FDS Annunciator and/or Portable backup power
- Any 24VDC load requiring up to 1A

**The panel does not directly supervise the Aux power delivered to the load. The load device must have a mechanism to supervise the power and indicate a trouble to the panel using a network or other mechanism (such as an SLC Input). Supported SLC NACs and Annunciators have this mechanism. If not, then open circuit conditions may not be recognized by the panel and a trouble alarm will not be generated.

To wire the Aux power circuits, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. Aux cable connections on the TB1 terminal block are provided in Table 17. Two pins are provided for each connection allowing up to four Aux connections directly on the terminal block.

TB1 Pin #	*AUX Circuits*
30 (2 connections available)	AUX 1 24VDC+
31 (2 connections available)	GND
32 (2 connections available)	AUX 2 24VDC+
33 (2 connections available)	GND

Table 17: AUX 1 and 2 Connections

NOTE: If additional Aux power feeds are required, split the connection in a suitable junction box externally mounted to the FACP (Figure 44) or use the spare terminals (Section 3.3.7).

Figure 44 provides example connections for the Aux 1 and 2 circuits.

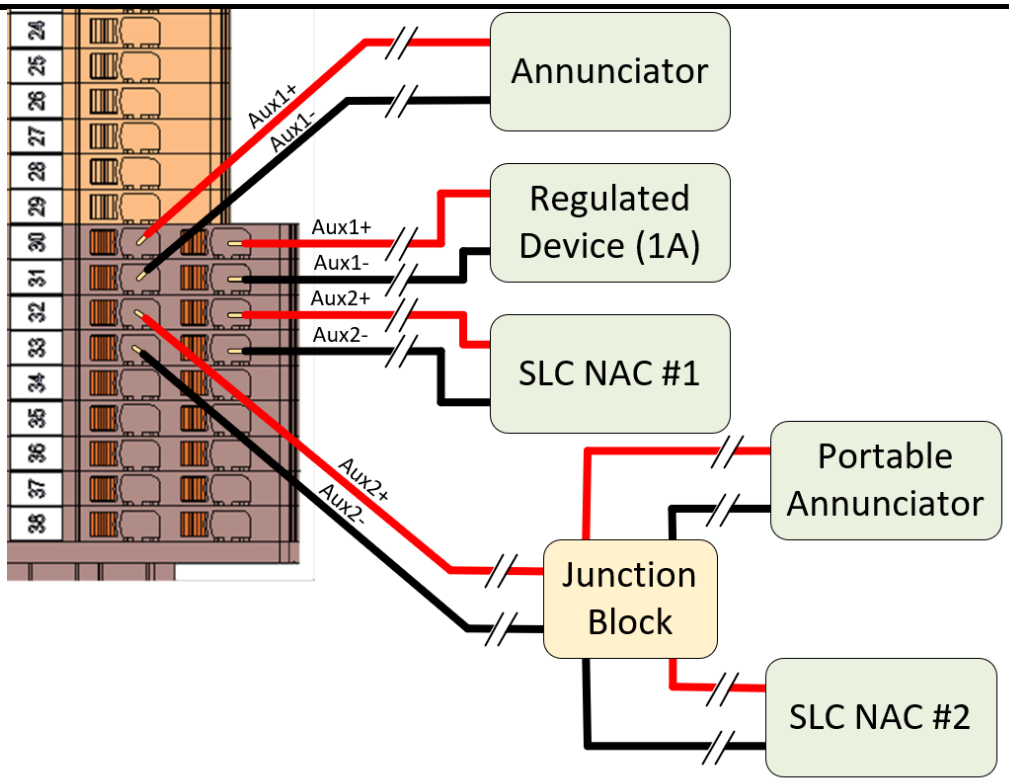


Figure 44: Aux 1 and 2 Power Connections (TB1 30-33)

NOTE: Refer to Section 3.4 Installation Planning Tool for Aux circuit loading considerations including which and how many devices can be attached to each Aux circuit.

4.3.4.5 Networking Communication Circuits

The FACP features both RS-485 and Ethernet communication ports. The two independent Ethernet ports can be individually ordered as copper and/or fiber and are joined to the FACP microprocessor through a multi-port switch.

Ethernet networks in all topologies provide the capability for Panel-to-Panel communication.

The RS-485 and Ethernet networks may also be used to communicate with 3rd party devices such as a shipboard machinery control system (MCS).

4.3.4.5.1 Ethernet

The FACP provides two internally switched Ethernet ports. These Ethernet connections are available as Copper/Copper, Copper/Fiber, or Fiber/Fiber variations. Refer to Appendix A – Product Specifications for detailed specifications on ports offered.

Both Ethernet circuits are rated as Power limited and Supervised. Copper Ethernet also includes ground fault detect.

Each Ethernet connection is presented on the back of the panel door as connections Ethernet-1 (J4) and Ethernet-2 (J5) on the bottom of the TS1 (A1 in Figure 45).

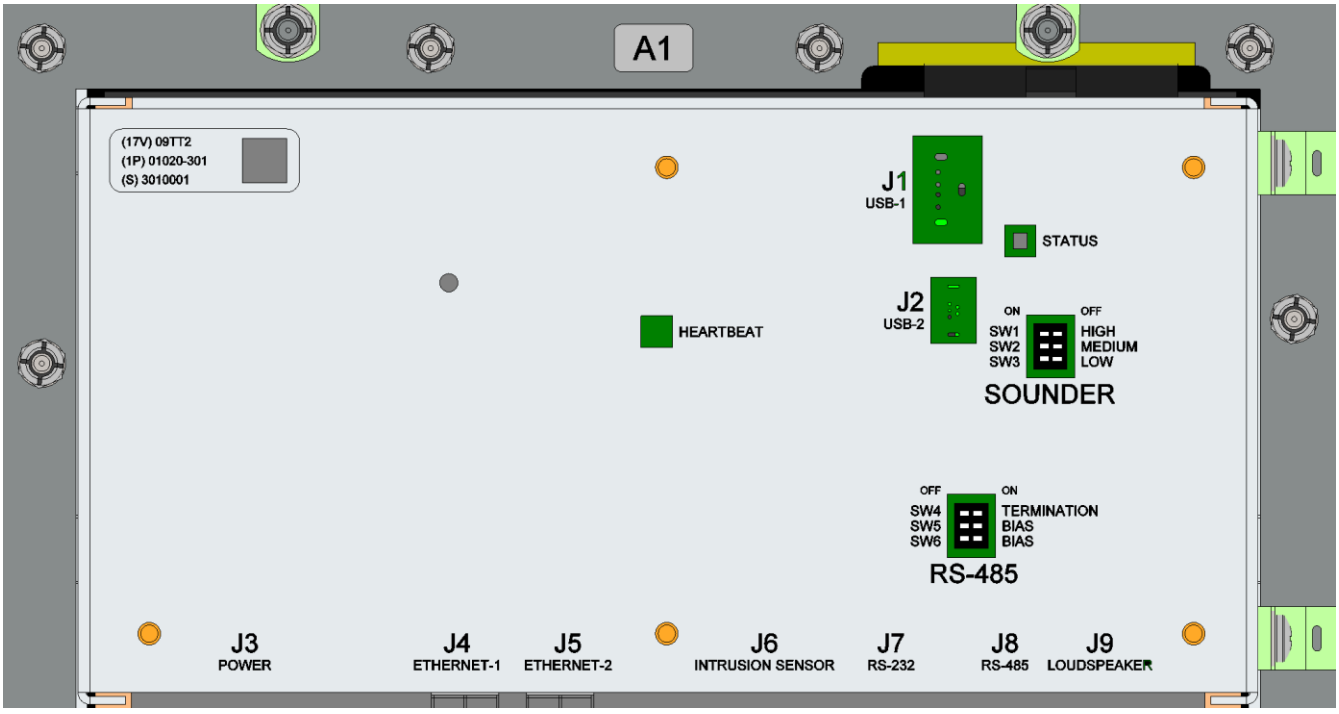


Figure 45: Copper and Fiber LC Ethernet Connections

Copper and Fiber Ethernet Connections:

Field Ethernet network cables enter the panel through the Cable Glands on the Gland Plate (see Section 4.2.4) and terminate at the TS1 on the enclosure door.

Figure 46 and Figure 47 are interior sectional views of the panel showing the Ethernet routing pattern to follow. The yellow and white/yellow path runs inside the enclosure and across the door hinge following the existing factory installed RS-485 network wires (white/yellow cable attached to J8 on TS1) to the desired Ethernet port (yellow cable) J4 or J5 on TS1. Secure the Ethernet wires in place with wire ties using the provided wire tie-down points and the RS-485 cable across the door hinge area.

Copper Ethernet connections are made using RJ45 connectors; Fiber Ethernet connections are made using LC connections.

Ensure the allowable bend radius is not exceeded when running the Ethernet cable. If the jacketed cable does not permit the needed bend radius, then remove the outer jacket from the entire length of the cable after it passes through the gland plate. Note: removing the jacket from the copper Ethernet cable will allow the twisted pair wires to have a smaller bend radius than with the jacket present.

NOTE: If the outer jacket must be removed to route copper Ethernet, DO NOT UNTWIST THE TWISTED PAIRS or Ethernet signal integrity may be lost.

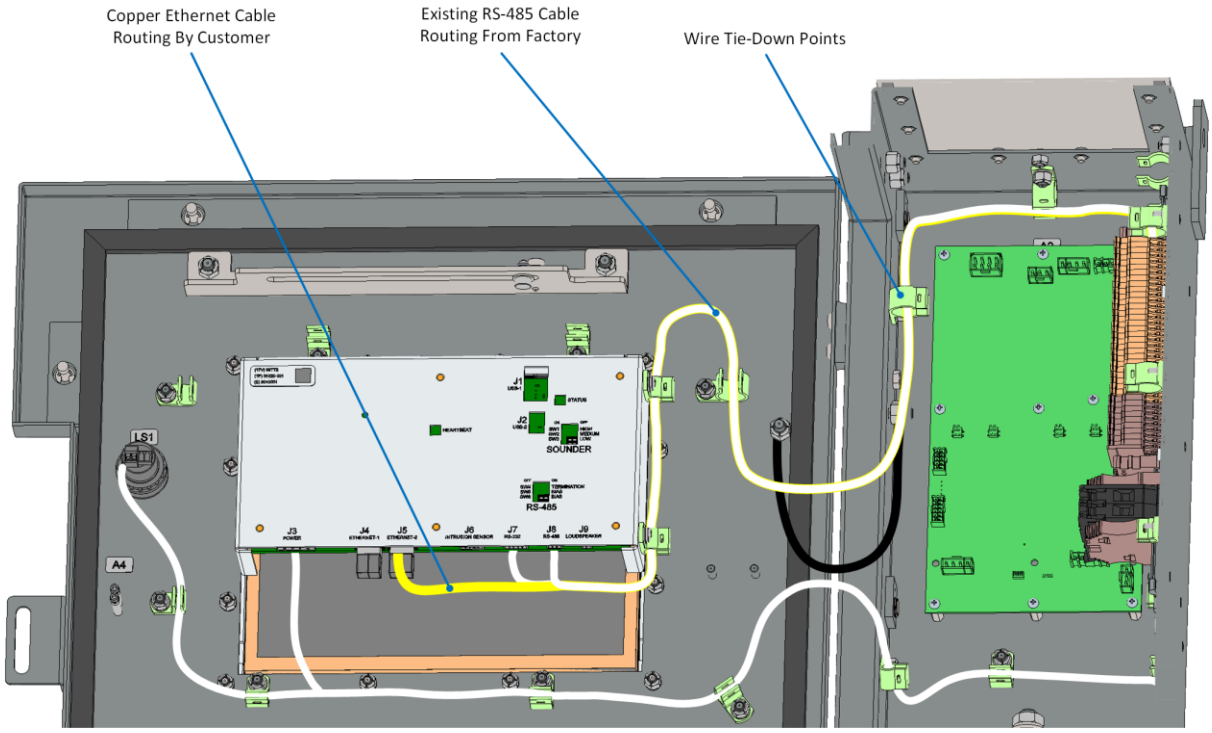


Figure 46: Wire Routing for Copper Ethernet

NOTE: Failure to follow the routing pattern indicated may result in not meeting the UL-864 required power limited circuit separation for field cables.

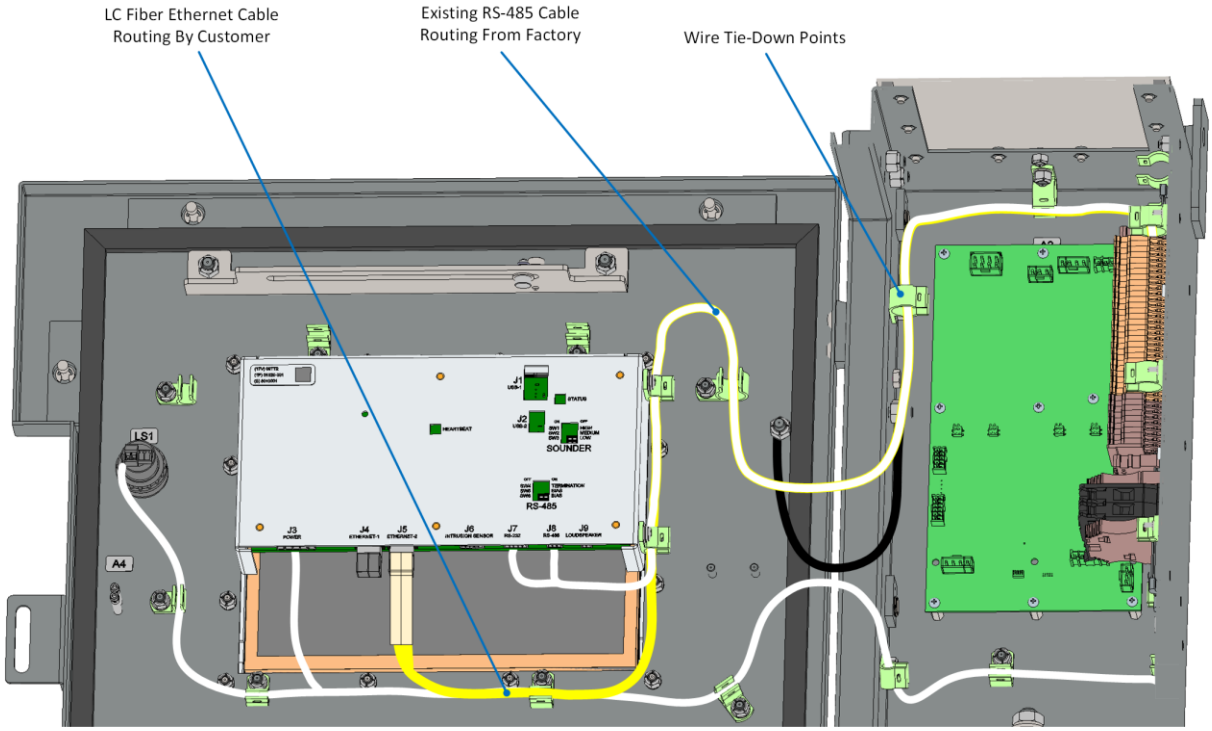


Figure 47: Wire Routing for LC Fiber Ethernet

NOTE: Select fiber optic cable with a bend radius sufficient to follow the routing pattern indicated. Exceeding the bend radius tolerance of a fiber cable will compromise the cable and/or signal quality.

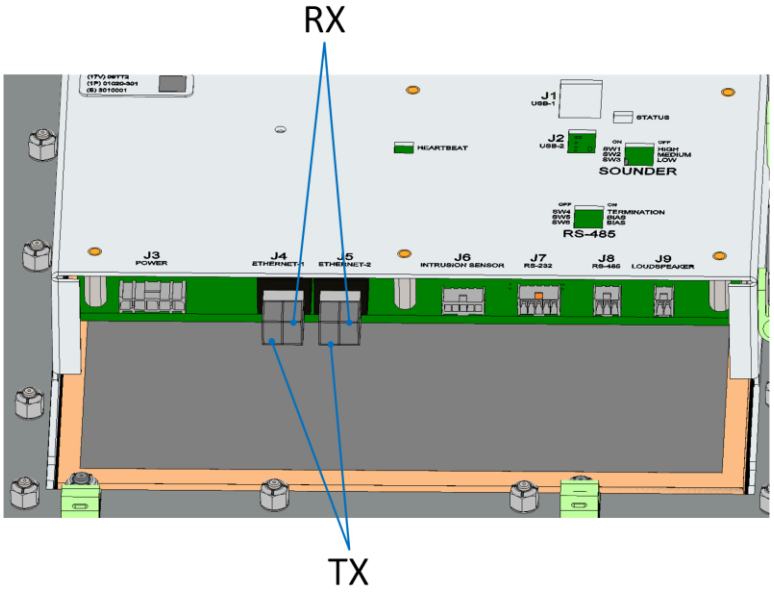


Figure 48: TX and RX LC Fiber Ports

Figure 48 shows the relative positions of the transmit (TX) and receive (RX) fiber transceivers within the LC connector.

Optional ST Fiber Ethernet Conversion Kit:

ST Fiber connections are available through an optional conversion kit (FA P/N 01020-487). The kit includes an LC to ST fiber cable that goes from the LC connectors on the TS1 to an ST junction block on the right inside panel door. The blue cable in Figure 49 shows the cable routing path for Ethernet 2 with a loop for any excess fiber cable. Figure 50 shows the ST junction block. Note that the figures only show the Ethernet 2 routing and connections. For dual-fiber applications, the Ethernet 1 cable will be similarly routed to the junction block and mate with ST connectors to the left of the Ethernet 2 connectors.

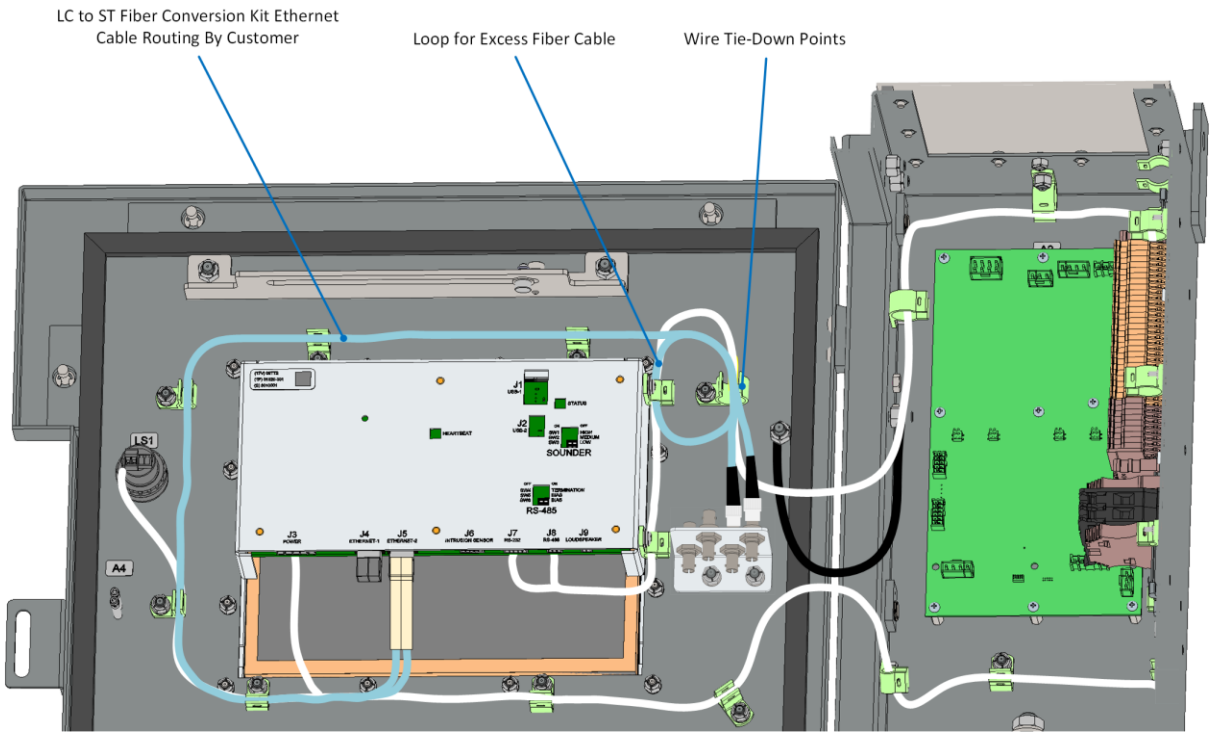


Figure 49: Fiber LC to ST Conversion Kit Cable Routing

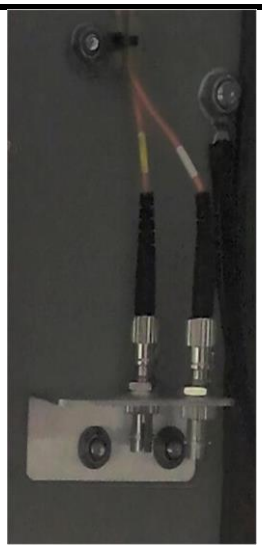


Figure 50: ST Fiber Ethernet Junction Block Connections

When wiring fiber ST field cables, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. Make sure the enclosure door is open fully, then follow the routing pattern for the yellow and white/yellow cable as indicated in Figure 51 below. When the wire is run as directed, secure the wires in place with wire ties.

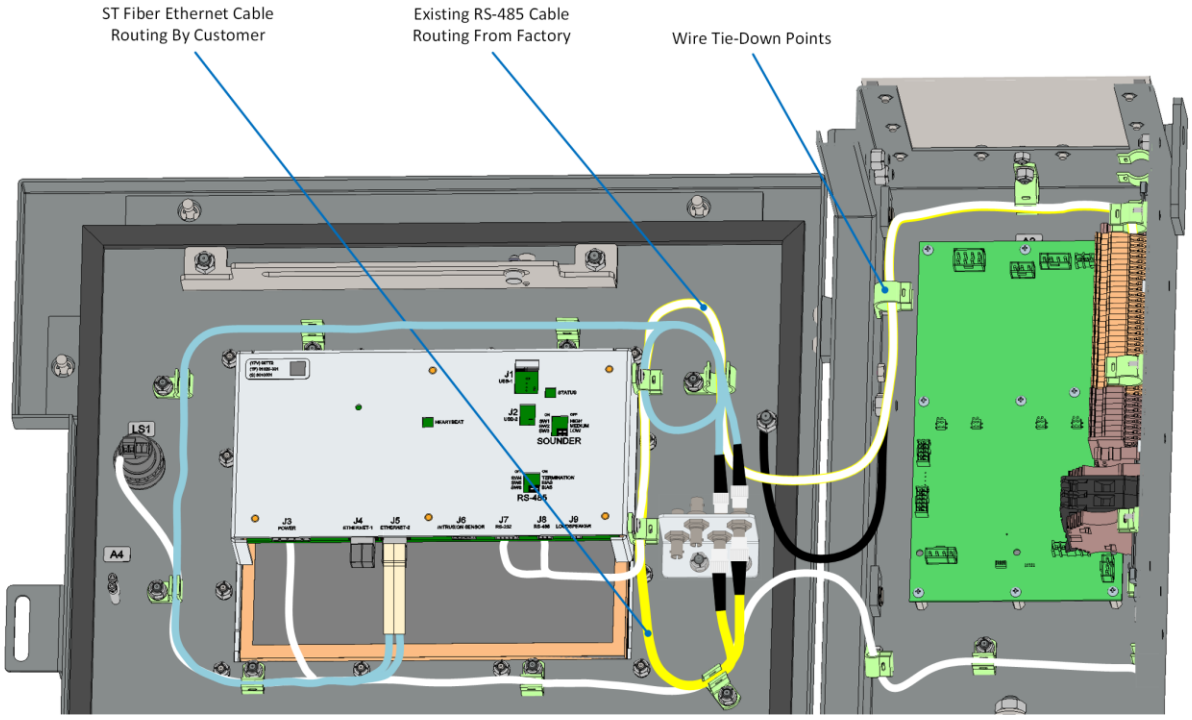


Figure 51: Cable Routing for ST Fiber Ethernet

NOTE: Failure to follow the routing pattern indicated may result in cables twisting or becoming strained potentially compromising connection integrity over time.

4.3.4.5.2 RS-485

The RS-485 circuit is rated as Power limited and Supervised with ground fault detect.

To wire the RS-485 circuit, pass the cables through the Cable Glands on the Gland Plate as indicated in Section 4.2.4. RS-485 cable connections on the TB1 terminal block are provided in Table 18.

TB1 Pin #	*RS-485 Network*
1 and 4	RS-485 +
2 and 5	RS-485 -
3 and 6	RS-485 GND

Table 18: RS-485 Network Connections

Example wiring with the FACP connected in the middle of the RS-485 bus is provided in Figure 52.

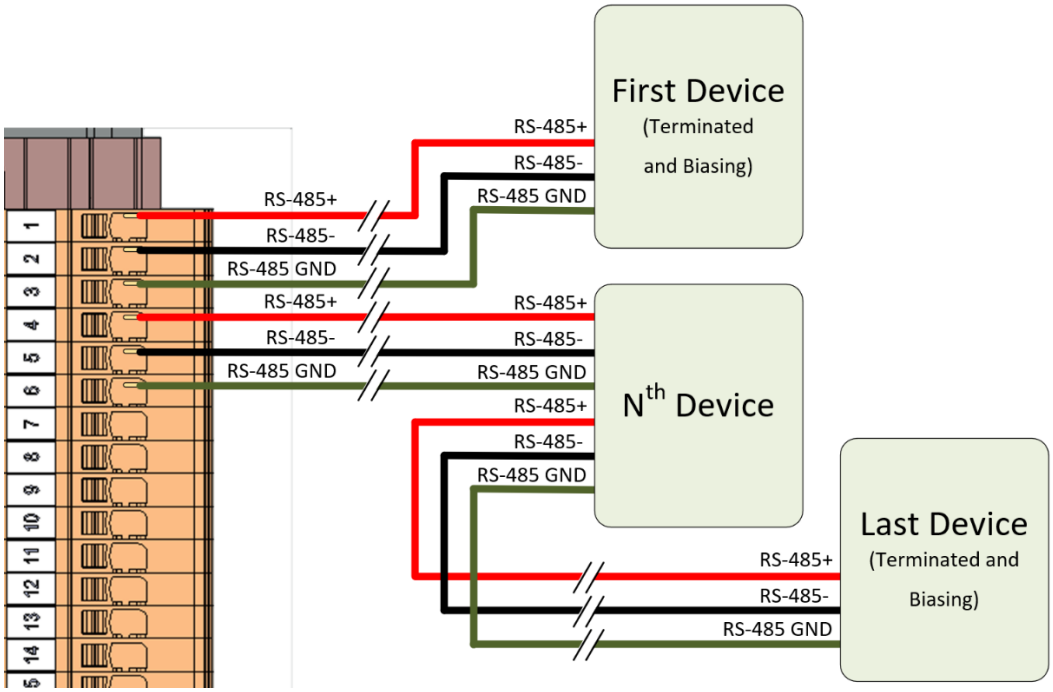


Figure 52: RS-485 Connections (TB1 1-6)

The RS-485 installation requires biasing and termination resistors. Use switches SW4 to SW6 on the TS1 Control Board to set the biasing and termination state on the panel. Refer to Section 4.3.2 TS1 DIP switches for the switch location.

The communication link follows RS-485 standards in requiring termination resistors be enabled at both ends of the RS-485 bus. Setting the TERMINATION switch to ON will enable 120 Ω termination at this node. If this panel is at either end of the RS-485 bus, enable TERMINATION.

Additionally, biasing must be enabled on at least one node in the network. For redundancy (i.e., if a network node with biasing is removed for maintenance or loses power) it is recommended that two network nodes activate biasing.

- TERMINAL (SW4): Set this switch "ON" to enable the termination resistor, "OFF" to disable it
- BIAS (SW5/6): Set both switches to "ON" to enable the bias resistors, "OFF" to disable the bias resistors

4.3.5 Circuit Protection

With the exception of Networking Communications circuits, all input and output circuits are fused for overcurrent protection. Circuits are protected with either a non-replaceable electronic fuse or fast blow replaceable fuse as detailed in the following sections.

4.3.5.1 Replaceable Fuses

Panels use fuses per UL 248-14 & MIL-PRF-15160/03:

- Two fuses are used for AC input power protection (XF1 in Figure 10 and Figure 4).
- Two fuses are used for 24VDC primary power protection (XF2 in Figure 10 and Figure 4).
- One automotive style fuse is used on the power supply battery charging / interface circuit.

See Section 4.3.3.3 for details on inspecting and replacing fuses.

4.3.5.2 Electronic Non-Replaceable Fuses with Automatic Reset

The following fuses are not replaceable and will automatically reset to the normal position when the associated fault is cleared:

AUX:

- 3A+ electronic for Power Limited
- 11A peak surge for SLC NACs

NAC:

- 1.8A+ polyfused for power limited 3A, “slow blow”
- 11A for shorts (1A NAC supports 10A surges), "fast blow"

RAC: Electronic Fuse, 1A

SLC:

- 1.8A polyfused (internal faults)
- electronic fuse (external faults)

Power Supply 24VDC1 and DC2 Outputs:

- If the TS1 is not activating and the SYS FLT LED indicator is illuminated on the power supply, it may indicate that there is a ruptured fuse on the power supply board (DC1).

4.3.5.3 Electronic Non-Replaceable Fuses without Automatic Reset

The following fuses are not replaceable and remain blown when a fault is detected:

Power Supply AC Input:

- The power supply's AC input is electronically fused and is non-replaceable. Rupture of this fuse indicates a major malfunction, and the supply should be replaced.

4.3.5.4 SLC circuit Isolators

The FACP provides SLC negative leg isolation on each SLC loop that protects against shorting faults on the initial/final leg of the SLC loop between the first/last device and the control panel. The FACP loop isolation is typically used in concert with the SLC isolators present in SLC Class A or X devices.

FACP SLC loop isolation operates independently for each loop and will function based on the loop configuration as follows:

- SLC loops configured for class B, internal isolation is disabled.
- SLC loops configured for class A or X, internal isolation is enabled on both the A and B side of the circuit.

NOTE: Isolator does not protect in CLASS B mode, nor 100% in class A. Isolator protects only SLC + to SLC - faults.

NOTE: Refer to Section 3.3.1.1 Circuit Isolation for considerations when planning for and wiring isolating devices into the loop.

4.3.5.5 SLC Isolation vs electronic fuse operation and considerations

Each SLC utilizes an auto-resetting electronic fuse to protect against excessive current draw from the FACP. In rare cases, an internal auto-resetting polyfuse provides additional protection to the SLC circuitry.

SLC Isolators will open when voltage between "+" and "-" drops below a certain value (a short circuit). The unpowered / open circuit is only present between isolators experiencing the low voltage condition allowing the rest of the circuit to remain operational. When a pre-determined load resistance is measured by the isolators (short removed), the open segment is reconnected.

Note, weak shorts may not bring the SLC voltage down enough for the isolators to open but may be enough to draw more current than is allowed for a power limited circuit. Under this condition, the electronic fuse will trip before the isolator opens the circuit. UL defines a wire-to-wire short as 0.1 ohms or less.

Other possible reasons for the fuse to trip instead of the isolators opening:

- SLC + shorted to Aux power supply + or –
- SLC + shorted to panel NAC or RAC outputs
- SLC + shorted to another SLC output

APPENDIX A – PRODUCT SPECIFICATIONS

Table 19: Product Specifications

Functional Area	***Specification***
FACP Enclosure	
Input Power	115VAC +/- 15%, 50-60 Hz, 3.2Amps
Rechargeable Battery Circuit	• Voltage: Two 12V batteries in series • Type: Sealed Lead Acid • Ampere-Hour (Ah): 13Ah to 42Ah • Charging: 2A +/- 10%
Mounting	Four 3/8-inch diameter, 16 threads-per-inch (tpi), grade 5 bolts (no bulkhead foundation needed)
Dimensions	20” H x 20” W x 9” D (the height is 23” when including mounting tabs)
Environment	• -30°C to +60°C (-22°F to +140°F) Operating, -30°C to +80°C (-22°F to +176°F) Storage • Fully Sealed (IP67 Protection)
Weight	• 75 pounds including 2x13 Amp-hour batteries, or • 102 pounds including 2x28 Amp-hour batteries, or • 126 pounds including 2x42 Amp-hour batteries
Security	Enclosure physical entry lock hasp with intrusion detection
Signaling Line Circuits (SLCs)	
Quantity	4 independent loops
Capacity	Addressable devices per loop: • 126 legacy devices (504 total per panel) • 254 Core Protocol devices (1016 per panel)
Network Types	Class A, B, or X
Rating	Special application, power-limited, and supervised
Output Power	400mA; 24V, 28V; DC Max line impedance: Device types and quantity attached will determine maximum impedance. Refer to Section 3.4 Installation Planning Tool for further details.

Cable Gauge	• 14 AWG • 16 AWG • 18 AWG • 18 AWG 2XSW-1 (MIL DTL 24640-16E)
Max Cable Length	12000ft (dependent on devices, cable, and SLC voltage setting)
Panel Notification Appliance Circuit (NAC)	
Quantity	1 circuit
Network Types	Class A or B
Rating	Dual-rated, power-limited, and supervised
Output Power	24VDC, 1A either special application or regulated depending on synchronization
Line Impedance	Max line impedance: Device types and quantity attached will determine maximum impedance. Refer to Section 3.4 Installation Planning Tool for further details.
Cable Gauge	• 14 AWG • 16 AWG • 18 AWG • 18 AWG 2XSW-1 (MIL DTL 24640-16E)
Synchronization	Built-in Wheelock
SLC Notification Appliance Circuit (SLC NAC)	
Quantity	NAC connected to addressable SLC Sounder Control Module. Dependent on SLC circuit and AUX circuit capacity.
Network Types	Class A or B
Rating	Dual-rated, power-limited, and supervised
Output Power	24VDC, 1A either special application or regulated depending on presence of DSM for synchronization
Line Impedance	Max line impedance: Device types and quantity attached will determine maximum impedance. Refer to Section 3.4 Installation Planning Tool for further details.
Cable Gauge	• 14 AWG • 16 AWG • 18 AWG

	• 18 AWG 2XSW-1 (MIL DTL 24640-16E)
Synchronization	Requires Wheelock DSM installation directly attached to SLC Sounder Control Module
Releasing Actuation Circuit (RAC)	
Quantity	1 circuit
Network Types	Class B
Rating	Special application, power-limited, and supervised
Output Power	24VDC, 1A
Cable Gauge	• 14 AWG • 16 AWG • 18 AWG • 18 AWG 2XSW-1 (MIL DTL 24640-16E)
Auxiliary Power (Aux)	
Quantity	2 circuits
Rating	Dual-rated, power-limited, and supervised* * Only SLC NAC, Annunciator, and Portable Annunciator connections will detect loss of Aux power.
Output Power	Regulated 24V 1A, special application 24V 3A
Cable Gauge	• 14 AWG • 16 AWG • 18 AWG • 18 AWG 2XSW-1 (MIL DTL 24640-16E)
Ethernet Communications	
Quantity	2 x 10/100 Mbps circuits with ground fault detect
Network Connections	2 internally switched ports as: • Copper/Copper, Copper/Fiber, or Fiber/Fiber Copper is RJ45 Fiber is: • LC, Multimode, 1310 nm, or • ST, Multimode, 1310 nm (with optional conversion kit)
Network Types	Class A, B, or X
Rating	Power-limited and supervised

Topology	Ring (pending) or Bus
Panel-to-Panel	Supported
Protocols	EtherNet/IP Client and/or Server, Modbus TCP/IP Client or Server, SNMP, Custom TCP/IP or UDP Messaging
RS-485 Communications	
Quantity	2-Wire Isolated RS-485 Interface with Selectable On-board Biasing and Termination
Network Type	Class B
Rating	Power-limited and supervised
Max Baud Rate	Up to 1 Mbit / Second
Biasing	510 Ω high and low
Termination	120 Ω
Network Load / Drive	Panel is 1/8 unit load. Can drive up to 7 unit loads in bus topology.
Panel-to-Panel	Not supported
Protocols	Master or Slave Modbus RTU/ASCII, Master or Slave FairNET, and Custom ASCII or Binary Messaging
FDS System	
Panel-to-Panel	Up to 30 panels and annunciators (max 20 control panels)
Max addressable Devices	• Up to 8,000 (across all panels) • Up to 504 (legacy) / 1016 (Core Protocol) (single panel)
System Log Capacity	100,000 entries minimum
Event List Capacity	2,000 entries
Zone support	• Includes pre-alarm, alarm, and releasing with timers, grouping, and cross-zone functionality • Detectors support pre-programmed activation modes and custom activation thresholds
Max Number of Zones	200 entries
Security	• Intrusion detection • Role based user authentication access control with event logging (includes remote log support) • Data encryption, data wipe, trust groups, and secure boot