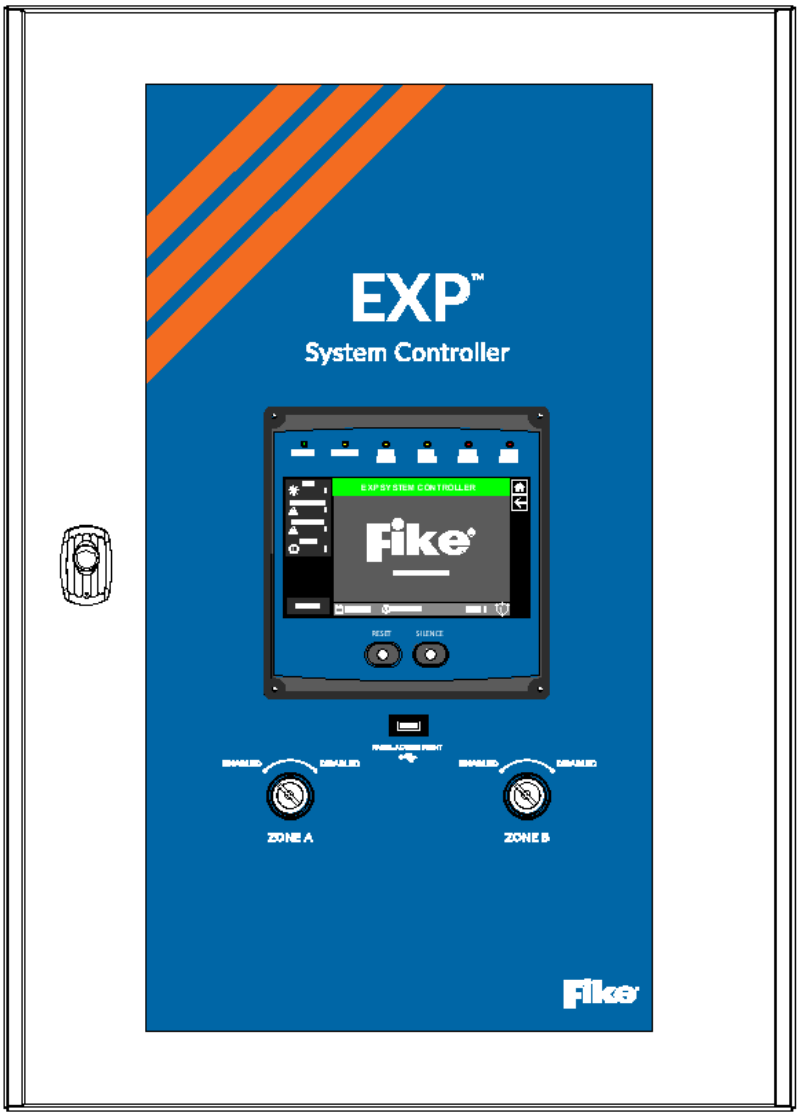
INSTALLATION, OPERATION AND MAINTENANCE MANUAL

EXP™ System Controller



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1.0 INTRODUCTION

1.1 About This Manual

This manual is intended to be a complete reference for installing, operating, and maintaining the Fike EXP Control Panel. The first-time installer and/or user should thoroughly read and understand the instructions contained within this manual before installing or using this device. The instructions contained in this manual must be followed to avoid potential damage to the equipment itself, adverse operating conditions caused by improper installation, and false activation of the connected suppression/isolation systems.

1.2 Product Support

Fike's worldwide distribution network sells, installs, and services Fike equipment. If you have any questions or encounter a problem not covered in this manual, contact the nearest Fike Sales Outlet/Office. The nearest Fike Sales Outlet/Office may be found online at www.fike.com.

1.3 Safety Information

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment.

WARNING: Indicates the presence of a hazard that will or may cause personal injury, death, or loss of service if safety instructions are not followed or if the hazard itself is not avoided.

CAUTION: Indicates the presence of a hazard that will or may cause damage to the equipment if safety instructions are not followed or if the hazard is not avoided.

NOTE: Provides a helpful hint, sometimes a tip, to help the installer work more efficiently.

This "hard-hat" symbol indicates a procedure SHALL be performed ONLY by factory-trained and certified personnel.

IEC 60417 - 5019, Protective earth; protective ground.
Function/description: To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.

IEC 60417 - 5041, Caution, hot surface.
Function/description: To indicate that the marked item can be hot and should not be touched without taking care.

1.4 Approvals

- Factory Mutual (FM)
- Conformité Européenne (CE)
- Atmosphères Explosibles (ATEX)

For exact certification listings, please reference the respective agency website.

1.5 System Label

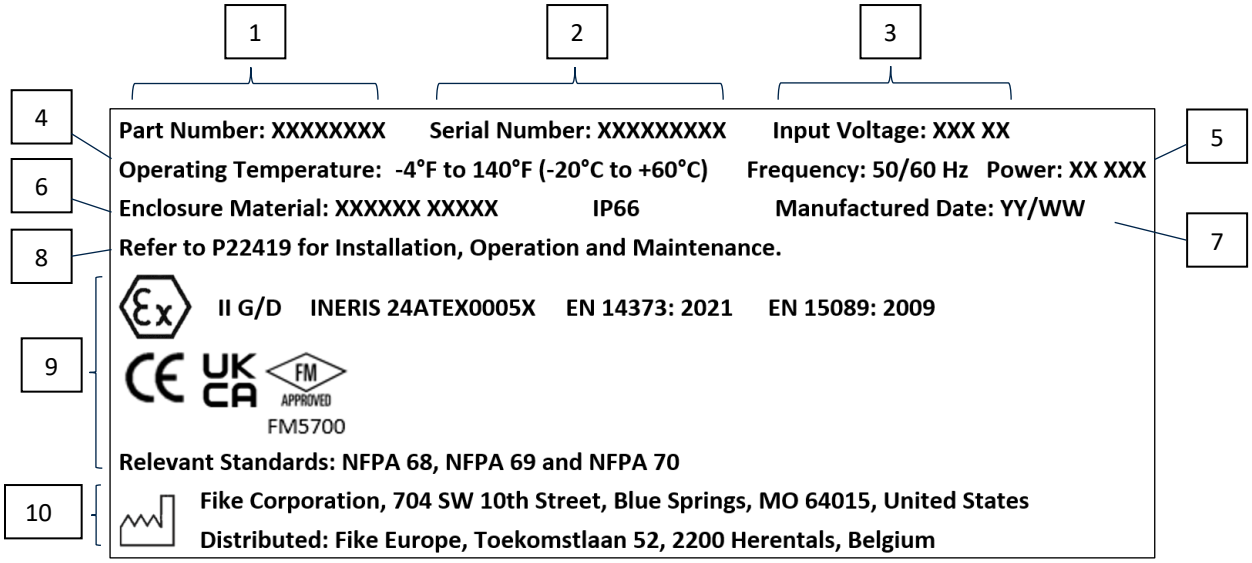


Table 1 – Label Parts

Item	Description
1	Part Number
2	Serial Number
3	Input Voltage
4	Operating Temperature
5	Input Frequency and Power
6	Enclosure Material, IP rating
7	Manufactured Date (YY/WW)
8	Manual Reference
9	Approvals and Standards
10	Manufacturer

1.6 General Description

The EXP System Controller is the heart of Fike's explosion suppression system. Its state-of-the-art design features a micro-processor-based main circuit board specifically designed to monitor the protected hazard, react to incipient explosions, and activate the components of the explosion protection system, which range from chemical suppression, mechanical isolation (gate and pinch valve), chemical isolation, or any combination thereof.

The EXP can operate as a standalone controller for small to medium-sized explosion protection applications. It can also be networked with up to seven other EXP panels for larger applications. Each panel can be configured to operate as a single-zone or dual-zone system based on programming. Each unit can support up to ten configurable, non-intrinsically safe detection input circuits. Each circuit can monitor pressure and/or flame-radiation detectors designed to sense the incipient explosion and trigger the explosion suppression and/or isolation systems.

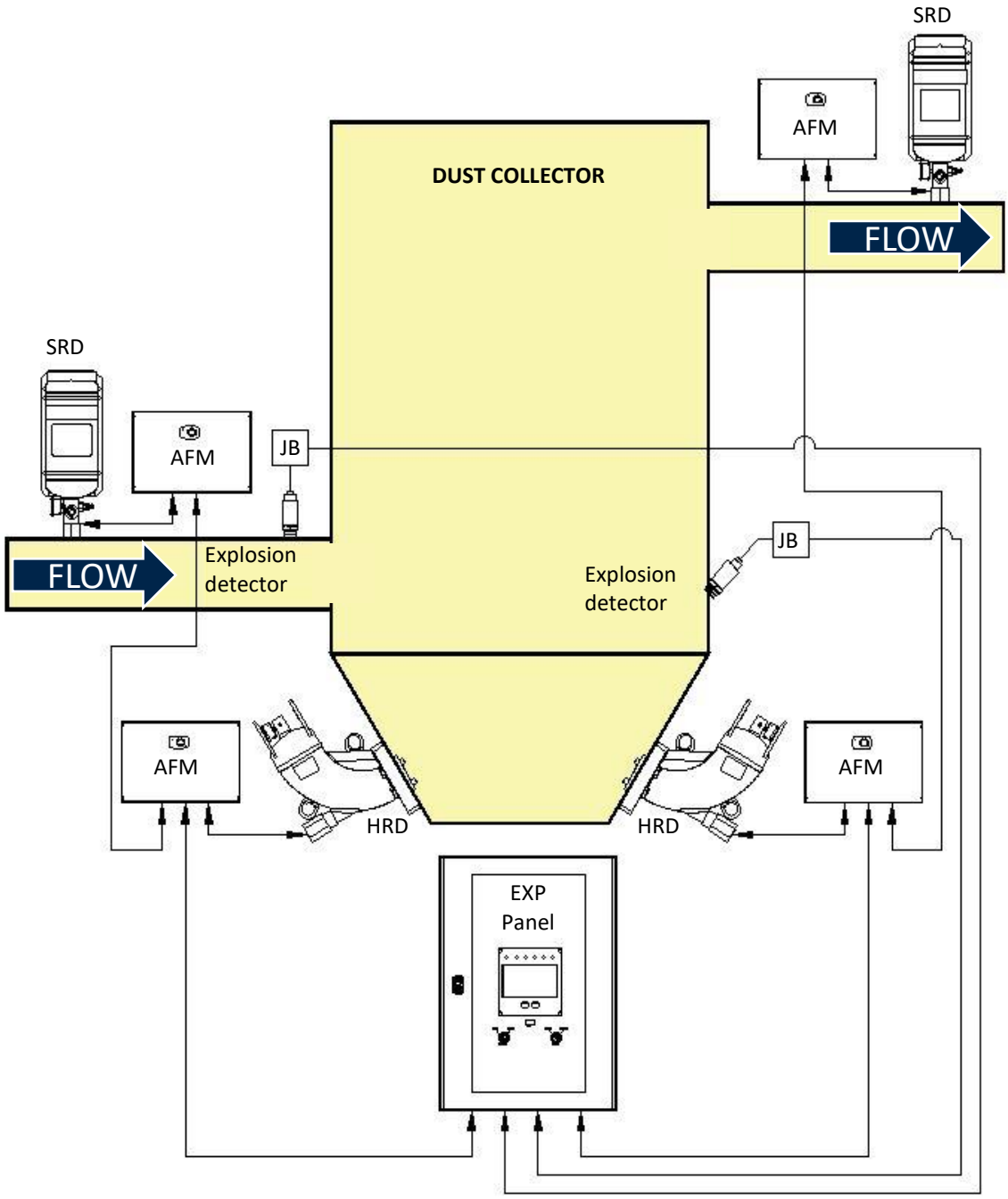
The EXP design uses modular hardware to facilitate rapid configuration, installation, and testing. The main board, system power supply, emergency batteries, field connection board, optional detection input, and relay boards are all incorporated into a common enclosure. A touchscreen user interface displays all fault and alarm messages, giving real-time indication of the system status. All system events are stored in the panel's non-volatile event history buffer and can be reviewed through the user interface or downloaded for review.

The EXP System Controller provides two independent releasing circuits (zones A and B). Each circuit can support up to ten addressable field modules (AFM), allowing a maximum of twenty suppression and/or isolation components to be connected to a single panel, depending on the AFMs used. The AFMs are mounted directly adjacent to the explosion suppression and isolation component they control and monitor, eliminating the long wire runs typically associated with other explosion suppression control panels. The AFMs provide the flexibility to attach the required devices for your installation.

1.6.1 EXP System Configuration Example

Figure 1 provides a general overview of how the EXP system components are utilized to form a completed system.

Figure 1 – EXP System Overview



2.0 SYSTEM COMPONENTS

2.1 EXP Enclosure

The EXP panel can be ordered with a carbon or stainless steel wall-mounted enclosure. The carbon steel enclosure provides a removable cable gland plate at its bottom to facilitate field wiring installation. The lockable outer door is hinged on the right and provides a transparent safety glass window to allow clear viewing of the Panel's user interface and diagnostic LEDs. An inner dead front door is provided to restrict access to the system's electronic components with the enclosure door open.

Figure 2 – EXP Control Panel Front View

Table 2 – Enclosure Specifications

Enclosure	Carbon Steel Enclosure	Stainless Steel Enclosure
Material	Steel body, single piece, Door steel with security glass	Body and door 304L stainless steel Door with security glass
Mounting	Wall-mount to solid structural surface	
Gland Plate	Yes	No
Finish	Epoxy-polyester powder	Scotch-Brite® brushed
Color	Gray RAL 7035	NA
Standards	IEC 62208	
Net Weight	54 lb (24.5 kg)	58 lb (26.31 kg)
NEMA degree of protection	1, 2, 3, 3R, 4, 4X, 5, 12, 13	
IP Degree of Protection	IP66 IEC 60529	
IK Degree of Protection	IK08 IEC 62262	
Door Opening Side	Reversible, 120°	
Lock Type	3-point lock, 3 mm double-bar	
Removable Parts	Door by hinges, cable gland plate by screws	Door by hinges

2.1.1 Enclosure Layout

Several of the EXP boards are factory-installed in the system enclosure before shipment, as shown in **Figure 3**. The Main Controller and Detector input boards are shipped separately and must be field-installed by factory-trained personnel. This is done to prevent potential board damage during shipment and enclosure installation. Factory wiring is provided to connect AC and DC battery power to the main board. Disconnect switches are provided for both the AC and DC power to allow easy power down of the Panel for service and maintenance.

Figure 3 – Typical EXP Enclosure Layout

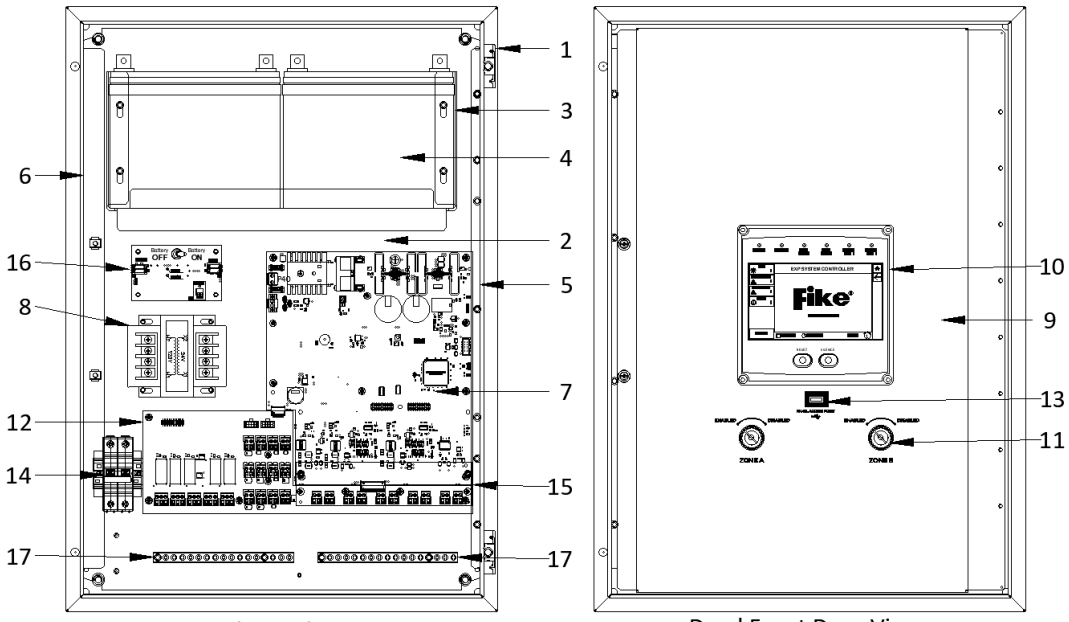


Table 3 – Enclosure Components

Item	Description	Part Number	Item	Description	Part Number
1	System Enclosure Carbon Steel (Enclosure Only) Stainless Steel (Enclosure Only)	 02-17538 02-17539	9	Dead Front Door, CS (hinged)* Dead Front Door, SS (hinged)*	70-2361 F0291012
			10	User Interface	10-3009
2	Back Panel*	E10-0196	11	Disable Switch (qty. 2)*	02-11912
3	Battery Shelf*	70-2366	12	Field Connection Board*	10-3060
4	Standby Batteries	Varies	13	USB Port*	F0290268
5	Dead Front Hinge Bracket*	70-2362	14	AC Disconnect Switch*	02-17186
6	Dead Front Stop Bracket*	70-2363	15	Mock Input Board	F0291482
7	Main Controller	10-3018	16	Battery (DC) Monitor Board*	F0295332
8	AC Transformer* 100VAC to 24VAC 120VAC to 24VAC 240VAC to 24VAC	 02-10879 02-10881 02-10882	17	Grounding Bar (qty. 2)*	F0290283

*Component is installed at Fike before shipment. The remaining items will be installed in the field.

2.2 Primary Boards

The following boards are installed in the EXP enclosure either at the factory prior to shipment or are field installed after the EXP enclosure has been installed. The boards should remain in their anti-static shipping package until ready for installation. Proper anti-static safety precautions must be used when handling the electronic components.

The figures in this section identify the components of interest and the field connection points for each board.

2.2.1 Main Controller (P/N 10-3018) Board Layout

The Main Controller is the heart of the EXP system. It evaluates and stores information from the connected detectors, initiates the shutdown of the protected process, sends signals to actuate the explosion suppression system(s), and sends signals to the User Interface for display, annunciation, and reporting purposes.

Figure 4 – Main Controller Board Layout

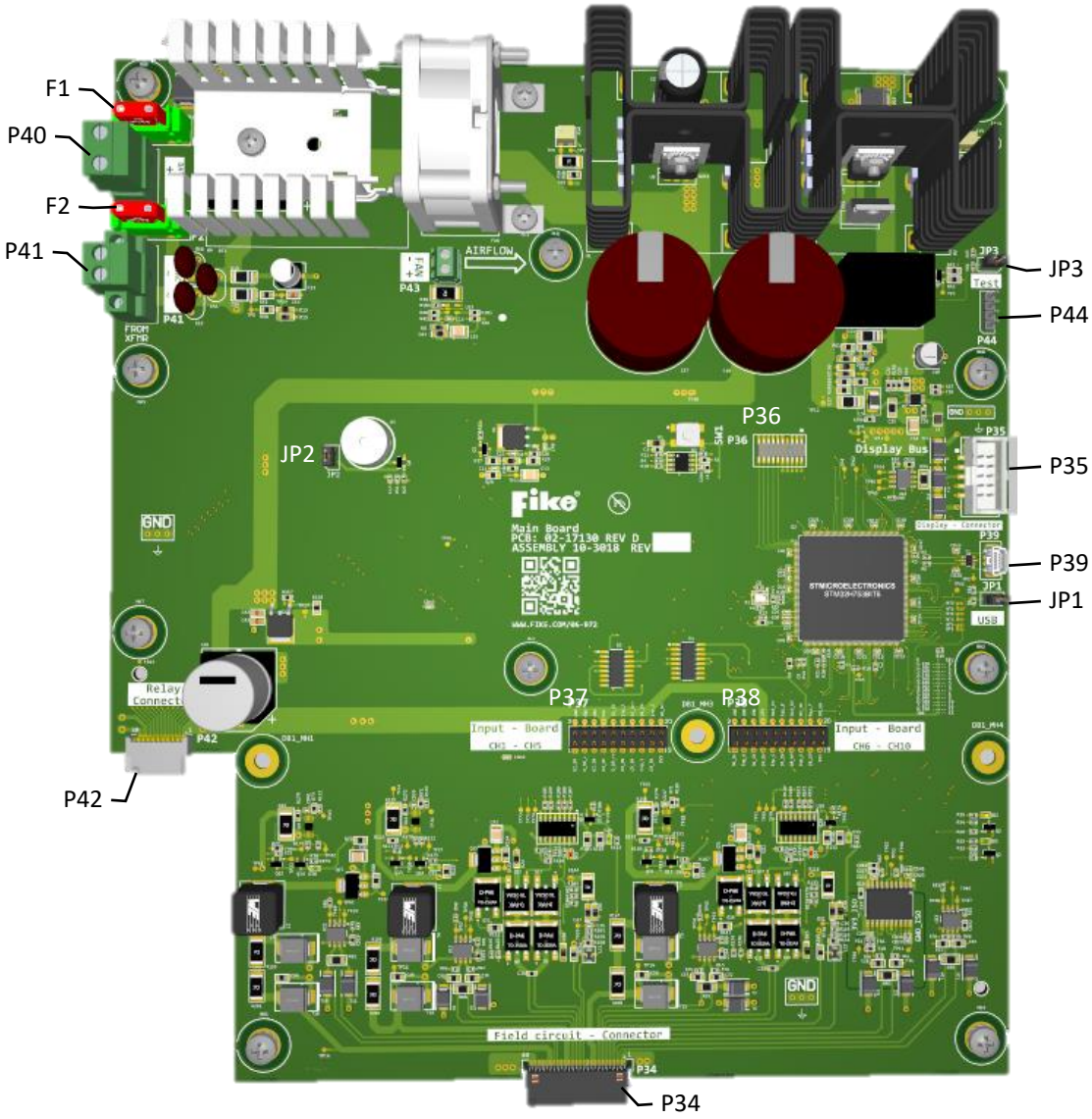


Table 4 – Main Controller Components

Label	Description	Function
P34	Field Circuit - Connector	Connection to the Field Connection Board for Field Input communication.
P35	Display - Connection	Connection to the User Interface via ribbon cable.
P36	----	Factory use only.
P37	Input-Board, CH1-CH5	Header for connection of Detector Input Board #1.
P38	Input-Board, CH6-CH10	Header for connection of Detector Input Board #1.
P39	----	Factory use.
F1	Battery Fuse	10A replaceable fuse for Main Controller protection.
P40	Battery Connection	Removable terminal block for battery connection from Battery Monitor Board.
F2	24VAC Power Fuse	10A replaceable fuse for Main Controller protection.
P41	24VAC Power Connection	Removable terminal block for AC power connection from AC power transformer.
P42	Relay Connector	Connection to the Field Connection Board for relay communication.
JP3	Test	Test jumper. Factory use only.
P44	Test	Scope Tool interface connection. Service only.
SW1	Push button	Main Controller hard reset (panel reset).
JP1	USB	Factory use only.
JP2	Piezo	Piezo disable. Service only.

2.2.2 Field Connection Board (P/N 10-3060) Layout

The Field Connection board is a companion board to the Main Controller. It connects directly to it via the P17 and P18 connectors. The board provides the following connection points for the EXP system: zone disable switches, panel network, AFM auxiliary power, AFM comms bus, and AFM release output. The Field Connection board provides five programmable (SPDT) safety relays with force-guided contacts. Relay capacity is expandable from five to ten by installing the optional Five Status Relay or Five Status Relay Safety module.

Figure 5 – Field Connection Board Layout

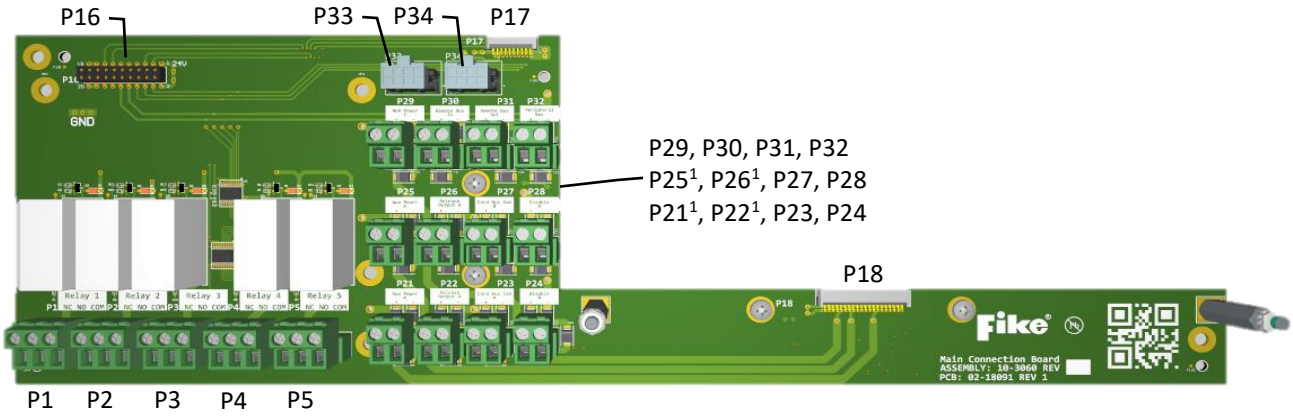


Table 5 – Field Connection Board Components

Label	Description	Function
P1 – P5	Safety Relays 1-5	Individually programmable safety relays (NC/NO/COM).
P16	Relay Connector	Header for connection of the optional Safety Relay Board.
P17	Main Board – Relay Connector	Connection to the Main Controller Board for relay communication.
P18	Main Board – Field Circuit Connector	Connection to the Main Controller Board for Field Input communication.
P21[1]	Aux Power A (+/-)	Zone A, 24VDC auxiliary power for Actuator Field Modules.
P22[1]	Release Output A (+/-)	Zone A, Reverse polarity signal for Actuator Field Modules.
P23	Card Bus Com A (+/-)	Zone A, RS485 communication for Actuator Field Modules.
P24	Disable A (+/-)	Zone A, Disable Switch input.
P25[1]	Aux Power B (+/-)	Zone B, 24VDC auxiliary power for Actuator Field Modules.
P26[1]	Release Output B (+/-)	Zone B, Reverse polarity signal for Actuator Field Modules.
P27	Card Bus Com B (+/-)	Zone B, RS485 communication for Actuator Field Modules.
P28	Disable B (+/-)	Zone B, Disable Switch input.
P29	Aux Power C (+/-)	24VDC auxiliary power for field devices
P30	Remote Bus In (+/-)	Panel to panel network communication for release operation.
P31	Remote Bus Out (+/-)	Panel to panel network communication for release operation.
P32	Peripheral Bus (+/-)	Future use.
P33	Zone disable switch A	Zone A, remote disable switch input.
P34	Zone disable switch B	Zone B, remote disable switch input.

[1] Connectors are keyed to ensure proper Zone A and Zone B connection.

2.2.3 User Interface (P/N 10-3009) Layout

The User Interface displays system events on a color touchscreen display. Five status LEDs and two control buttons with integrated white LEDs are also provided on the interface. Event history is stored in memory and is accessible without interruption in system protection. Access to most of the features and functions available through the display menus is available only by entering an access code.

Figure 6 – User Interface, Operators View Layout

Figure 7 – User Interface, Board View Layout

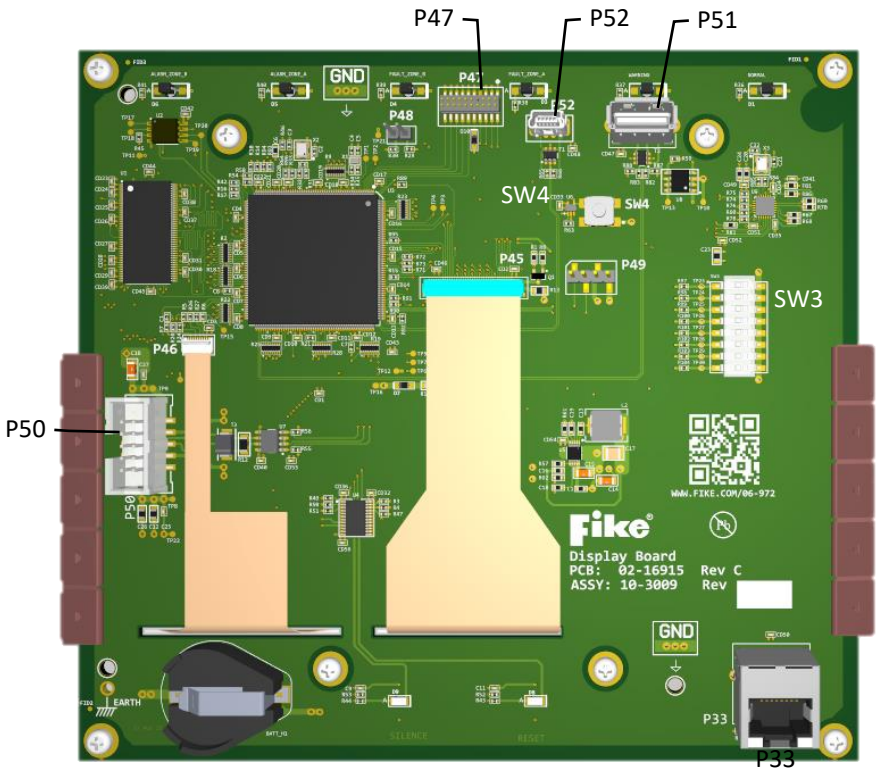


Table 6 – User Interface Board Components

Label	Description	Function
SW3	Panel address dip-switch	Used to set panel ID on the fire bus network.
SW4	User Interface reset switch	Used to perform a hard reset of the User Interface.
P33	----	Future use.
P47	----	Factory use only.
P50	User Interface cable connection	Pathway for communication with the Main Controller.
P51	USB cable connection	Download pressure data after system activation.
P52	PC connection	System configuration upload. Service use only.

2.2.4 Mock Detector Input Board (P/N F0291482) Layout

The Mock Detector Input Board ships with some models to allow field termination of detection circuits before commissioning. Factory-trained and certified personnel must remove and replace it with a functional detection board before system operation.

Figure 8 –Mock Detector Input Board Layout

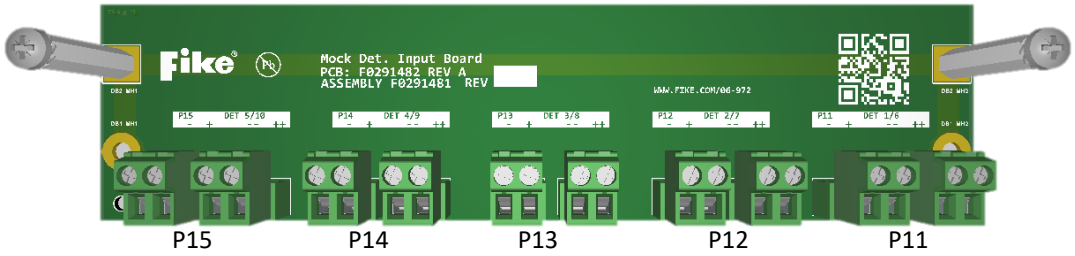


Table 7 – Mock Detector Input Board Components

Label	Description	Function
P11	DET 1/6 (-/+/--/++)	Removable terminal block for detector input connection.
P12	DET 2/7 (-/+/--/++)	Removable terminal block for detector input connection.
P13	DET 3/8 (-/+/--/++)	Removable terminal block for detector input connection.
P14	DET 4/9 (-/+/--/++)	Removable terminal block for detector input connection.
P15	DET 5/10 (-/+/--/++)	Removable terminal block for detector input connection.

2.2.5 Battery Monitor Board (P/N F0295332) Layout

The Battery Monitor Board provides an ON/OFF switch for disconnecting the EXP panel's standby batteries. The board supervises the batteries for over-charging conditions and will automatically disconnect the batteries should this condition occur. A NORMAL and TROUBLE LED indicates battery status.

Figure 9 –Battery Monitor Board Layout

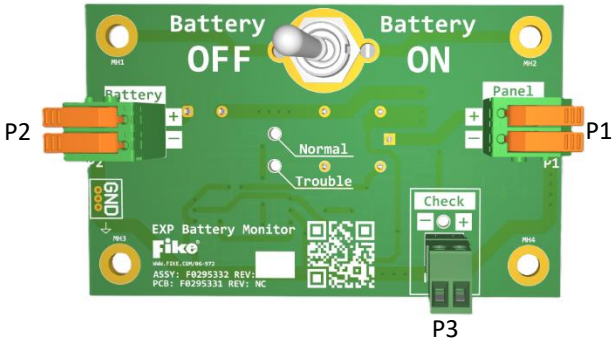


Table 8 – Battery Monitor Board Components

Label	Description	Function
P1	Panel Connector (-/+)	Connection point for standby battery connection to Main Controller.
P2	Battery Connector (-/+)	Connection point for the standby battery wiring.
P3	Check Connector	Future use. Service only.
----	Battery ON/OFF	Toggle switch for connecting/disconnecting the standby batteries.
----	Normal (Green LED)	Battery voltage normal LED ▪ > 29.5VDC = OFF ▪ < 29.5VDC = ON
----	Trouble (Yellow LED)	Battery trouble LED ▪ Battery charge voltage > 29.5VDC = ON (board will automatically disconnect the batteries from the charging circuit.) **NOTE:** Battery WARNING indicated at panel indicating the battery trouble condition.

2.3 Detector Input Boards

The base EXP panel configuration does not include a Detector Input Board. At least one board must be installed on an EXP system (single Panel or networked Panels) to connect 4-20mA or contact-closure devices. Each EXP panel supports the installation of up to two Detector Input Boards. Adding two Detector Input Boards to the EXP Panel allows ten detection inputs to be connected to a single panel. The Detector Input mounts to the Main Controller using the standoffs provided.

2.3.1 Class A, Non-Intrinsically Safe (P/N 10-3014) Detector Input Board Layout

The Class A, Non-intrinsically Safe Detector Input Board provides five non-intrinsically safe detector input circuits that can be wired Class A. Board inputs can also be wired Class B with the addition of jumpers, as shown in the circuit diagram. (See Section 4.8).

Figure 10 –Class A, Non-Intrinsic Safe, Detector Input Board Layout

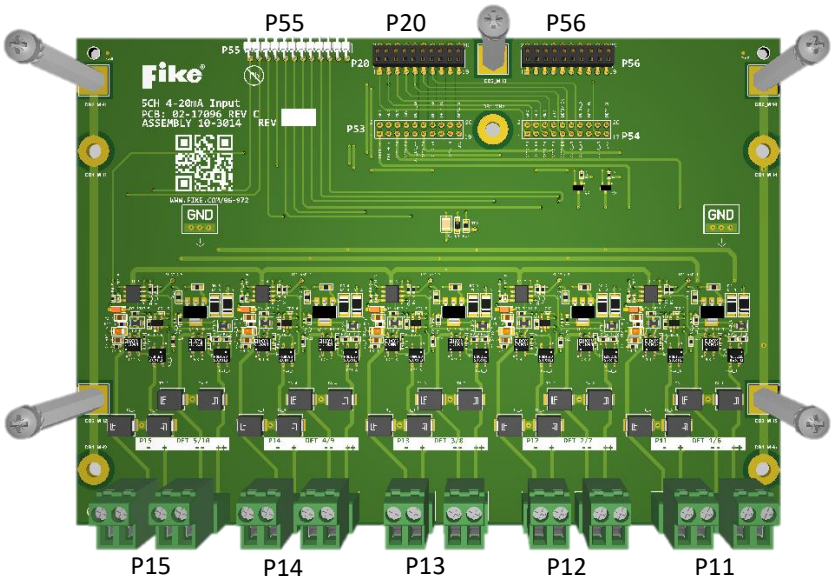


Table 9 – Class A, Non-Intrinsic Safe, Detector Input Board Components

Label	Description	Function
P11	DET 1/6 (-/+/--/++)	Removable terminal block for detector input connection.
P12	DET 2/7 (-/+/--/++)	Removable terminal block for detector input connection.
P13	DET 3/8 (-/+/--/++)	Removable terminal block for detector input connection.
P14	DET 4/9 (-/+/--/++)	Removable terminal block for detector input connection.
P15	DET 5/10 (-/+/--/++)	Removable terminal block for detector input connection.
P20	----	Header for connection of Detector Input Board #2.
P53	----	Header pins for connection of Detector Input Board #1 to Main Controller.
P54	----	Header pins for connection of Detector Input Board #1 to Main Controller.
P56	----	Header for connection of Detector Input Board #2,

2.3.2 Class B, Non-Intrinsically Safe (P/N F0291448) Detector Input Board Layout

The Class B, Non-intrinsically Safe Detector Input Board provides five non-intrinsically safe detector input circuits that can be wired Class B only.

Figure 11 –Class B, Non-Intrinsic Safe, Detector Input Board Layout

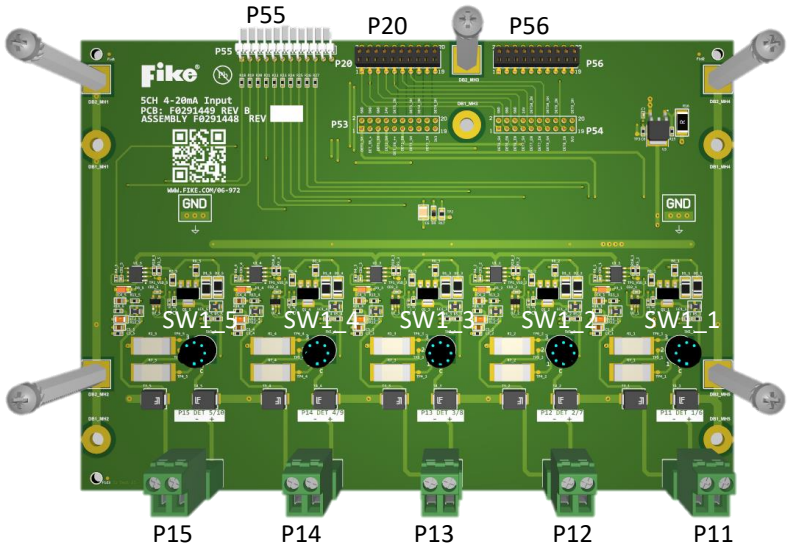


Table 10 – Class B, Non-Intrinsic Safe, Detector Input Board Components

Label	Description	Function
P11	DET 1/6 (-/+/--/++)	Removable terminal block for detector input connection.
P12	DET 2/7 (-/+/--/++)	Removable terminal block for detector input connection.
P13	DET 3/8 (-/+/--/++)	Removable terminal block for detector input connection.
P14	DET 4/9 (-/+/--/++)	Removable terminal block for detector input connection.
P15	DET 5/10 (-/+/--/++)	Removable terminal block for detector input connection.
P20	----	Header for connection of Detector Input Board #2.
P53	----	Header pins for connection of Detector Input Board #1 to Main Controller.
P54	----	Header pins for connection of Detector Input Board #1 to Main Controller.
P56	----	Header for connection of Detector Input Board #2.
SW1_1	Rotary Switch	3-position rotary switch for setting detector input circuit input type.
SW1_2	Rotary Switch	3-position rotary switch for setting detector input circuit input type.
SW1_3	Rotary Switch	3-position rotary switch for setting detector input circuit input type.
SW1_4	Rotary Switch	3-position rotary switch for setting detector input circuit input type.
SW1_5	Rotary Switch	3-position rotary switch for setting detector input circuit input type.

2.4 Relay Boards

The base EXP panel configuration provides five configurable (SPDT) safety relays on the Field Connection Board. A single Five-Status Relay Board can be mounted to the Field Connection Board to add five configurable (SPDT) safety relays. The relay card is also available in a Safety version, incorporating force-guided relays rather than general-purpose relays.

2.4.1 Five Status Relay Board (P/N 10-3016) Layout

The Five Status Relay Board provides five Form-C SPDT relay contacts that can be used to initiate process shutdown or for monitoring purposes.

Figure 12 – Five Status Relay Board Layout

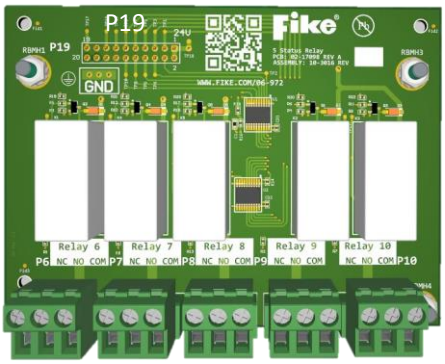


Table 11 – Five Status Relay Board Components

Label	Description	Function
P6	Relay 6 (NC/NO/COM)	Individually programmable SPDT relay.
P7	Relay 7 (NC/NO/COM)	Individually programmable SPDT relay.
P8	Relay 8 (NC/NO/COM)	Individually programmable SPDT relay.
P9	Relay 9 (NC/NO/COM)	Individually programmable SPDT relay.
P10	Relay 10 (NC/NO/COM)	Individually programmable SPDT relay.
P19	----	Header pins for connection to Field Connection Board (P16).

2.4.2 Five Status Safety Relay Board (P/N 10-3017) Layout

The Five Status Safety Relay Board Provides five Form-C SPDT force-guided relay contacts that can be used to initiate process shutdown or for monitoring purposes.

Figure 13 – Five Status Safety Relay Board Layout

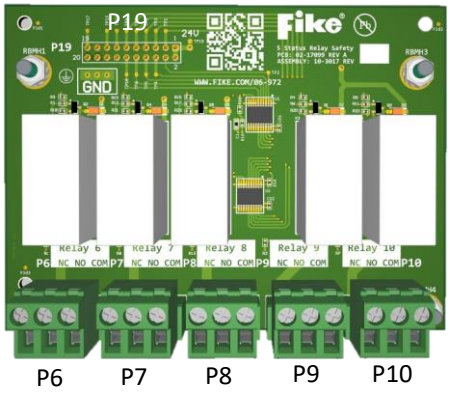


Table 12 – Five Status Safety Relay Board Components

Label	Description	Function
P6	Relay 6 (NC/NO/COM)	Individually programmable SPDT relay.
P7	Relay 7 (NC/NO/COM)	Individually programmable SPDT relay.
P8	Relay 8 (NC/NO/COM)	Individually programmable SPDT relay.
P9	Relay 9 (NC/NO/COM)	Individually programmable SPDT relay.
P10	Relay 10 (NC/NO/COM)	Individually programmable SPDT relay.
P19	----	Header pins for connection to Field Connection Board (P16).

2.5 Actuator Field Modules (AFM)

The explosion-protection field components (i.e., HRD, SRD, Gate Valves, etc.) are connected to the EXP panel using Actuator Field Modules (AFM). The AFMs provide the circuitry to control and monitor the explosion-protection system components.

Up to 20 AFMs can be connected to the EXP panel (10 per release circuit). The AFMs are mounted in a field box near the explosion protection component they serve. This drastically reduces the length of wire required to connect the explosion protection component to the EXP panel.

Refer to Fike document **P22420** for AFM installation instructions.

2.6 Battery Cabinet

The EXP system's standby batteries may be housed in the main panel enclosure; however, if the ambient temperature where the EXP panel is to be installed exceeds 113°F (45°C), the batteries cannot be installed in the EXP main panel enclosure. They must be installed in the external battery cabinet.

The EXP Battery Cabinet features the exact dimensions as the EXP Main Panel enclosure, with the following differences: It has a solid outer door and an enclosure-specific back plate, allowing up to two battery shelves to be installed. The battery cabinet can house up to four batteries (7AH to 44 AH maximum), and all types will use the same backplate assembly.

Figure 14 – Battery Cabinet

Table 13 – Battery Cabinet Specifications

Enclosure Part Number	F0295066	F0295067
Material	Steel body, single piece, CS Steel Door	Body and door 304L stainless steel
Mounting	Wall-mount	
Gland Plate	Yes	No
Finish	Epoxy-polyester powder	Scotch-Brite® brushed
Color	Gray RAL 7035	NA
Standards	IEC 62208	
Net Weight	48.5 lb (22 kg)	52.1 lb (23.6 kg)
NEMA degree of protection	1, 2, 3, 3R, 4, 4X, 5, 12, 13	
IP Degree of Protection	IP66 IEC 60529	
IK Degree of Protection	IK08 IEC 62262	
Door Opening Side	Reversible, 120°	
Lock Type	3-point lock, 3 mm double-bar	
Removable Parts	Door by hinges, cable gland plate by screws	Door by hinges

3.0 INSTALLATION

CAUTION: The components used in the EXP system are sensitive to electrostatic discharge (ESD). When handling electronic assemblies, you must take precautions to avoid the buildup of static charges on your body and the equipment.

- Do not open the anti-static packaging until the electronic component is ready to be installed.
- Wear a grounded wrist-strap to bleed off any static charge that may have built up on your body.

CAUTION: Never install or remove a component with power applied to the system.

It is critical to ensure that the system is installed correctly. Failure to follow this document's installation procedures and specifications may result in poor system performance. Strict adherence to the installation procedures and specifications will significantly reduce the likelihood of false activations.

NOTE: The hard hat symbol is used throughout this section to identify the EXP system components that must be installed by personnel who have been factory-trained and certified by Fike.

3.1 Installation Precautions

The effectiveness of the EXP system depends upon the instantaneous reaction of the protection system and is a direct function of its speed and response. Therefore, all possible measures must be taken to reduce system-component response times to an absolute minimum. It is essential to practice extreme caution when selecting the component mounting locations, cable specifications, cable routes, and the cleanliness of the power source supplying the EXP panel.

The electromagnetic environment surrounding the components can influence electronic devices, microprocessors, pyrotechnic initiators, and field wiring. The use of cellular phones, transmitters, induction motors, welding equipment, or the presence of power cables and transformers can create environments with high levels of electromagnetic radiation, resulting in induced electrical noise or voltage peaks. The location of EMI and RFI generating equipment should be noted when installing the EXP system.

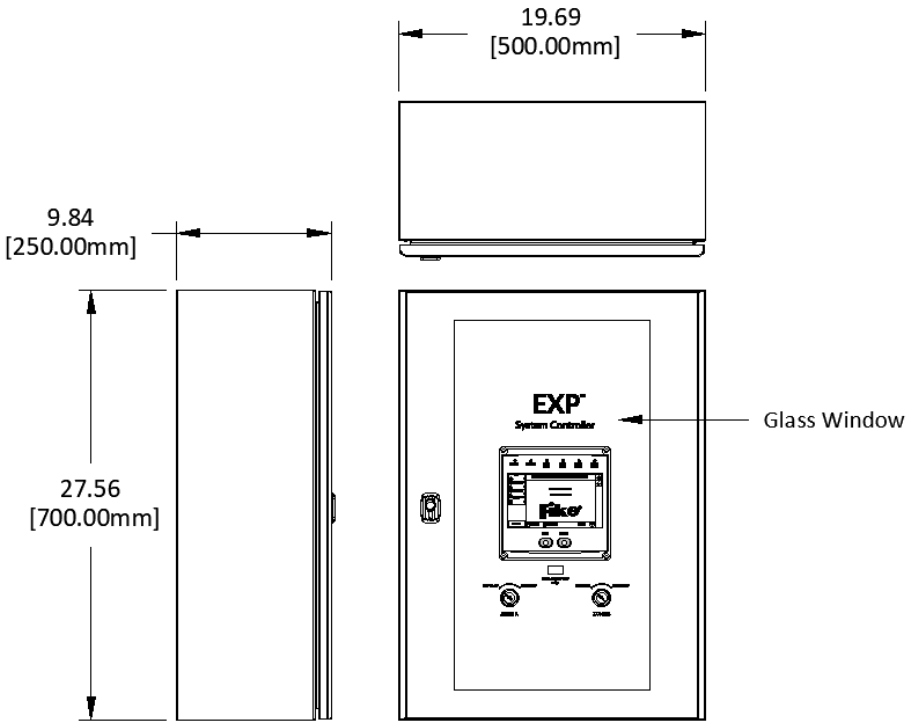
To reduce the electromagnetically induced noise to a level that will not affect the required performance of the explosion protection system, verify all earth connections.

3.2 Panel Mounting Location

The EXP control panel can be mounted indoors or outdoors, but indoors is preferred. It shall be mounted in an area that is readily accessible and has sufficient room to allow easy installation and maintenance. The mounting location must be capable of maintaining a nominal operating temperature of -4°F to 140°F (-20°C to 60°C), with 93% RH. Do not install the control panel in an environment that exceeds these values.

Additional items to consider when selecting the enclosure mounting location include vibration, dust, moisture, electromagnetic interference, and radio-frequency interference. These items could adversely affect the operation and useful life of the system and should be avoided. The EXP system is not rated for operation at altitudes exceeding 9,842 feet (3,000 meters) above sea level.

Figure 15 – EXP Enclosure Dimensions (Carbon Steel Enclosure Shown)



3.3 Enclosure Preparation

The EXP control panel is designed to have all field wiring enter the enclosure through the bottom. Depending on how the EXP control panel is ordered, the holes for bringing all field wiring into the enclosure may need to be drilled in the field, or the enclosure may come equipped with cable glands pre-installed to facilitate the entrance of field wiring into the enclosure. In either case, use the following instructions to prepare the enclosure for acceptance of field wiring before mounting.

CAUTION: Use extreme caution when drilling holes into the EXP enclosure so as not to damage the electronic components factory installed in the EXP panel.

Enclosure without cable glands:

Step 1. Determine the number and size of the penetrations required for the specific installation. Use a drill punch to mark the hole locations in the bottom of the enclosure or mark the drill location on the removable gland plate (if provided). Only drill the minimum number of holes required. A suitable plug must be installed if penetration is not used for any reason.

Step 2. Select the appropriate size drill bit and then drill the hole in the enclosure. Use extreme caution when drilling to prevent potential damage to the system components.

Step 3. Deburr all holes, ensuring no rough edges could damage the wire during installation.

Step 4. Install conduit connectors or cable glands into each hole to prepare for wiring installation.

Step 5. Thoroughly clean the interior of the enclosure, removing any debris or metal shavings that could damage the electronic components.

NOTE: To maintain the enclosure's IP/NEMA rating, all penetrations into the enclosure shall be made at the bottom of the enclosure.

Enclosure with cable glands:

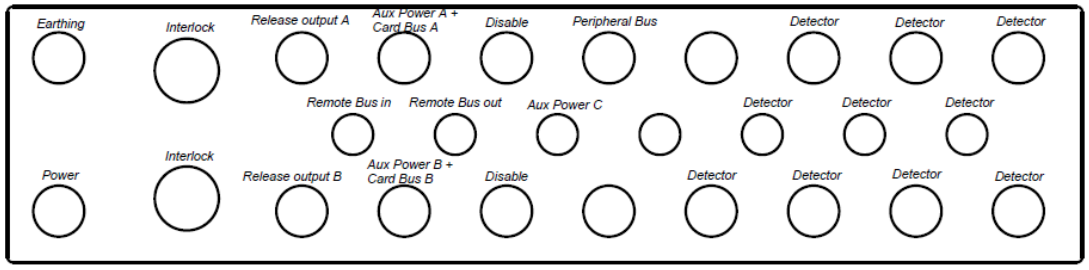
If the enclosure is ordered with cable glands, the maximum number of penetrations required for the EXP control panel is factory drilled in the bottom of the enclosure, and the required cable glands are installed. Depending on the system configuration, if not all cable glands are used, unused glands shall be removed, and blanking plugs shall be installed.

Step 1. Verify the number and location of the gland penetrations that will be in use based on the system configuration. See **Figure 16** for a typical cable gland layout.

Step 2. Remove any unused glands and install a blanking plug.

Step 3. Thoroughly clean the interior of the enclosure, removing any dust or debris.

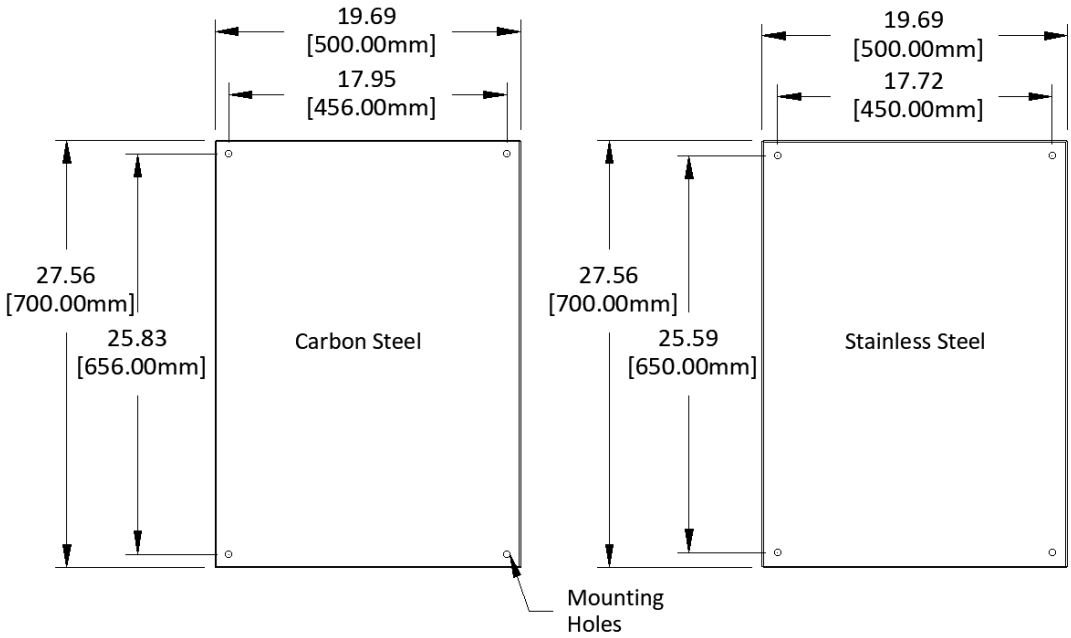
Figure 16 – EXP Enclosure with Cable Glands, Typical Layout



3.4 Enclosure Mounting

The EXP control panel must be surface mounted to a solid structural surface using anchors. Enclosures are equipped with four holes in the back of the enclosure for mounting purposes (See **Figure 17**). Mount the enclosure in an area that is readily accessible with sufficient room to allow easy service and maintenance.

Figure 17 – EXP Enclosure Mounting Dimensions (Back of Enclosure)



Fixing Lug Attachment to Cabinet

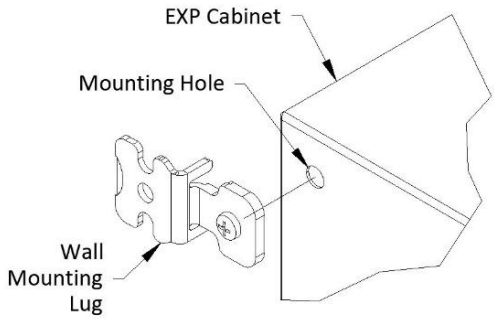
Fike recommends using Schneider wall fixing lugs to mount the EXP enclosure to the wall, as shown in **Figure 18**, **Figure 19** and **Figure 20**. Use the following instructions to attach the lugs to the enclosure.

Step 1: Orient the fixing lug horizontally. See **Figure 18**.

Step 2: Secure the fixing lugs to each corner of the enclosure using the integrated screw.

Step 3: Torque the screws to a maximum of 61.95 lb-in (7 Nm). Use the following instructions to mount the enclosure.

Figure 18 – Schneider Fixing Lug Attachment to the EXP Enclosure



Enclosure Attachment

Fike recommends using P1000 Unistrut channel to attach the EXP enclosure to the mounting surface, as shown in **Figure 19 and Figure 20**. Use the following instructions to attach the enclosure to the mounting surface.

Step 1: Cut the Unistrut channel to the appropriate length.

Step 2: Determine the appropriate mounting height for the enclosure and mark the mounting hole locations on the mounting surface. Consider the operator's ability to quickly read and use the panel's touchscreen display, and the ease of access to the enclosure for service or maintenance.

Step 3: Secure the Unistrut channels to the mounting surface using suitable anchors. Verify the channels are level.

Step 4: Insert Unistrut spring nuts into the ends of each Unistrut channel.

Step 5: Secure the enclosure mounting lugs to the spring nuts installed in the Unistrut channel and secure with appropriate bolts and washers.

Figure 19 – EXP Enclosure Attachment to the Mounting Surface (Carbon Steel Enclosure Shown)

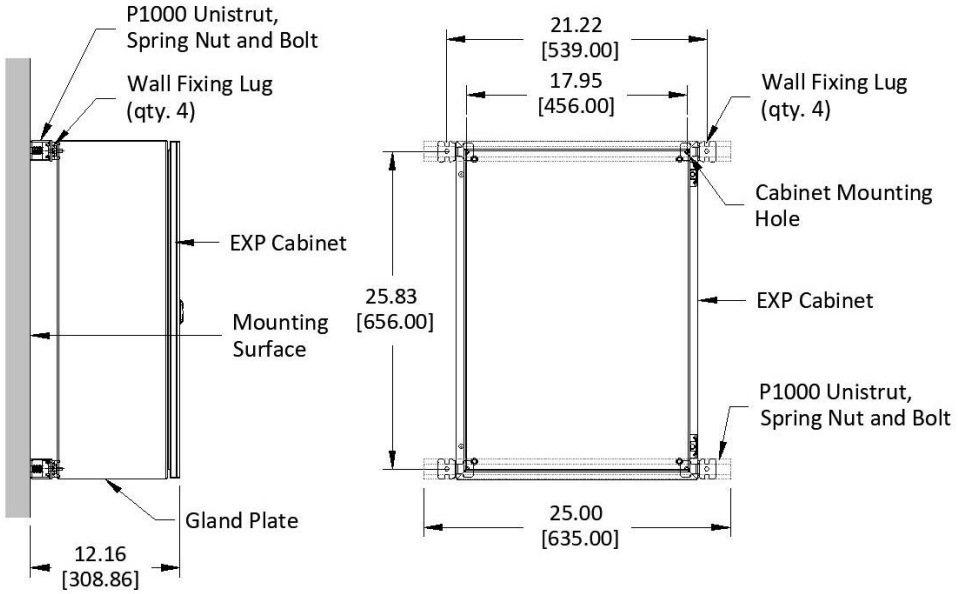
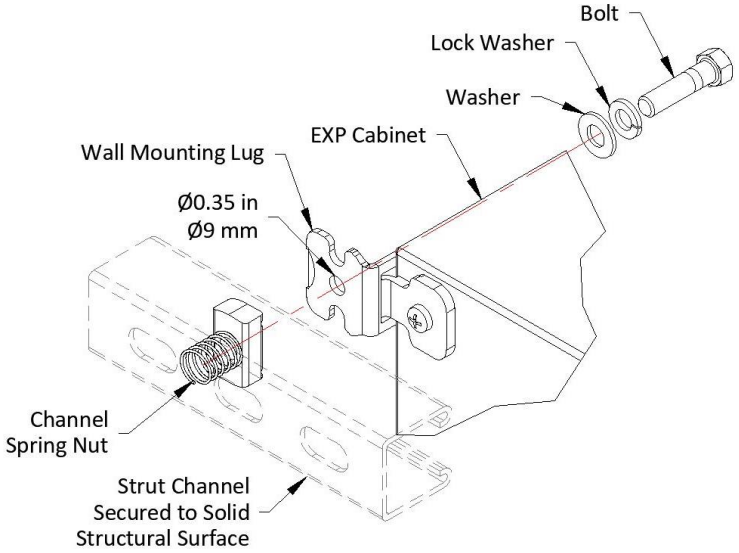


Figure 20 – Fixing Lug Attachment to Channel (Schneider Lugs Shown)



3.5 Main Controller Installation

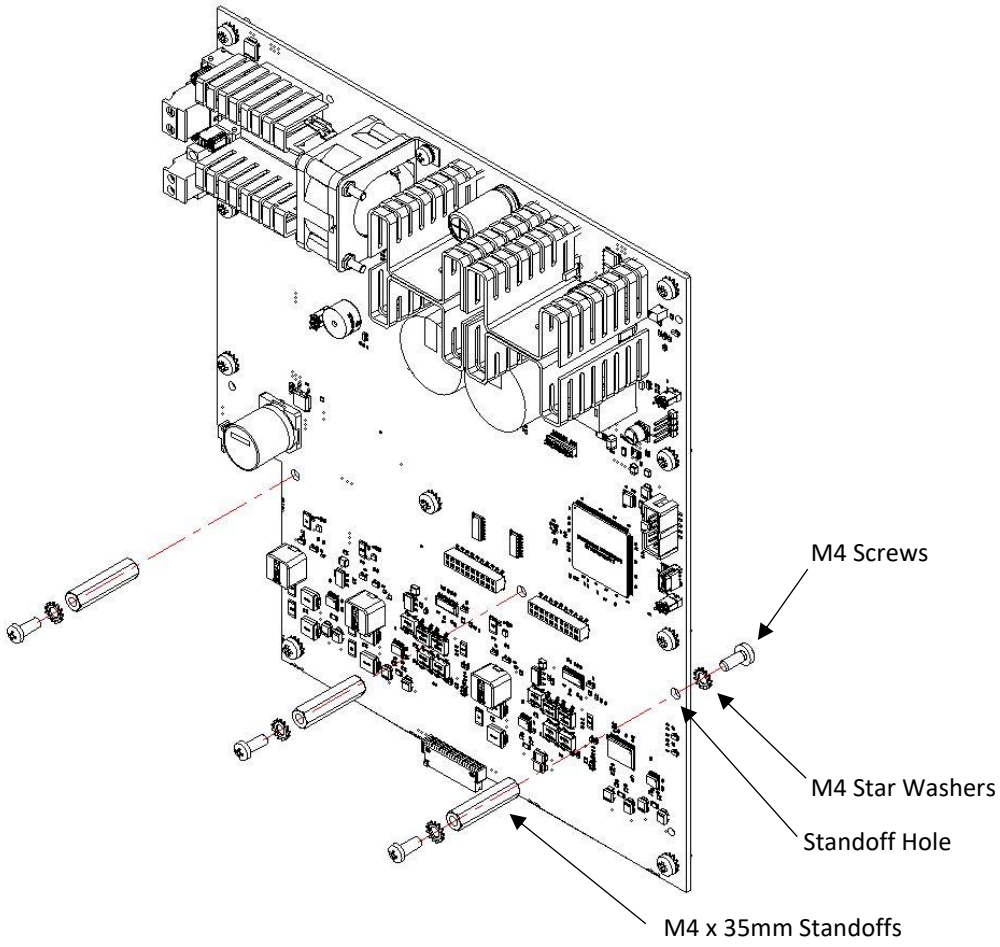
The Main Controller is shipped separately and must be field-installed using the following instructions.

CAUTION: All components shall be installed by factory-trained and certified personnel ONLY.

CAUTION: Disconnect all power from the Panel (AC and DC) before installing or uninstalling electronic components. NO HOT SWAPPING OF ELECTRONICS IS ALLOWED.

Step 1. Install the three standoffs supplied with the Main Controller. See **Figure 21**.

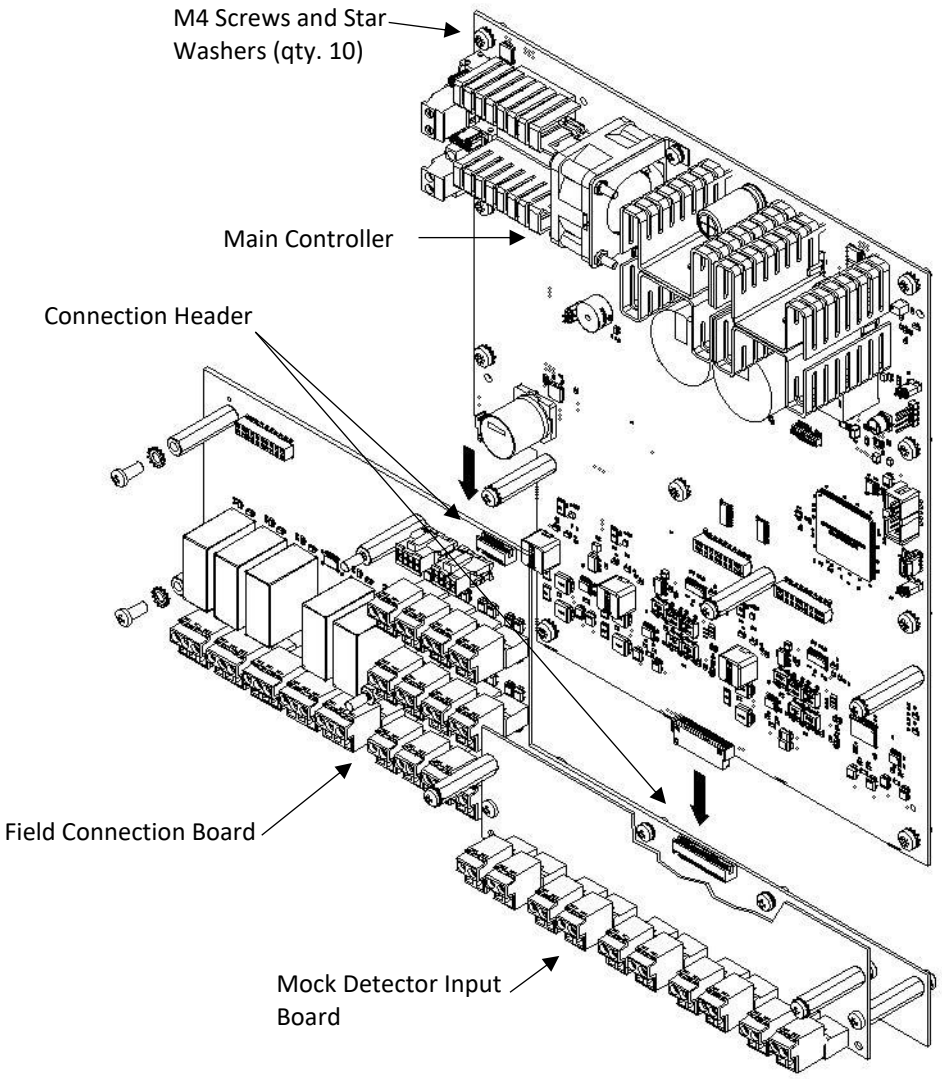
Figure 21 – Standoff Installation to Main Controller



Step 2. Align the header connectors on the Main Controller with the mating connectors on the Field Connection Board, and gently connect the two boards. Verify that the headers are firmly seated. **See Figure 22**.

Step 3. Secure the Main Controller to the enclosure back panel using the ten (10) star washers and screws provided. **See Figure 22**.

Figure 22 – Main Controller Connection to Field Connection Board



3.6 Detector Input Board Installation

The Detector Input Board(s) are installed after the field wiring has been thoroughly tested. Standoffs connected to the Main Controller provide a mounting point for the first board.

The Detector Input Boards are shipped separately and must be field-installed using the following instructions.

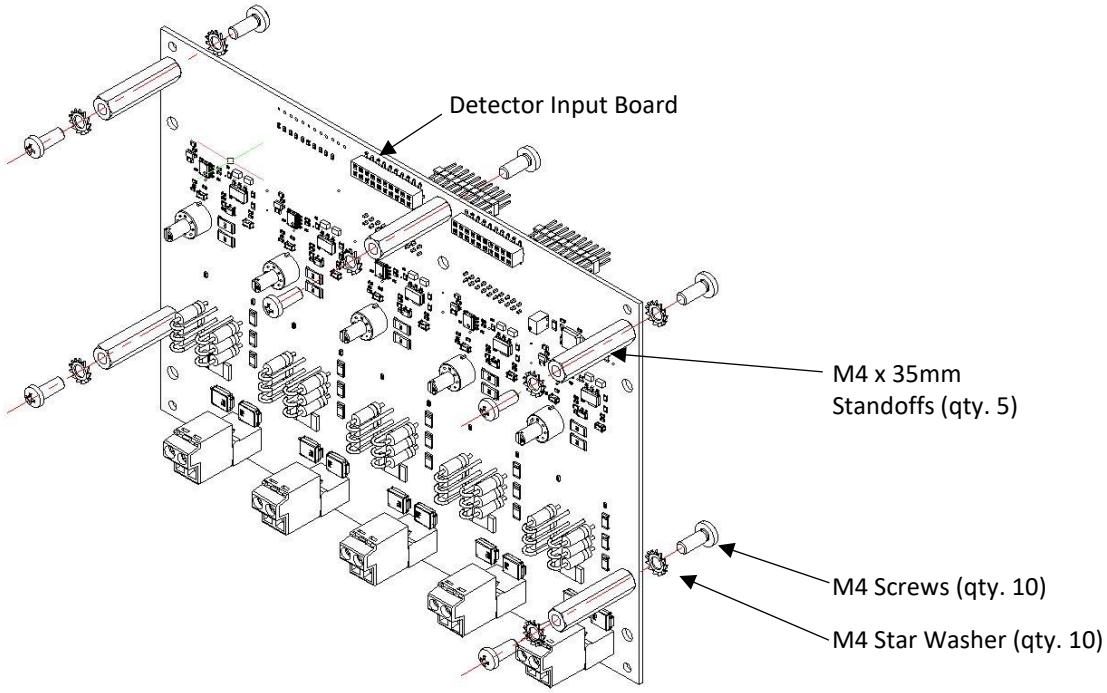
Step 1. Locate the five (5) holes provided in the Detector Input Board for securing the standoffs.

Step 2. Secure the five (5) standoffs in place using the screws and washers provided. See **Figure 23**.

Step 3. Set the board aside.

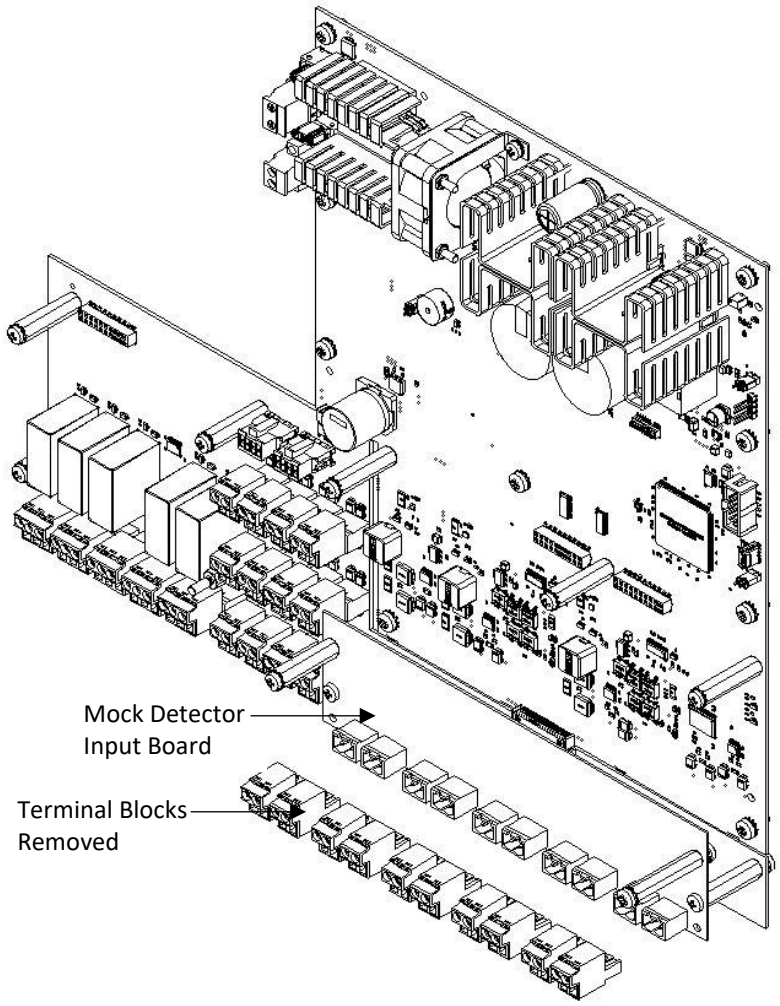
Step 4. If applicable, set the rotary switches on the Detector Input Board as detailed in Section 3.6.2.

Figure 23 – Standoff Installation to Five-Detector Input Board



Step 5. Remove the terminal block connectors from the Mock Detector Input Board(s) if installed, leaving the field wiring intact. **See Figure 24**.

Figure 24—Mock Detector Input Board

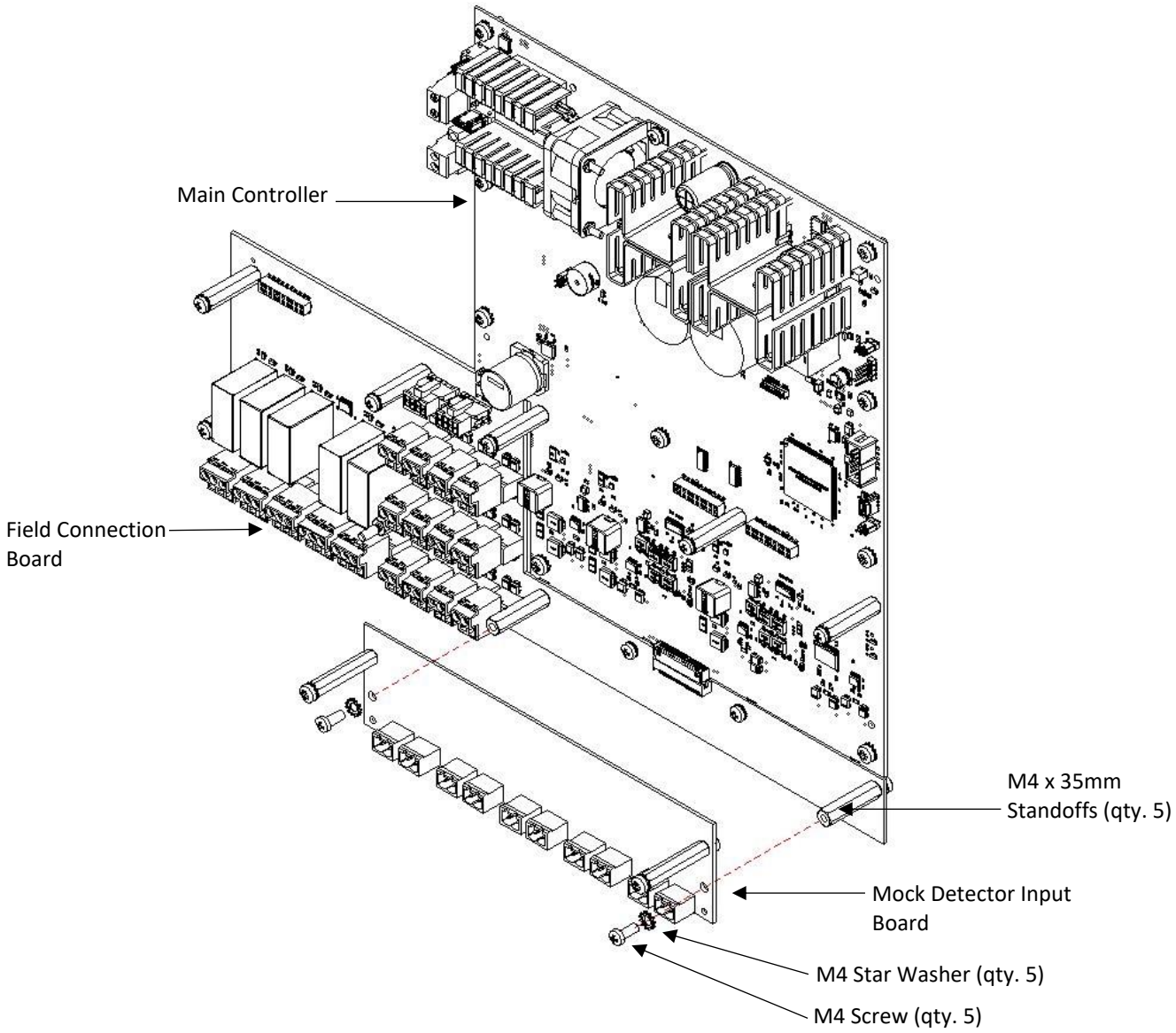


Step 6. Remove the two (2) M4 star washers and (2) M4 screws securing the Mock Detector Input Board to the Field Connection Board. See **Figure 25**.

Step 7. Carefully remove the Mock Detector Input Board and discard it.

Step 8. Repeat steps 4-6 if more than one Mock Detector Input Board is installed.

Figure 25—Mock Detector Input Board Removal



Step 9. Remove the screws and star washers (qty. 5) from the standoffs installed on the Main Controller Board and the Field Connection Board for mounting the Detector Input Board. See **Figure 23**4.

Step 10. Mount the Detector Input Board to the standoffs, ensuring that the vertical header pins on the back of the board are aligned with the connectors provided on the Main Controller.

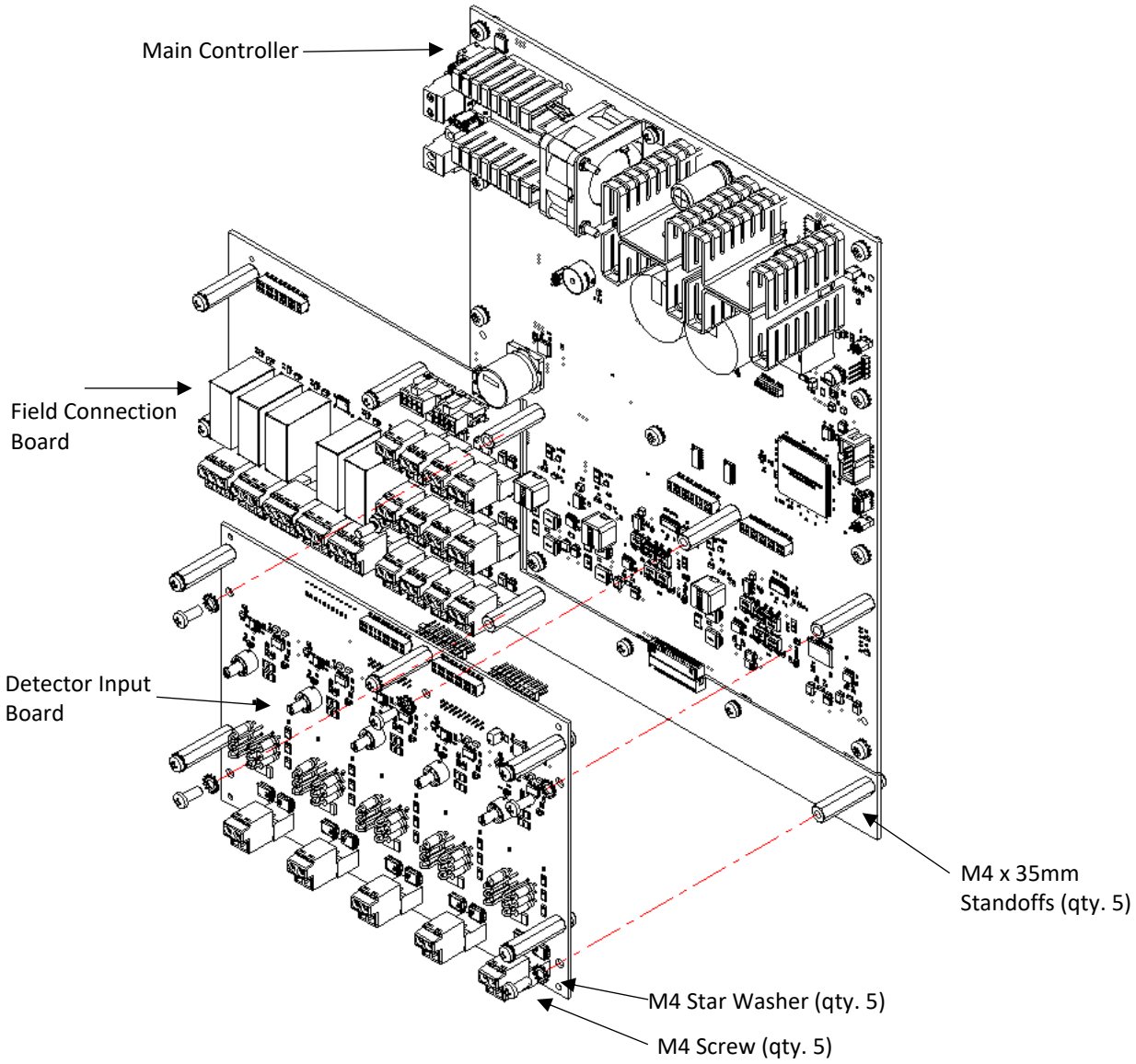
> **CAUTION:** Verify the correct alignment of the vertical header-connection pins when installing the Detector Input Board onto the Main Controller. Misalignment of header-connector pins can cause immediate and irreversible electronic damage.

Step 11. Secure the Detector Input Board to the standoffs using the screws and star washers removed in Step 9. See **Figure 26**.

Step 12. Connect the terminal block connectors removed in Step 4 to the correct terminals on the Detector Input Board.

> **CAUTION:** The terminal block connecters removed from the Mock Detector Input Board must be connected to the corresponding terminal on the Detector Input Board.

Figure 26 – Detector Input Board Installation (separation barrier not shown)



3.6.1 Second Detector Input Board Installation

Up to two Detector Input Boards can be mounted in the EXP Main Controller, enabling up to ten detector inputs to be connected to each EXP panel. Standoffs attached to the first Detector Input Board provide a mounting point for the second board.

If a second Detector Input Board is required, use the following instructions to install the board.

Step 1. If applicable, set the board's rotary switches as detailed in Section 3.6.2.

Step 2. Remove the screws and star washers (qty. 5) from the standoffs on the previously installed Detector Input board.

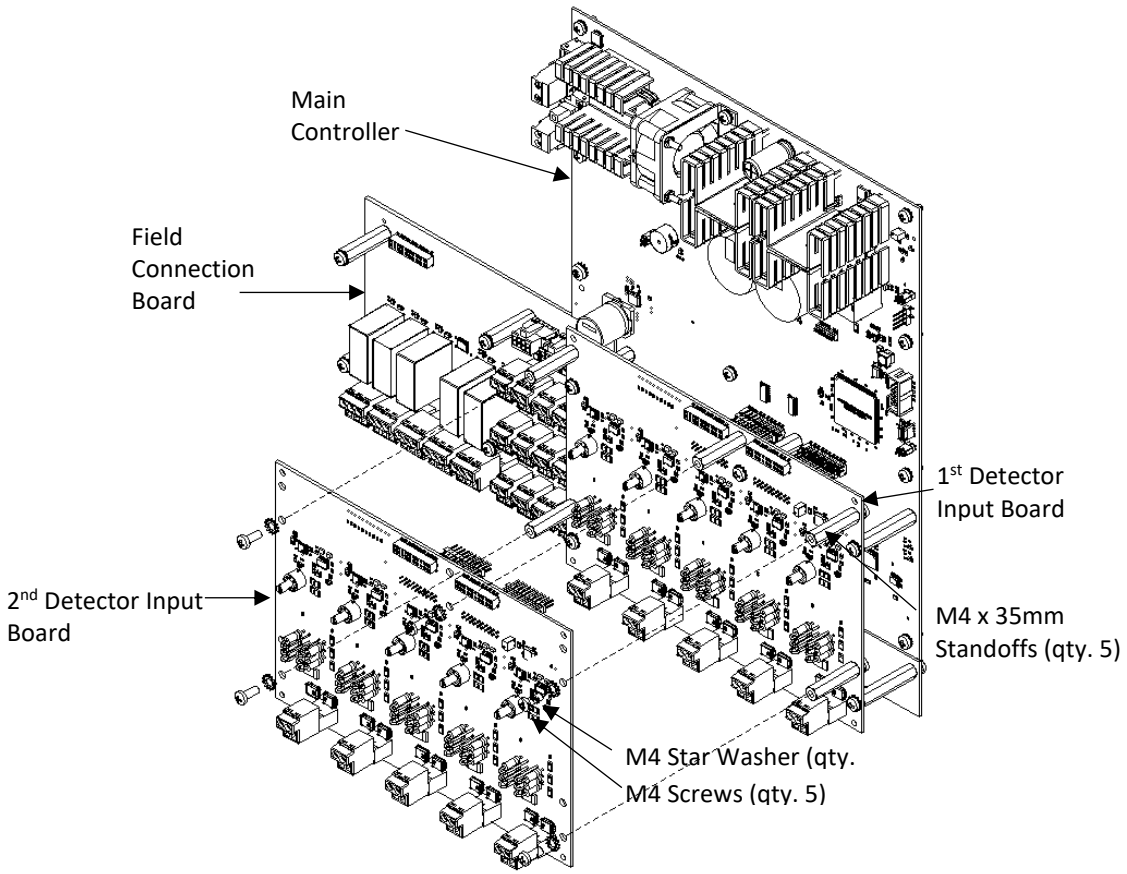
Step 3. Mount the Detector Input board onto the standoffs provided on the first Detector Input Board, ensuring that the vertical header-connection pins correctly align with the headers on the first Detector Input Board.

> **CAUTION:** Verify the correct alignment of the vertical header-connection pins when installing the input board onto the Main Control board. Misalignment of header-connector pins can cause immediate and irreversible electronic damage.

Step 4. Secure the Detector Input Board to the standoffs using the screws and star washers removed in Step 2.

Step 5. Connect the terminal block connectors to the correct terminals on the Detector Input Board.

Figure 27– Second Detector Input Board Installation



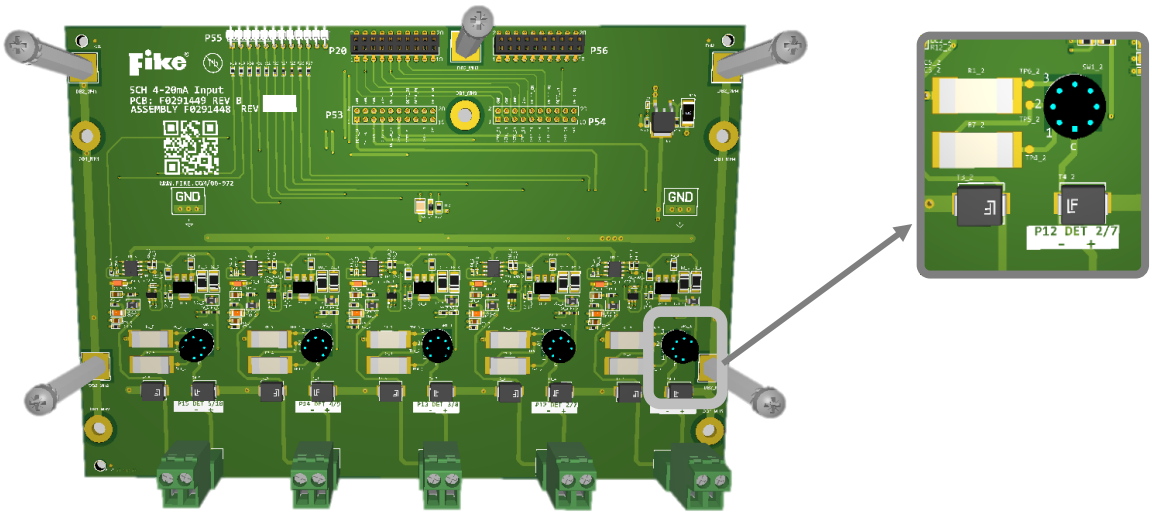
3.6.2 Detector Input Board Rotary Switch Settings

The Class B Non-intrinsically Safe Detector Input boards are equipped with 3-position rotary switches that must be set according to the type of component to be connected to each circuit. See **Figure 28**.

Use the following instructions to install the second Five-Detector Input board.

CAUTION: Failure to set the rotary switches properly can result in unexpected operation.

Figure 28– Detector Input Board Rotary Switch Settings (typical)



The following table shows the correct switch settings for each input device type.

Table 14 – Rotary Switch Settings, Class B Non-intrinsically Safe

P/N F0291448 Non-IS Class B	Detector Input Switch Position
All 4-20mA sensors (optical and pressure)	1
[Future Use]	2
All burst indicators and N.O. contact closure devices	3

3.7 Safety Relay Board Installation

An optional Safety Relay Board can be added to the EXP system to increase the number of programmable relays to ten. The board mounts to the Field Connection Board using the four standoffs that the factory has installed.

The optional Safety Relay Board is shipped separately and must be field installed using the following instructions. See **Figure 29**.

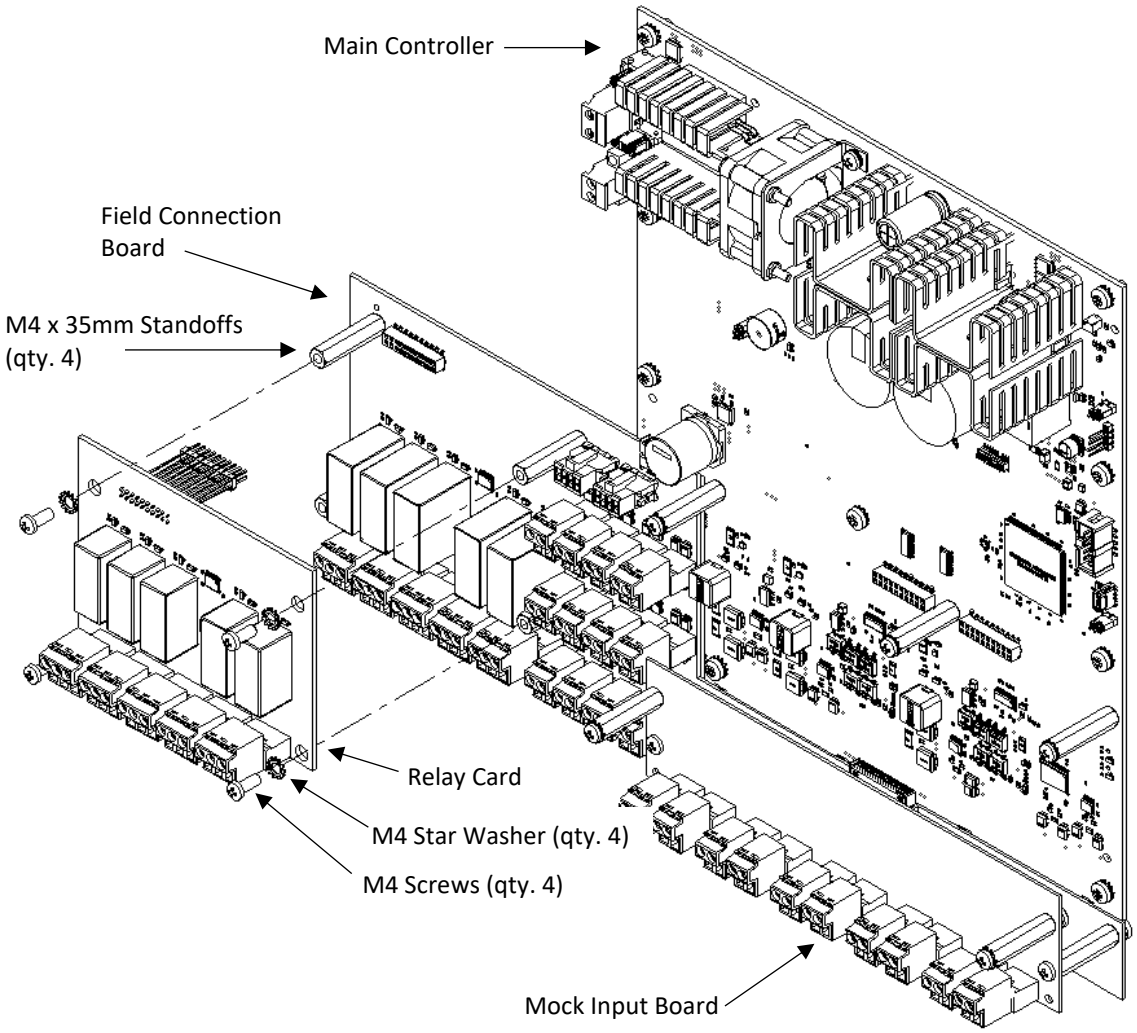
Step 1. Remove the nuts and star washers from the standoffs on the Field Connection Board.

CAUTION: Verify the correct alignment of the vertical header-connection pins when installing the Relay Board onto the Main Controller. Misalignment of header-connector pins can cause immediate and irreversible electronic damage.

Step 2. Mount the Safety Relay board onto the four (4) standoffs provided on the Field Connection Board, ensuring that the header pins are correctly aligned with the headers on the Field Connection Board.

Step 3. Secure the Safety Relay board onto the standoffs using the four (4) screws and star washers removed in Step 1.

Figure 29– Safety Relay Board Installation



3.8 User Interface Installation

Use the following procedure to install the User Interface on the dead front. See **Figure 30**.

Step 1. Feed the User Interface ribbon cable and the green ground wire (not shown) through the opening in the enclosure dead-front.

Step 2. Align the User Interface with mounting holes provided in the enclosure dead-front.

Step 3. Secure the User Interface to the dead-front with the mounting screws provided. Do not overtighten the screws.

Step 4. Remove the closest nut and star washer used to secure the dead-front to the hinge.

Step 5. Install the grounding wire ring terminal over the hinge stud; then reinstall the nut and star washer removed in Step 4.

Step 6. Set the EXP network panel address (1 – 8) using dip-switch SW3 on the back of the User Interface. Each Panel connected to the panel network must be assigned a unique address. See **Table 15** for DIP-switch settings.

NOTE: Default EXP Panel address is "1." Changing the panel address is required only in multi-panel networks.

Figure 30–User Interface Installation

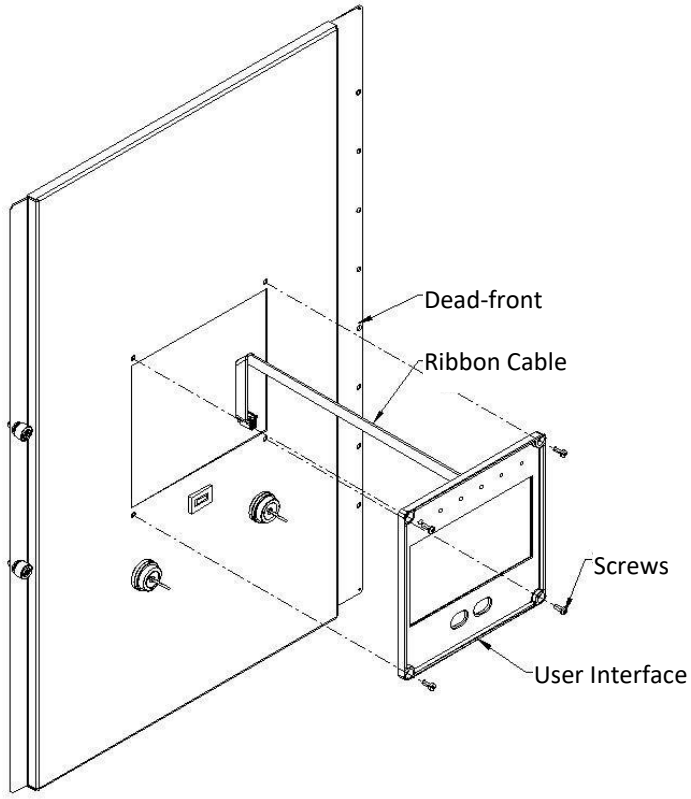


Table 15 – Setting EXP Network Panel Address

Binary Value		1	2	4	8
DIP Switch #		S1	S2	S3	S4
		1=ON / 0=OFF			
Address	1	1	0	0	0
	2	0	1	0	0
	3	1	1	0	0
	4	0	0	1	0
	5	1	0	1	0
	6	0	1	1	0
	7	1	1	1	0
	8	0	0	0	1

Note: EXP Panel is factory set to address 1.

3.9 Battery Installation

The battery shelf and back panel form the enclosure for mounting the standby batteries in the EXP enclosure. A metal bracket is provided to secure the batteries to the battery shelf. Batteries must be installed in a separate enclosure for installations with a max ambient temperature exceeding 113°F (45°C).

Brackets are installed differently according to the size of the batteries. Use the following procedures to install each battery size.

CAUTION: DO NOT install the batteries at the bottom of the EXP enclosure.

3.9.1 7Ah and 12Ah Battery Installation

Step 1. Remove protective terminal covers from the battery.

Step 2. Place batteries in the enclosure against the battery shelf back panel with the terminals oriented towards the left side of the enclosure. See **Figure 31**.

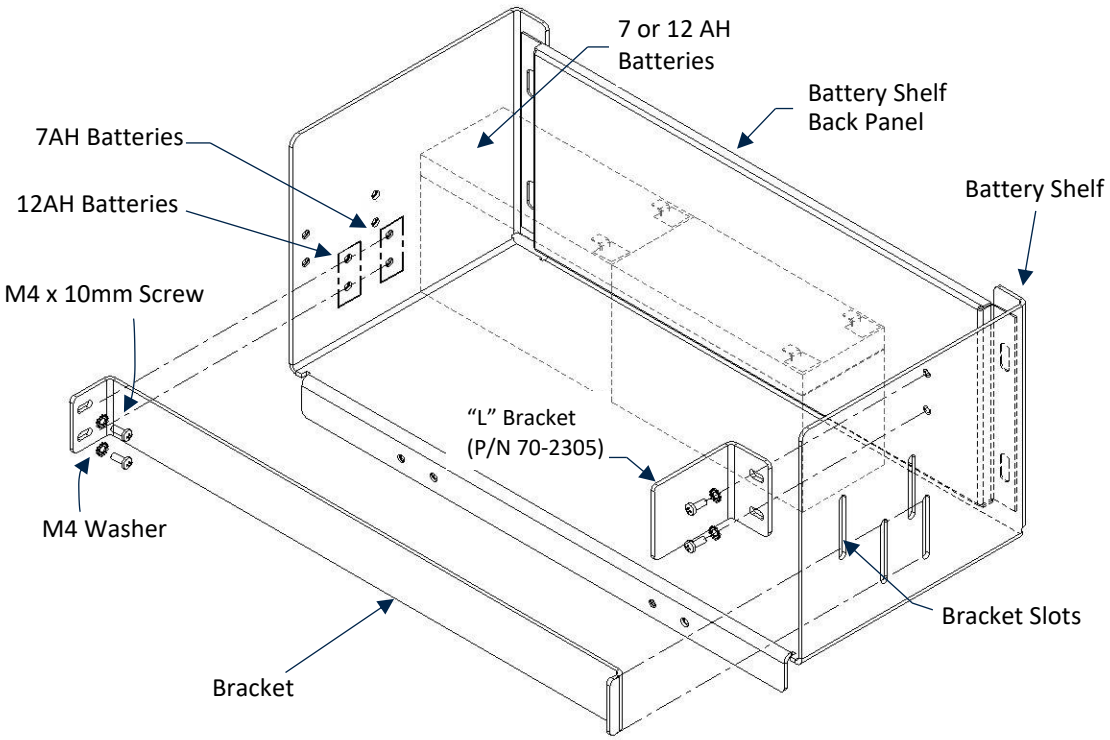
Step 3. Install bracket 70-2305 and ensure the bracket fits snugly against the battery. Secure the bracket with M4x10mm screws (2) and external star washers (2).

Step 4. Insert the hooked end of the battery bracket into the bracket slot closest to the batteries.

Step 5. Secure the opposite end using M4x10mm screws (2) and external star washers (2).

CAUTION: Use extreme caution not to allow the battery terminals to touch the top of the enclosure during installation.

Figure 31 – Battery Installation (7Ah or 12Ah Batteries)



3.9.2 18Ah Battery Installation

Step 1. Remove protective terminal covers from the battery.

Step 2. Place batteries in the enclosure against the battery shelf back panel with terminals oriented towards the front of the enclosure. See **Figure 32**.

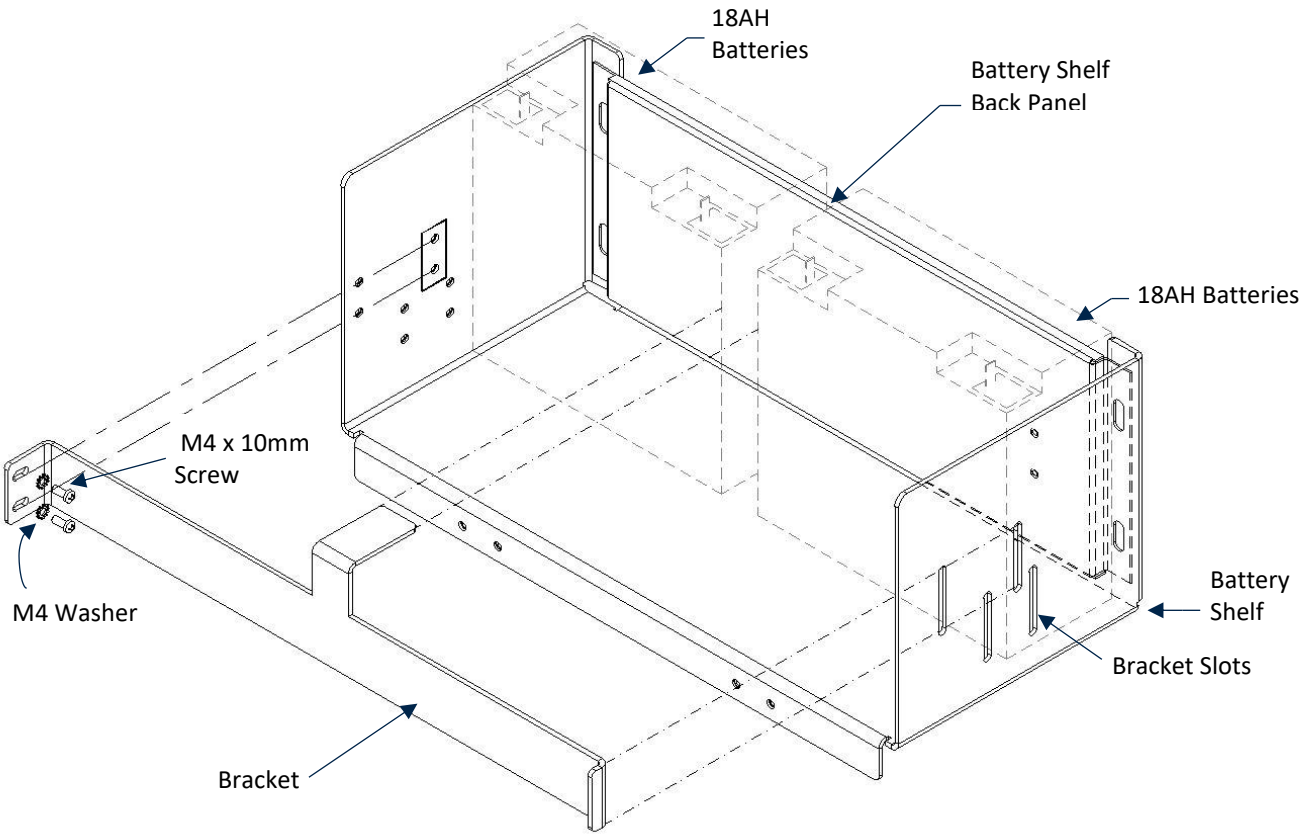
Step 3. Insert the hooked end of the battery bracket into the bracket slot closest to the batteries.

Step 4. Ensure the center divider fits between the two batteries.

Step 5. Secure the opposite end using M4x10mm screws (2) and external star washers (2).

CAUTION: Use extreme caution not to allow the battery terminals to touch the top of the enclosure during installation.

Figure 32– Battery Installation (18Ah Batteries)



3.9.3 35Ah Battery Installation

Step 1. Remove protective terminal covers from the battery.

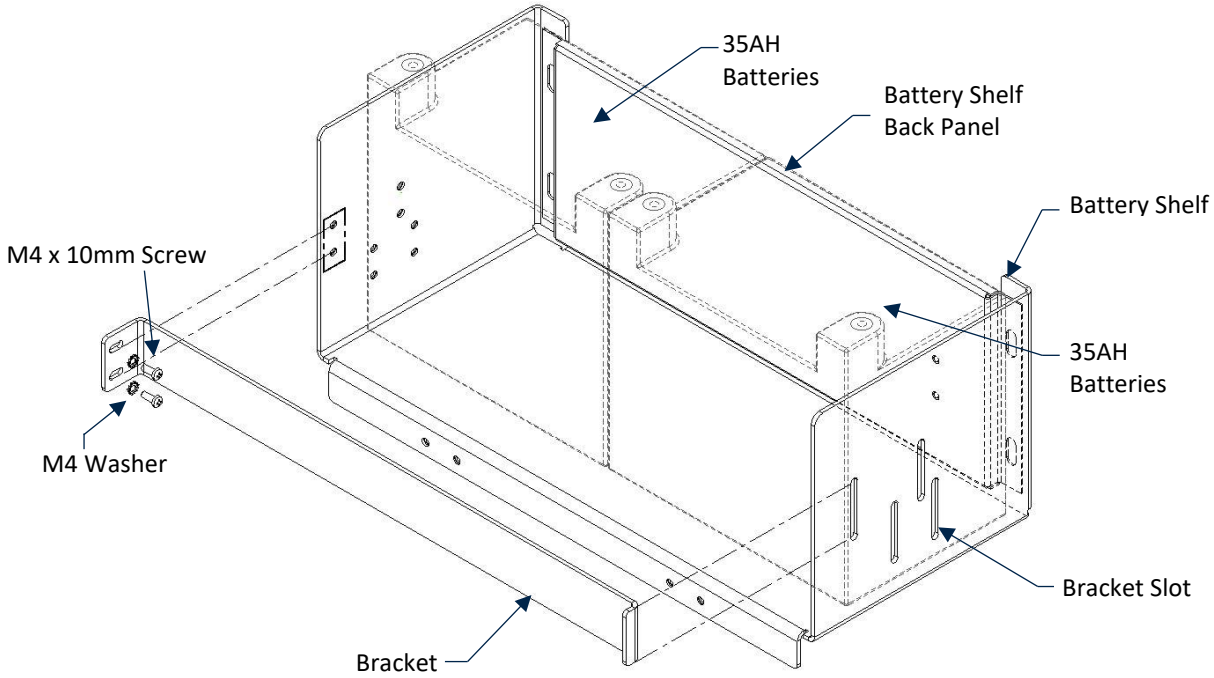
Step 2. Place batteries in the enclosure against the battery shelf back panel with terminals oriented towards the front of the enclosure. See **Figure 33**.

Step 3. Insert the hooked end of the battery bracket into the bracket slot closest to the batteries.

Step 4. Secure the opposite end using M4x10mm screws (2) and external star washers (2).

CAUTION: Use extreme caution not to allow the battery terminals to touch the top of the enclosure during installation.

Figure 33– Battery Installation (35Ah Batteries)



3.9.4 44Ah Battery Installation

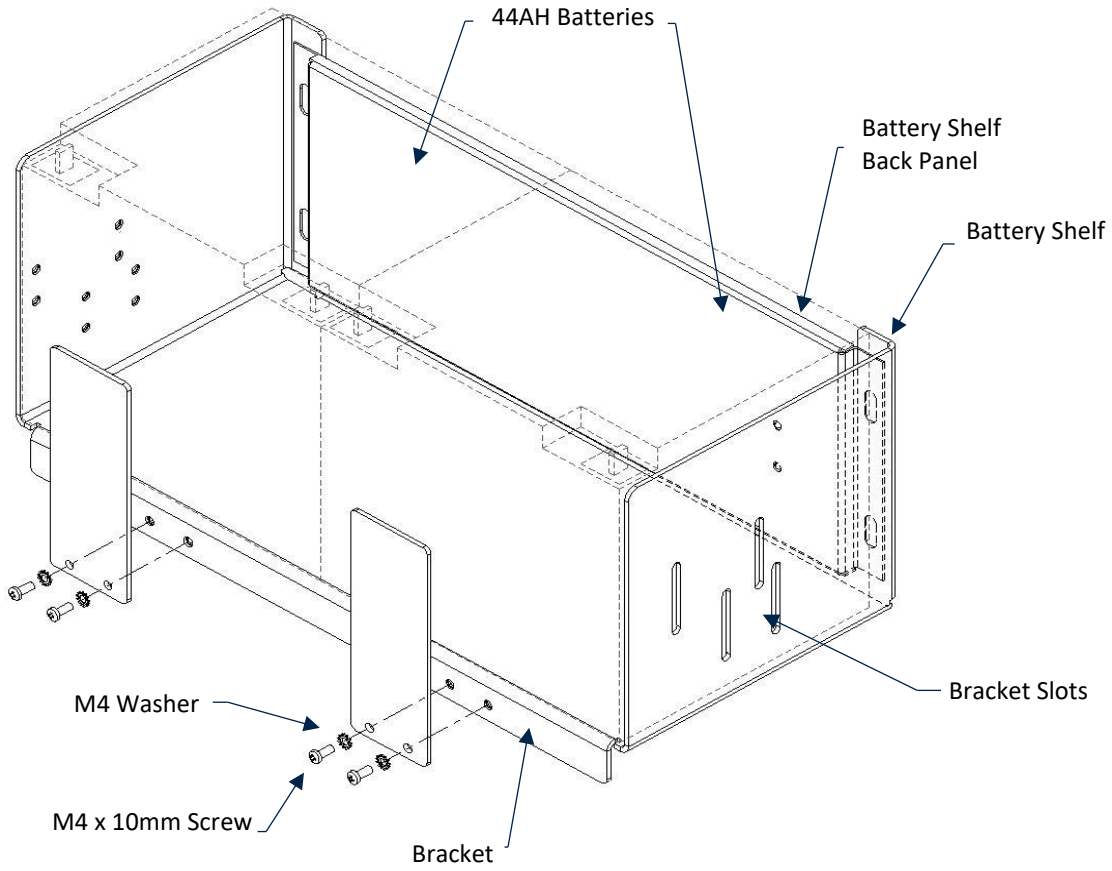
CAUTION: Use extreme caution not to allow the battery terminals to touch the top of the enclosure during installation.

Step 1. Remove protective terminal covers from batteries.

Step 2. Place batteries in the enclosure against the battery shelf back panel with terminals oriented toward the front of the enclosure. See **Figure 34**.

Step 3. Connect battery brackets (2) to the battery shelf using M4 screws (2) and washers (2). See Figure 34.

Figure 34 – Battery Installation (44Ah Batteries)



3.10 Battery Cabinet Installation

The battery cabinet must be mounted within 20 feet of the EXP panel it serves. It is also recommended that the interconnect wiring between the battery cabinet and the EXP panel be mechanically protected (i.e., conduit or raceway) to prevent accidental disconnection of the standby batteries.

The battery cabinet must be surface mounted to a solid structural surface. Mount the cabinet in an area that is readily accessible with sufficient room to allow easy installation and maintenance.

Step 1. Determine the appropriate mounting height and location for mounting the cabinet.

CAUTION: The external battery cabinet is not intended for installation in a location where ambient temperatures exceed the range of -4°F to 140°F (-20°C to 60°C).

Step 2. Verify that the enclosure is level. Mark the mounting hole locations on the mounting surface.

Step 3. Pre-drill holes in the mounting surface for the anchors being used.

Step 4. Secure the enclosure to the mounting surface using appropriate anchors.

Step 5. Drill penetrations in the bottom of the enclosure for wire/cable penetrations. The carbon steel enclosure has a removable cable gland for wire/cable penetrations. DO NOT drill penetrations in the top or sides of the cabinet for wire/cable entrance.

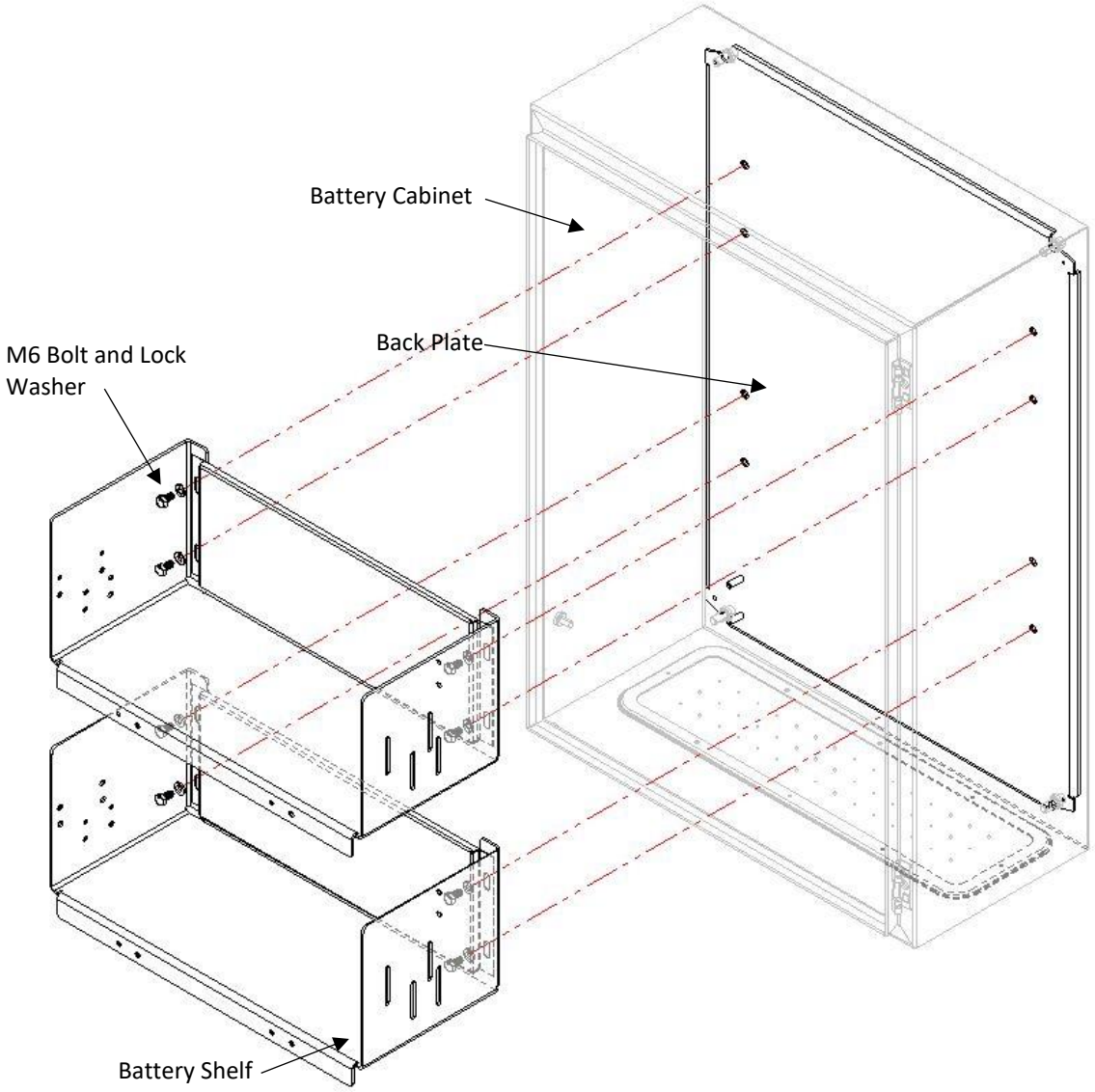
Step 6. Thoroughly clean the interior of the enclosure to remove all dust and debris.

Step 7. At the EXP panel, remove the four M6 bolts and washers used to secure the battery shelf and back panel to the enclosure back panel.

Step 8. Move the battery shelf and back panel to the battery cabinet and secure them to the back plate standoffs using the removed M6 bolts and lock washers. See **Figure 35**. Do not overtighten.

Step 9. Install the standby batteries onto the battery shelf or shelves and secure them in place with the appropriate battery bracket(s). See Section 3.9.

Figure 35 – Battery Shelf Installation in Battery Cabinet



NOTE: A maximum of two battery shelves can be installed in the Battery Cabinet.

4.0 ELECTRICAL INSTALLATION

4.1 Field Wiring Testing

All field wiring shall be tested before connection to the control panel or the associated Actuator Field Modules (AFMs). All field wiring shall be verified against site-specific drawings.

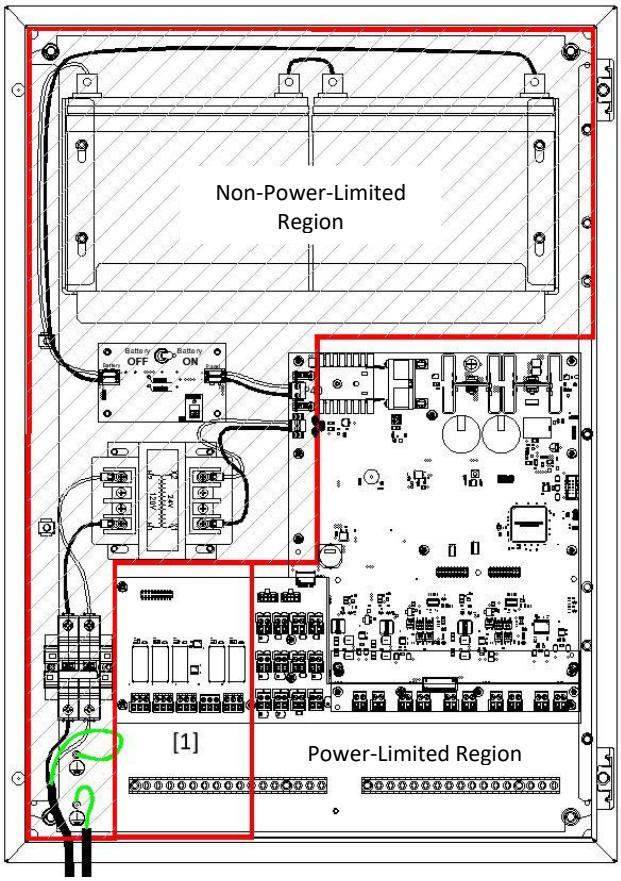
CAUTION: All field wiring shall only enter the EXP control panel enclosure from the bottom. See **Section 3.3**.

CAUTION: Where stranded wire is used, Fike recommends installing crimped pin connectors for ease of use and longevity. Wire tinning can be used as an alternative.

4.2 Enclosure Wire Separation

The EXP system wiring is classified as power-limited or non-power-limited per NEC Article 760. All power-limited wiring must be separated from all non-power-limited wiring by a minimum distance of ¼ inch (6.35 mm) within the panel enclosure. **Figure 36** identifies the power-limited versus non-power-limited regions of the enclosure with the base system components installed.

Figure 36– Power Limited versus Non-Power Limited Wire Separation



Notes [ ]:

1. Relay connections are power-limited only when connected to a power-limited source. If connected to a non-power-limited source, wiring must be routed separately from all power-limited wiring.

4.3 Main Controller Wiring

4.3.1 AC Power Wiring

AC Power Wiring to the EXP system shall be connected to a dedicated 100V, 120V, or 240V 15A breaker. A disconnect switch is provided in the EXP enclosure to connect the AC power line and neutral wires to the panel. Two grounding posts are provided on the enclosure back plane for Protective Earth connections.

Use the following instructions to connect AC power to the EXP panel. See **Figure 37** and **Figure 38**.

CAUTION: Available power transformers are rated at 100/120/240 VAC, 50/60 Hz. Verify that the power source is compatible with the panel's power transformer before connecting it to the Panel.

Step 1. Verify that the circuit breaker at the main power distribution center feeding the EXP panel is turned off.

Step 2. Route the AC power wire into the enclosure through the appropriate hole in the enclosure gland plate (if applicable).

Step 3. Strip the wires and install wire-end ferrules.

Step 4. Land the Line and Neutral wires to the AC Power Disconnect Switch (rated for 3 amps).

Step 5. Land the AC Power Protective Earth ground wire to the top grounding post.

Step 6. Land the dedicated Protective Earth ground wire to the bottom grounding post. Verify all earth connections.

Figure 37 – AC Terminal Location

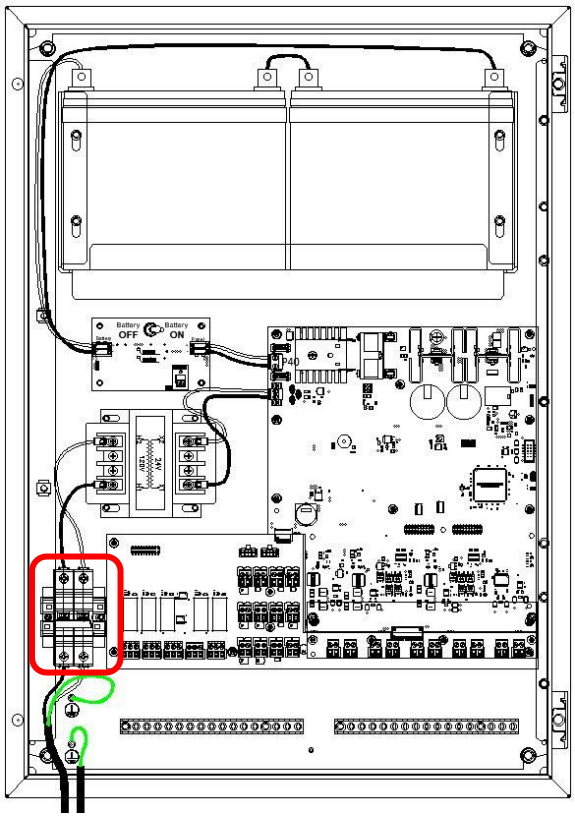
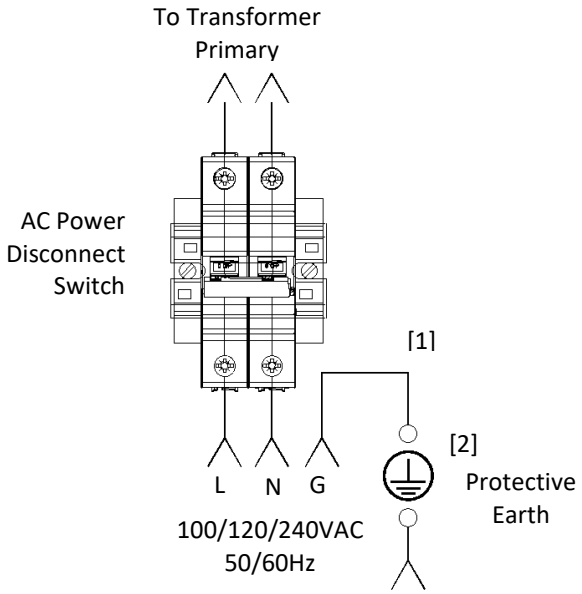


Figure 38 – AC Line Power Connection



Notes [ ]:

1. AC power Earth Ground wire must be longer than the Line and Neutral wires.
2. Press studs (qty. 2) provided on the back plate for ground connections.

Table 16 – AC Power Specifications

Circuit Breaker	Dedicated 15 amp minimum
Circuit Breaker Identification	Labeled “EP SYSTEM,”
Circuit Breaker Protection	Equipped with lockout mechanism
Main Power Cable Thickness	14 AWG minimum (2.5mm^2)
Power Consumption	100VAC 50/60Hz 2.8A
	120VAC 50/60Hz 2.1A
	240VAC 50/60Hz 1.1A

4.3.2 24VAC Power Wiring (P41)

24VAC power to the Main Controller is supplied by the secondary side of the factory-installed transformer (X1 and X2). Wire leads and a terminal block connector are factory-installed to facilitate the quick connection of the 24VAC power to the Main Controller.

Use the following instructions to connect the 24VAC power to the Main Controller. See **Figure 39** and **Figure 40**.

Step 1. Verify that the AC power disconnect switch is in the off position.

Step 2. Verify that the standby batteries are not connected.

Step 3. Verify that the battery disconnect switch is in the off position.

Step 4. Connect the factory-installed wires from the secondary side of the power transformer (X1 and X2) to the P41 terminal block on the Main Controller.

Step 5. DO NOT apply AC or DC power at this time.

Figure 39 – 24VAC Terminal Location

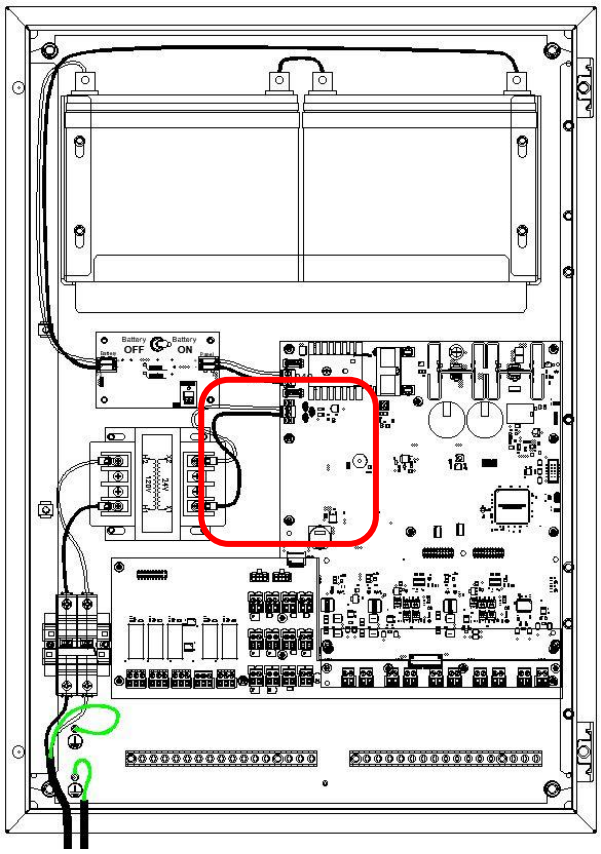


Figure 40 – 24VAC Power Connection to Main Controller

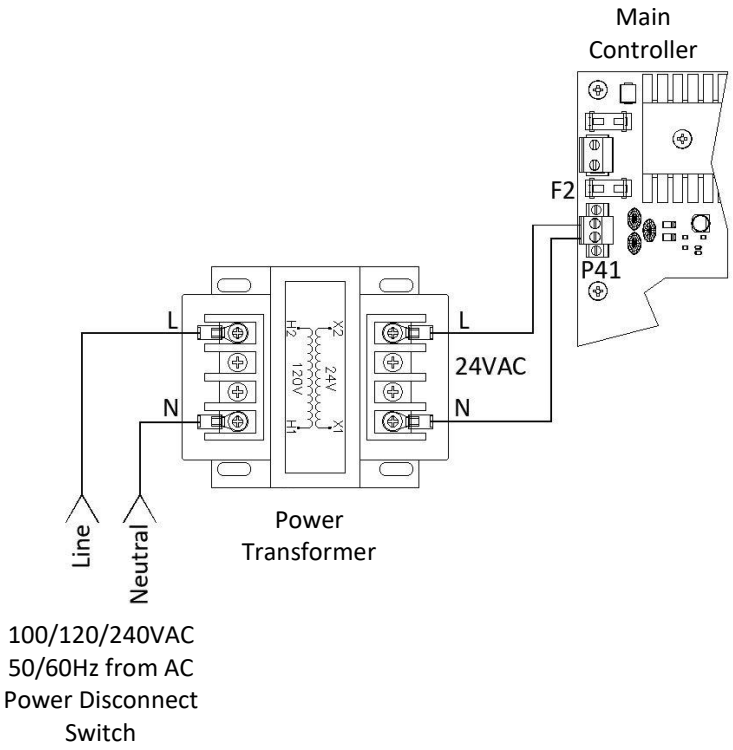


Table 17 – 24VDC Power Input Specifications

Transformer Secondary Voltage (X1 and X2)	20.4 – 28.1VAC
Classification	Non-power limited and supervised
Protection	Fused by F2, 10A field replaceable (P/N 02-4173)
Wire Leads	Factory-supplied wire harness

4.3.3 Battery Wiring (P40)

The EXP control panel can house up to two 12-volt, sealed lead acid batteries within the enclosure for standby power.

CAUTION: Connect and disconnect standby batteries only with the AC power applied.

Use the following instructions to connect the standby batteries to the Main Controller. See **Figure 41** and **Figure 42**.

Step 1. Verify that the AC power to the Panel has been turned off.

Step 2. Verify that the battery disconnect switch is in the off position.

Step 3. Remove terminal P40 from the Main Controller.

Step 4. Verify that wire leads are properly connected between the battery disconnect switch and the P40 terminal block.

Step 5. Reconnect terminal P40 to the Main Controller.

Step 6. DO NOT apply AC or DC power at this time.

Figure 41 – Battery Terminal Locations

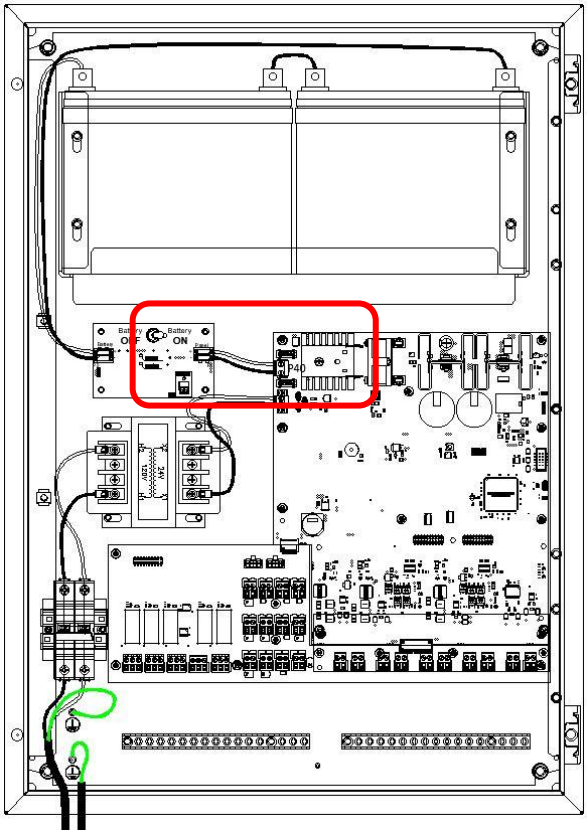
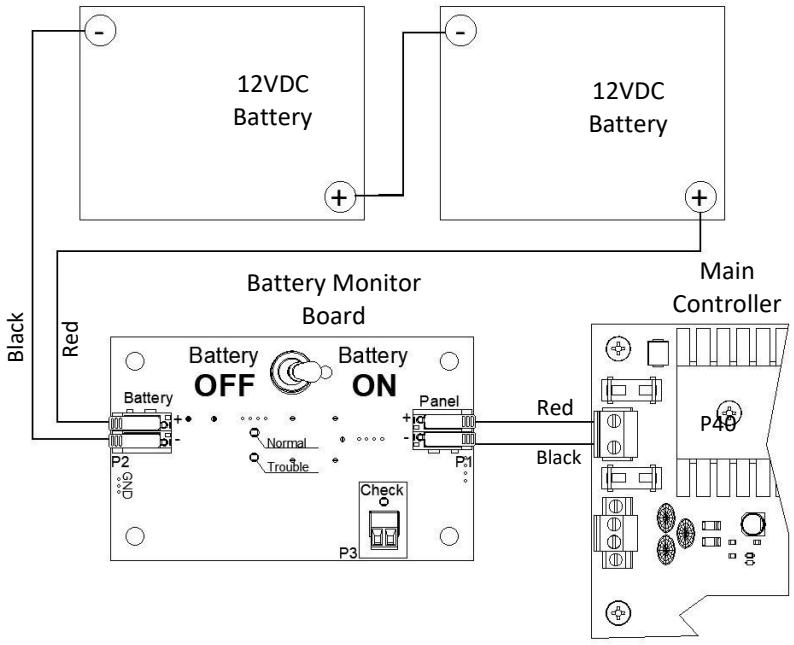


Figure 42 – Standby Battery Connections



NOTE: Standard battery capacity shall be in accordance with the adopted codes and standards.

Table 18 – Standby Battery Circuit Specifications

Batteries	12-volt, sealed lead acid only
Battery Charging Capacity	7 to 44 AH maximum
Supply Current	5A @ 24VDC nominal
Charge Current	2.5A @ 27VDC maximum
Classification	Non-power-limited and supervised
Protection	Fused by F1, 10A field replaceable (P/N 02-4173)
Wire Leads	Factory-supplied wire harness

4.3.3.1 Remote Battery Cabinet Wiring

If the ambient temperature where the EXP panel is installed exceeds +45°C (+113°F), the standby batteries cannot be installed in the EXP main panel enclosure. They must be installed in an external battery cabinet. Wiring between the EXP enclosure and the Battery Cabinet shall comply with the following.

1. The interconnect wire/cable between the EXP Battery Monitor board and the standby batteries shall be routed on the left-side of the EXP enclosure within the non-power limited area.
2. The battery interconnect wire/cable shall be a minimum of 14 gauge (2.5mm^2) and a maximum of 20 ft. (6 m).
3. The battery interconnect wire/cable routing shall comply with local codes and standards.
4. Fike highly recommends that the battery interconnect wire/cable enter the cabinet through the bottom of the enclosure.

4.4 User Interface Connections

The User Interface requires three cable connections for proper operation and user interface.

Use the following procedure to make the field connections to the User Interface board. **See Figure 43**.

Step 1. From the front of the Main Panel, locate the rectangular opening labeled "USB."

Step 2. Insert the USB plug end of the Type-A USB cable through the opening and into the interior of the enclosure.

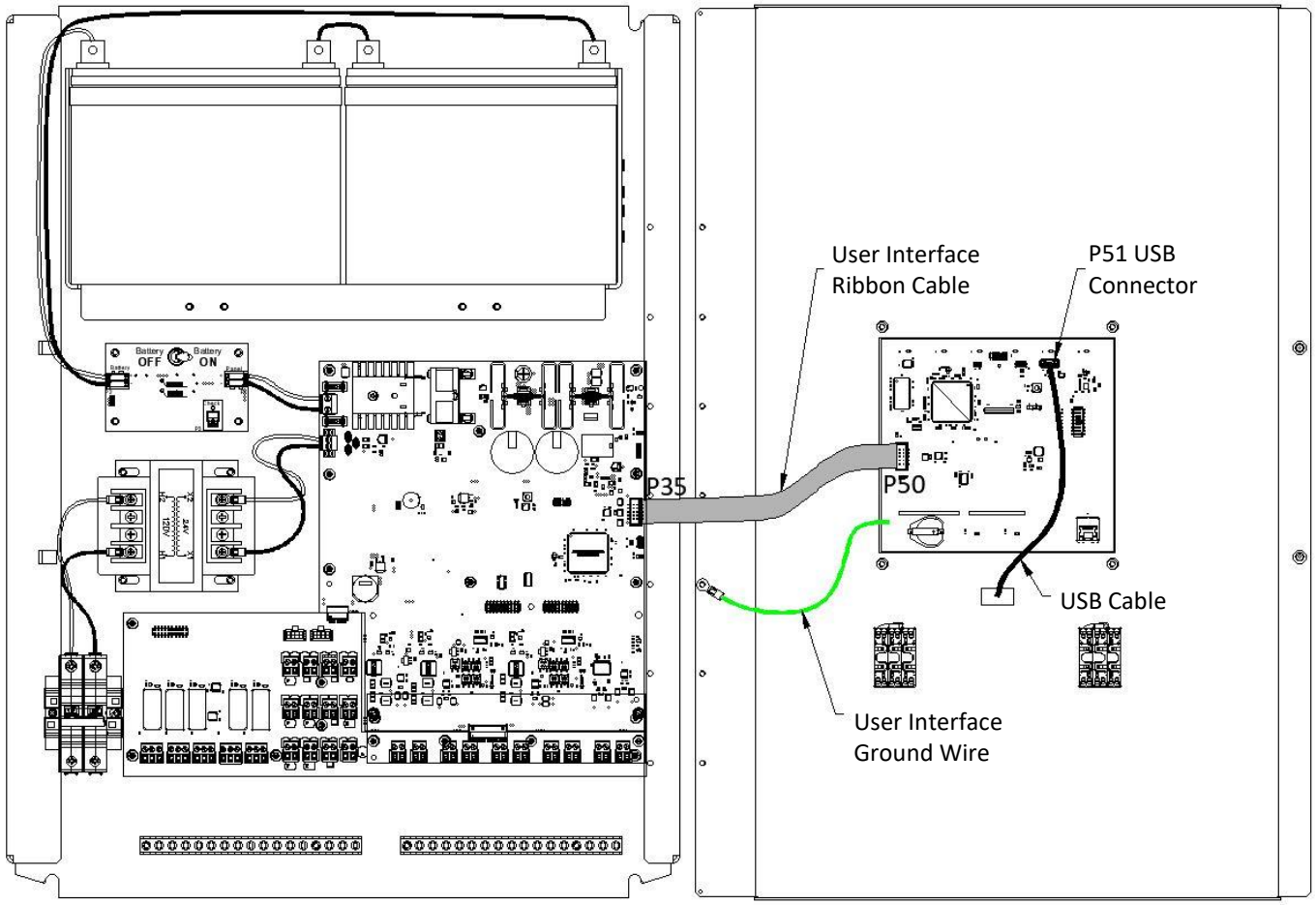
Step 3. Pull the entire length of the cable through the hole.

Step 4. Snap the USB-A receptacle end of the cable into the mounting hole.

Step 5. Attach the USB Type-A "plug" end to the USB port (P51) on the back of the User Interface.

Step 6. Connect the USB cable plug to P51 on the back of the User Interface.

Figure 43 –User Interface Connections



EXP Enclosure **Back of Dead Front**

Port P52 on the User Interface provides a temporary connection point for the panel programming cable.

4.5 Disable Switch Wire Harness Connections

The disable switches are factory installed to the EXP panel's dead front door. After installing The Main Controller, the switch wire harnesses must be connected to the Field Input board at P33 and P34. **See 44** and **Figure 45**.

Figure 44 – Disable Switch Wire Harness Routing

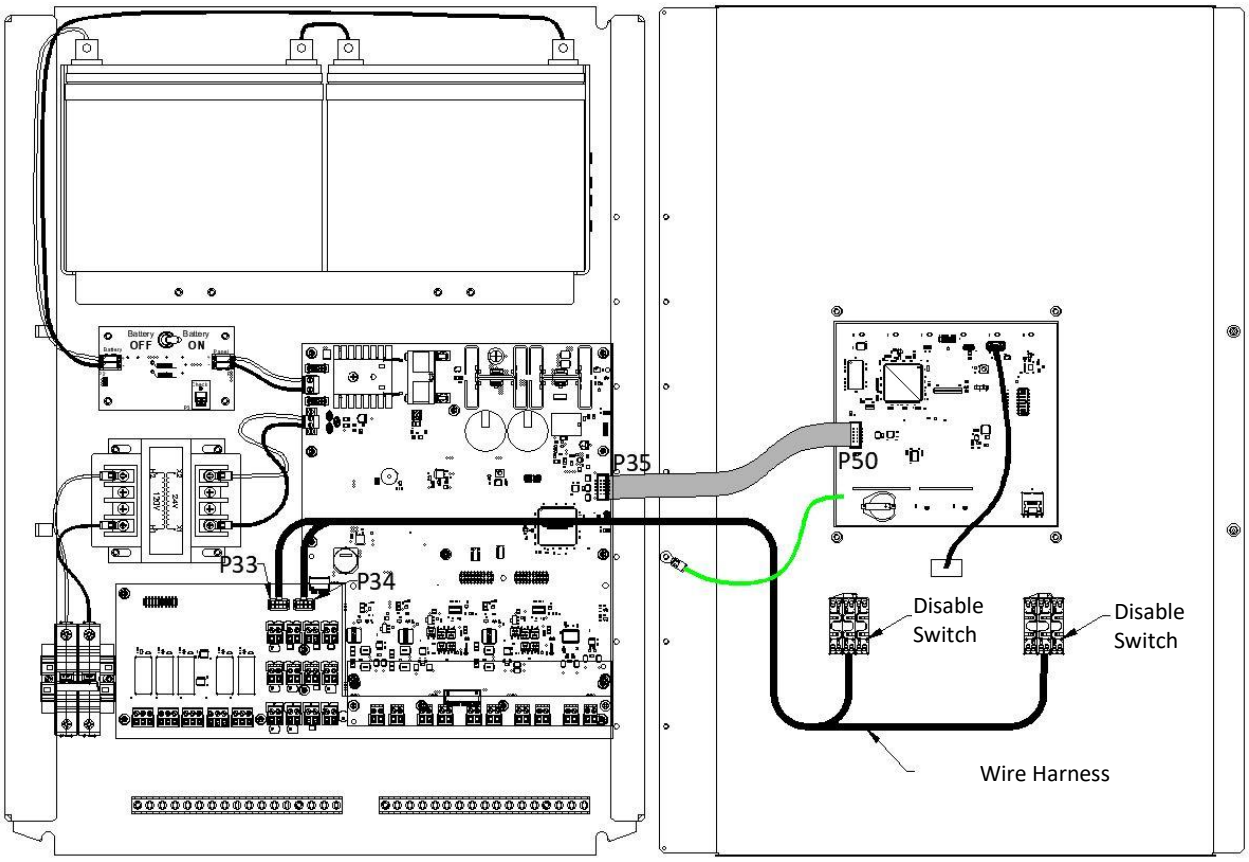


Figure 45 – Panel-Mounted Zone Disable Switch Wiring

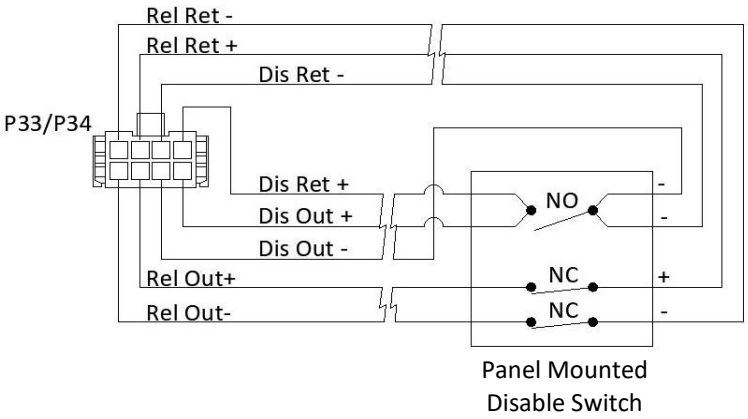


Table 19 – Zone Disable Switch Circuit Specifications

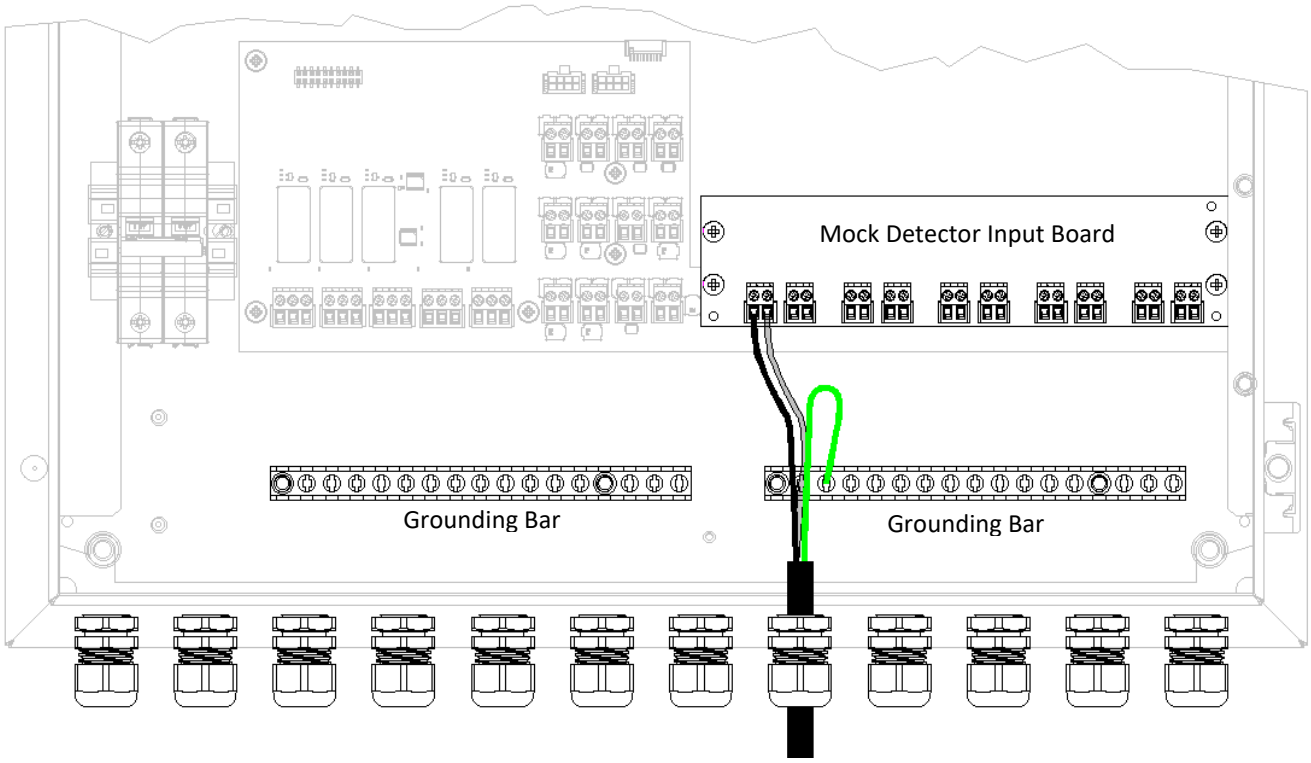
Classification	Non-power-limited and supervised
Wire Leads	Factory-supplied wire harness

4.6 Mock Detector Input Board Wiring

The Mock Detector Input Board is factory mounted in the EXP enclosure. Its purpose is to provide terminal blocks for landing the input device field wiring within the enclosure before installing the Detector Input boards. After installing the Detector Input Board, the field wiring is moved from the Mock Detector Board to the Detector Input Board.

Wire/cable entry into the EXP enclosure is made through the bottom of the enclosure via factory-installed cable glands or field-installed conduit connections, depending on the enclosure ordered. The enclosure provides two grounding bars to land the wire/cable ground wire. See **Figure 46**.

Figure 46 – Mock Detector Input Board Wiring



4.7 Field Connection Board Wiring

The Field Connection board provides terminals for connecting the EXP system's field circuits. All system wiring types shall be in accordance with identified circuit specifications.

4.7.1 Safety Relay Wiring (P1 – P5)

The Field Connection Board provides five (5) programmable safety relays. See **Figure 47** and **Figure 48**. The relays can be connected to power-limited or non-power-limited sources, but not both. If the relays are connected to non-power-limited sources, the field wiring must be separated from all power-limited wiring.

Figure 47 – Relay Terminal Locations

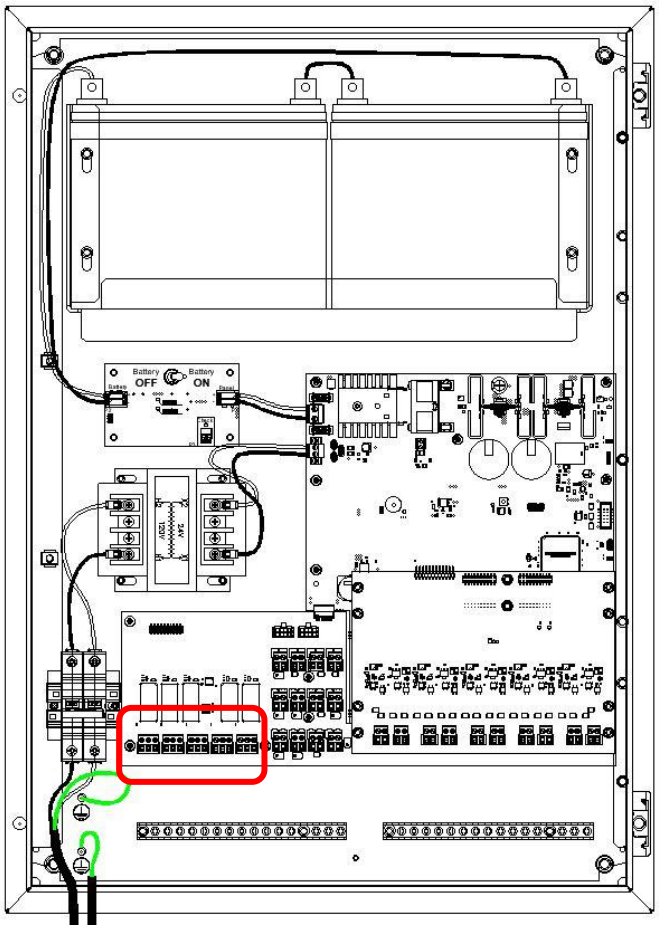


Figure 48 – Example Safety Relay Wiring

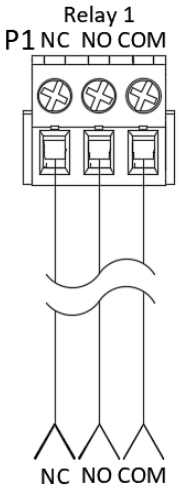


Table 20 – Safety Relay Circuit Specifications

Relay Style	Form C, SPDT
Relay Rating	2A @ 30VDC 0.5A @ 250VAC resistive only
Wire Gauge	20 AWG min, 16 AWG max (0.50 mm^2 min, 1.50 mm^2 max)

4.7.2 Auxiliary Power Wiring – (P21 – Zone A & P25 – Zone B)

The Field Connection Board provides two (2) auxiliary power circuits (Zone A and B) that provide power to the Actuator Field Modules connected to each Zone. See **Figure 49** and **Figure 50**. Each circuit can power up to ten (10) AFMs or combined load of AFMs and releasing devices of 2A maximum.

Figure 49 – Auxiliary Power Terminal Locations

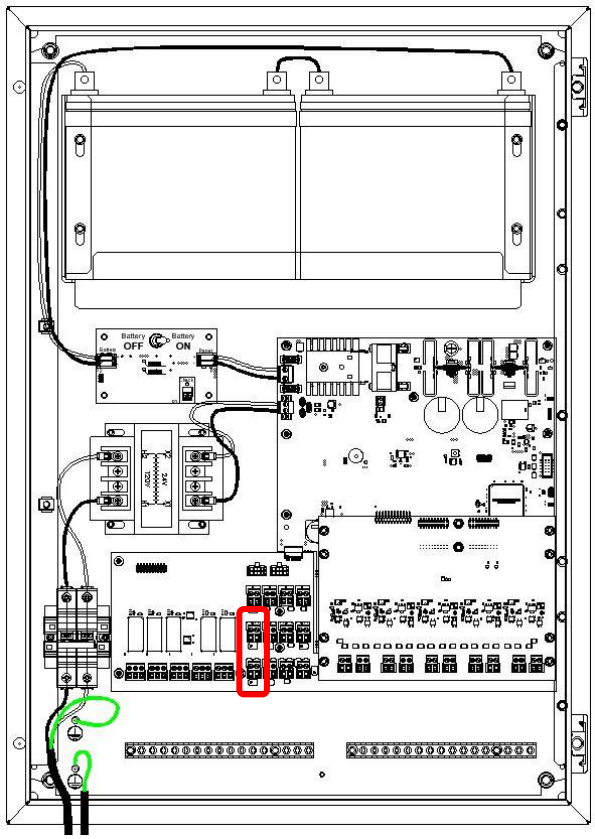
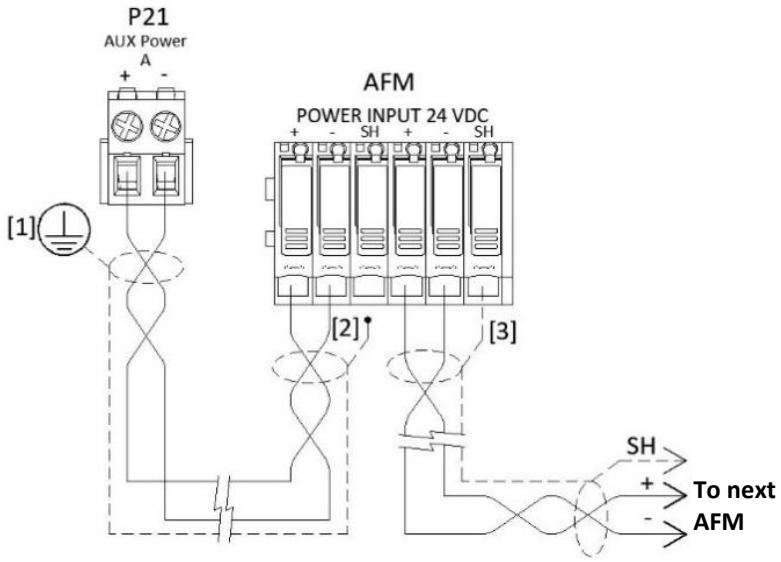


Figure 50 – Auxiliary Power Wiring (A, B, C)



Notes [ ]:
1. Land shield wire to the Protective Earth bar in the EXP enclosure.
2. Insulate shield wire. DO NOT land.
3. Land shield wire to the AFM outgoing terminals only.

Table 21 – Auxiliary Power Circuit Specifications

Voltage	24VDC nominal (range = 19.8 to 27.6VDC)
Current	2A maximum (special application)
Classification	Power-limited
Wire Type	LiYCY cable or twisted shielded pair with drain wire
Wire Gauge	18 AWG min, 14 AWG max (1.5 mm^2 min, 2.5 mm^2 max)
Wire Resistance	Voltage drop calculation via the Fike wire calculator must be performed to verify maximum circuit resistance. Refer to the system design calculation for maximum circuit resistance allowed.

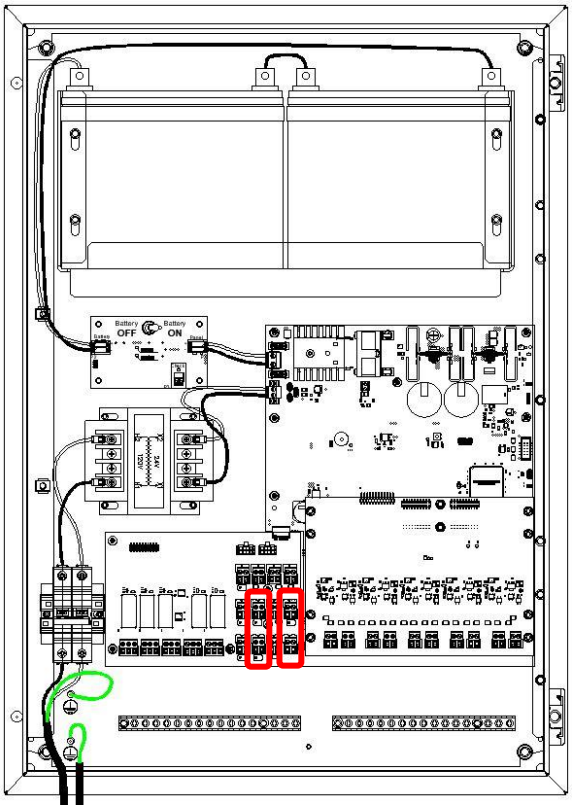
For a list of compatible AFMs, refer to **Fike Actuator Field Module Manual #P22420.**

NOTE: Auxiliary Power C (P29) and Peripheral Bus (P32) terminals are for future use. No connection is required.

4.7.3 Release Output Wiring (P22 – Zone A & P26 – Zone B) Remote Zone Disable Switch Wiring (P24 – Zone A & P28 – Zone B)

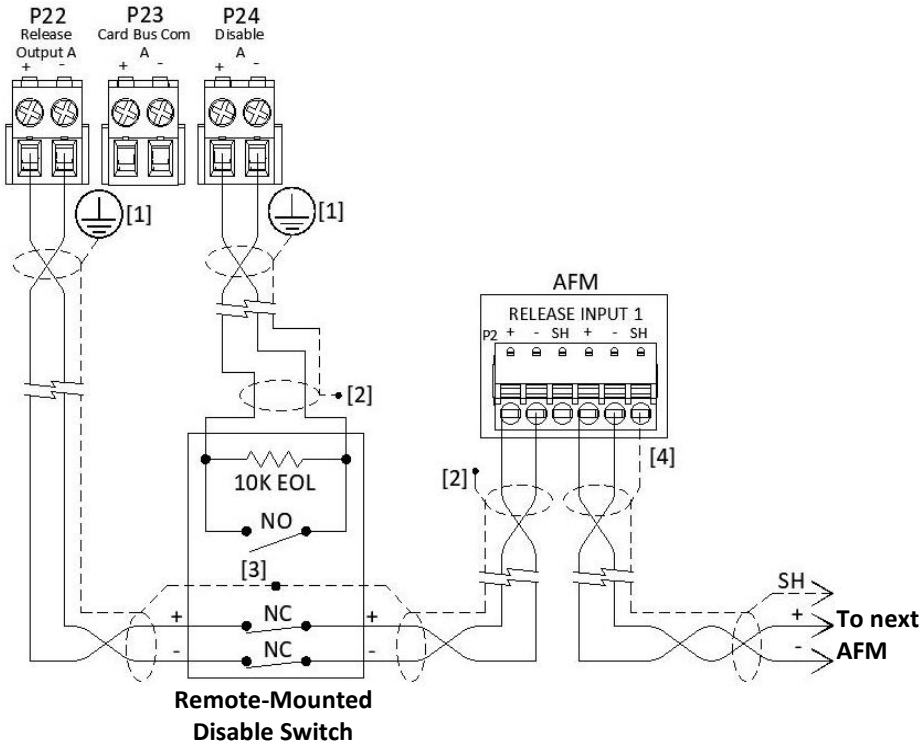
The Field Connection Board provides two (2) release output circuits (Zone A and B) that provide a reverse polarity signal to the Actuator Field Modules connected to each Zone for module activation. See **Figure 51**, **Figure 52**, and **Figure 53**. Each circuit can support up to ten (10) AFMs or a combined load of AFMs and releasing devices of 2A maximum.

Figure 51 – Release Output and Zone Disable Terminal Locations



Activating a remote disable switch disables the associated Zone's release output circuit and physically breaks the zone's release output circuit. As a result, the charging current required to keep the capacitors on the Single and Dual Input AFMs charged is disconnected. With the charging current removed, the energy stored within the AFM's capacitors will slowly bleed off after +10 minutes. Once the stored energy in the capacitors is depleted, the devices connected to the AFM's release output circuit can be safely removed for system maintenance, service, or testing.

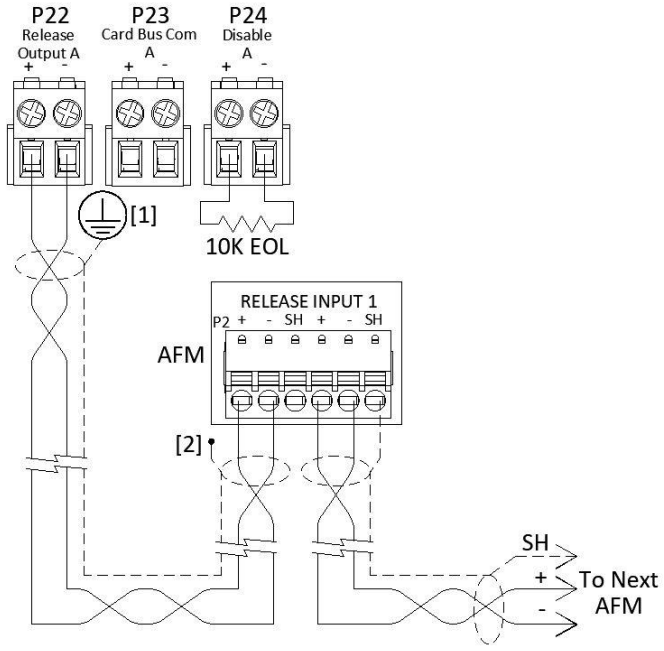
Figure 52– Release Output and Remote Disable Switch Wiring (Zone A/B)



Notes [ ]:

1. Land shield wire to the Protective Earth bar in the EXP enclosure.
2. Insulate shield wire. DO NOT land.
3. Join shield wires together and insulate.
4. Land shield wire to the AFM outgoing terminals only.

Figure 53– Release Output, Without Remote Disable Switch (Zone A/B)



Notes [ ]:
1. Protective Earth
2. Insulate shield wire. DO NOT land.

Table 22 – Release Output and Zone Disable Circuit Specifications

Release Output	
Voltage	24VDC nominal, -24VDC when active (special application)
Current	0.2A maximum
Classification	Power-limited and Supervised
Wire Type	LiYCY cable or twisted shielded pair with drain wire
Wire Gauge	20 AWG min, 16 AWG max (0.50 mm^2 min, 1.50 mm^2 max)
Wire Resistance	200Ω maximum based upon system load. (Refer to system design calculations)
Zone Disable	
Contact Types	One Normally open contact and two Normally closed contacts
Classification	Power-limited and supervised
Pathway	Class B, 10K EOL assembly

For a list of compatible AFMs, refer to **Fike Actuator Field Module Manual #P22420.**

4.7.4 Card Bus Communication Wiring (P23 – Zone A & P27 – Zone B)

The Field Connection Board provides two (2) Card Bus Communication circuits (Zone A and B) that supervise the Actuator Field Modules connected to each Zone. See **Figure 54** and **Figure 55**. Each circuit can support up to ten (10) AFMs or combined load of AFMs and releasing devices of 2A maximum.

Figure 54 – Card Bus Com Terminal Locations

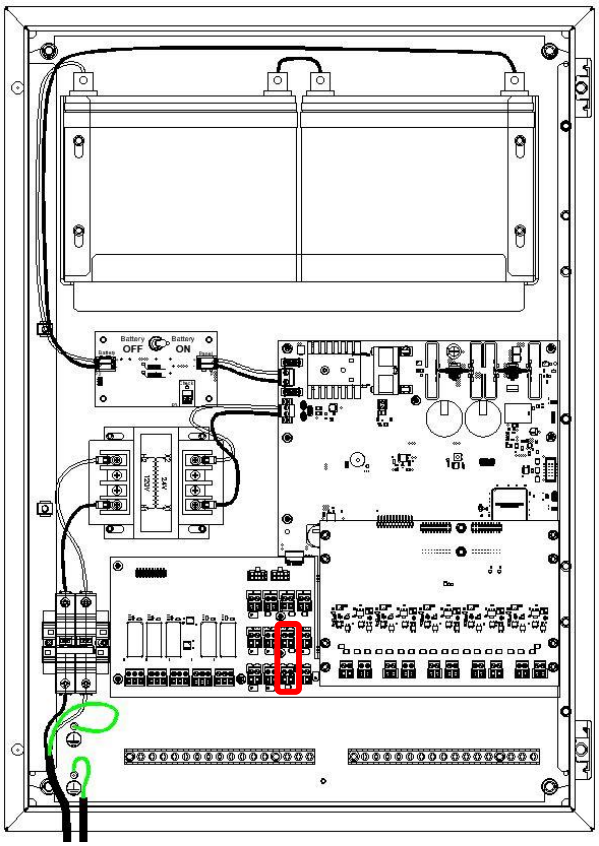
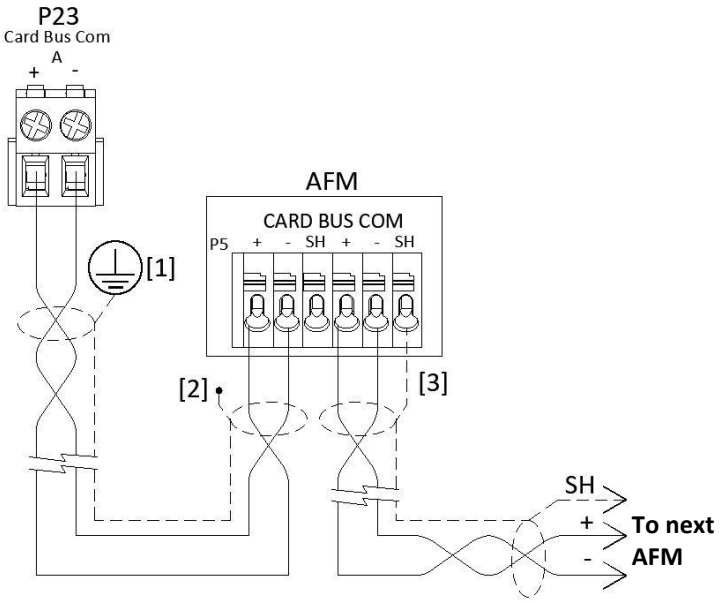


Figure 55 – Card Bus Communication Wiring (Zone A/B)



Notes [ ]:

1. Land shield wire to the Protective Earth bar in the EXP enclosure.
2. Insulate incoming shield wire. DO NOT land.
3. Land shield wire to the AFM outgoing terminals only.

Table 23 – Card Bus Communication Circuit Specifications

Classification	Power-limited and supervised
Wire Type	RS485 (Belden 9841 or equivalent)
Pathway	Class B, T-tapping of the circuit is not allowed
Max Wire Length	4,000 ft. (1219m) maximum

For a list of compatible AFMs, refer to **Fike Actuator Field Module Manual #P22420.**

4.7.5 Remote Bus Communication Wiring (P30 & P31)

The Field Connection Board provides two (2) Remote Bus Communication circuits that allow up to eight panels to be connected to enable release operation between connected panels. See **Figure 56** and **Figure 57**.

Figure 56 – Remote Bus Terminal Locations

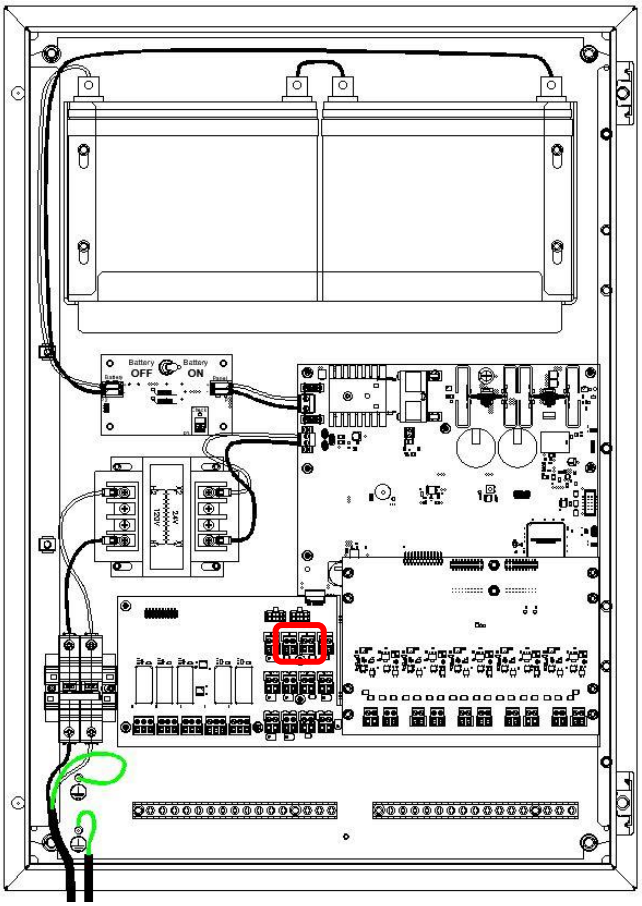
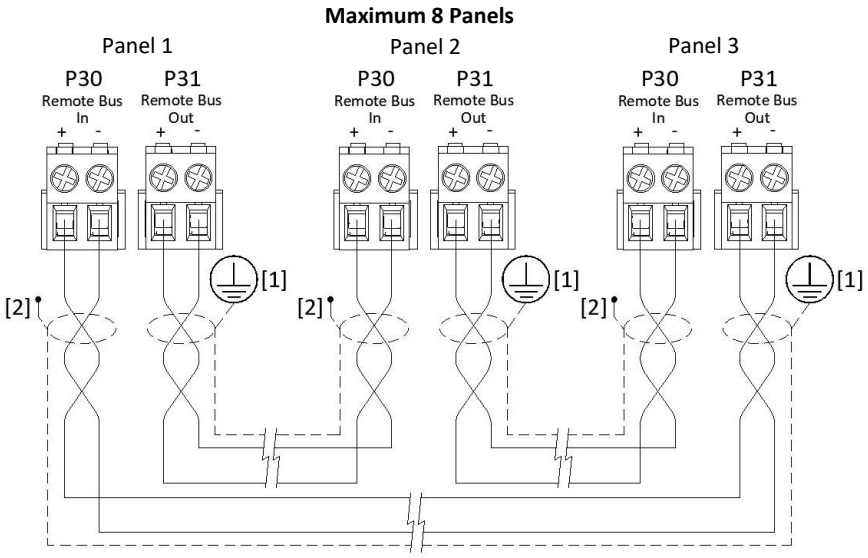


Figure 57 – Remote Bus (Panel-to-Panel) Communication Wiring



Notes [ ]:

1. Land shield wire to the Protective Earth bar in the EXP enclosure.
2. Insulate incoming shield wire. DO NOT land.

Table 24 – Remote Bus (Panel to Panel) Communication Circuit Specifications

Classification	Power-limited and supervised
Pathway	Class A only (t-tapping of the circuit is not allowed.)
Wiring	RS485 (Belden 9841 or equivalent)
Wire Length	1,000 ft. (300m) maximum between panels

4.8 Five-Detector Input Board Wiring (P11 thru P15)

The Five-Detector Input Boards (P/N 10-3014 and F0291449) provide five input circuits to connect approved 4-20mA, contact-closure, and burst indicator devices to the EXP panel for system activation. Only one 4-20mA device is permitted on each circuit. The detector input circuits can be wired Class B or Class A. See **Figure 59**8, **Figure 59**, and **Figure 60**.

Figure 58 – Detector Input Terminal Locations

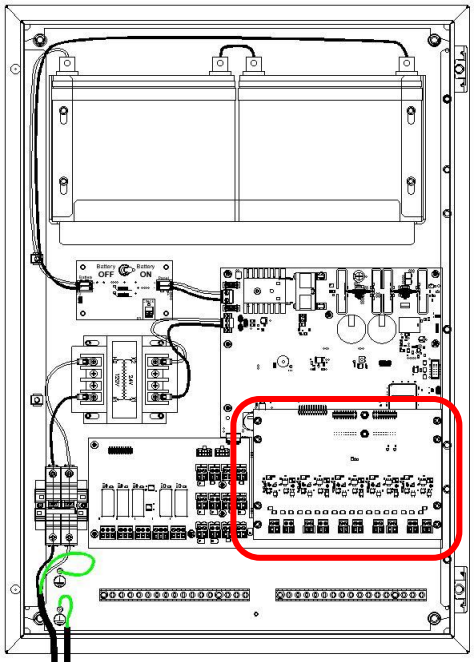
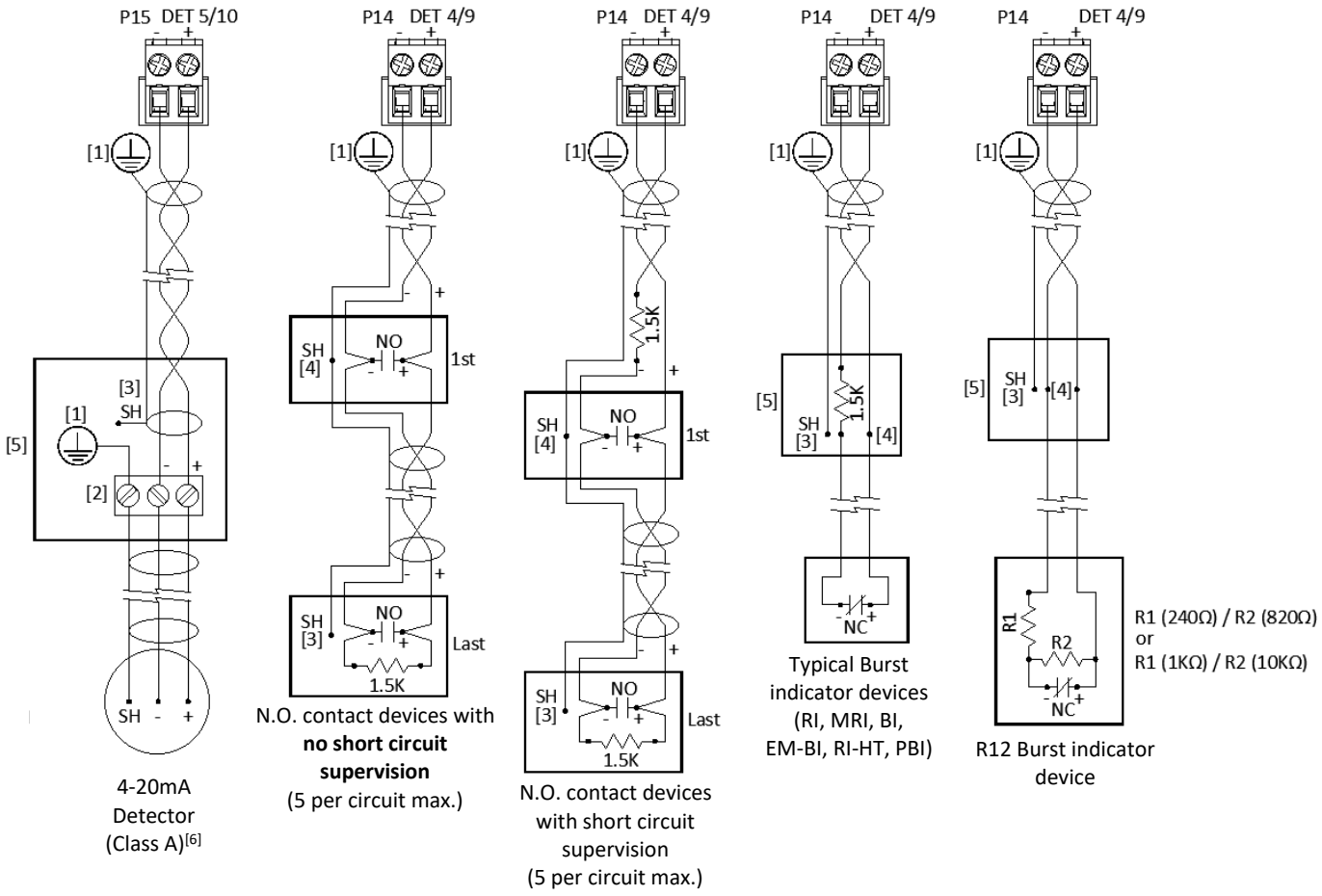


Table 25 – Detector Input Circuit Specifications

Compatibility	4-20mA and contact closure-type devices
Pathway	Class B or Class A
Output Voltage	19.9 – 27.6VDC
Current	50mA maximum
Resistance	30Ω maximum
Classification	Power-limited and supervised
Wiring	LiYCY cable or twisted shielded pair with drain wire
Wire Gauge	20AWG minimum, 16AWG maximum (0.52mm^2 min., 1.31mm^2 max)

See **Fike EXP Compatibility Document #P21945** for a list of compatible devices.

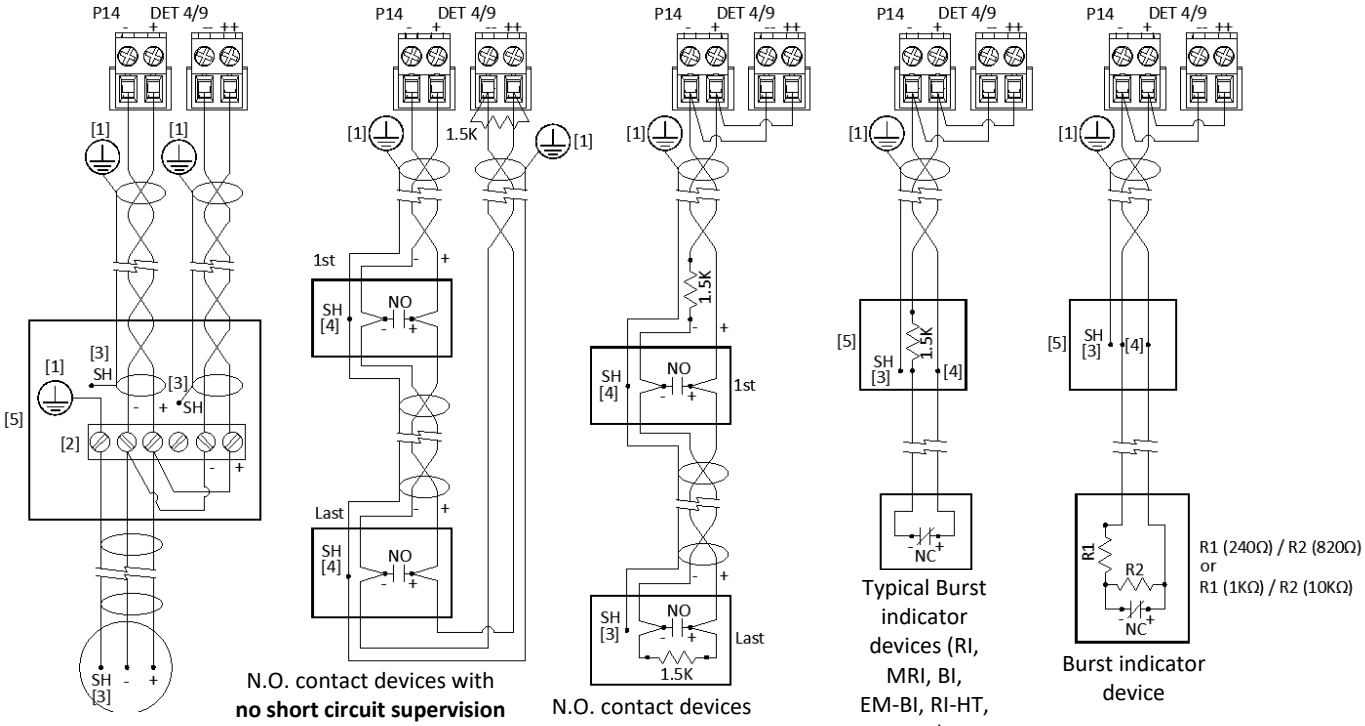
Figure 59 - Class B Detector Input Wiring
(P/N F0291448 Detector Input Boards)



Notes [ ]:

1. Protective Earth
2. Terminal block inside the field junction box
3. No termination, insulate
4. Join together and insulate
5. Junction box

Figure 60- Class A Detector Input Wiring
(P/N 10-3014 Detector Input Board)



Notes [ ]:

1. Protective Earth
2. Terminal block inside the field junction box
3. No termination, insulate
4. Join together and insulate
5. Junction box
6. 4-20mA detector are the only inputs that can be wired Class A. All other inputs must be wired as shown when mixing Class A and Class B circuits on a Class A card.

5.0 SYSTEM OPERATION

The primary function of the EXP System Controller is to monitor the status changes in the connected detectors and activate the system outputs according to the application-specific panel configuration. The operating parameters of the EXP system are configured using the EXP configuration software and are uploaded to the panel. On a networked system, each panel will have its own custom configuration that must be uploaded.

The operation of the EXP System Controller is based on mapping detector inputs to the system outputs to activate the explosion prevention components and panel relays. Detector inputs can be programmed to use an OR, AND, or VOTING logic to activate the system outputs.

5.1 Operational States

The panel will enter into one of the following operational states when a system event occurs,

5.1.1 Monitor State

The EXP System Controller initiates a Monitor (a.k.a. Shock Filter) event when debris impacts a pressure detector, causing an instantaneous rise in pressure typically not associated with an explosion pressure wave. Shock filtering operation is enabled/disabled for each detector using the system configuration software. Monitor events are non-latching. If the condition causing the event clears, the event will clear from the EXP panel.

- Event is not displayed on the User Interface
- Panel buzzer will not sound in response to the event
- Event is recorded in the local Panel's history buffer
- Event is not transmitted over the panel-to-panel Remote Bus
- Panel relays transfer (based on system configuration)

5.1.2 Electrical Fault State

An Electrical Fault occurs when an electrical problem has been detected on a monitored circuit, system, or component, such as faulty wiring or other equipment problems. Contact your Fike factory-trained and certified technician for further information. Electrical Fault events are non-latching. If the condition causing the event clears, the event will clear from the EXP panel.

- Event is displayed on the User Interface, flashing until silenced, then solid.
- Event is indicated in the Electrical Event Queue
- Panel buzzer will sound until it is silenced
- Fault LED (Zone A and/or B) will illuminate, flashing until silenced, then solid.
- Event is recorded in the local Panel's history buffer
- Event is not transmitted over the panel-to-panel Remote Bus
- Panel relays transfer (based on system configuration)

5.1.3 Mechanical Fault State

A Mechanical Event occurs when a mechanical impairment has been detected that can affect the operation of the explosion protection system, such as container lockout operation, remote Zone disable, actuator missing, bottle pressure, and nozzle cover missing events. Contact your Fike factory-trained and certified technician for further information. Mechanical Fault events are non-latching. If the condition causing the event clears, the event will clear from the EXP panel.

- Event is displayed on the User Interface, flashing until silenced; then solid.
- Event is indicated in the Mechanical Event Queue
- Panel buzzer will sound until it is silenced
- Fault LED (Zone A and/or B) will illuminate, flashing until silenced, then solid.
- Event is recorded in the local Panel's history buffer
- Event is not transmitted over the panel-to-panel Remote Bus
- Panel relays transfer (based on system configuration)

5.1.4 Warning State

A Warning Event occurs when a detector connected to a detector input circuit detects pressure levels outside of the normal operating pressure that does not meet the threshold for Alarm operation or when the pressure level with a suppression container is outside of expected levels but is still within safe operating limits, so as not to trigger a Mechanical Fault indication. Contact your Fike factory-trained and certified technician for further information. Warning events are non-latching. If the condition causing the event clears, the event will clear from the EXP panel.

- Event is displayed on the User Interface, flashing until silenced; then solid.
- Event is indicated in the Warning Event Queue
- Panel buzzer will sound until it is silenced
- Warning LED will illuminate, flashing until silenced; then solid
- Event is recorded in the local Panel's history buffer
- Event is not transmitted over the panel-to-panel Remote Bus
- Panel relays transfer (based on system configuration)

5.1.5 Alarm State

An Alarm Event occurs when a detector input exceeds the configuration's required alarm conditions. The EXP detector inputs can be configured for the following input logic scenarios: OR, AND, and VOTING (N of NN) for Alarm activation. **Following an Alarm event, the process must be shut down to inspect the hazard and connected devices.** Contact your Fike factory-trained and certified technician for further information. Alarm events are non-latching if the zone’s activation criteria is not met. If the condition causing the event clears, the event will clear from the EXP panel. Once the zone’s activation criteria is met, the Alarm events will latch.

- Event is displayed on the User Interface, flashing until silenced; then solid.
- Event is indicated in the Alarm Event Queue
- Panel buzzer will sound until it is silenced
- Event is recorded in the local Panel's history buffer
- Panel relays transfer (based on system configuration)

5.1.6 Release State

The EXP panel enters the Release State when the detector input conditions have met the panel configuration requirements for release operation. Releasing operation can be initiated by Alarm events occurring at the local EXP panel only and by Alarm events occurring on networked panels. See Section 5.2 Release Operation for details. **Following a Release event, the process must be shut down to recharge and recondition the explosion protection components.** Contact your Fike factory-trained and certified technician for further information.

- Release LED on the User Interface flashes until silenced; then solid.
- Event is indicated in the Alarm Event Queue of the originating EXP panel and networked panels.
- Panel buzzer (originating and networked) will sound until silenced
- Event is recorded in the originating Panel's history buffer and the history buffer of networked panels.
- Panel relays transfer (based on system configuration)
- Pressure data that caused the release is recorded in the panel to which the detector is connected. Refer to Section 6.7.3.6 for details.

CAUTION: Recorded pressure data must be erased after system activation to allow new data to be recorded. See Section 6.7.4.3.

5.2 Release Operation

Actuator Field Modules (AFMs) provide the primary interface for connecting the explosion protection components (i.e., containers, gate valves, pinch valves, etc.) to the EXP panel. The panel's two Release Output circuits (Zone A and B) provide a connection point for up to ten Actuator Field Modules (AFMs) per circuit for a maximum of 20 AFMs per panel. The total number of AFMs connected to each Release Output circuit varies depending on the AFM type used. Refer to the Actuator Field Module DIOM (P22420) for details.

As detailed below, the EXP controller can be configured via software to operate as a single-zone or dual-zone system, depending on the project-specific requirements.

Single Zone: When configured as a single-zone system, panel zones A and B operate simultaneously in response to a deflagration event. This allows the panel to protect a single hazard, requiring no more than twenty explosion protection components.

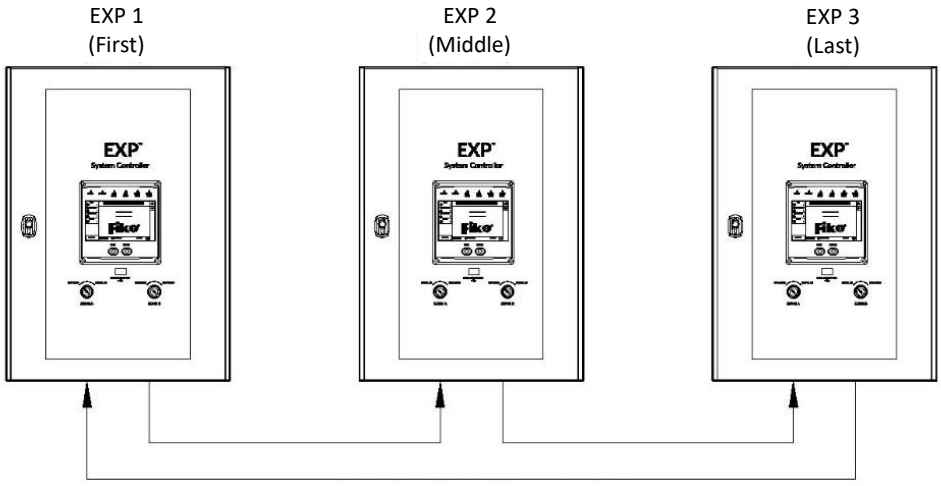
Dual-Zone: When configured as a dual-zone system, panel zones A and B operate independently in response to a deflagration event. This allows the panel to protect two separate hazards, each requiring no more than ten explosion protection components. The use of Dual-Input AFMs (i.e., P/N 10-3054 and 10-3055) enables zones A and B to be cross-connected to common AFMs to facilitate the activation of explosion-isolation components (isolation valves, SRD chemical-isolation containers, pinch valves, etc.) from either panel zone.

For large Explosion Protection applications that exceed the component limits of one EXP panel, up to 8 EXP panels can be networked via a common Fire Bus for shared released operation. EXP panels connected to the Fire Bus can be configured to respond to the activation of Zone A or B on any other networked panel to activate the explosion protection system components.

5.3 Panel Network

The EXP control panel can operate as a standalone panel or as part of a panel network consisting of two to eight panels. See **Figure 61**.

Figure 61- Three-Panel Network Example



When panels are networked together, they will operate as follows:

1. Networked panels can be configured to respond to "Alarm Zone" events initiated by other panels. All other event types are isolated to the local Panel and are not shared across the panel network. Sharing "Alarm Zone" events between panels allows all networked panels to operate as one, providing up to 16 zones of operation.
2. The operation of the RESET and SILENCE buttons on the user interface is isolated to the local Panel only. If more than one networked Panel is active in response to an event, it will be necessary to SILENCE or RESET each networked Panel. Reset originating panels first to prevent an Alarm loop.
3. Networked panels do not synchronize their time and date; therefore, it is necessary to manually synchronize each Panel to ensure the accuracy of the event timeline between networked panels.
4. Networked panels configured to respond to "Alarm Zone" events initiated by other panels will display these event types on the Local User Interface. They will record the event in the Panel's history buffer. All other events initiated by networked panels will not be displayed nor recorded in the Panel's history buffer. These events will be displayed and recorded in history by the originating Panel only.
5. Disabling a releasing zone using the disable switches (Panel or remote) will only disable the local Panel's releasing circuit(s). **If using a dual-input AFM, both circuits must be disabled prior to service**. Refer to Section 5.4 for further information.

To network EXP panels together (minimum two, maximum of eight), the following steps must be taken:

1. Each Panel must be connected to the explosion protection system's Remote Bus. The Remote bus is a Class A circuit providing communication paths between network panels.
2. Each Panel must be assigned a unique panel address for identification on the panel network. This is done using the DIP-switch on each Panel's system display board.
3. Each Panel must be designated as First, Middle, or Last using the EXP system-configuration software. This designation enables supervision of the communication path between networked panels. Should the

Remote Bus (Class A) circuit break, a Fault will be displayed on the panels where the network break has occurred.

5.4 Zone Disable

The EXP panel is equipped with two keyed switches for disabling the Panel's releasing output circuits (Zone A and Zone B). See **Figure 62**. Activating a disable switch will software disable and physically break the associated zone's release output circuit, preventing the accidental release of the system during maintenance, service, and testing. In response to the activation of the disable switch, the zone's fault LED on the EXP User Interface will flash, the panel buzzer will sound, and a Zone Disable event will be displayed on the User Interface.

Where multiple EXP panels are networked together for joint releasing operation, activating the Zone Disable switches on more than one panel may be necessary to prevent unwanted system activation.

Figure 62 – Zone Disable Switches

When a zone is disabled, the panel will continue to receive and record system events as they occur; however, the disabled zone will not activate in response to a Release event as long as the zone remains disabled. If the panel indicates it is still in the Release State, DO NOT enable the zone. Doing so will result in the immediate activation of the system components associated with the affected zone. All alarms must be cleared before re-enabling the zone.

Single and dual input AFMs

Disabling the zone breaks the release output circuit connected to the AFMs, preventing the AFMs from receiving the reverse polarity signal from the EXP panel required to activate the connected initiator (GCA or Metron). Breaking the circuit also disconnects the current required to keep the AFM's capacitors charged. With the charging current removed, the energy stored within the AFM's capacitors will slowly bleed off after +10 minutes. Once the stored energy in the capacitors is depleted, the devices connected to the AFM's release output circuit (GCA and Metron) can be safely removed for system maintenance, service, or testing.

Solenoid AFMs

Disabling a zone breaks the release output circuit connected to the AFMs, preventing the module from receiving the reverse polarity signal from the EXP panel required to activate the connected solenoids.

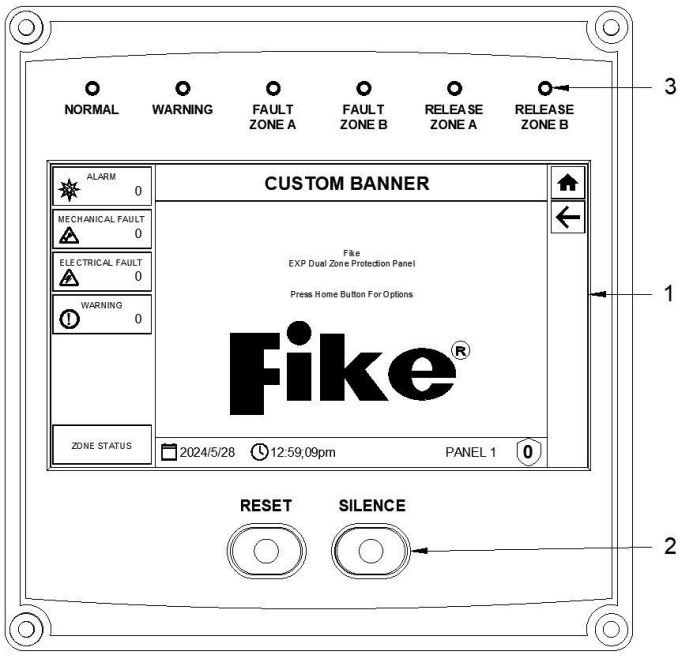
Dual-input or solenoid AFMs

Dual-input AFMs can be connected to two separate release output circuits, either from one panel (Zone A & B) or from two separate panels. In this scenario, to fully disable the associated dual-input AFM to prevent accidental operation, both zone release output circuits connected to the dual-input AFM must be disabled.

6.0 USER INTERFACE OVERVIEW

The EXP user interface includes indicators and operator controls that allow the operator to view event details and system reports, respond quickly to system events, and enable/disable switches that allow the disabling of each output zone separately.

Figure 63- EXP User Interface

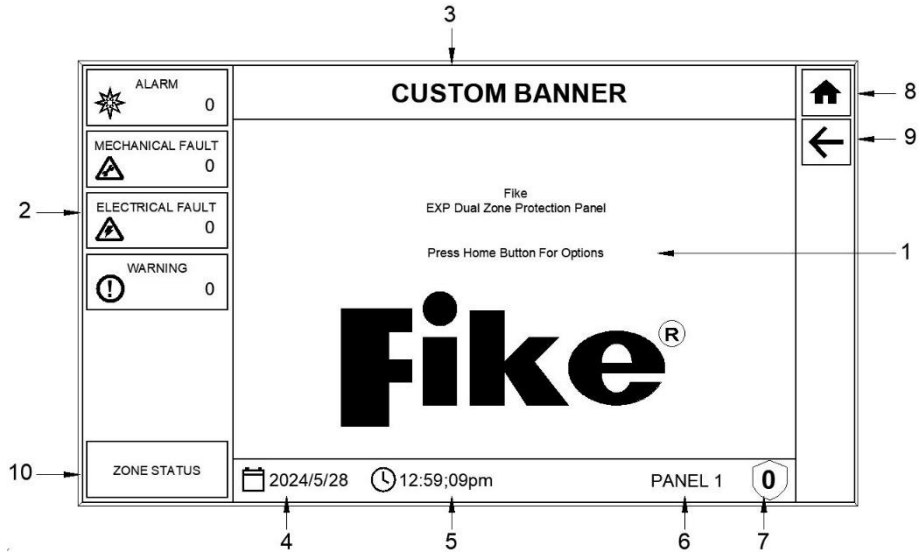


1. **Touchscreen Display**
2. **Control Buttons**
3. **Status Indicators**

6.1 Normal Screen

The System Normal Screen is displayed when there are no active events. The status banner can be customized to suit the project's needs using the EXP Configuration software.

Figure 64 - Normal Screen

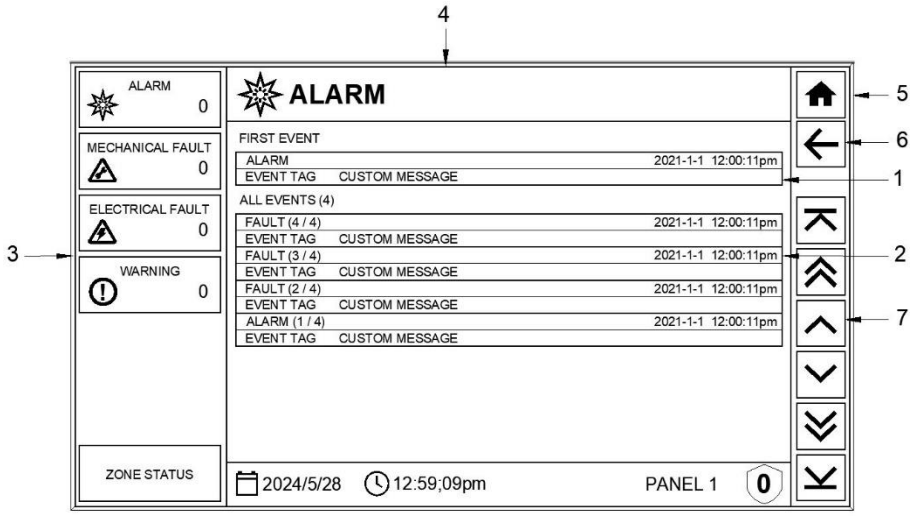


1. **System Banner (custom message)**
2. **Event Type Filters**
3. **Custom Banner**
4. **System Date**
5. **System Time**
6. **Remote bus Panel Address**
7. **Password Access Level**
8. **Go to Home Screen**
9. **Previous Screen**
10. **Zone Status Screen Display**

6.2 Off-Normal Screen

When an active event occurs on the system, the Off-Normal screen is displayed by default. The Off-Normal screen will remain displayed until the system operator navigates to another screen.

Figure 65- Off-Normal Screen



1. **First Event.** The first event of the highest event priority type received by the Panel is displayed here. The event will flash until the system is silenced.
2. **All Events.** All events will be displayed here in the order they are received, regardless of the event type. The events will flash until the system is silenced.
3. **Event Type Queues.** The queues indicate the quantity of each event type received by the Panel since the last Reset. Queues with an active event will flash until silenced. Select any queue with an active event to filter the All Events section of the display to show only the event types associated with the selected queue.
4. **System Status Banner.** Changes to indicate the highest priority event type active on the system. It also shows when the system is being Reset.
5. **Home Screen.** Returns the screen to the Main menu when pressed.
6. **Previous.** Returns to the previous screen.
7. **Event Increment Keys.** Refer to **Figure 66.**

Figure 66- Event Increment Keys


When pressed, the events list is incremented to the top.


When pressed, the events list is incremented upwards by fourteen events.


When pressed, the events list is incremented upwards by one event.


When pressed, the events list is incremented downwards by one event.


When pressed, the events list is incremented downwards by fourteen events.


When pressed, the events list is incremented to the bottom.

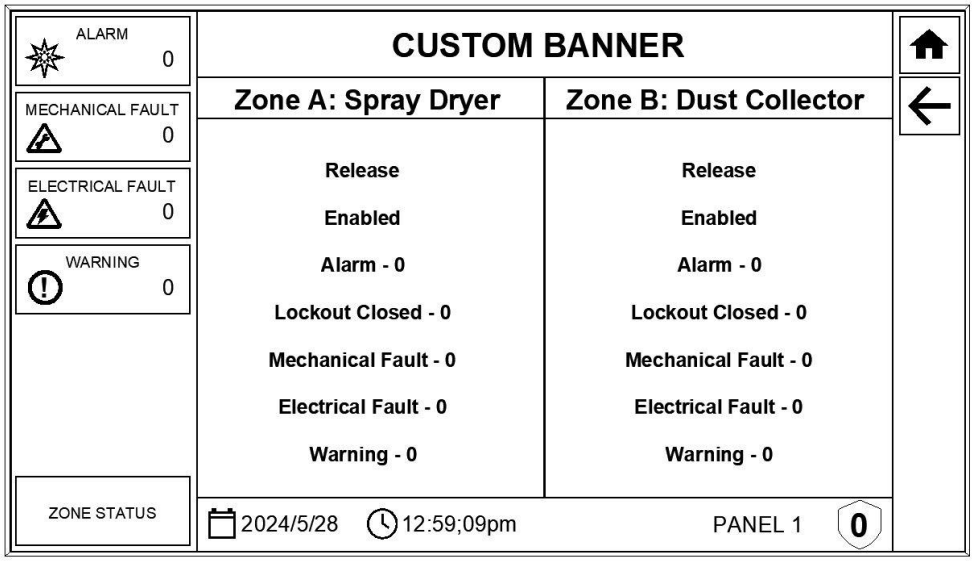
6.3 Zone Status Screen

The Zone Status Screen is displayed by pressing the **ZONE STATUS** button on the system Normal Screen. This screen provides a quick snapshot of the number of active events associated with Zones A and B. Panel (system) events will not be added to the zone event counters.

The header for each Zone can be customized using the panel configuration software to identify the protected process.

Using the panel configuration software, the Zone Status Screen can be set to be the first screen displayed in response to an active system event, replacing the standard Off-Normal screen. **For FM installation, the default Off Normal screen must be displayed in response to an active system event.**

Figure 67 – Zone Status Screen



Release – Displayed if the Zone's explosion protection components have been activated.

Enabled – Changes to indicate the Enabled or Disabled status of the Zone

Alarm – The counter indicates the number of active Alarm events for the Zone.

Lockout Closed – The counter indicates the number of closed container lockouts.

Mechanical Fault – The counter indicates the number of mechanical faults currently active in the system.

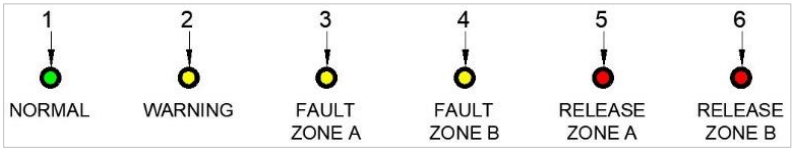
Electrical Fault – The counter indicates the number of electrical faults currently active in the system.

Warning – The counter indicates the number of current warnings in the system.

6.4 System Status Indicators

The User Interface has six LEDs to provide a quick visual indication of the system status. See **Figure 68**.

Figure 68 – System Status Indicators

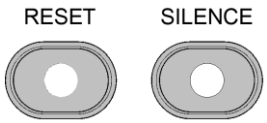


1. **Normal LED.** Green LED illuminates solid to indicate that no off-normal conditions are present on the system.
2. **Warning LED.** Yellow LED illuminates when the control panel records a Warning event. LED will turn off if the event clears or the system is Reset.
3. **Fault Zone A LED.** Yellow LED illuminates when the control panel records a Zone A Fault. LED will turn off if the event clears or the system is Reset.
4. **Fault Zone B LED.** Yellow LED illuminates when the control panel records a Zone B Fault. LED will turn off if the event clears or the system is Reset.
5. **Release Zone A LED.** Red LED illuminates when the control panel records a Zone A Release. LED will turn off when the system is Reset.
6. **Release Zone B LED.** Red LED illuminates when the control panel records a Zone B Release. LED will turn off when the system is Reset.

6.5 System Control Buttons

The User Interface has a RESET and SILENCE button with an associated LED. See **Figure 69**. The operation of these buttons impacts the function of the local Panel only. RESET and SILENCE button operation will not affect other networked panels. The embedded LED in each button will turn on while the process is active and turn off when it is completed.

Figure 69 – System Reset and Silence Buttons



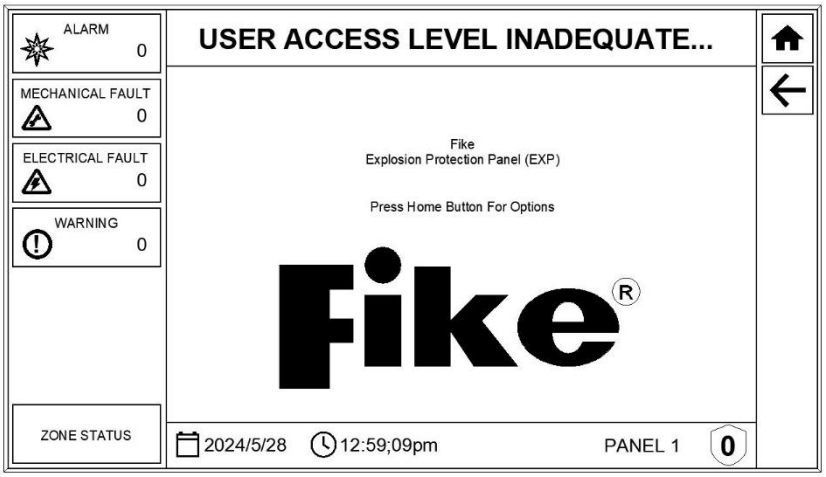
6.5.1 SILENCE

When pressed and released, the SILENCE button will silence the local panel sounder, and the switch LED will be turned on to indicate the panel has been silenced. Any flashing LEDs or User Interface fields will change to steady on. The switch LED will turn off when the SILENCE button is deactivated. When multiple events are active, each event is not required to be individually silenced.

6.5.2 Reset

A valid access code must be entered before the RESET button can be used. Pressing the RESET button without entering a valid access code will not impact the panel. The following screen indicates that a valid access code must be entered.

Figure 70 – Inadequate User Access Level



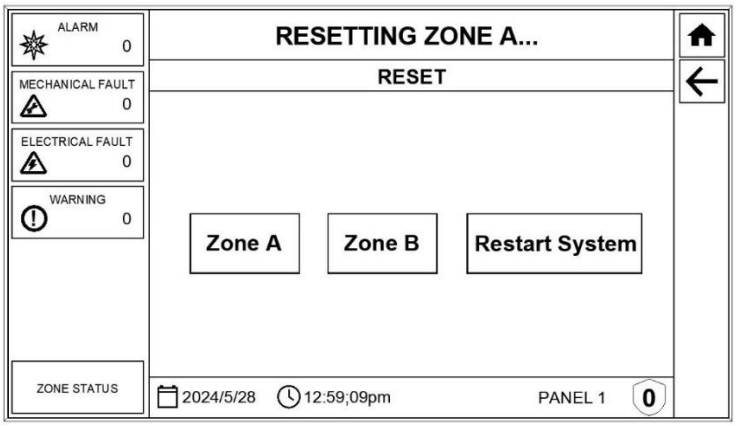
When pressed and released, the RESET button will cause the panel to display three options: Reset Zone A, Reset Zone B, or Restart System (reboot).

6.5.2.1 Reset Zone A or B

Selecting Zone A or Zone B from the RESET submenu will reset the selected Zone and generate a Zone Reset event. The User Interface top banner will display the Zone being reset, as shown in **Figure 71**. The User Interface will return to the Normal screen after completing the Zone reset sequence.

NOTE: During a Zone Reset, system protection for the opposite zone will continue; however, if voting logic has been applied to cross-zone protection, the release inputs from the zone undergoing RESET will not be active during the Zone Reset process.

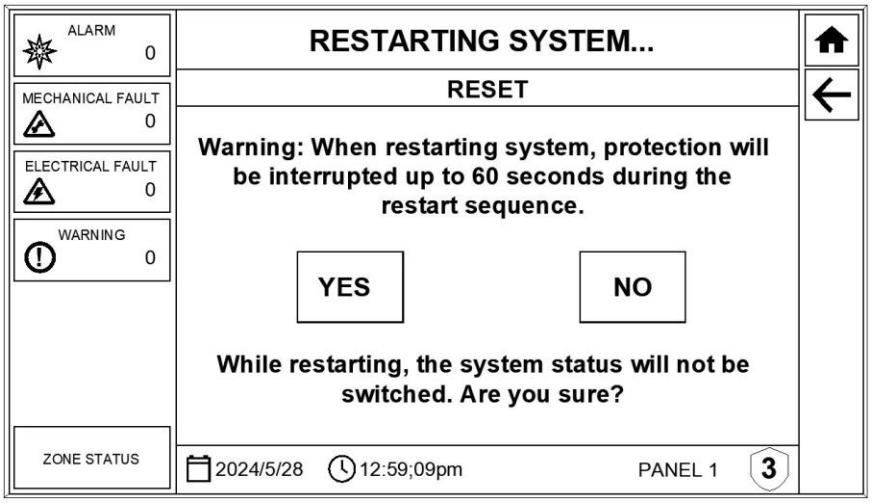
Figure 71 – Zone Reset



6.5.2.2 Restart System

Selecting Restart System from the RESET submenu will initiate the system reset process. See **Figure 72**. This will restart the EXP panel and all field devices and turn off the auxiliary power for the system's Actuator Field Modules (AFMs). A Warning message will be displayed indicating that the reset process can take up to 60 seconds, during which the system cannot monitor hazards protected by the panel being reset. Operators must then confirm that they want to proceed with resetting the system. Any active events that exist after a Restart will re-sound the system.

Figure 72 – Restart System



To Restart the System:

Step 1. Enter a valid password.

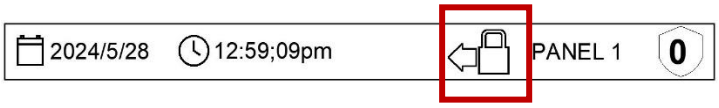
Step 2. Press and release the "RESET" button.

Step 3. Select "Restart System."

Step 4. Confirm restart by selecting "YES".

If the EXP panel is in the Release state, operation of the RESET button is delayed (±2 min.) immediately after an Alarm Event until confirmation is received that the display has received the detector pressure data. This will be indicated by a system event and a download lock indicator displayed at the bottom of the User Interface. See **Figure 73**. The download lock indicates that the Reset button is non-operable.

Figure 73 – Detector Pressure Data Download Lock Indicator



The pressure data must be immediately downloaded to a USB drive or PC for analysis. The pressure data must be manually erased.

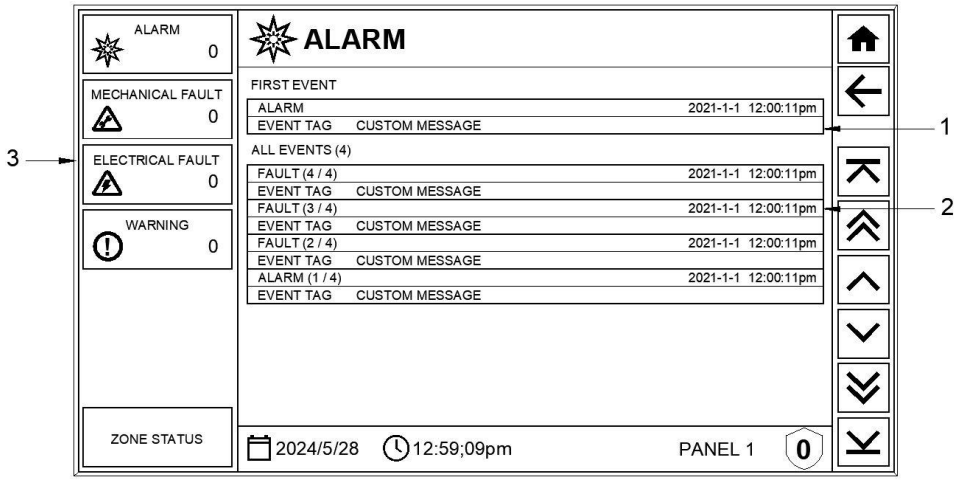
NOTE: It is strongly recommended to use the panel configuration software to verify the integrity of the downloaded data before the pressure data is erased from the Panel.

6.6 Event Messages

The EXP control panel uses event messages to signal a status change. The panel automatically displays the first highest priority active event in the First Event area on the display. All other active events are displayed below in the order they are received. See **Figure 74**.

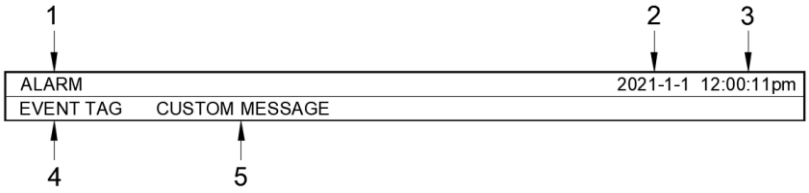
Select one of the four Event Queues (i.e., Alarm, Mechanical Fault, Electrical Fault, Warning) to filter displayed events by event type. See **Figure 75**. An active event must be in the queue before it can be selected. When viewing event messages in one queue and a higher priority event message is placed in another queue, the EXP control panel continues to display the content of the current queue until the user timeout period expires or until a different queue is selected.

Figure 74 – Event Display



1. First Event Area
2. All Events Area
3. Event Queues

Figure 75 – Event Message Details



1. **Event Type**
2. **Date the event was received**
3. **Time the event was received**
4. **System event tag**
5. **Event message**

6.6.1 Event Types and Priorities

The EXP System Controller uses the following system event types to indicate a status change. Each event type is assigned a priority for the purpose of displaying events on the User Interface.

- **Alarm** (priority 1 -highest): Events that signal an explosion event (i.e., static, rate, or smart). Alarm Events are recorded in both the local Panel's history buffer and the history buffer of each Panel connected to the panel-to-panel Remote Bus. Panels connected to the remote bus can be configured to initiate release operations from Alarm events initiated by other panels. Following an Alarm event, the process must be shut down to inspect the hazard and connected devices. Contact your Fike factory-trained and certified technician for further information.

- **Mechanical Fault** (priority 2). Events that signal mechanical impairment can affect the operation of the explosion suppression system, such as container lockout operation, remote Zone disable, actuator missing, bottle pressure, and nozzle cover missing events. Mechanical Faults are recorded in the local Panel's history buffer but are not transmitted over the panel-to-panel Remote Bus. Faults indicate that a condition exists in which explosion protection may be compromised. Contact your Fike factory-trained and certified technician for further information.

- **Electrical Fault** (priority 3). Events that signal an electrical fault has occurred in a monitored circuit, system, or component, such as faulty wiring or other equipment problems. Electrical Faults are recorded in the local Panel's history buffer but are not transmitted over the panel-to-panel Remote Bus. Faults indicate a condition exists in which explosion protection may be compromised. Contact your Fike factory-trained and certified technician for further information.

- **Warning** (priority 4). Events that signal a low- or high-pressure condition have been detected by the explosion detector or have been detected on the suppression container. The EXP panel enters the Warning State when a detector connected to a detector input circuit detects pressure levels that do not meet the threshold for Alarm operation or levels that require Mechanical Fault indication. These events are outside expected levels but still within safe operating limits. They are recorded in the local Panel's history buffer but are not transmitted over the panel-to-panel Remote Bus. Warnings indicate a condition that requires attention. Contact your Fike factory-trained and certified technician for further information.

- **Monitor**. Events that signal a pressure data filtering (shock filter) event on a pressure detector. Shock filtering operation is enabled/disabled for each detector using the system configuration software. Monitor events are not displayed on the User Interface. They are recorded in the local Panel's history buffer and are not transmitted over the panel-to-panel Remote Bus.

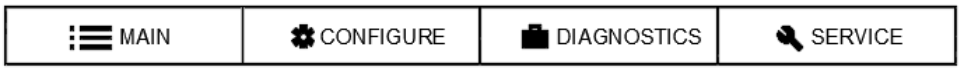
- **Release**. Indicates the associated zone has received a signal for activating the explosion-protection component (input is active). Three dashes indicate the input is NOT active.

- **System**. Events associated with user-initiated events include power-up reset, user reset, silence, system login, configuration update, memory erase, system card enrollment, etc. System events are not displayed on the User Interface. They are recorded in the local Panel's history buffer but are not transmitted over the panel-to-panel Remote Bus.

6.7 User Interface Menus

The EXP control panel user interface provides four top-level menus that allow you to view event history, configure basic system parameters, view system diagnostics, and initiate system service procedures. The user access levels restrict access to the menus. See Section 6.7.1.3.

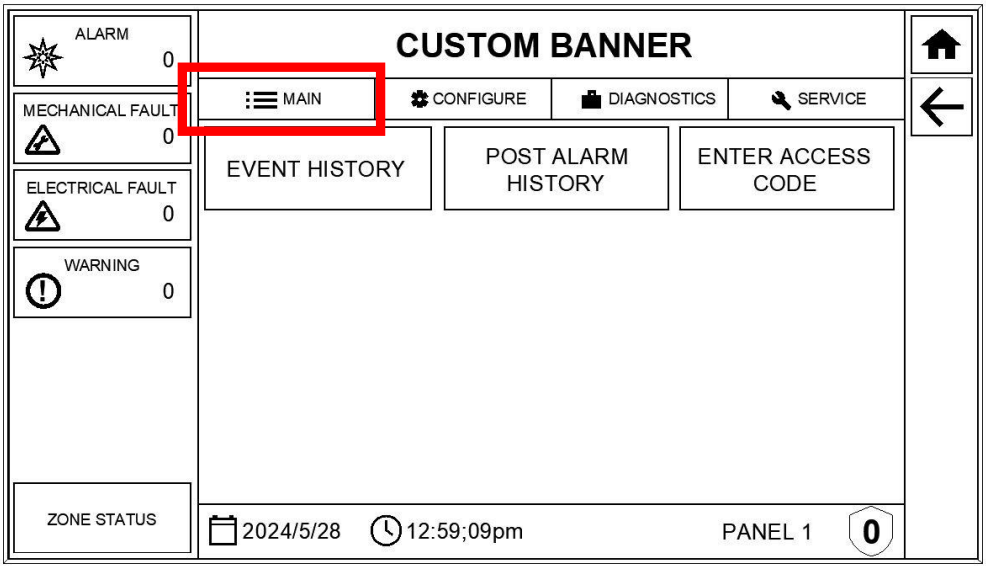
Figure 76 - User Interface Menus



6.7.1 Main Menu

The Main Menu is accessible by pressing the home button in the display's upper right corner. This menu offers the following selections. See **Figure 77**.

Figure 77 – Main Menu Selections



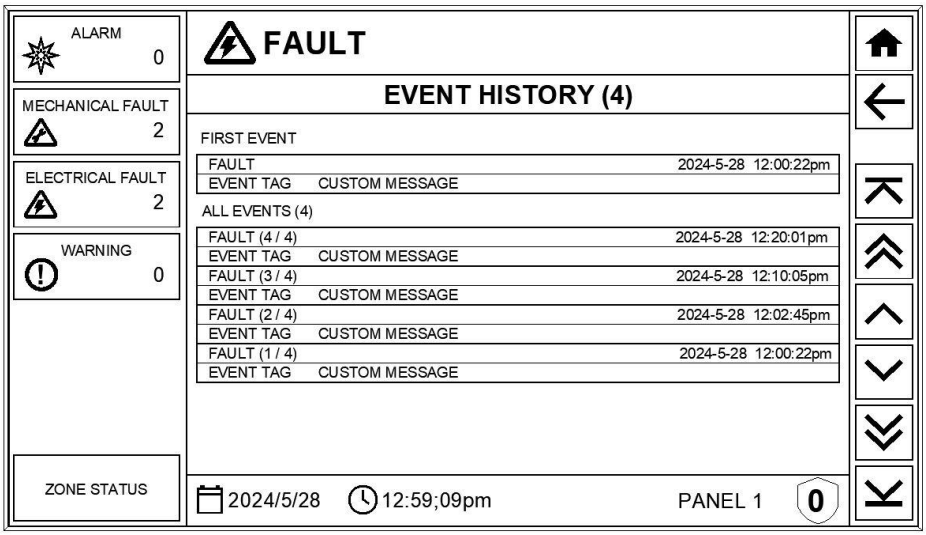
6.7.1.1 Event History

Each EXP control panel has its own 4080 event history buffer. See **Figure 78**. The buffer operates on a first in-first out principle. Each Panel records all events associated with its operation in its history buffer. Panels connected via a Remote bus (8 max.) only share Alarm events for Release operation. All other event types remain local to the Panel where the event occurred. It is important to note that you will be required to download the event history and pressure data from each Panel to get a complete picture of the events that led up to the system's release.

NOTE: If the event history is full AND events are still being recorded, the user may not have access to scroll through the events until all processing is complete.

NOTE: The panel's history buffer can be erased using the ERASE HISTORY feature, accessible via the user interface.

Figure 78 – Event History Display

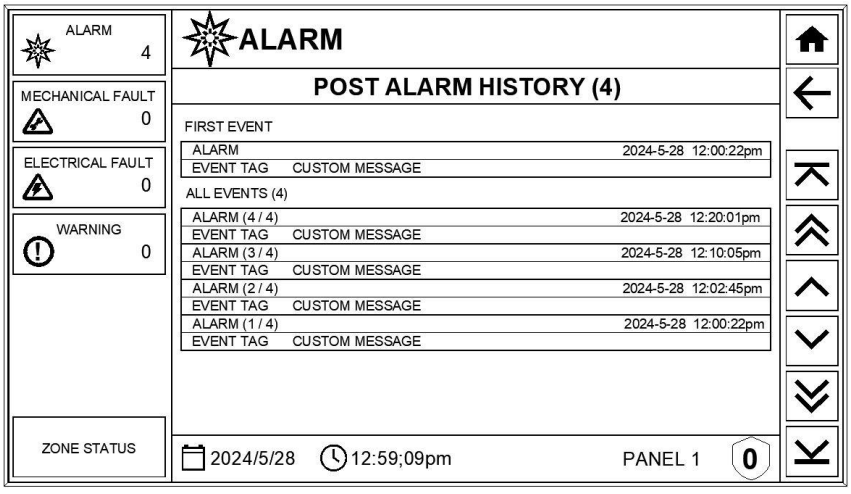


6.7.1.2 Post-Alarm History

When the EXP system controller records an alarm event, the event and all subsequent events are written in a post-alarm history buffer. This 4095 buffer is separate from the Event History buffer. The buffer is accessible from the Main Menu at the panel that initiated the Alarm condition. See **Figure 79**.

NOTE: Panels connected via a Remote bus (8 max.) only share Alarm events for Release operation. All other event types remain local to the Panel where the event occurred. It is important to note that you will be required to download the event history and pressure data from each Panel to get a complete picture of the events that led up to the system's release.

Figure 79 – Post-Alarm History Display



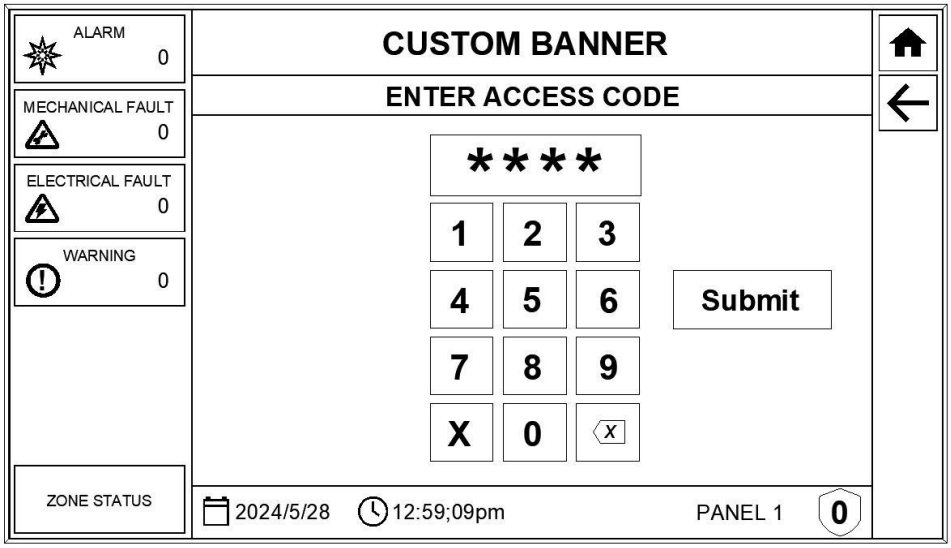
When the data in the buffer reaches a predetermined size, a Warning message (EVENT HISTORY LOG REQUIRES SERVICE) will be displayed at the Main Panel. When the buffer is full, it will stop recording, and data may be lost. Users are encouraged to download the data at the Main Panel as soon as possible to avoid data loss.

6.7.1.3 Enter Access Code

The EXP control panel uses access levels to prevent unauthorized users from accessing specific controls and menu features. Each level is assigned a custom password that can be changed using the system configuration software.

Once an access level password is entered at the User Interface. See **Figure 80**. Access is granted for any operator controls or menu commands with the same access level or lower unless the user timeout period expires. After that, the access code must be entered again. The timeout period is typically set for 5 minutes.

Figure 80 – Enter Access Code



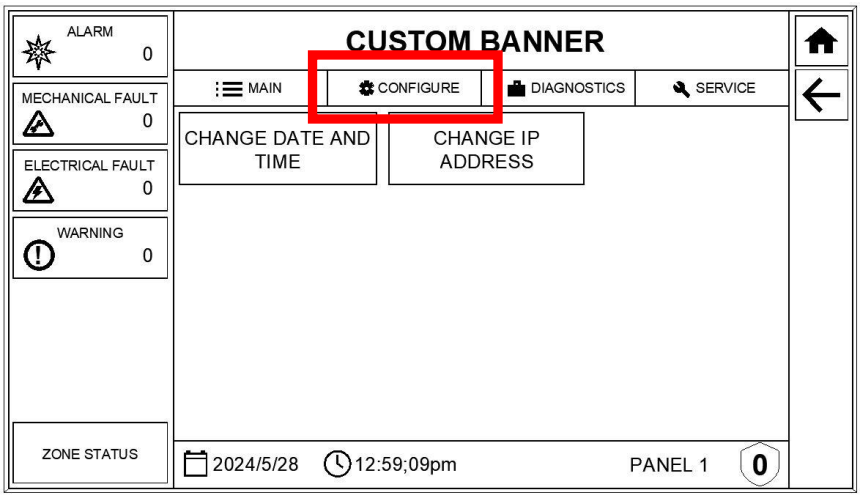
EXP User Interface Access Levels

MAIN	→	EVENT HISTORY	Level 0 (no password)
	→	POST ALARM HISTORY	Level 0 (no password)
	→	ENTER ACCESS CODE	Level 0 (no password)
CONFIGURE	→	CHANGE DATE & TIME	Level 3
	→	CHANGE IP ADDRESS	Level 3
DIAGNOSTICS	→	VERSIONS	Level 0 (no password)
	→	DETECTORS	Level 0 (no password)
	→	AFM PRESSURE	Level 3 (future use)
	→	AFM TEMPERATURE	Level 3 (future use)
	→	SYSTEM VALUES	Level 0 (no password)
	→	PRESSURE DATA STATUS	Level 2
	→	AFM INPUTS	Level 3
SERVICE	→	SAVE TO USB DRIVE	Level 0 (no password)
	→	TESTS → PANEL LEDS	Level 0 (no password)
		TESTS → LCD	Level 0 (no password)
		TESTS → BUTTONS	Level 0 (no password)
		TESTS → LOCK LCD	Level 0 (no password)
	→	ERASE HISTORY	Level 3
	→	ERASE PRESSURE DATA	Level 3

6.7.2 Configure Menu

The Fike Certified Technician/Engineer will use the functions in the Configure Menu to set the EXP system up for normal operation. See **Figure 81**. Access to the Configure Menu requires a higher access level.

Figure 81 – Configuration Menu Selections

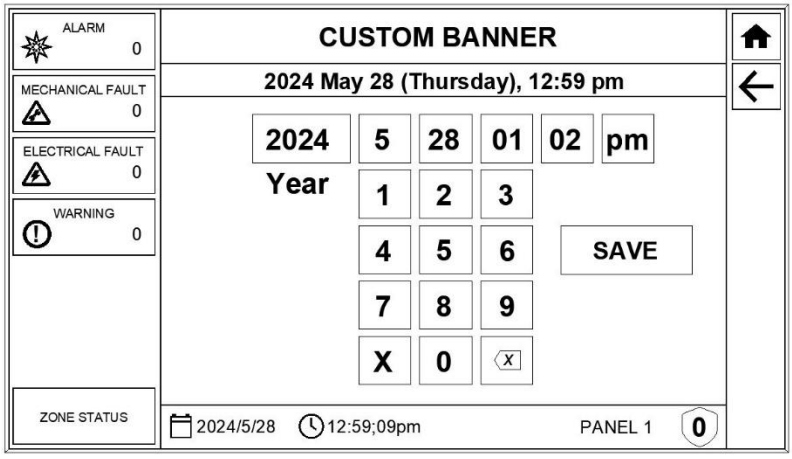


6.7.2.1 Change Date and Time

The Fike Certified Technician/Engineer uses this screen to set the panel's date and time, displayed at the bottom of the user interface. The date and time settings are unique to each EXP panel. If multiple panels are connected via the remote bus for common operation, it is important to verify that the date and time on all networked panels match to provide a correlation when viewing event history. The date format displayed on the User Interface can be changed using the system configuration software (i.e., Y-M-D, M-D-Y, or D-M-Y).

Where required, Daylight Savings can be enabled/disabled for each EXP panel using the system configuration software. If this feature is used with a panel network, it must be enabled or disabled on all networked panels to provide correlation when viewing event history.

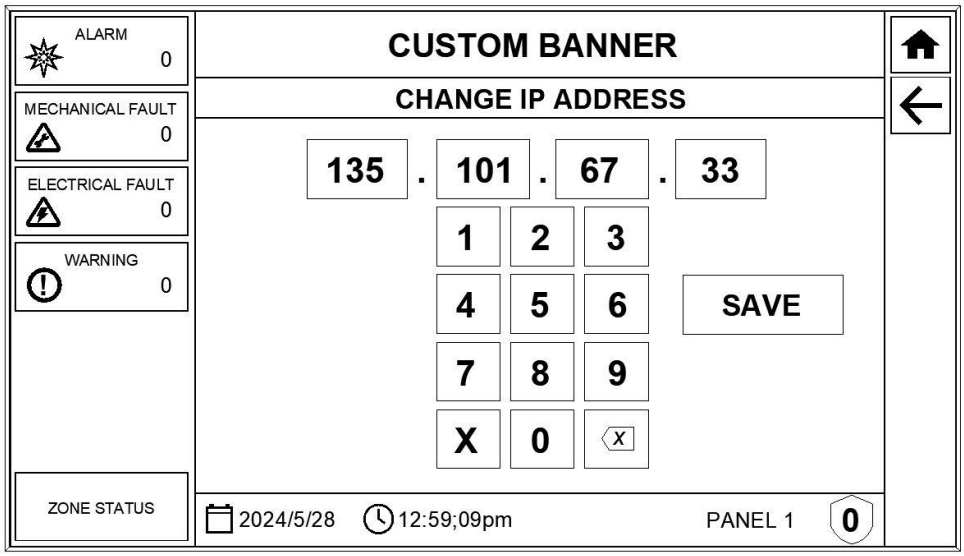
Figure 82 – Change Date and Time



6.7.2.2 Change IP Address

This screen is for future use. The Fike Certified Technician/Engineer will use it to set the IP Address of the panel.

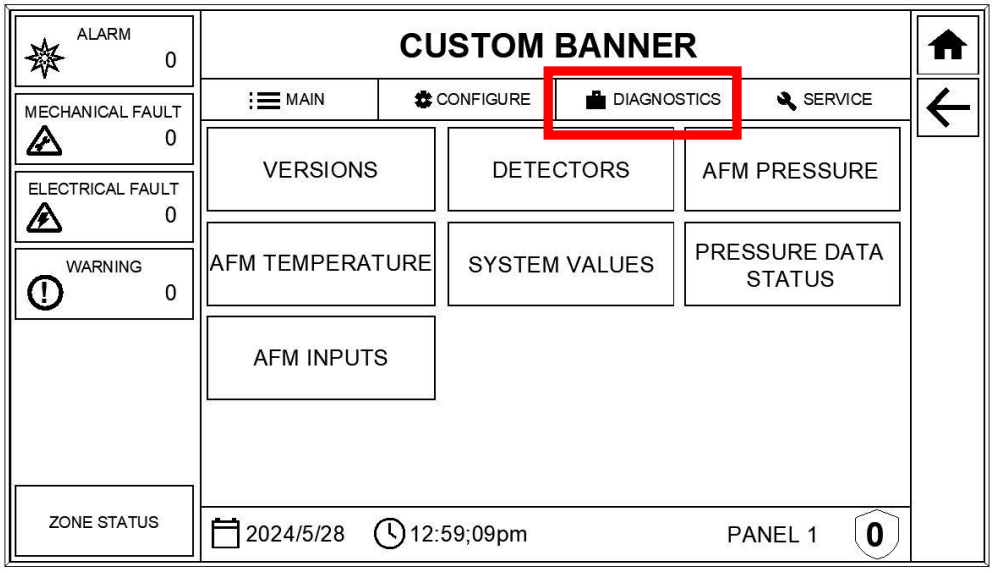
Figure 83 – Change IP Address



6.7.3 Diagnostics Menu

The functions in the Diagnostics Menu are to be used by the Fike Certified Technician/Engineer to determine the system's current state and to identify and correct problems with the system.

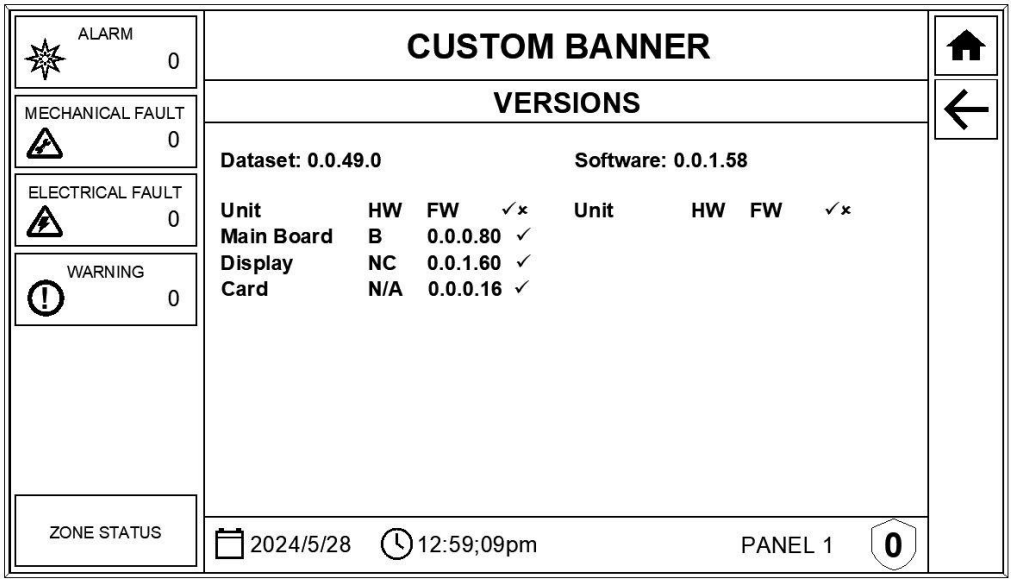
Figure 84 – Diagnostic Menu Selections



6.7.3.1 Versions

This screen displays the dataset and software versions currently loaded on the panel and the hardware and firmware versions for all of the EXP system boards (local panel only).

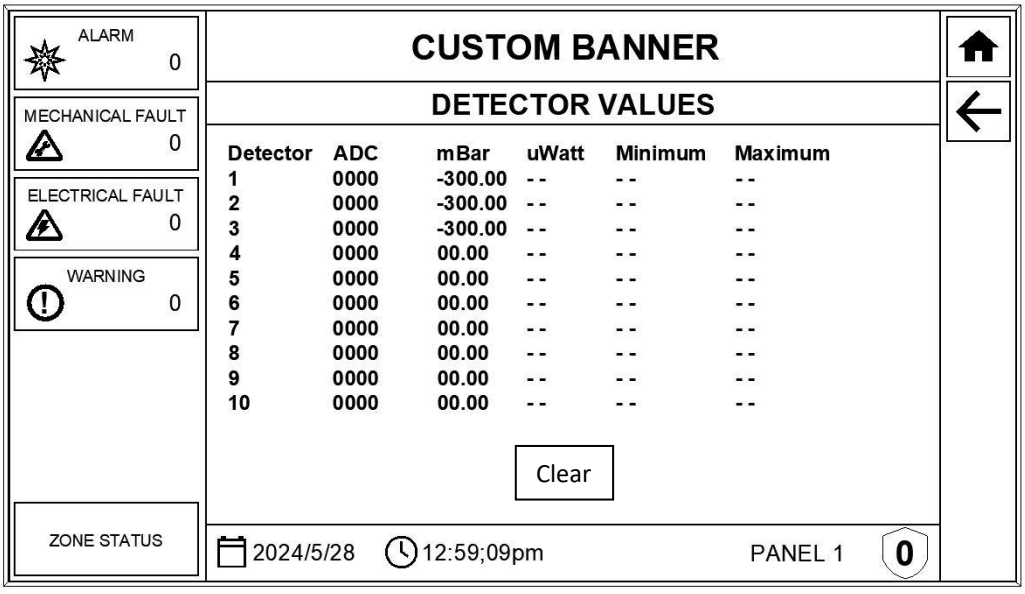
Figure 85 – Versions Screen



6.7.3.2 Detectors Values

The Detector Values screen displays the current pressure readings for all detectors connected to the EXP panel's detector input circuits (local panel only). The pressure units displayed can be changed using the system configuration software. The displayed values are refreshed every 1 second.

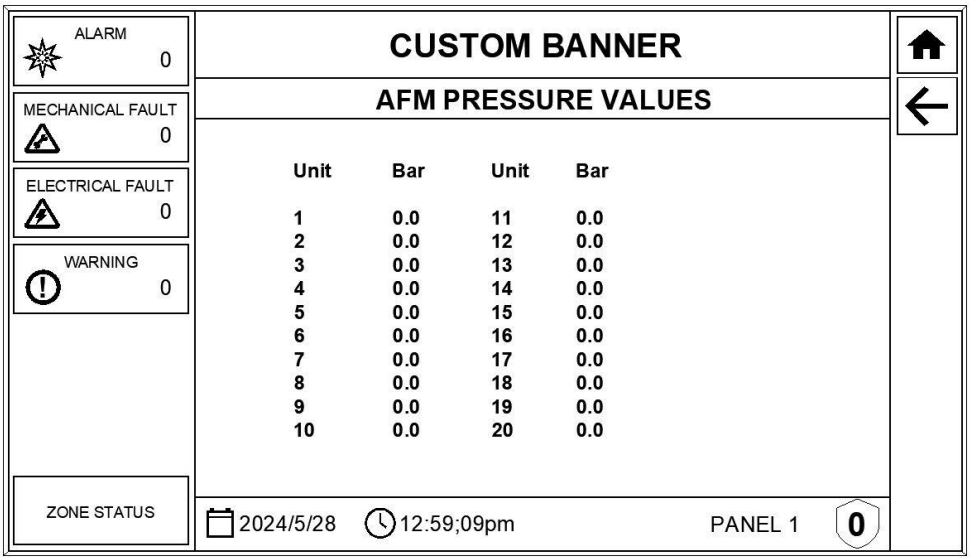
Figure 86 – Detector Values Screen



6.7.3.3 AFM Pressure Values

The AFM Pressure Values screen displays the current pressure reading from the suppression container (HRD or SRD). *These readings are only available when the Fike Next Gen Global Suppressors are used.* Otherwise, this screen will indicate all dashes. The pressure units displayed can be changed using the system configuration software. The displayed values are refreshed every 11 seconds.

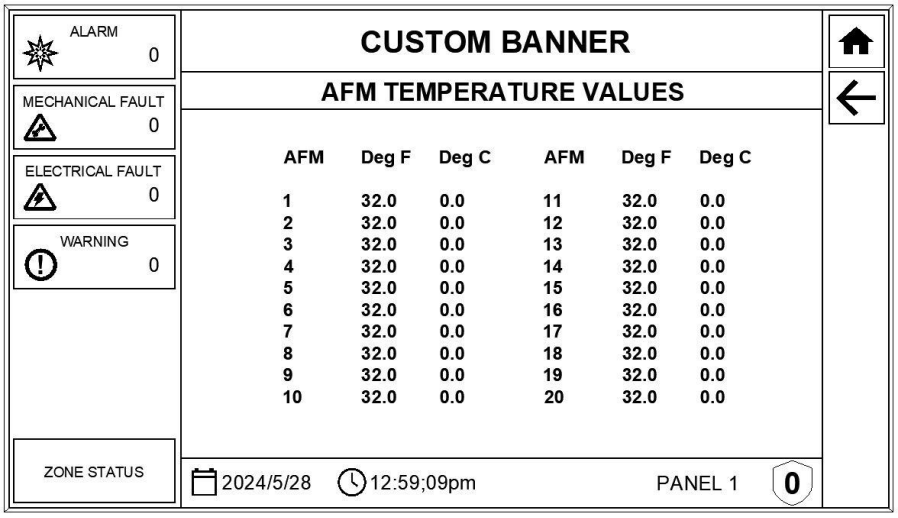
Figure 87 – AFM Pressure Values Screen



6.7.3.4 AFM Temperature

The AFM Temperature screen displays the current temperature reading from the suppression container (HRD or SRD). *These readings are only available when the Fike Next Gen Global Suppressors are used.* Otherwise, this screen will indicate all dashes. The temperature units displayed can be changed using the system configuration software. The displayed values are refreshed every 11 seconds.

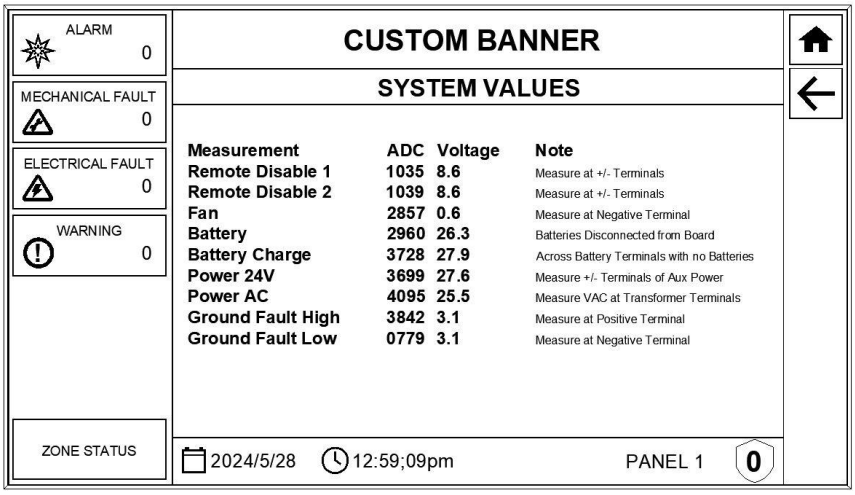
Figure 88 – AFM Temperature Screen



6.7.3.5 System Values

The System Values screen displays diagnostics data for the system that can be used by a Certified Technician/Engineer to resolve issues with the system. The displayed values are refreshed every 11 seconds.

Figure 89 – System Values Screen

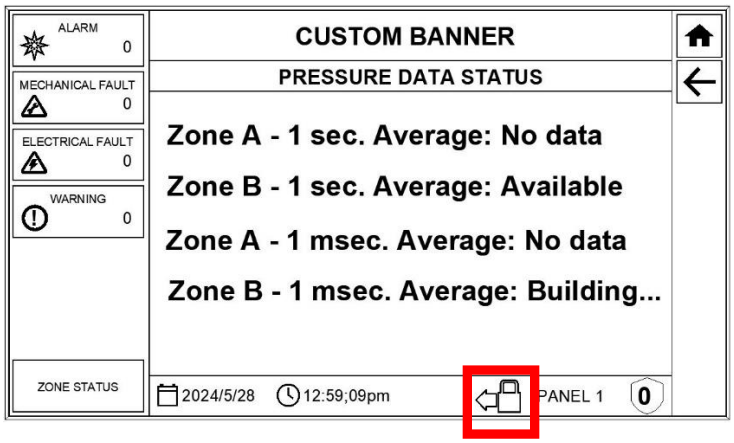


6.7.3.6 Pressure Data Status

When an Alarm Event occurs on a pressure detector, the pressure data is recorded and uploaded to the User Interface for archival and display. The Pressure Data Status screen provides visual confirmation of the status of the pressure data upload (e.g., No Data, Building, and Available). The ability to RESET the EXP panel is delayed (±2 min.) immediately after an Alarm Event until confirmation is received that the User Interface has received the detector pressure data. This will be indicated by a Pressure Data Available system event. A download lock indicator will be displayed on the bottom of the User Interface to indicate that the Reset button is inoperable (**Figure 90**).

CAUTION: The pressure data MUST be downloaded using the SAVE TO USB DRIVE function on the User Interface (See Section 6.7.4.1) or the EXP configuration software. Once downloaded, the pressure data must be erased to restore the system to normal operation. See Section 6.7.4.4.

Figure 90 – Pressure Data Status Screen



6.7.3.7 AFM Input Values

The AFM Input Values screen displays the current values for the 24Vdc supplied to each AFM and the analog-to-digital (ADC) values for the four Field Input circuits on each AFM (1-20). These ADC values are updated every 1 second. Fike will utilize the ADC values to evaluate the field wiring for issues. Refer to **Table 26** for the baseline ADC values.

Figure 91 – AFM Input Values Screen

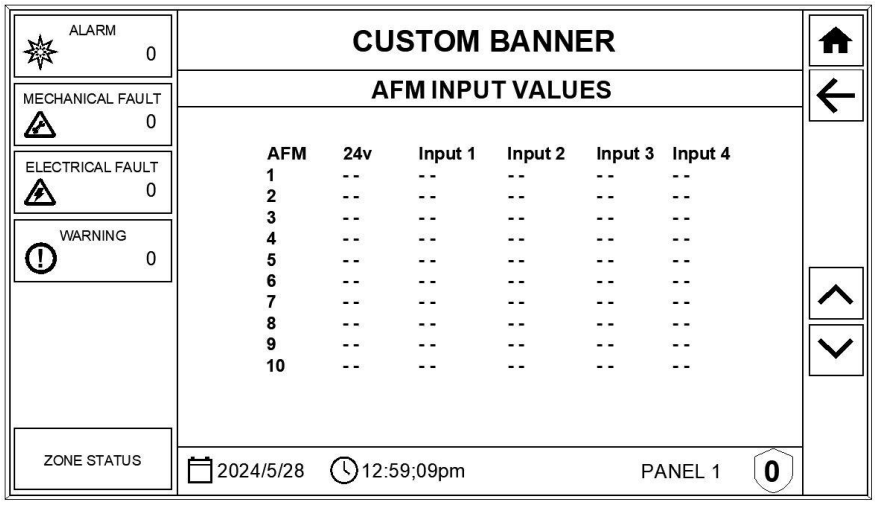


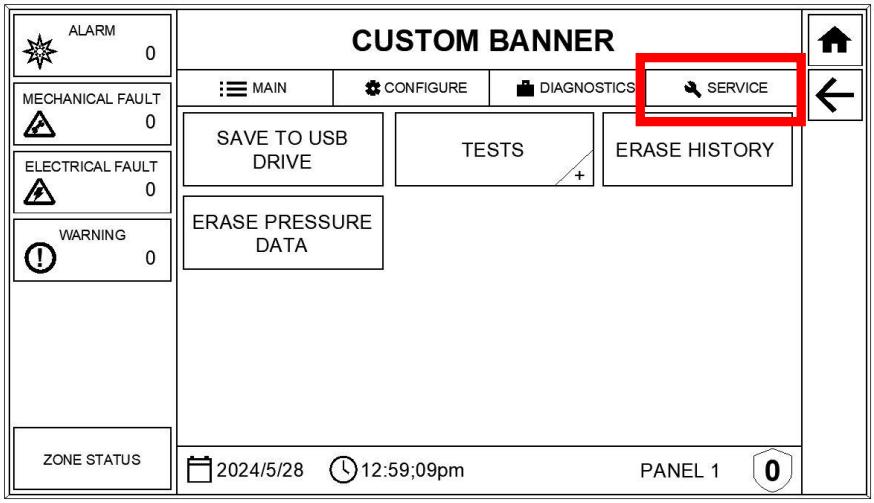
Table 26 – Default AFM Field Input ADC Values

Default AFM Field Input ADC values	
Activation (threshold 1)	ADC reading = 1500 (1.2V)
Short Circuit (threshold 2)	ADC Default reading = 4095 (3.3V)
Open Circuit (threshold 3)	ADC reading = 300 (0.2V)

6.7.4 Service Menu

The functions in the Service Menu are to be used to test and service the EXP system. Certain functions will only be available to a Fike Certified Technician/Engineer.

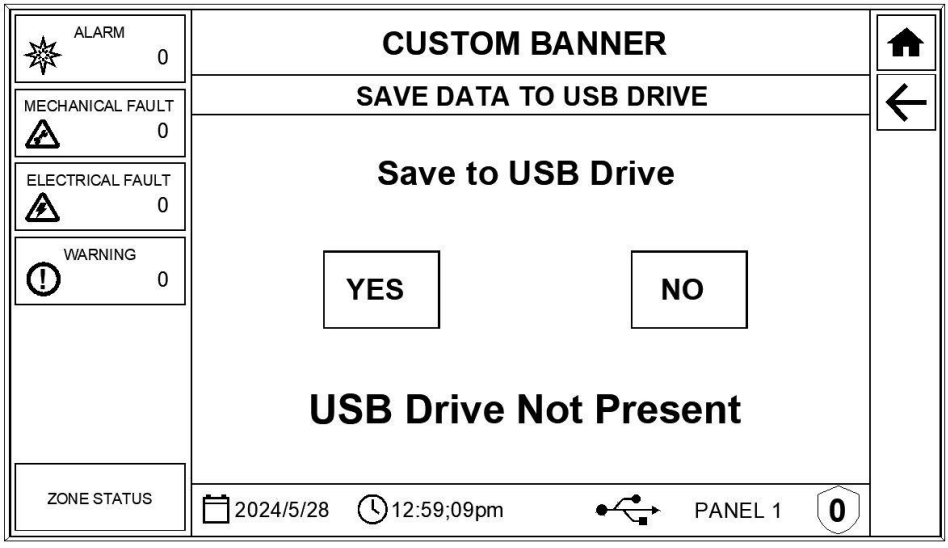
Figure 92 - Service Menu Selections



6.7.4.1 Save to USB Drive

The Save to USB Drive screen enables downloading the panel history, pressure, and configuration data to a PC or jump drive. A 1 MB minimum jump drive is required.

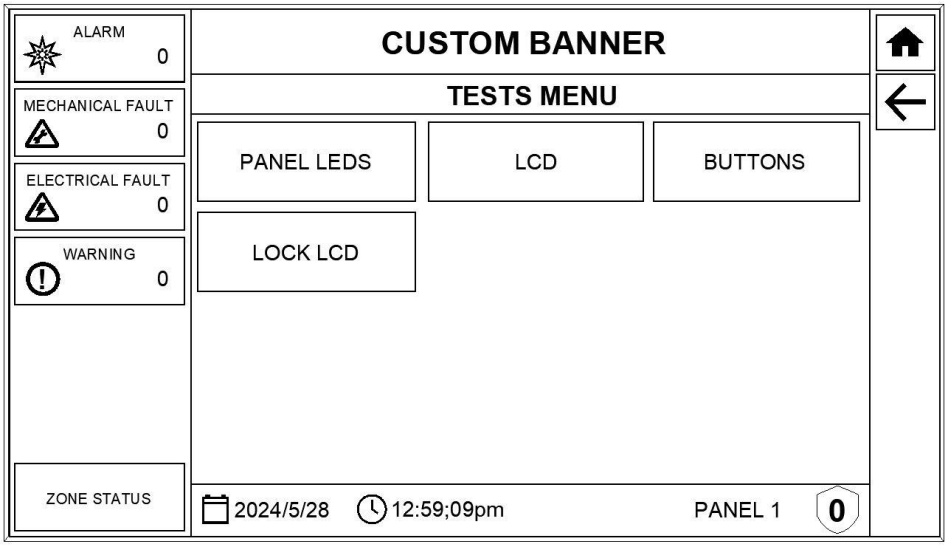
Figure 93 - Save Data to USB Drive



6.7.4.2 Tests Sub Menu

The Tests Sub Menu offers the following options that allow the user to test the operation of the EXP User Interface.

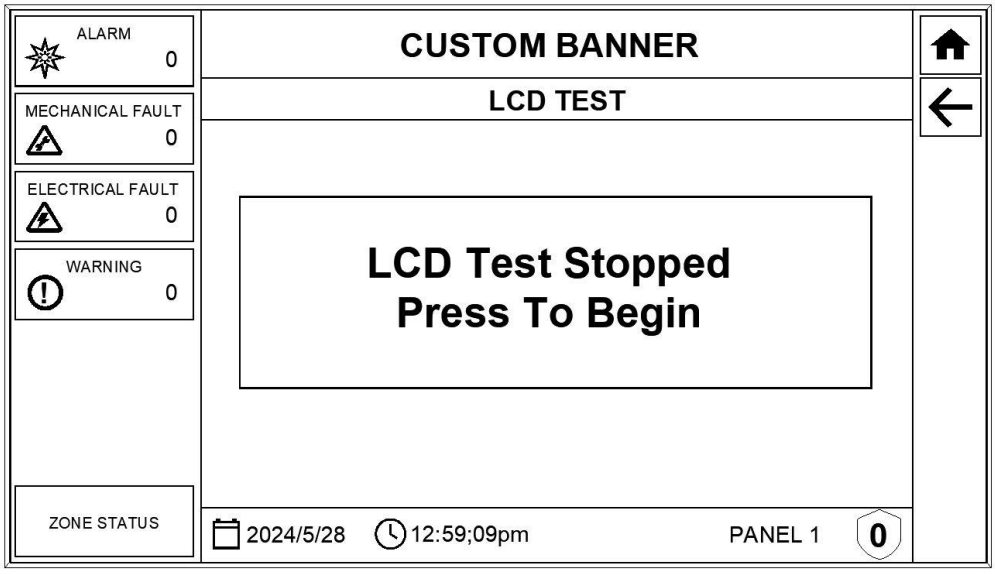
Figure 94 – Tests Sub-Menu Selections



Panel LEDs –When pressed, all of the LEDs on the User Interface will flash to allow you to verify their operation. LEDs will return to normal operation upon completion of the test.

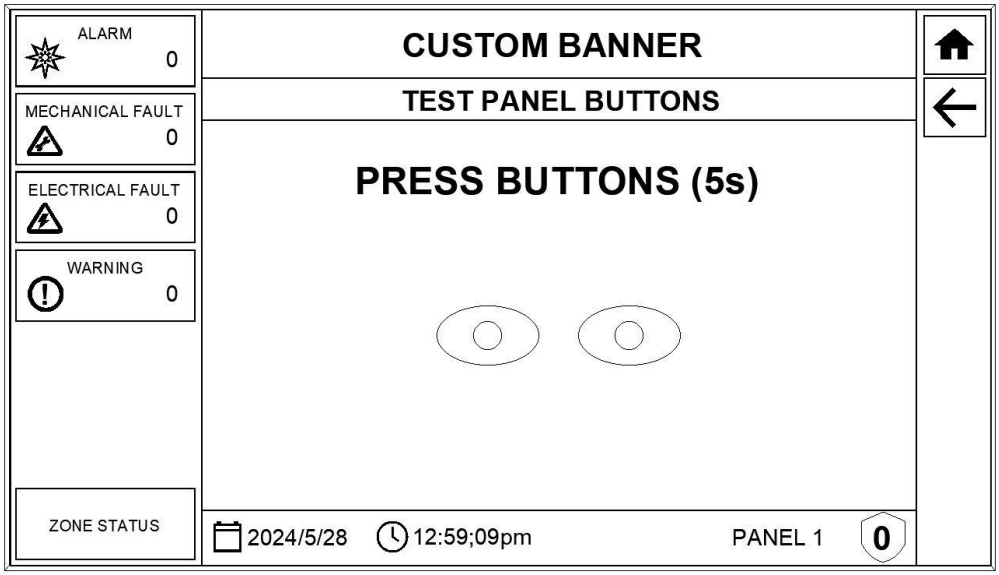
LCD –When pressed, the user will be prompted to Press to Begin the LCD test. Upon activation of the test, the LCD will begin to cycle through the display of several colors (full screen). This will allow you to verify that the display has no burnt-out pixels. The LCD will return to normal display operation upon completion of the test.

Figure 95 – LCD Test Screen



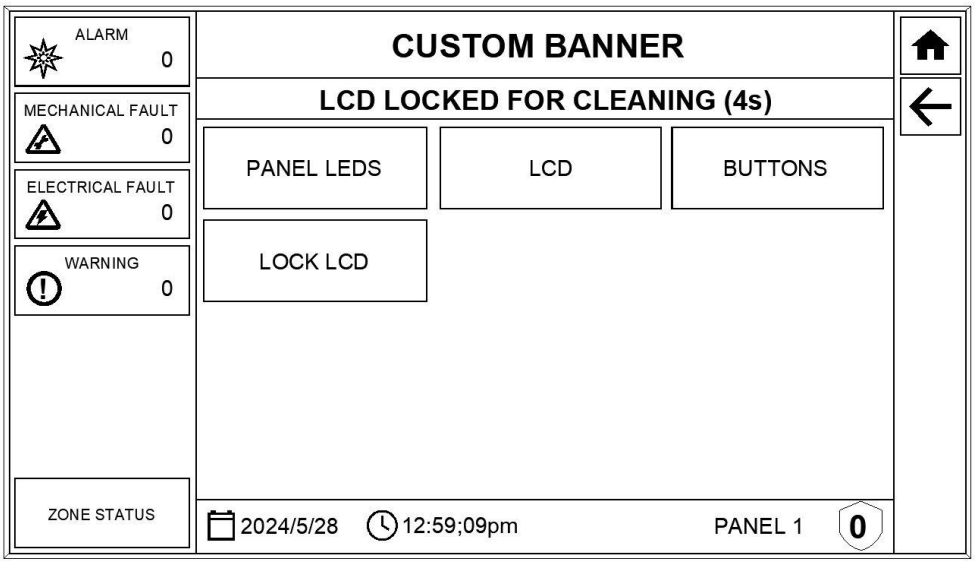
Buttons – When pressed, the Test Panel Buttons screen is displayed (**Figure 96**). This screen has a 10-second timeout feature that starts to countdown as soon as the screen is displayed. The timeout is reset each time a panel button is pressed. Press each of the user interface buttons to test its operation. A yellow checkmark will appear to verify each switch operation.

Figure 96 – Test Panel Buttons Screen



Lock LCD –When pressed, the LCD screen's touchscreen operation will be temporarily disabled for 10 seconds. This feature allows you to clean the LCD without affecting the system. Upon expiration of the countdown, the display will return to normal operation.

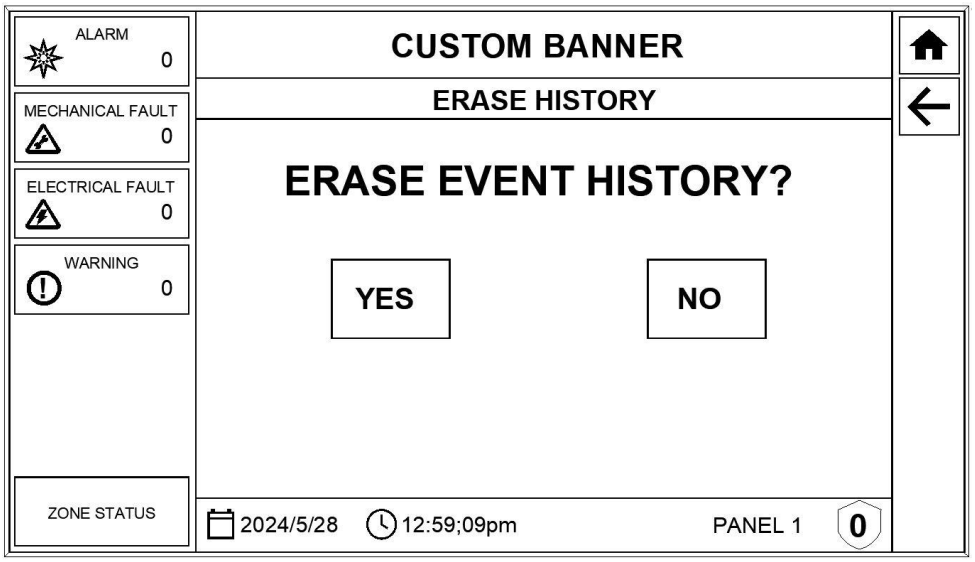
Figure 97 – LCD Lock Screen



6.7.4.3 Erase History

The Erase History screen presents an option to erase all recorded events stored in the panel's history buffer. It is recommended that the panel history be erased after a system activation to provide an empty buffer for recording new events.

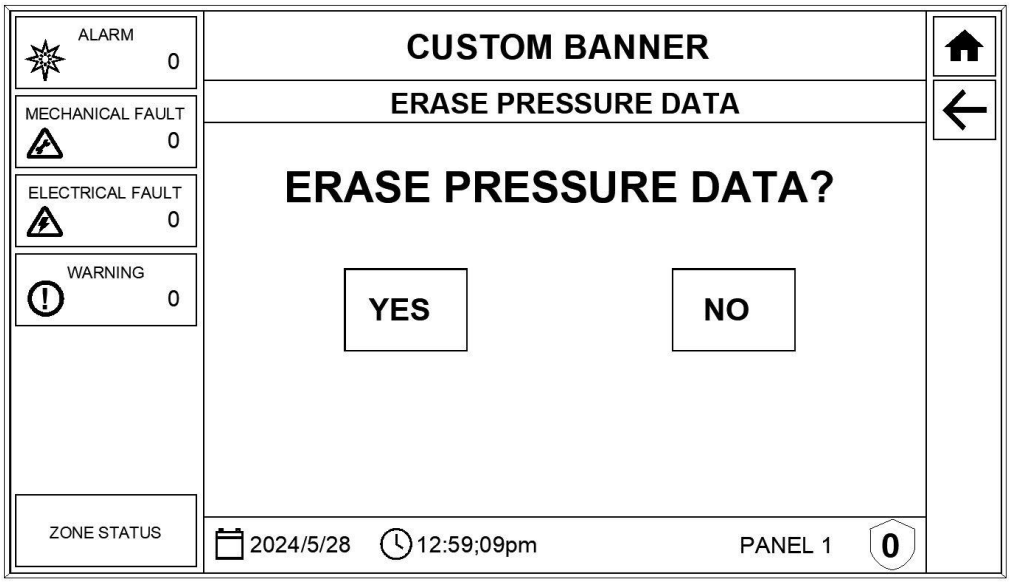
Figure 98 – Erase History Screen



6.7.4.4 Erase Pressure Data

The Erase Pressure Data screen presents an option to erase all pressure data stored in the panel's pressure data buffer. This **MUST BE PERFORMED** after system activation to allow new detector pressure readings to be logged in the zone buffer.

Figure 99 – Erase Pressure Data Screen



7.0 INSPECTION AND MAINTENANCE

Routine system inspections shall be conducted following the requirements of the appropriate local authority having jurisdiction or per the schedule outlined in the Safety Integrity Level analysis. These inspections are to be performed by Fike factory-trained and certified personnel. It is essential to obtain all pertinent data related to the system being inspected before conducting an inspection.

The required information includes the following:

- Fike System drawings
- Copy of manuals, specifications, or documents referenced on the Fike System Engineered Drawings.
- Inspection equipment
- Operating specifications on each component being inspected.

It is essential to closely monitor the operational characteristics of your system during the first few weeks after initial start-up. A routine inspection shall follow jurisdictional code requirements and system performance criteria.

7.1 Preventative Maintenance and Proof Test

During the initial system check-out or start-up of the explosion protection system, the Fike factory-trained and certified personnel may determine that an additional inspection is required other than the routine inspections described in this section due to process operational characteristics and historical inspection data on the specific process. Both the explosion prevention system designer and the AHJ shall approve a change to the inspection frequency.

Some routine inspections of the explosion protection system may be performed by the End User, while others must be performed by factory-trained and certified personnel. Fike recommends following the governing standards for your area, such as NFPA 69.

EVERY 12 MONTHS or as determined by process conditions:

Functional Safety Assessment EN 15233 requires that the explosion protection system be subject to preventive maintenance and proof test at regular intervals not longer than 12 months. If a dangerous failure is detected during the proof test, it shall be repaired. If this is not possible, the process shall be kept in a safe state.

- Verify process interlocks
- Test operation of the system

EVERY THREE YEARS or as determined by process operational conditions:

- Replace the standby batteries
- Replace the coin-cell battery on the user interface[1]

[1] To be completed only by Fike factory-trained and certified personnel

7.2 Care and Cleaning

Use a non-corrosive detergent solution and a soft, nonabrasive cloth to clean the metal surfaces of the enclosure's exterior. Do not use corrosive cleaning solutions, abrasive cloths, etc. The glass front panel may be cleaned with glass-care products like Windex.

8.0 REPAIR AND RETURN AUTHORIZATION

Any component to be returned to Fike must be approved for return before shipment. For the returned component to receive the proper attention (credit, repair, replacement) either under warranty or at the owner's expense, a Shipping Label or prearranged return authorization must be provided by Fike. A prearranged return authorization will expedite the business and corrective action measures taken upon receipt of the part(s).

When preparing the component for shipment, please put the Shipping Label that Fike provides on the package with the goods to be returned. Also, include a specific statement of the perceived defect or component failure so Fike can examine the returned part(s). This statement should address symptoms and the operation history of the system in which the component was installed. If the part(s) have been in contact with any medium, provide a (Material) Safety Data Sheet – (M)SDS with the shipment.

If the suspect part is found within a larger top assembly component, the party providing the Shipping Label should be able to assist you as to whether the entire assembly must be returned or only the component in question.

Any part returned without authorization or correct labeling will not be handled and will be scrapped without notification.

To start the repair and return authorization procedure, contact the nearest Fike Sales Outlet. The nearest Fike Sales Outlet may be found on the Internet at www.fike.com.

9.0 REMOVAL FROM SERVICE

To complete the removal of the explosion prevention system from service, the following procedure must be performed solely by Fike factory-trained and certified technicians. The following checklist must all be answered by "YES" before the system can be safely removed from service. Each step must be completed before the explosion prevention system can be entirely removed from service.

Step	Yes	No	Remarks
1. Has the location of all Fike system components for each Zone and system been verified and recorded using the Fike system/project component location drawings?	☐	☐	
2. Has the control panel been disarmed/shut down?	☐	☐	
3. Have all suppressor/valve actuators been shunted?	☐	☐	
4. Has each suppressor/valve container been depressurized? **CAUTION: DO NOT ventilate nitrogen in a confined space.**	☐	☐	
5. Has the AC power supply to the control panel been isolated by the customer and disconnected to prevent accidental reconnection? Fike field personnel to verify.	☐	☐	
6. Has the control panel battery been disconnected and removed for proper disposal?	☐	☐	
7. Has each suppressor/valve actuator been removed and placed in a protective housing for storage on-site or removal for proper disposal?	☐	☐	
8. Are all suppressor/valve gauges reading zero?	☐	☐	
9. Are fill valve caps installed loosely on all suppression/valves?	☐	☐	

The explosion prevention system is now removed from service and ready for dismounting by the customer.

10.0 PARTS LIST

Description	Part Number
Battery Wire Harness (from Disconnect Switch to Batteries)	F0291212
Sealed-Lead-Acid Battery Bracket Kit, 7Ah/12Ah/35Ah	F0292831
Sealed-Lead-Acid Battery Bracket Kit, 18Ah	F0292832
Sealed-Lead-Acid Battery Bracket Kit, 44Ah	F0292833
Coin-cell Battery (used in display)	02-4040
Wall Fixing Lugs (qty. 4)	F0295698
Main Controller	10-3018
Main Connection Board	10-3060
AC Transformer* 100VAC to 24VAC 120VAC to 24VAC 240VAC to 24VAC	 02-10879 02-10881 02-10882
Touchscreen Display	10-3009
Disable Switch	02-11912
Disable Switch Harness	F0292633
Field Connection Board*	10-3060
USB Cable and Port Assembly	F0290268
AC Disconnect Switch*	02-17186
Battery (DC) Disconnect Switch*	02-11344
End Clamp	E02-0272
M4 Screw/Washer Kit (qty. 30)	F0292836
M4 Nut and Washer Kit (qty. 30)	F0292839
30mm x M4 Standoff Kit (qty. 10)	F0292838
Grounding Bar *	F0290283
Five Detector Input Board – Class A, Non-Intrinsically Safe	10-3014
Non-intrinsically Safe, Five Detector Input Board – Class B	F0291448
Input Board Barrier Kit	F0292628
Physical Barrier, Board Side (included with Input Board Barrier Kit)	F0294646
Physical Barrier, Cover Plate (included with Input Board Barrier Kit)	F0294702
M4 x 0.7 x 10mm Screw (qty 2) (included with Input Board Barrier Kit)	02-17762
M4 External Tooth Lock Washer (qty 2) (included with Input Board Barrier Kit)	02-18060
Five Status Relay Board	10-3016
Five Status Safety Relay Board, (force-guided contacts)	10-3017
Ribbon Cable (Display)	F0290284
10K Disable Switch EOL	F0292377

1.5K Contact-Closure Detection Circuit EOL (for pressure detectors)	F0292837
1K Contact-Closure Detection Circuit EOL (for burst indicators)	10-2956
240-ohm/820-ohm Detection Circuit EOL (for burst indicators, compatible with legacy Fike EPC systems)	F0293276
Cable Gland Plate, Carbon Steel Enclosure	F0299385
Cable Gland M16x1.5 D4-8mm EEXE II KEMA EX-93.C9125 Black	29975289
Cable Gland M16x1.5 D4-8mm EEEXE II PTB EX-93.C3125 Blue	29975489
Cable Gland M20x1.5 D10-14mm EEEXE II PTB EX-93.C3125 Black	29975589
Cable Gland M20x1.5 D6.5-12mm EEEXE II PTB EX-93.C3125 Black	29975889
Cable Gland M20x1.5 D6.5-12mm EEEXE II PTB EX-93.C3125 Blue	29975689
Cable Gland M20x1.5 D6.5-12mm ATEX SST	29972331
Cable Gland M25x1.5 D13-18mm EEXE IIKEMA EX-93.C9125 Black	29975989
Cable Gland M16x1.5 D4-8mm ATEX SST	29972231
Stopping Plug, M16x1.5 ATEX II G/D IP66 Black	29964489
Stopping Plug, M20x1.5 ATEX II G/D IP66 Black	29964589
Nut for Cable Gland, M16 Polyamide	F0299184
Nut for Cable Gland, M20 Polyamide	F0299185
Nut for Cable Gland, M25 Polyamide	F0299186
Nut for Cable Gland, M16 1.4404 Stainless Steel	F0299187
Nut for Cable Gland, M20 1.4404 Stainless Steel	F0299188
Nut for Cable Gland, M25 1.4404 Stainless Steel	F0299189
Key, Main Connection terminal board plug	F0295090
Key, Main Connection terminal board header	F0295247

*Included as part of the Main Assembly

11.0 OPERATIONAL POSTING

The operational posting on the next page provides a quick reference for the first responder on how to interact with the EXP control panel after an event has occurred. The operational posting shall be framed and posted adjacent to the EXP control panel.

EXP™ System Controller Operational Posting

I. OPERATION

Normal Standby

1. Green NORMAL LED lit steady.
2. Panel buzzer off.

System Alarm

☐ **The protection system has been compromised. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Red Alarm Zone LED (A/B) flashes.
2. Local buzzer on.
3. Explosion protection measures activate.
4. First Alarm event is displayed on LCD.
5. All active events are displayed on LCD in order of occurrence.
6. Press the SILENCE button to turn off the local buzzer. Displayed events will stop flashing.
7. Select the ALARM event queue to view all active Alarm events.
8. Select ZONE STATUS to view events by Zone (A & B).
9. Investigate the cause of the Alarm and take appropriate actions.
10. Do not RESET the panel at this time. Contact your system service provider. See Section VI.

System Fault (Mechanical/Electrical)

☐ **The protection system has been compromised. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Yellow Fault Zone LED (A/B) flashes.
2. Local buzzer on.
3. Fault event(s) displayed on LCD in order of occurrence.
4. Press the SILENCE button to turn off the local buzzer. Displayed events will stop flashing.
5. Select the MECHANICAL or ELECTRICAL FAULT queues to view all active Fault events.
6. Select ZONE STATUS to view events by Zone (A & B).
7. Investigate the cause of the Fault and take appropriate action.
8. The panel will return to Normal operation if the event clears or the panel is RESET.
9. Contact your system service provider if Fault event(s) continue to occur. See Section VI.

System Warning

☐ **The system has detected conditions not within expected limits, but the protection is still in place. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Yellow Fault Zone LED (A/B) flashes.
2. Local buzzer on.
3. Warning event(s) displayed on LCD in order of occurrence.
4. Press the SILENCE button to turn off the local buzzer. Displayed events will stop flashing.
5. Select the WARNING event queue to view all active Warning events.
6. Select ZONE STATUS to view events by Zone (A & B).
7. Investigate the cause of the Warning and take appropriate actions.
8. The panel will return to Normal operation if the event clears or the panel is RESET.
9. Contact your system service provider if Warning event(s) continue to occur. See Section VI.

II. LED INDICATORS

Normal (green): Illuminates solid to indicate no active events exist on the system.

Warning (yellow): Illuminates when a warning event is present on the system. This event type will not cause a process shutdown.

Fault Zone A & B (yellow): Illuminates when a Fault (electrical or mechanical) is present on the system. This event type will not cause a process shutdown.

Release Zone A & B (red): Illuminates when a Release is present on the system.

III. CONTROL BUTTONS WITH LED

RESET (white): When pressed:

1. The panel and all field devices connected to it will be reset.
2. Resettable power to field devices will be turned off.
3. Any active events that still exist after a RESET will reactivate the system.
4. The switch LED will turn on while the reset is in process and turn off after completion.

CAUTION: Hazard protection will be disabled during the reset procedure.

CAUTION: After a system activation, the RESET switch will be inoperable for 2 minutes until the EXP User Interface confirms it has received and recorded the detector pressure data from the event.

SILENCE (white): When pressed:

1. The panel's local buzzer will turn off.
2. The switch LED will turn on when the switch is active.
3. Any flashing LEDs or flashing events displayed on the User Interface will turn on steady.

IV. ZONE DISABLE SWITCHES

CAUTION: *Zone Disable switch operation affects the local panel and its connected AFMs only. Networked panels must be disabled individually.*

CAUTION: *Where dual-input AFMs are used, it may be necessary to disable both zones connected to the AFM to prevent accidental operation.*

Zone Disable switch (A or B) turned to the DISABLED position:

1. The hazard protection for the selected zone will be disabled, while the detection inputs for the selected zone will continue to operate.
2. A Disable Fault Event will be displayed on LCD.
3. Local buzzer on.
4. Press the SILENCE button to turn off the local buzzer. Displayed events will stop flashing.
5. Select the MECHANICAL FAULT queue to view all active Fault events.
6. Select ZONE STATUS to view events by Zone (A & B).
7. The panel will return to Normal operation once the switch or switches are returned to the ENABLED position.

V. MAINTENANCE AND SERVICE

The explosion protection system shall be Inspected and Maintained in accordance with the adopted standards and the requirements of the local authority having jurisdiction (AHJ).

Only factory-trained and authorized service personnel shall be allowed to work on the system.

VI. FOR SERVICE CONTACT:

Company Name:

_____

_____

Address:

_____

_____

Phone #:_____

Refer to Fike document #P22419, EXP manual, for product details.

EXP™ System Controller Operational Posting

I. OPERATION

Normal Standby

1. Green NORMAL LED lit steady.
2. Panel buzzer off.

System Alarm

☐ **The protection system has been compromised. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Red Alarm Zone LED (A/B) flashes.
2. Local buzzer on.
3. Explosion protection measures activate.
4. Status of Zone A and B is displayed on LCD.
5. Press the SILENCE button to turn off the local buzzer. User Interface LEDs and event messages will stop flashing.
6. Select the EVENT STATUS button to view all active events. Active events will be displayed on LCD in order of occurrence.
7. Select the ALARM event queue to view all active Alarm events.
8. Investigate the cause of the Alarm and take appropriate actions.
9. Do not RESET the panel at this time. Contact your system service provider. See Section VI.

System Fault (Mechanical/Electrical)

☐ **The protection system has been compromised. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Yellow Fault Zone LED (A/B) flashes.
2. Local buzzer on.
3. Status of Zone A and B is displayed on LCD.
4. Press the SILENCE button to turn off the local buzzer. User Interface LEDs and event messages will stop flashing.
5. Select the EVENT STATUS button to view all active events. Active events will be displayed on LCD in order of occurrence.
6. Select the MECHANICAL or ELECTRICAL FAULT queues to view all active Fault events. Fault event(s) displayed on LCD in order of occurrence.
7. Investigate the cause of the Fault and take appropriate actions.
8. The panel will return to Normal operation if the event clears or the panel is RESET.
9. Contact your system service provider if Fault event(s) continue to occur. See Section VI.

System Warning

☐ **The system has detected conditions not within expected limits, but the protection is still in place. An orderly shutdown will occur.**

☐ **No shutdown will occur, per hazard analysis.**

1. Yellow Fault Zone LED (A/B) flashes.
2. Local buzzer on.
3. Status of Zone A and B is displayed on LCD.
4. Press the SILENCE button to turn off the local buzzer. User Interface LEDs and event messages will stop flashing.
5. Select the EVENT STATUS button to view all active events. Active events will be displayed on LCD in order of occurrence.
6. Select the WARNING event queue to view all active Warning events. Warning event(s) displayed on LCD in order of occurrence.
7. Investigate the cause of the Warning and take appropriate actions.
8. The panel will return to Normal operation if the event clears or the panel is RESET.
9. Contact your system service provider if Warning event(s) continue to occur. See Section VI.

II. LED INDICATORS

Normal (green): Illuminates solid to indicate no active events exist on the system.

Warning (yellow): Illuminates when a warning event is present on the system. This event type will not cause a process shutdown.

Fault Zone A & B (yellow): Illuminates when a Fault (electrical or mechanical) is present on the system. This event type will not cause a process shutdown.

Release Zone A & B (red): Illuminates when a Release is present on the system.

III. CONTROL BUTTONS WITH LED

RESET (white): When pressed:

1. The panel and all field devices connected to it will be reset.
2. Resettable power to field devices will be turned off.
3. Any active events that still exist after a RESET will reactivate the system.
4. The switch LED will turn on while the reset is in process and turn off after completion.

CAUTION: Hazard protection will be disabled during the reset procedure.

CAUTION: After a system activation, the RESET switch will be inoperable for 2 minutes until the EXP User Interface confirms it has received and recorded the detector pressure data from the event.

SILENCE (white): When pressed:

1. The panel's local buzzer will turn off.
2. The switch LED will turn on when the switch is active.
3. Any flashing LEDs or flashing events displayed on the User Interface will turn on steady.

IV. ZONE DISABLE SWITCHES

CAUTION: *Zone Disable switch operation affects the local panel and its connected AFMs only. Networked panels must be disabled individually.*

CAUTION: *Where dual-input AFMs are used, it may be necessary to disable both zones connected to the AFM to prevent accidental operation.*

Zone Disable switch (A or B) turned to the DISABLED position:

1. The hazard protection for the selected zone will be disabled, while the detection inputs for the selected zone will continue to operate.
2. A Disable Fault Event will be displayed on LCD.
3. Local buzzer on.
4. Press the SILENCE button to turn off the local buzzer. Displayed events will stop flashing.
5. Select the EVENT STATUS button to view all active events. Active events will be displayed on LCD in order of occurrence.
6. Select the MECHANICAL FAULT queue to view all active Fault events.
7. The panel will return to Normal operation once the switch or switches are returned to the ENABLED position.

V. MAINTENANCE AND SERVICE

The explosion protection system shall be Inspected and Maintained in accordance with the adopted standards and the requirements of the local authority having jurisdiction (AHJ).

Only factory-trained and authorized service personnel shall be allowed to work on the system.

VI. FOR SERVICE CONTACT:

Company Name:

_____

_____

Address:

_____

_____

Phone #:_____

Refer to Fike document #P22419, EXP manual, for product details.

12.0 BATTERY CALCULATIONS

SECTION 1 – GENERAL REQUIREMENTS

Component Description	Standby Current Per Component (mA)		Qty		Total Standby Current Per Component (mA)	Alarm Current Per Component (mA)		Qty		Total Alarm Current Per Component (mA)
EXP Core Panel [Note 1]	338	x	1	=	338	287	x	1	=	287
10-3014 Detector Input Board	50	x	1	=		50	x	1	=	
F0291449 Class B Non-Intrinsically Safe Detector Input Board	22	x	1	=		22	x	1	=	
10-3016 Status Relay Board	50	x	1	=		N/A	x	N/A	=	
10-3017 Status Relay Board Safety	55	x	1	=		N/A	x	N/A	=	
Insert Section 2 Totals Below					↓					↓
Detector Inputs - Board 1	N/A	x	N/A	=	N/A		x	1	=	
Detector Inputs - Board 2	N/A	x	N/A	=	N/A		x	1	=	
Insert Section 3 Totals Below					↓					↓
Auxiliary Power A [Note 2]		x	1	=			x	1	=	
Auxiliary Power B [Note 2]		x	1	=			x	1	=	
Auxiliary Power C [Note 2]		x	1	=			x	1	=	
Release Output A [Note 3]		x	1	=			x	1	=	
Release Output B [Note 3]		x	1	=			x	1	=	
					↓					↓
	Total Standby (mA)					**Total Alarm (mA)**				
					[Note 4]					[Note 5]

Total Standby Current (mA)		/1000 =		Amps
Total Alarm Current (mA)		/1000 =		Amps

Max. Standby Load (Quiescent):		**hr**	**Total Alarm Load:**		**min. x 1/60 =**		**hr**
	[Note 6]			[Note 7]			

Required Standby Time (hr)		Total System Standby Current (A)		Required Standby Capacity (AH)	Required Alarm Time (hr)		Total System Alarm Current (A)		Required Alarm Capacity (AH)
	x		=			x		=	

Required Standby Capacity (AH)		Required Alarm Capacity (AH)		Total Required Battery Capacity (AH)		Optional Factor of Safety (%)		Adjusted Battery Capacity (AH)
	+		=		x		=	
						[Note 8]		[Note 9]

Section 1 Notes:

1. Includes 10-3018 Main Controller, 10-3009 User Interface, 10-3060 Field Connection Board with the five safety relays active, and F0295332 Battery Monitor Board.
2. Maximum of 2 amps per Aux circuit A, B, C.
3. Maximum of 4 amps total distributed between Aux circuits A, B, C, and Release Output circuits A and B.
4. Standby current cannot exceed 1.5A during normal standby operation.
5. Alarm current cannot exceed 4.75A during full system operation.
6. Factory Mutual (FM) requires a minimum of 4 hrs of standby operation.
7. Factory Mutual (FM) requires a minimum of 15 minutes of alarm operation.
8. Factory Mutual (FM) requires a 20% battery derating factory.
9. The EXP is capable of charging up to 44AH batteries.

SECTION 2 – FIELD DETECTOR INPUTS [Note 1]						
Input Device Type		**Alarm Current (mA)**		**Qty**		**Subtotal Alarm Current (mA)**
Detector Type and Quantity Connected to Input Board 1						
D1:			x		=	
D2:			x		=	
D3:			x		=	
D4			x		=	
D5:			x		=	
				Total Alarm (mA)		
Detector Type and Quantity Connected to Input Board 2						
D6:			x		=	
D7:			x		=	
D8:			x		=	
D9			x		=	
D10:			x		=	
				Total Alarm (mA)		

Detector Input Device Alarm Current Draw:

DEVICE	mA
4-20mA Detector	20
Burst Indicator 240-820	10
Burst Indicator 1K-10K	5
Contact Closure	1
No Connection	0

Section 2 Notes:

1. Table lists the current draw of all devices that can be connected to the Detector Input board(s) 1 and 2.

SECTION 3 – ACTUATOR FIELD MODULES										
Component Description	**Standby Current (mA)**		**Qty**		**Total Standby Current (mA)**	**Alarm Current (mA)**		**Qty**		**Total Alarm Current (mA)**
Quantity and Current Draw of Each Component Connected to Auxiliary Power Circuit A										
10-3012 Single Input AFM [Note 1]	29	x		=		27	x		=	
10-3054 Dual Input AFM [Note 1]	28	x		=		27	x		=	
10-3055 Solenoid Output AFM	27	x		=		30	x		=	
Solenoid Current from Section 4	N/A	x	N/A	=	N/A		x	1	=	
Additional Current [Note 2]		x	1	=			x	1	=	
			Total Standby (mA)					**Total Alarm (mA)**		
										[Note 3]
Quantity and Current Draw of Each Component Connected to Auxiliary Power Circuit B										
10-3012 Single Input AFM [Note 1]	29	x		=		27	x		=	
10-3054 Dual Input AFM [Note 1]	28	x		=		27	x		=	
10-3055 Solenoid Output AFM	27	x		=		30	x		=	
Solenoid Current from Section 4	N/A	x	N/A	=	N/A		x	1	=	
Additional Current [Note 2]		x	1	=			x	1	=	
			Total Standby (mA)					**Total Alarm (mA)**		
										[Note 3]
Quantity and Current Draw of Each Component Connected to Auxiliary Power Circuit C										
		x		=			x		=	
		x		=			x		=	
			Total Standby (mA)					**Total Alarm (mA)**		
										[Note 3]
Quantity of each AFM Type Connected to Release Output Circuit A										
10-3012 Single Input AFM	10	x		=		5	x		=	
10-3054 Dual Input AFM	19	x		=		10	x		=	
10-3055 Solenoid Output AFM	19	x		=		10	x		=	
			Total Standby (mA)					**Total Alarm (mA)**		

Quantity of each AFM Type Connected to Release Output Circuit B										
10-3012 Single Input AFM	10	x		=		5	x		=	
10-3054 Dual Input AFM	19	x		=		10	x		=	
10-3055 Solenoid Output AFM	19	x		=		10	x		=	
Total Standby (mA)						**Total Alarm (mA)**				

Section 3 Notes:

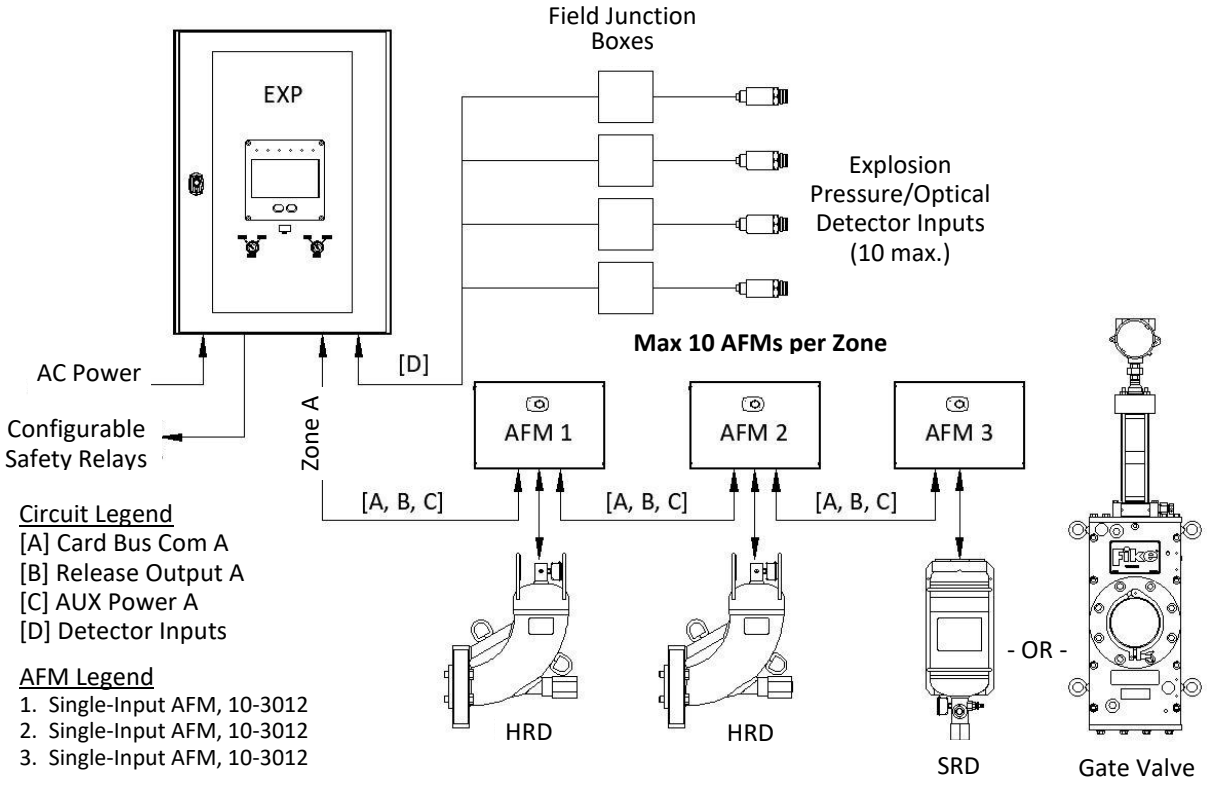
1. Includes the current draw of the AFM board and the connected energetic device (GCA or Metron).
2. Include the current draw of additional components (i.e., barriers, etc.) connected to the Auxiliary Power Circuit.
3. Maximum of 2 amps per Aux circuit A, B, C.

SECTION 4 – SOLENOID TYPES (Insert Zone A and Zone B Standby and Alarm totals into Section 3)										
Component Description	**Standby Current (mA)**		**Qty**		**Total Standby Current (mA)**	**Alarm Current (mA)**		**Qty**		**Total Alarm Current (mA)**
Type and Quantity of Solenoids Connected to Zone A AFMs										
EIPV Solenoid (1 – 24V)	15	x		=		456	x		=	
IFLEX Solenoid (2 – 12V)	15	x		=		283	x		=	
IFLEX Solenoid (4 – 6V)	15	x		=		556	x		=	
Other	N/A	x	N/A	=	N/A		x		=	
Total Standby (mA)						**Total Alarm (mA)**				
Type and Quantity of Solenoids Connected to Zone B AFMs										
EIPV Solenoid (1 – 24V)	15	x		=		456	x		=	
IFLEX Solenoid (2 – 12V)	15	x		=		283	x		=	
IFLEX Solenoid (4 – 6V)	15	x		=		556	x		=	
Other	N/A	x	N/A	=	N/A		x		=	
Total Standby (mA)						**Total Alarm (mA)**				

APPENDIX A – SYSTEM CONFIGURATION EXAMPLES

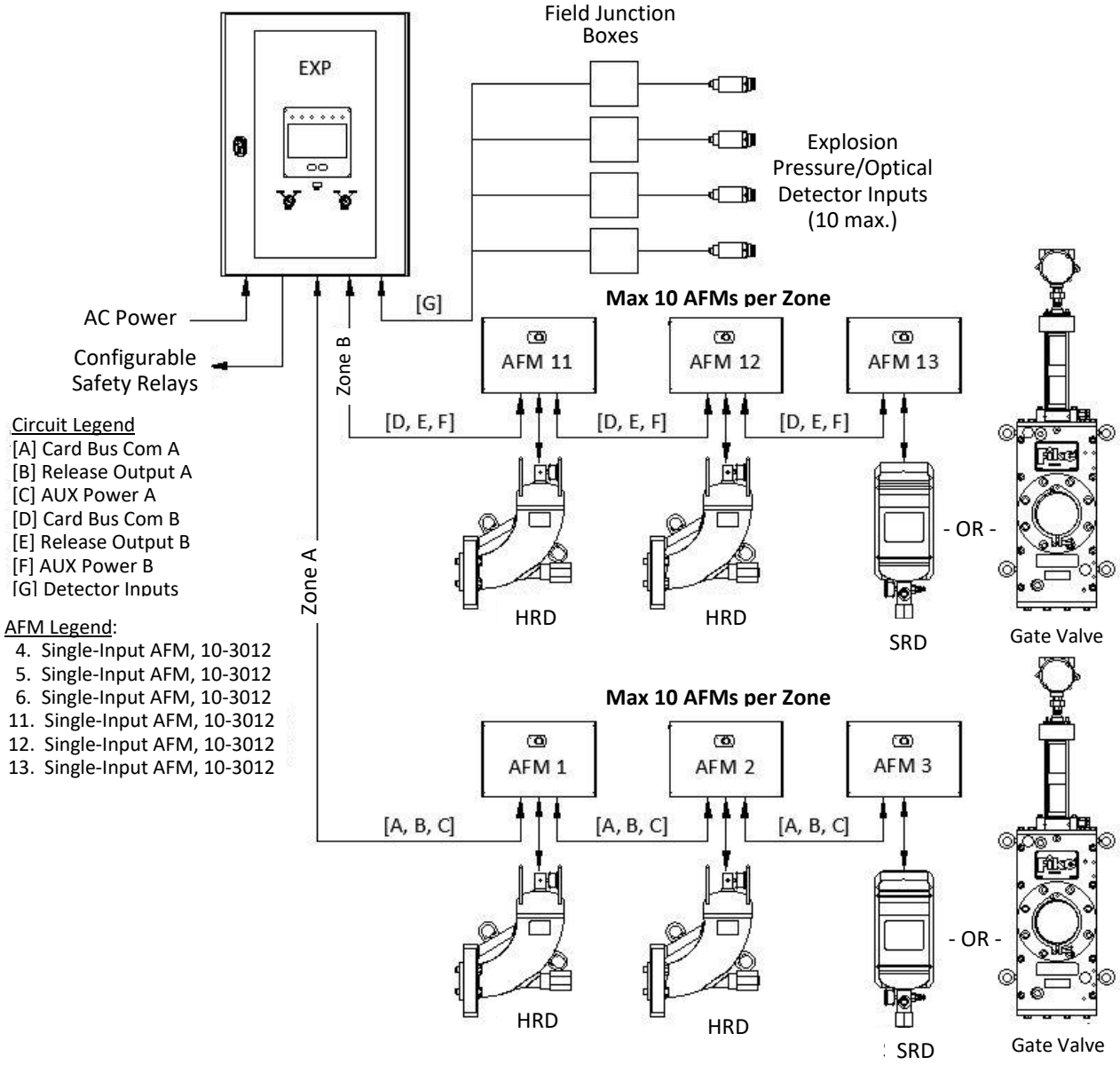
Example 1 - Single Zone EXP System

In this configuration, the EXP system protects a single piece of equipment and/or process; therefore, only one Zone of the EXP panel is used (Zone A) with a maximum of 10 AFMs connected to the release circuit. An AFM connects to each SRD, HRD, or Gate Valve to control and monitor the component. One Class B detector input board is installed to connect up to five detector inputs. The detector inputs are assigned to activate Zone A when activated.



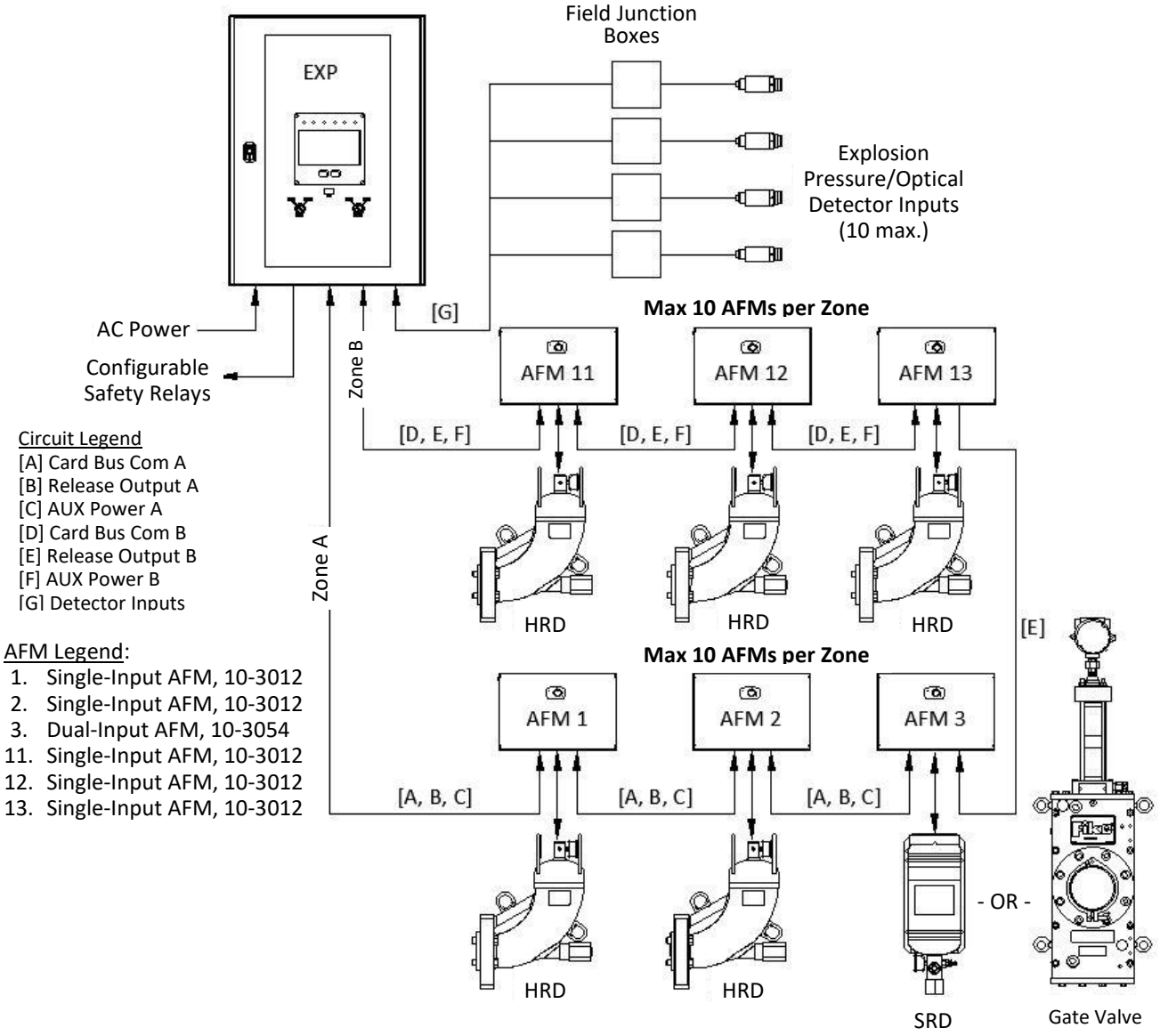
Example 2 -Two Zone EXP System with Independent Zone Operation

In this configuration, the EXP system protects two separate pieces of equipment and/or processes that operate independently; therefore, both zones of the EXP panel are used (zones A and B) with a maximum of 10 AFMs connected to each release circuit. An AFM connects to each SRD, HRD, or Gate Valve to control and monitor the component. One Class B detector input board is installed to connect up to five detector inputs. The detector inputs are assigned to activate either zone A or B when activated, not both.



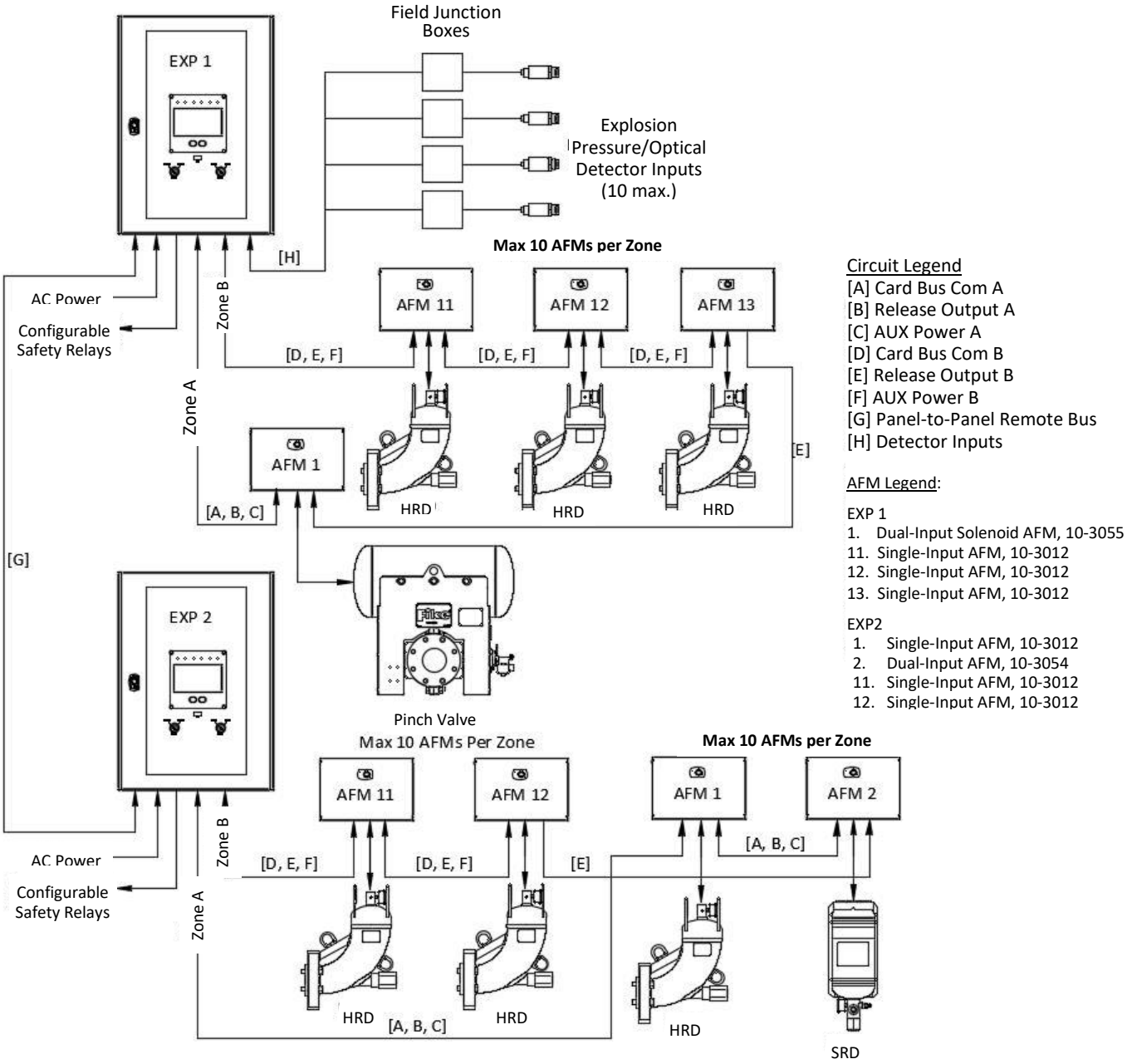
Example 3 -Two-Zone EXP System with a Common Isolation Valve

In this configuration, the EXP system protects two separate pieces of equipment and/or processes that operate independently but share a common duct connection requiring isolation; therefore, both zones of the EXP panel are used (zone A and B) with a maximum of 10 AFMs connected to each release circuit. An AFM connects to each SRD, HRD, or Gate Valve to control and monitor the component. One Class B detector input board is installed to connect up to five detector inputs. The detector inputs are assigned to activate either zone A or B when activated, not both. A Dual Input AFM activates the common isolation component (i.e., SRD or Gate Valve) between the two processes.



Example 4 -Two-Panel Networked EXP System

In this configuration, the number of explosion protection components (i.e., HRD, SRD, Gate Valves) and/or detection inputs exceeds the capabilities of one EXP panel; therefore, multiple EXP panels are networked together to expand the system capacity. Refer to section 5.1 for details of networked panel operation.



APPENDIX B – GLOSSARY OF TERMS

Alarm. An event or condition that signals an explosion has been detected, and the protection system has been activated. Upon Alarm occurrence, the protected process shall be emergency shutdown to prevent further escalation of the hazard.

Class A circuit. A circuit that includes a redundant pathway.

Class B circuit. A circuit that does not include a redundant pathway.

Disable. A procedure to disable all or part of the protection system. This includes activating the panel Zone Disable switch and/or physically disarming the system components to render them inoperable.

Disabled. A condition that signals that a Zone (A or B) has been placed in a Disable state, preventing the panel from activating the Actuator Field Modules (AFM) connected to the disabled Zone. Using the Dual-Input AFMs will require that both zones connected to the module be disabled.

Electrical Fault. An event or condition that signals that an electrical fault has occurred in a monitored electrical circuit, system, or component, such as faulty wiring or other electrical equipment problems. Electrical faults indicate a condition that may compromise the operation of the explosion protection system. Upon Electrical Fault occurrence, the protected process shall be shut down to remove the explosion hazard.

Enable. A procedure to place all or part of the protection system into operation. This includes arming the system components to make them ready for action or operation.

Energetic Device. A pyrotechnic or pyro mechanical device that is activated electronically by the EXP system and is used for the purpose of activating explosion-prevention components connected to the EXP system.

Fault. Electrical or Mechanical Fault that indicates a condition that may compromise the operation of the explosion protection system. Upon Fault occurrence, the protected process shall be shut down to remove the explosion hazard.

Gas Cartridge Actuator (GCA). A single-use, pyrotechnic device that provides the pressure necessary to open the Fike explosion protection suppression container and to operate the Fike fast-acting explosion isolation valves.

Inspection. A visual examination of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage. An inspection schedule shall be established in accordance with the manufacturer's recommendations. NFPA 69 15.7.1 stipulates that "Systems shall be inspected and tested at 3-month intervals. 15.7.1.4 Maximum inspection and test interval shall not exceed 2 years. 15.7.2.1 Inspection and maintenance procedures shall comply with the manufacturer's instructions. 15.12.2 A visual inspection shall be performed after every process maintenance turnaround.

Installation. The action or process of installing the EXP explosion protection system so that it is ready for use.

Intrinsic Safe (IS). A circuit (including the interconnect wiring) or apparatus that prevents explosions from occurring by restricting the electrical energy (i.e., voltage, current, and power) exposed to the potentially explosive atmosphere to a level below that which can cause ignition by either sparking or heating effects.

Locked Out. An event or condition that signals that the Mechanical Locks of all actuators in a specific protection Zone are closed and locked. The Locked Out signal cannot be used as the sole means to provide safety in Lock-Out/Tag-Out procedures but is complimentary to the specific Lock-Out/Tag-Out practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment or the release of hazardous energy during service and maintenance activities.

Maintenance. Work performed after any condition that could impair the protection system in accordance with the manufacturer's requirements, such as replacement of defective parts or cleaning of polluted parts.

Mechanical Fault. An event or condition that signals a mechanical impairment has occurred, such as container lockout operation, Zone disable, actuator missing, low suppression bottle pressure, etc. Mechanical faults indicate a condition that can affect the operation of the explosion protection system. Upon Mechanical Fault occurrence, the protected process shall be shut down to remove the explosion hazard.

Mechanical Lock. A mechanical device designed to provide a means to physically prevent an accidental discharge of an explosion suppression or isolation container into the process vessel or an accidental closure of a mechanical explosion isolation valve.

Metron Actuator. A single-shot, pyro-mechanical device that utilizes a small pyrotechnic charge to drive a piston with a very high thrust to open the Fike explosion suppression containers.

Monitor. An event that signals that a shock filter event has occurred on a pressure detector.

Non-Intrinsic Safe (NIS). As applied to equipment and wiring, equipment and wiring that is capable of causing ignition of a mixture of flammable or combustible material in air under prescribed conditions.

Non-Power Limited. A circuit supplied by a power source with a nominal output voltage not exceeding 600 volts. The circuit is equipped with a circuit breaker.

Power Limited. A circuit powered by a power-limiting source (e.g., listed transformer, power supply, or equipment marked to identify the power-limited source). Power-limited circuits are inherently unable to exceed maximum voltages.

Release Indication. Indicates the associated zone has received a signal for activating the explosion-protection component (input is active).

Remote Disable. An optional component that can be connected to the EXP control panel's Zone Disable circuit to provide a means to remotely disable either of the panel's two explosion protection zones.

Safety Relay. Provides a set of two redundant contacts that are mechanically connected to achieve a high level of contact reliability.

Shock Filter. An electronic filter that has been incorporated into the EXP panel's pressure detector algorithms to reduce possible false activations due to particle impingement and electrical disturbances.

Field Service. Performance of maintenance, recharge, or testing.

System Acceptance. A series of actions to verify installation, operation, and integration of the protection system in accordance with the basis of design, as well as training, validation testing, documentation, and arming of the system. All new protection systems and modifications shall be tested or otherwise evaluated to confirm operational integrity.

Test, Proof Test. A procedure intended to verify or validate a system component's function, operational status, or performance.

Warning. An event or condition that signals a problem area that requires attention but does not affect the operation of the explosion protection system. For example: An explosion detector detects a low or high-pressure condition, or a low or high-pressure condition is detected on a suppression container that is outside expected levels but still within safe operating limits.

Zone. A defined group of explosion protection components (explosion detectors, isolation valves, suppression containers, etc.), which detect an explosion and activate simultaneously to provide effective deflagration protection and control for enclosures with the potential for deflagration.

CONTACT US

FIKE WORLD HEADQUARTERS
704 SW 10TH STREET
BLUE SPRINGS, MISSOURI 64015 USA
TEL: +001 816-229-3405
TOLL-FREE (US ONLY): 1-800-YES-FIKE (1-800-937-3453)
WWW.FIKE.COM

FOR A LIST OF CONTACT INFORMATION FOR FIKE OFFICES AROUND THE WORLD,
VISIT fike.com/contact-us