PRODUCT MANUAL

SINGLE HAZARD PANEL

SHP PRO

CONVENTIONAL FIRE ALARM AND SUPPRESSION SYSTEM

Doc. P/N 06-297
Rev. 7 / April, 2020

Fike®

SOLUTIONS

- Fire Protection
- Explosion Protection
- Overpressure Protection
- Pressure Activation

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REVISION HISTORY

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REVISION / DESCRIPTION OF CHANGE		REVISION DATE
REV 1	ALL SECTIONS, UL 9TH EDITION REVISIONS	JULY, 2006
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1. SECTION 1.3 – REVISED CLASS B AND CLASS A DEFINITIONS
2. SECTION 2.2 – REMOVE LISTING NUMBERS
3. SECTION 3.2 – ADDED HOCHIKI SOE DETECTORS AND REPLACED THERMOCABLE LHD WITH PROTECOWIRE LHD CABLE
4. SECTION 4.1 ,BOARD SPECIFICATIONS, INDEX 7 – ADDED 50 DETECTOR LIMIT REFERENCE
5. SECTION 8.6 – REVISED DESCRIPTION OF LINEAR HEAT DETECTION OPERATION

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1. GENERAL INFORMATION

1.1. About This Manual

This manual is intended to be a complete reference for the installation, operation, and service of the Fike Single Hazard Panel Professional (SHP-Pro) Fire Alarm/Suppression Control System. The information contained in this manual must be utilized by the factory trained Fike distributor in order to properly install, test and service the SHP-Pro. This manual can also be used by the end user as an Operations Manual for the SHP-Pro.

Before you refer to any section in this manual, and before you attempt to install or use the SHP-Pro, be sure to read the important safety notices in Section 1.5.

This manual is divided into sections for easy reference. The first-time installer and/or user should thoroughly read and understand the instructions contained within this manual before using this device. These instructions must be followed to avoid possible damage to the SHP-Pro itself or adverse operating conditions caused by improper installation and programming.

1.2. Product Support

If you have a question or encounter a problem not covered in this manual, you should first try to contact the distributor that installed the protection system. Fike has a worldwide distribution network. Each distributor sells, installs, and services Fike equipment. Look on the inside of the door, left side, there should be a sticker with an indication of the distributor who sold the system. If you cannot locate the distributor, please call Fike Customer Service for locating your nearest distributor, or go to our web-site at www.fike.com. If you are unable to contact your installing distributor or you simply do not know who installed the system you can contact Fike Product Support at (800) 979-FIKE (3453), Monday through Friday, 8:00 a.m. to 4:30 p.m. CST.

1.3. Terms Used in This Manual

The following are various terms used in this manual with a brief description of each:

Ω - Symbol for “ohm”. Unit of resistance.

AC Normal State (“AC Normal” Green LED ON) - The system is in the AC Normal state when appropriate AC power is being applied to the system.

Abort - An input to a suppression system to prevent an unwanted discharge of fire suppressant agent. The SHP-Pro has several different abort types.

Alarm State (“Alarm” Red LED ON, Piezo pulsing) - The alarm occurs when an input circuit configured for alarm operation has been activated. Activation typically initiated by a detector or contact device. The system leaves the alarm state upon entry into the pre-discharge or release state.

Class A Pathway – Includes a redundant path that enables the circuit to continue to operate beyond a single open or a non-simultaneous single ground fault. These conditions are annunciated as a trouble signal.

Class B Pathway – Does not include a redundant path and circuit operation stops due to a single open. Circuit operation continues during the application of a non-simultaneous single ground fault. These conditions are annunciated as a trouble signal.

Initiating Device - A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch. This manual interchanges the terms initiating device and input device.

1.3 Terms Used in This Manual – Continued

Initiating Device Circuit - A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated. This manual interchanges the terms initiating device circuit and input circuit.

Normal State ("Trouble" Yellow LED OFF) - The system is in the normal state when the power supply and all circuits are configured properly, connected, and responding properly. The system remains in normal state until a trouble condition occurs.

Cross-zone Detection - A detection scheme where two detectors must activate before the system enters into the pre-discharge state: at least one detector from each detection initiating circuit must be active.

Notification Appliance - A fire alarm system component such as a bell, horn, speaker, light, or textual display that provides audible, tactile, or visible output, or any combination thereof. The device notifies building occupants of system status. This manual interchanges the terms notification and audible appliance.

Notification Appliance Circuit - A circuit or path directly connected to a notification appliance(s). This manual interchanges the terms notification appliance circuit and audible circuit.

Non-Power Limited - A circuit designation given for wiring purposes. The amount of current flowing through the circuit is unlimited vs. being limited, or power limited. AC power and Battery wiring is Non-Power Limited.

Power Limited - A circuit designation given for wiring purposes. The amount of current flowing through the circuit is limited (typically by fuse) vs. being unlimited, or non-power-limited. The SHP-Pro input and output circuits are power-limited. The circuit has a maximum power that flows through it or it current limits and opens the circuit.

Pre-discharge Delay - The time (in seconds) that the system will delay entering the release state after the zone's detection type has been satisfied. Activation of an abort switch will have an effect on this value, depending upon the abort type selected.

Pre-discharge State ("Alarm" Red LED ON, Piezo chirping) - The pre-discharge state occurs when the zone's detection type input conditions are satisfied (Cross-zone Detection, Sequential Alarm Detection, or Single Detector Release). Upon time delay countdown completion (unless delayed by a pertinent activated abort input), the system leaves the pre-discharge state and enters the release state.

Release State ("Alarm" Red LED ON, Piezo chirping) - The release state occurs upon completion of the pre-discharge state or upon activation of a manual release input. At the start of the release state, output circuits configured for releasing shall operate

Sequential Detection - A detection scheme where the sum total of active detectors on the detection initiating circuits must be two or more before the system will enter the pre-discharge state.

Single Detector Release Detection - A detection scheme where activation of one detector causes the system to enter the pre-discharge state. SDR (Single Detector Release) detector(s) are installed on initiating circuits setup for sequential detection.

Solenoid On Time - The time (in minutes) that the solenoid is activated upon entering the release state. Reset of the system overrides this value.

Supervisory State ("Supervisory" Yellow LED ON, Piezo Warble) - The supervisory state occurs upon activation of a supervisory input circuit. The supervisory state is non-latching and will follow the status of the supervisory input contact.

Trouble State ("Trouble" Yellow LED ON, Piezo Constant) - The trouble state occurs upon any detectable condition which could impair system operation including connection problems, ground faults, hardware problems, power problems, configuration problems, or prematurely activated abort inputs. Certain trouble conditions are latching; others allow the system to reset upon trouble condition removal. Depending upon the type of trouble condition, the system may or may not remain operational. When the system is in trouble state, it is not in the normal state.

1.4. Symbols Used in This Manual

The following cautions and warnings appear in this manual. Be certain to read all of the following warning and cautions before attempting to install or use this device. Personal injury or accidental release of the suppression system may result if these warnings and cautions are NOT followed!

Warning Symbol – This symbol is used in this manual to warn of possible injury or death from improper use or application of the product under noted conditions.

Caution Symbol – This symbol warns of possible personal injury or equipment damage under noted conditions. Follow all safety standards of professional practice and the recommendations in this manual. Using equipment in ways other than described in this manual can present serious safety hazards or cause equipment damage.

Notes – This symbol indicates the message is important, but is not of a Warning or Caution category. These notes can be of great benefit to the user and should be read.

Tips – Tips provide advice that may save time during a procedure, or help to clarify an issue. Tips may include additional reference.

1.5. Safety Notices

Be certain to read all the following warnings and cautions before installing or using this device. Accidental damage to the device could result if these warnings and cautions are NOT heeded!

CAUTION: The SHP-Pro contains static sensitive components. Handle the electronics by the edges only and avoid touching the integrated components. Keep the electronics in the protective static bags it was shipped in until time for installation. Always ground yourself with a proper wrist strap before handling the module(s). If the installer is properly grounded at all times, damage due to static discharge will not occur. If the module requires repair or return to Fike, it must be shipped in an anti-static bag.

CAUTION: To ensure proper system operation after installation of the SHP-Pro, this device must be tested in accordance with NFPA 72. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

WARNING: Failure to disconnect power to the releasing circuit(s) and completely disarm the solenoid(s) or any other "critical operation" contacts prior to system testing may cause accidental activation of the system.

1.6. FCC Compliance

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

2. PRODUCT OVERVIEW

2.1. Description

The Fike SHP-Pro (P/N 10-063 Series) is a compact, cost-effective, conventional fire alarm and suppression releasing panel. The SHP-Pro is designed for use with Fike Clean Agent Fire Suppressant, CO_2, sprinkler (pre-action/deluge), or other industrial solenoid-based suppression systems. The SHP-Pro controller is shipped from the factory pre-configured for Clean Agent suppression operation.

The main controller contains all electronics required for a complete detection and control system suitable for most applications. Optional modules, which plug into the main circuit board, are available to add increased functionality to the system.

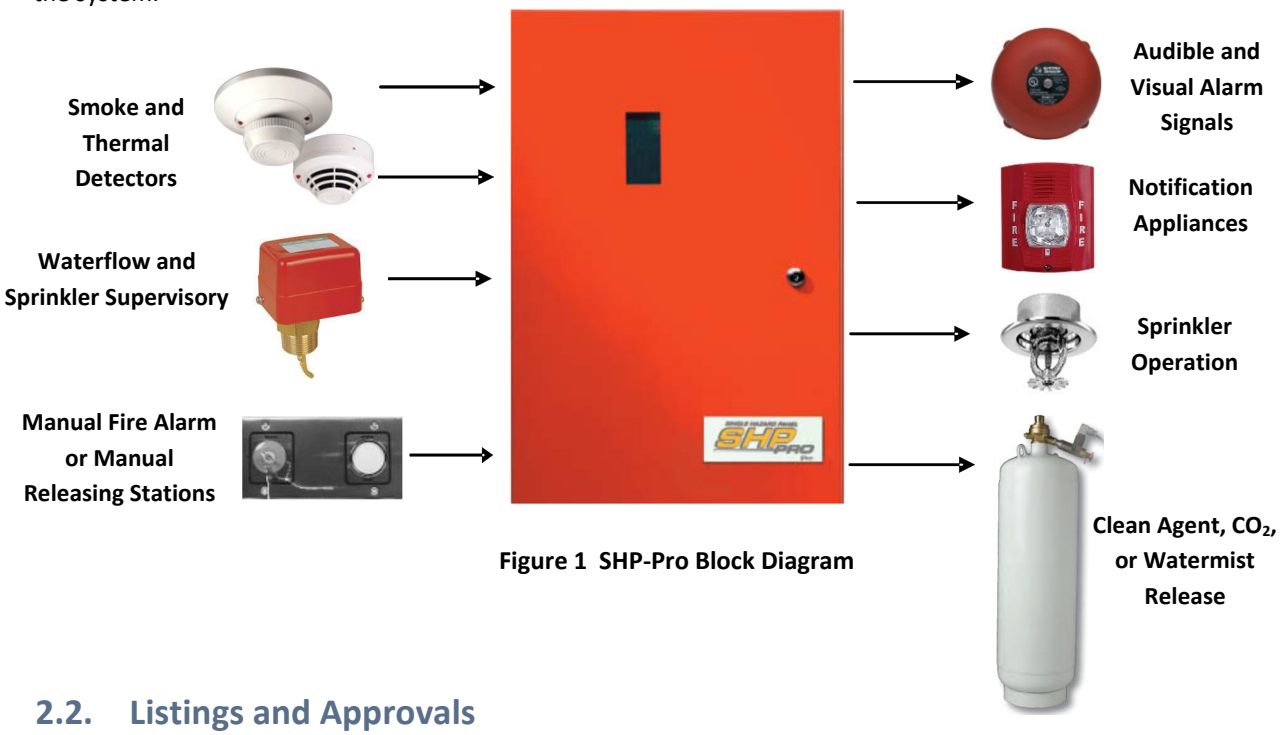

Figure 1 SHP-Pro Block Diagram

2.2. Listings and Approvals

Underwriters Laboratories

Type:	Local, Remote Station, Central Station PPU
Service Type:	A-Automatic Fire Alarm, M-Manual Fire Alarm WF-Water-flow Alarm, SS-Sprinkler Supervisory, Releasing, DACT
Type Signaling:	Non-coded

Factory Mutual (FM)

California State Fire Marshall

City of New York (MEA)

Hong Kong

2.3. Agency Compliance Standards

This fire alarm control panel complies with the following NFPA and UL Standards:

NFPA 72 – National Fire Alarm Code
UL 864 – Control Units and Accessories for Fire Alarm Systems

Related Fire Alarm Standards:

National Fire Protection Association (NFPA) Codes:

NFPA 12 – Carbon Dioxide Extinguishing Systems (High Pressure Only)
NFPA 12A – Halon 1301 Extinguishing Systems
NFPA 13 – Sprinkler Systems
NFPA 15 – Water Spray Fixed Systems
NFPA 16 – Deluge, Foam-water and Foam-water Spray Systems
NFPA 70 – National Electrical Code (NEC)
NFPA 70, Article 300 – Wiring Methods NFPA 70, Article 760– Fire Protective Signaling Systems
NFPA 72 – National Fire Alarm Code
NFPA 101 – Life Safety Code
NFPA 110 – Emergency Standby Power Systems
NFPA 2001 – Clean Agent Fire Extinguishing Systems

Underwriters Laboratories (UL) Standards:

UL 38 – Manually Actuated Signaling Boxes
UL 217 – Smoke Detectors, Single and Multiple Station
UL 228 – Door Closers – Holders for Fire Protective Signaling Systems
UL 268 – Smoke Detectors for Fire Protective Signaling Systems
UL 268A – Smoke Detectors for Duct Applications
UL 346 – Waterflow Indicators for Fire Protective Signaling Systems
UL 464 – Audible Signaling Appliances
UL 521 – Heat Detectors for Fire Protective Signaling Systems
UL 1481 – Power Supplies for Fire Protective Signaling Systems
UL 1638 – Visual Signaling Appliances
UL 1971 – Visual Signaling Appliances

Factory Mutual (FM) Standards:

FMRC 1011 and 1012 – Deluge and Pre-action Sprinkler Systems
FMRC 3820 – Electrical Utilization Equipment

Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction

2.4. Related Documentation

To obtain a complete understanding of the specific features of the SHP-Pro or to become familiar with related functions in general, refer to the documentation listed below. Please reference the most current version or the version noted on the label located on the product.

- 06-106 – Agent Release Module (ARM III) Manual
- 06-186 – Compatible Notification and Releasing Devices
- 06-159 – DACT/Fire Communicator Addendum
- 06-160 – DACT/Fire Communicator Manual
- 02-11060 – SHP-Pro System Operation Posting
- 06-552 – Impulse Releasing Module Product Manual

2.5. SHP-Pro Features

- **General**
  - ❑ Microprocessor-controlled
  - ❑ Power-limited on all circuits except power connections (P1)
  - ❑ Four operational modes:
    1. Clean agent release (10-2452-1)
    2. Clean agent release with sprinkler operation (10-2452-1)
    3. Sprinkler operation (10-2452-1, 10-2452-2)
    4. Industrial releasing (10-2452-1)
  - ❑ Ten system status LEDs to provide positive indication of system status
  - ❑ Seven segment diagnostic LED for trouble and event occurrences
  - ❑ System configuration via dip-switches
  - ❑ Local piezo with distinct event tones
  - ❑ Reset switch
  - ❑ Audible silence switch
  - ❑ Disable Mode for audible and release circuits, and relays
  - ❑ Alarm and trouble resound
- **Power**
  - ❑ Integral power supply at 24VDC nominal; 1.0 Amp total normal standby / 4.0 Amp alarm
  - ❑ Selection of 120, or 240VAC power input at 50 or 60 hertz
  - ❑ Re-settable and non-re-settable special application power output
  - ❑ Battery/Earth fault supervision
  - ❑ 7 AH to 40 AH battery options, up to 90 hours (Factory Mutual) standby
- **Enclosure**
  - ❑ Steel enclosure 21” high by 14.35” wide by 4” deep (Back-box dimensions)
  - ❑ Enclosure is equipped with a .50” wide lip to facilitate flush mounting
  - ❑ Removable door for easy installation
  - ❑ Enclosure is available in Red or Gray
- **Initiating Device Circuits**
  - ❑ Up to two Class B initiating device circuits capable of sequential alarm, cross-zone, or single detector release operation with an overall system capacity of 50 detectors maximum
  - ❑ Three Class B initiating device circuits capable of monitoring closed contact devices
  - ❑ Optional Class A module that converts all five initiating device circuits to Class A wiring and operation
- **Notification Appliance Circuits**
  - ❑ Three Class B notification appliance circuits rated at 2.0 amps each
  - ❑ Optional Class A module that converts all five output circuits to Class A (3 NAC, 2 releasing)
- **Releasing Circuits**
  - ❑ One Agent Release circuit with maximum of 6 ARM’s or IRM’s (any combination)
  - ❑ One Solenoid release circuit which can activate one 24V or two 12V solenoids
  - ❑ Model 10-063-1 provides option to use *both* releasing circuits simultaneously
- **Relays**
  - ❑ General Alarm, Supervisory and Trouble relays
  - ❑ Two Optional CRM4 modules to add eight more SPDT dry relay contact outputs
- **Sprinkler Monitoring Points**
  - ❑ Waterflow input
  - ❑ Supervisory input

3. MAIN PANEL HARDWARE

3.1. SHP-Pro Control System

The 10-063, SHP-Pro Control System (Figure 2) includes the main controller, transformer, and steel enclosure with red or gray finish. The enclosure is equipped with a removable door to facilitate installation of the enclosure back box. The door is fitted with a standard Fike key-lock and a viewing window covered with clear Lexan. The enclosure back-box is 21" (533 mm) high x 14.35" (364 mm) wide x 4" (102 mm) deep. It also includes a 0.5" (13 mm) lip around the back box to facilitate flush mounting. The enclosure includes space for installing up to 18 AH batteries (ordered separately).

Refer to Section 4.5 for a complete detail of the back-box features and dimensions.

Figure 2 SHP-Pro Control System

The basic part numbers for the components covered in further detail in this section are as follows:

Part Number	Description
10-063-m-c-p	SHP-Pro Control System m: 1 = all modes 2 = sprinkler mode only c: R = red, G = gray p: 1 = 120VAC, 2 = 240VAC
10-2452 - m	SHP-Pro Controller Printed Circuit Board m: 1 = all modes 2 = sprinkler mode only Compatibility Identifier for this product is "**SHP-PRO**"
10-2450	Class A Input Module
10-2448	Class A Output Module
10-2204	CRM4 Relay Module
10-2190-b	Battery Assembly (AH selection: b: 1 = 7 AH, 2 = 18 AH) NOTE: Assembly includes 10-2192 wire assembly
02-3468	Battery, 12VDC, 35 AH
10-2154-C	Battery Enclosure, 33 AH, where C= R for Red; G for Gray
A02-0252	Battery, 12 VDC, 40 AH (requires 75 AH enclosure)
10-2236-C	Battery Enclosure, 75 AH, where C= R for Red; G for Gray

Figure 3 Ordering Information

3.1.1. SHP-Pro Controller (P/N 10-2452)

The SHP-Pro controller (Figure 4) is the heart of the SHP-Pro control panel. It contains the system's central processing unit, power supply, and other primary components. It also includes the electronics required to support the optional Class A modules and CRM4 Relay modules.

Figure 4 SHP-Pro Controller

3.1.2. Class-A Input Module (P/N 10-2450)

The optional Class-A Input Module (See Figure 5) allows all of the five initiating device circuits to be wired Class A versus the standard Class B. The Class A module mounts directly onto the SHP-Pro Controller at P6 utilizing two standoffs supplied with the module.

Figure 5 Class A Input Module

3.1.3. Class-A Output Module (P/N 10-2448)

The optional Class A Output Module allows all of the three notification appliance and both releasing circuits to be wired Class A versus the standard Class B. The Class A module mounts directly onto the SHP-Pro Controller at P7 utilizing two standoffs supplied with the module.

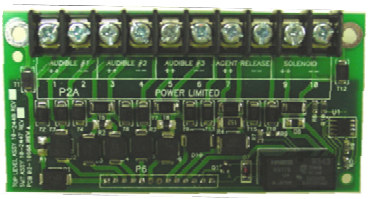

Figure 6 Class A Output Module

3.1.4. CRM4 Relay Module (P/N 10-2204)

The optional CRM4 Relay Module provides four SPDT dry contact relays, which activate upon selected events per the configuration switches. The CRM4 Relay modules mount directly onto the SHP-Pro Controller at P8 or P9 utilizing four stand-offs supplied with the module.

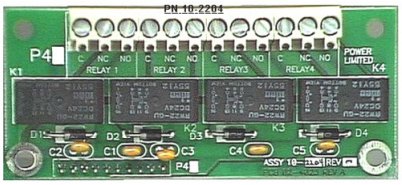

Figure 7 CRM4 Relay Module

3.1.5. Standby Batteries

Batteries are required for alarm systems for maintaining emergency back-up power. Two each 12V batteries are required and are to be wired in series for maintaining a 24VDC back-up. Most systems require at least a 24 hour standby current with 5 minutes alarm current for determining minimum battery size. Refer to Appendix 1 for Battery Calculation form for determining required battery size for system.

- 02-2018 - (1) 7AH, 12 VDC battery
- 02-2820 – (1) 18AH, 12 VDC battery
- 02-3468 – (1) 35AH, 12 VDC battery
- A02-0252 – (1) 40AH, 12 VDC battery

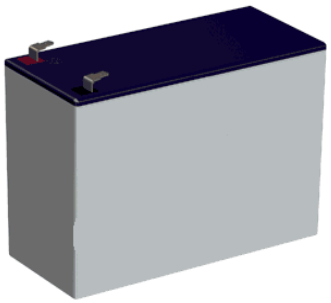

Figure 8 SLA Battery

3.1.6. 33 AH Battery Enclosure (P/N 10-2154-R/G)

The 33 AH Enclosure is a heavy gauge metal enclosure (21”w x 11”h x 5”d) and is large enough to house two each 33 AH batteries. Conduit knockouts are provided for entry of battery wiring. The box lid is installed onto the back-box using the 4 mounting screws provided.

Refer to Fike document 06-534 for installation instructions.

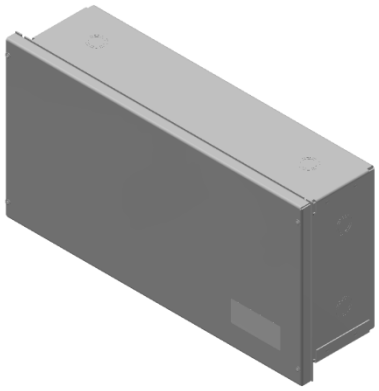

Figure 9 33 AH Battery Enclosure

3.1.7. 75 AH Battery Enclosure (P/N 10-2236-R/G)

The 75 AH Enclosure is a heavy gauge metal enclosure (26 1/4”w x 14”h x 7”d) and is large enough to house two each 40 AH batteries. Conduit knockouts are provided to provide entry of battery wiring. The box lid is installed onto the back-box using the 4 mounting screws provided.

Refer to Fike document 06-535 for installation instructions.

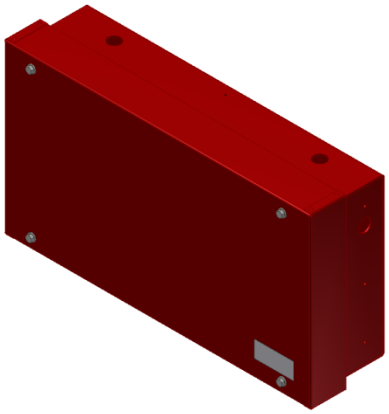

Figure 10 75 AH Battery Enclosure

3.2. Compatible Input/Output Devices

The following table lists devices that are approved for use with the SHP-Pro's input circuits. Other devices such as contact closure input devices, contact closure detectors, notification appliances, and Solenoids are listed in the Fike Compatibility Document, P/N 06-186. Refer to Section 4.1.1 for selecting the appropriate detector base for system operation.

Mfg	Replacement P/N	Part Number	Mfg Model Number	Description
System Sensor		63-1015 [1]	2451	Photoelectric Detector
		63-1017 [1]	2451TH	Photo/heat Detector
		67-1025 [1]	1451	Ionization Detector
		60-1027 [3]	5151	135° Thermal Detector
		63-1014	2151	Photoelectric Detector, Low Profile
		67-1040	1151	Ionization Detector, Low Profile
		67-1023	1151	Ionization Detector
		67-1026 [1,5]	B401BR	470 Ω base, 6-inch
		67-1029 [5]	B110RLP	470 Ω Low Profile Base, 6-inch
		67-1031 [5]	B401B	0 Ω Base, 6-inch
Hochiki		63-1024 [1]	SLR-24V	Photoelectric Detector
		67-1033 [1]	SIJ-24	Ionization Detector
		63-1025	SLR-24H	Photo/Thermal Detector
		63-1307[1]	SOC-24V	Photoelectric Detector
		63-1308[1]	SOC-24VN	Photoelectric Detector, no test feature
		63-1320[7]	SOE-24V	Photoelectric Detector
		63-1321[7]	SOE-24H	Photo/Heat Detector
		60-1020 [3]	DFE-135	135° F Fixed Temperature Heat Detector
		60-1022 [3]	DFE-190	190° F Fixed Temperature Heat Detector
		60-1029 [3]	DCD-135	135° F Fixed, Rate of Rise Heat Detector
		60-1030 [3]	DCD-190	190° F Fixed, Rate of Rise Heat Detector
		67-1034 [4,6]	NS6-224	430 Ω Base, 6-inch
		67-1036 [4,6]	NS4-224	430 Ω Base, 4-inch
		67-1035 [4,6]	NS6-220	220 Ω Base, 6-inch
		67-1037 [4,6]	NS4-220	220 Ω Base, 4-inch
	67-1034 [4,6]	67-1027 [1]	HSB-224	430 Ω Base, 6-inch
	67-1036 [4,6]	67-1028 [1]	YBA-M224	430 Ω Base, 4-inch
	67-1035 [4,6]	67-1010 [1]	HSB-220	220 Ω Base, 6-inch
	67-1037 [4,6]	67-1017 [1]	YBA-M220	220 Ω Base, 4-inch
Linear Heat Detection Cable (See notes 2 and 3)			PHSC-*-EPC-**	Protectowire® Type EPC, vinyl jacket
			PHSC-*-XCR-**	Protectowire® Type XCR, fluoropolymer jacket
			PHSC-*-XLT-**	Protectowire® Type XLT, vinyl-polymer jacket
			PLR-*R-**	Protectowire® Type PLR-R, polypropylene jacket
			CTI-*-**	Protectowire® Type CTI, vinyl jacket
			CTI-*-M-**	Protectowire® Type CTI, vinyl jacket, messenger wire
			CTI-*X-**	Protectowire® Type CTI-X, fluoropolymer jacket
			CTI-*X-M-**	Protectowire® Type CTI-X, fluoropolymer jacket, messenger wire
	*Cable alarm temperature **Cable spool length			

Figure 11 Table of Compatible Input Devices

NOTES:
1. Device has been discontinued by manufacturer. Listed for retrofit compatibility.
2. Maximum LHD cable line impedance of 440Ω for cross-zone detection operation or 220Ω for single detector operation.
3. Heat detectors are for property protection only, not Life Safety!
4. Base provides terminals for connection to conventional graphic panel.
5. Base is compatible with all System Sensor detectors listed.
6. Base is compatible with all Hochiki detectors listed.
7. UL listed. Not Factory Mutual approved.

3.3. Ancillary Devices

The following table lists several ancillary devices that can be used in conjunction with the SHP-Pro panel to provide increased system flexibility and performance. For detailed wiring instructions for each of these devices refer to the appropriate product manual.

P/N	Manual P/N	Description	Function
10-2256 (obsolete)	06-159	Digital Alarm Communicator Transmitter (DACT). Complies with NFPA 72-Supervising Station Fire Alarm System. Refer to FPT-DACT Operation & Installation Guide (F01U002505B) for details.	The SHP-Pro panel is capable of communicating to a central station via the DACT (optional). The DACT monitors the relay outputs of the SHP-Pro. This model provides 4 channel inputs; 3 standard inputs with one programmable selection. It is necessary to program the DACT with the 10-2257 programmer and 10-2258 cable or 10-2259 modem and 06-151 software.
10-2476		5 Zone Digital Alarm Communicator Transmitter (DACT). Complies with NFPA 72-Supervising Station Fire Alarm System.	The 5 zone DACT contains inputs configurable for one of the seven types of conditions: Fire Alarm, Waterflow Alarm, Supervisory, Monitor Alarm, System Fault, AC Failure, and Low Battery. It is programmable using the 10-2477 programmer.
10-1832	06-106	ARM-III (Agent Release Module)	Provides a releasing means for Fike's Clean Agent suppression systems with GCA valves The SHP-Pro panel is capable of supporting up to 6 ARM's on the single Agent Release Output Circuit. The ARM is required for each Clean Agent Suppressant Container equipped with a GCA valve.
		Conventional Graphic Annunciator GEMCOM, Inc. 8028 S. Archer Ave. Willow Springs, Il. 60480-1204 Toll Free: 888-4-GEMCOM	Graphic Annunciators provide a graphic display of the protected area using LED's to indicate the location of the smoke detectors. The LED will illuminate when the detector is in alarm. Hochiki NS4 and NS6 detector bases must be used for graphic panel interface.
10-2748	06-552	Impulse Releasing Module	Provides a releasing means for Fike's Clean Agent suppression systems with Impulse valves. The SHP-Pro panel is capable of supporting up to 6 IRM's on the single Agent Release Output Circuit. The IRM is required for each Clean Agent Suppressant Container equipped with an Impulse valve.
	06-588	Compatible Surge Protection Devices	Provides a complete list of Emerson Power surge suppression devices approved for use with the SHP-Pro.
10-2983	06-905	Output Analyzer	Provides a means to test the releasing circuit's integrity and firing capability.

Figure 12 Table of Compatible Ancillary Devices

3.4. Spare Parts

The following table lists spare parts used with the SHP-Pro control system.

Description	Part Number
Keylock with cam	02-1606
Panel Key Only (without cam)	02-12025
Battery, 7 Amp-Hour	02-2018
Battery, 18 Amp-Hour	02-2820
Battery, 35 Amp-Hour	02-3468
Battery, 40 Amp-Hour	A02-0252
Wire Assembly, 7/18 AH Batteries	10-2192
Standoff and lock washer/hex nut kit (30 each)	02-4035
Transformer, 110VAC	02-10881
Transformer, 240 VAC	02-10882
Releasing circuit EOL assembly, 2.4K, 1W 5%	02-12281
Switch circuit 3,4 & 5 EOL assembly, 20K	10-2461
Detection circuit 1 & 2 circuit EOL assembly, 4.3K	10-2318
Audible output circuit EOL assembly, 1.2K	10-2570
Fuse, 10 Amp, Mini Auto, Fast Acting (For F1 & F2)	02-4173
Fuse, 4 Amp, Mini Auto, Fast Acting (For F3 & F4)	02-11412
Flashbulb (for testing ARM III release) 12/box	02-3799
End Of Line Relay - Hochiki	02-4667
End Of Line Relay – System Sensor	02-4981
Touch-Up Paint (Not available from Fike)	
Sherwin Williams, Signal Red, RAL 3001 per RAL 840-HR (matt finish)	
Sherwin Williams, Light Gray, RAL 7035 per RAL 840-HR	

Figure 13 Table of Spare Parts

4. HARDWARE SPECIFICATIONS

NOTE: All electronics are rated 32 - 120°F (0 - 49°C), 93% relative humidity.

4.1. SHP-Pro Control Board (P/N 10-2452)

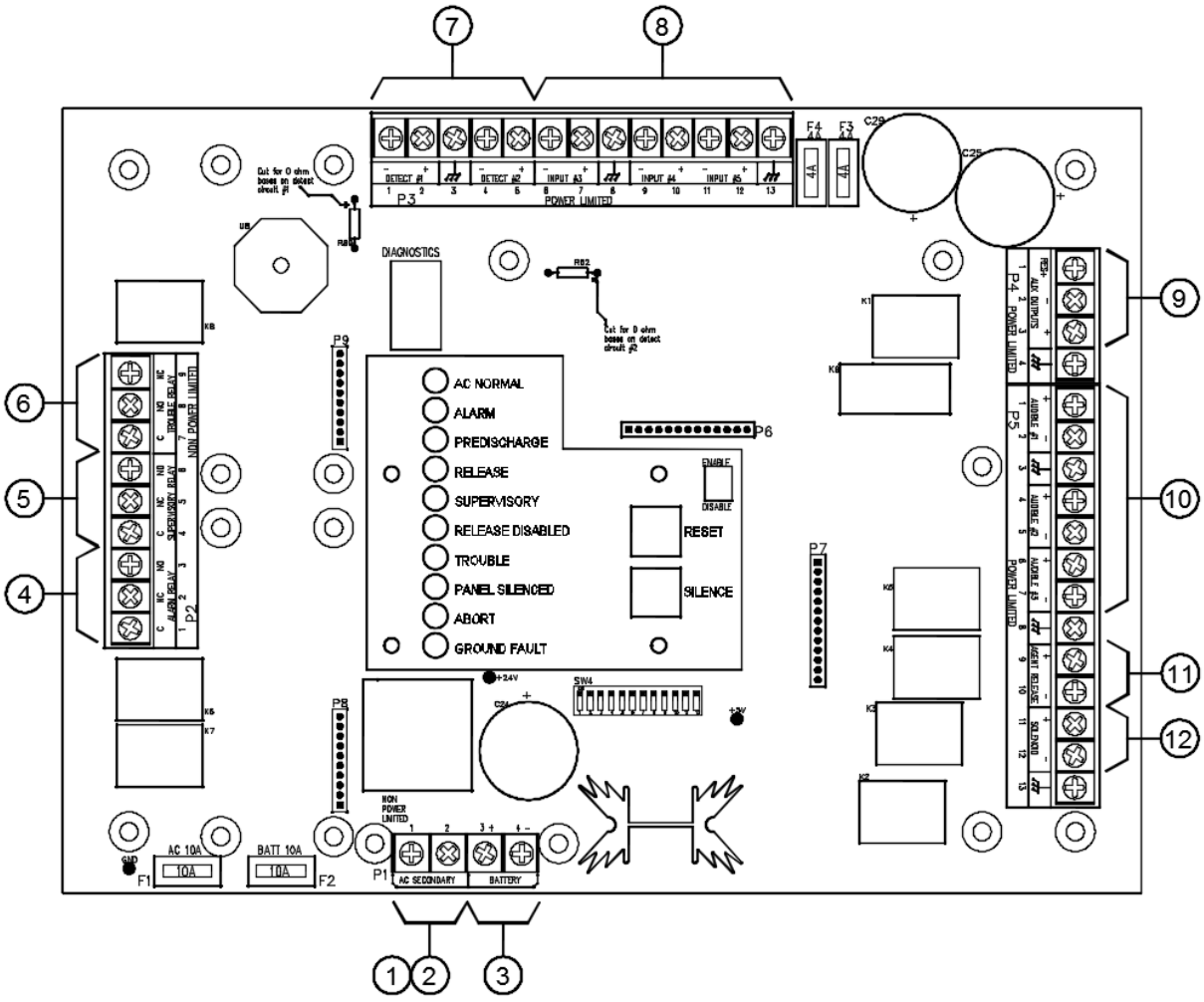

Figure 14 SHP-Pro Controller

Figure 15 SHP-Pro Controller Circuit Specifications

Index	Terminal	Description	Specifications
1	Transformer H1 and H2	Primary AC power input to Transformer Primary	• AC line power must originate from a dedicated circuit at the main building power distribution center. • Circuit breaker shall be equipped with a lockout mechanism and be clearly labeled as a “Fire Protection Control Circuit”. • Power Input: – 120 VAC, 50/60 Hertz, 2.6 A, 250 VA – 240 VAC, 50/60 Hertz, 1.5 A, 250 VA
2	P1-1 and P1-2	Transformer Secondary to SHP-Pro AC Secondary	• The SHP-Pro’s internal power supply provides 4.135 amps of 24 VDC power. • Controller power consumption = 0.135 amps at 24 VDC in the normal standby mode. • Voltage: 20.5 – 28.1 VAC • Non-power limited and supervised • Fused by F1, 10 A field replaceable (P/N 02-4173)

Figure 16 SHP-Pro Controller Circuit Specifications - Continued

Index	Terminal	Description	Specifications
3	P1-3(+) and P1-4(-)	Standby battery input	• Sealed lead acid batteries only • Charging capacity: 40 AH maximum • Voltage: 24 VDC nominal • Supply current: 8 A @ 27 VDC maximum • Charge current: 1.5 A @ 27 VDC maximum • Non-power limited and supervised • Fused by F2, 10 A field replaceable fuse (P/N 02-4173)
4	P2-1 thru 3	Alarm Relay	• Non-programmable, common Alarm relay that switches when any Alarm input is activated • Style: Form C, SPDT • Contact Rating (DC operation): 2 A @ 30 VDC (pf = .35) • Contact Rating (AC operation): 0.5 A @ 250 VAC (pf = .35) • Non-supervised • Can be connected to power limited or non-power limited source
5	P2-4 thru 6	Supervisory Relay	• Non-programmable, common Supervisory relay that switches when any Supervisory input is activated • Style: Form C, SPDT • Contact Rating (DC operation): 2 A @ 30 VDC (pf = .35) • Contact Rating (AC operation): 0.5 A @ 250 VAC (pf = .35) • Non-supervised • Can be connected to power limited or non-power limited source
6	P2-7 thru 9	Trouble Relay	• Non-programmable, common Trouble relay that switches on any Trouble condition or when panel is de-energized • Style: Form C, SPDT • Contact Rating (DC operation): 2 A @ 30 VDC (pf = .35) • Contact Rating (AC operation): 0.5 A @ 250 VAC (pf = .35) • Non-supervised • Can be connected to power limited or non-power limited source
7	P3-1(-) and P3-2(+) P3-4(-) and P3-5(+)	Detect #1 Input Detect #2 Input	• Compatible with conventional detectors (50 max.) and linear heat detection cable listed in Section 3.2 or contact closure type devices listed for fire alarm use. • Wire configuration: Class B (Class A with optional 10-2450 module) • Detector voltage: 19.9 – 27.5 VDC • Current: 360 mA maximum • Maximum wire resistance: 20 Ω detectors; 440 Ω linear heat detection or contact closure • End of line resistor: 4.3 Ω (banding: yellow/orange/red) • Power limited and supervised • Capable of Sequential, Cross-zone (Detect #1 & #2), or Single detector release detection methods • Appropriate “0 ohm” jumper must be clipped if using 0 ohm bases or contact closure device on Detect #1 or #2 circuits in order to limit the circuit current to 100 mA. • If using linear heat detection cable (LHD) on Detect #1 or #2 circuits, do NOT clip the “0 ohm” jumpers • Refer to Section 4.1.1 for detector base selection

Figure 17 SHP-Pro Controller Circuit Specifications - Continued

Index	Terminal	Description	Specifications
8	P3-6(-) and P3-7(+) P3-9(-) and P3-10(+) P3-11(-) and P3-12(+)	Input #3 Input #4 Input #5	• Compatible with contact closure inputs (i.e., manual release, abort, heat detection devices, waterflow and supervisory devices listed for fire alarm use) • Wire configuration: Class B (Class A with optional 10-2450 module) • Voltage: 5 VDC maximum • Current: 0.5 mA maximum • Wire resistance: 100 Ω maximum • End of line resistor: 20k Ω (banding: red/black/orange) • Power limited and supervised
9	P4-1(+) and P4-2(-)	Resettable AUX Output	• Voltage: 24 VDC nominal (range = 19.8 – 27.3 VDC) • Current: 2 A maximum, special application • Fused by F3, 4 A field replaceable fuse (P/N 02-11412) • Supervised and power limited • Resettable and Continuous AUX outputs share the same negative and shield terminals
	P4-2(-) and P4-3(+)	Continuous AUX Output	• Voltage: 24 VDC nominal (range = 19.8 – 27.3 VDC) • Current: 2 A maximum, special application • Fused by F4, 4 A field replaceable fuse (P/N 02-11412) • Supervised and power limited • Resettable and Continuous AUX outputs share the same negative and shield terminals
10	P5-1(+) and P5-2(-) P5-4(+) and P5-5(-) P5-6(+) and P5-7(-)	Audible #1 Audible #2 Audible #3	• Refer to Fike's Device Compatibility document P/N 06-186 for a list of compatible notification appliances. • Wiring: Class B (Class A with optional module P/N 10-2448) • Output Voltage: 24 VDC nominal, 27.9 VDC maximum (16 – 33 maximum RMS) • Output Current: 2 A maximum, regulated • Wire Resistance: Refer to Section 4.1.2 • End of line resistor: 1.2 kΩ (banding: brown/red/red) • Supervised and power limited
11	P5-9(+) and P5-10(-)	Agent Release	• Wiring: Class B (Class A with optional module P/N 10-2448) • Output Voltage: 24 VDC nominal, special application • Output Current: 2 A maximum • Wire Resistance: 35 Ω maximum • End of line resistor: 2.4 kΩ (banding: red/yellow/red) • Supervised and power limited • Compatible Devices: ARM III (P/N 10-1832) and IRM (P/N 10-2748), maximum 6 any combination • **FM REQUIREMENT ONLY**: Minimum 20.4Vdc required at the last releasing device under all conditions
12	P5-11(+) and P5-12(-)	Solenoid	• Wiring: Class B (Class A with optional module P/N 10-2448) • Output Voltage: 24 VDC nominal, special application • Output Current: 2 A maximum • Wire Resistance: Refer to Section 4.1.2 • End of line resistor: None required. Circuit is supervised through coil for wiring integrity. • Compatible Devices: Refer to Fike's Device Compatibility document P/N 06-186 • Testing: Install 200 Ω, 5 watt resistor (P/N 02-2686) to simulate solenoid resistance • **FM REQUIREMENT ONLY**: Minimum 20.4Vdc required at the last releasing device under all conditions

4.1.1. Detector Base Selection

The following table identifies the maximum number of detector bases that can be connected to the SHP-Pro's Detection input circuits and the detection scheme that is available with the base model being used. Bases of different models/manufacturers shall not be mixed on the system.

						Maximum Bases per Circuit		
Fike P/N	Size	Ω	Manufacturer	Mfg. P/N	Manufacturer Compatibility ID	Sequential	Cross-zone	Single Detector Release
67-1027 [2]	6"	430	Hochiki	HSB-224	HB-53	25	25	N/A
67-1028 [2]	4"	430	Hochiki	YBA-M224	HB-5	25	25	N/A
67-1010 [2]	6"	220	Hochiki	HSB-220	HB-56	N/A	25	25
67-1017 [2]	4"	220	Hochiki	YBA-M220	HB-3	N/A	25	25
67-1034 [3]	6"	430	Hochiki	NS6-224	HB-5	25	25	N/A
67-1036 [3]	4"	430	Hochiki	NS4-224	HB-5	25	25	N/A
67-1035 [3]	6"	220	Hochiki	NS6-220	HB-3	N/A	25	25
67-1037 [3]	4"	220	Hochiki	NS4-220	HB-3	N/A	25	25
67-1026[2]	6"	470	System Sensor	B401BR470	61-093-02A	25	25	N/A
67-1029	6"	470	System Sensor	B110RLP	61-093-02A	25	25	N/A
67-1031	6"	0	System Sensor	B401B	61-093-02A	N/A	Note 1	Note 1

Figure 18 Detector Base Selection Guide

NOTES:

1. 0 ohm bases do not have a current limiting resistor. They provide a contact closure input to the detection circuit(s) they are connected to. Depending upon controller configuration, they are capable of providing either single detector release or cross-zoned detection operation. The number of bases that can be connected to the circuit is limited by the circuit specifications. If using 0 ohm bases on the detection circuit(s), appropriate "0 ohm" jumper must be clipped in order to limit the circuit current to 100 mA. See Section 5.5.4.4.
2. Device has been discontinued by manufacturer. Listed for retrofit compatibility.
3. Base provides terminals for connection to conventional graphic panel. Replaces Hochiki HSB and YBA bases.

4.1.2. Circuit Impedance Limitations

The following table can be used to estimate the maximum allowable circuit impedance based on the total current draw of all devices connected to the circuit. First, determine the maximum amount of current flowing through the circuit; then use the table to find the corresponding maximum impedance allowed for the circuit wiring based on a maximum circuit voltage drop of 2.4 volts.

Max Current (Amps)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0
Audibles 1-3 (Max Ωs)	24	12	8	6	4.8	4.0	3.0	2.4	1.6	1.2
Solenoid (Max Ωs)	12	6	4	3	2.4	2.0	1.5	1.2	0.8	0.6

Figure 19 Field Wiring Resistance Limitations

4.2. Class-A Input Card (P/N 10-2450)

The Class A Input Card (Figure 20) mounts directly to the SHP-Pro control board and receives its control and operating power directly from the board via the P6 terminal connection. If the Class A Input card is installed, all five input circuits must be wired Class A, rather than Class B.

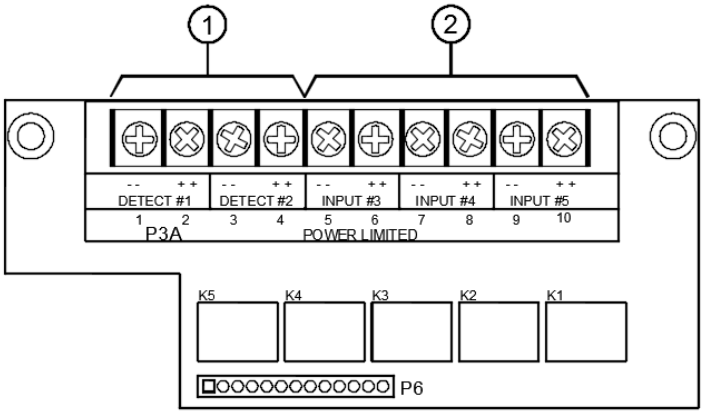

Figure 20 Class A Input Card

Figure 21 Class-A Input Card Specifications

Index	Terminal	Description	Specifications
1	P3A-1(--) and P3A-2(++) P3A-3(--) and P3A-4(++)	Detect #1 Input Detect #2 Input	• Compatible with conventional detectors listed in Section 3.2, linear heat detection cabling or contact closure type devices listed for fire alarm use. • Detector voltage: 19.9 – 27.5 VDC • Current: 360 mA maximum • Maximum wire resistance: 20 Ω detectors; 440 Ω linear heat and contact closure • Supervised and power limited
2	P3A-5(--) and P3A-6(++) P3A-7(--) and P3A-8(++) P3A-9(--) and P3A-10(++)	Input #3 Input #4 Input #5	• Compatible with contact closure inputs (manual release, abort, waterflow, heat detection cable, etc.) • Voltage: 5 VDC maximum • Current: 0.5 mA maximum • Wire resistance: 100 Ω maximum • Supervised and power limited

4.3. Class-A Output Card (P/N 10-2448)

The Class A Output Card (Figure 22) mounts directly to the SHP-Pro control board and receives its control and operating power directly from the board via the P7 terminal connection. If the Class A Output card is installed, all five Output circuits must be wired Class A, rather than Class B.

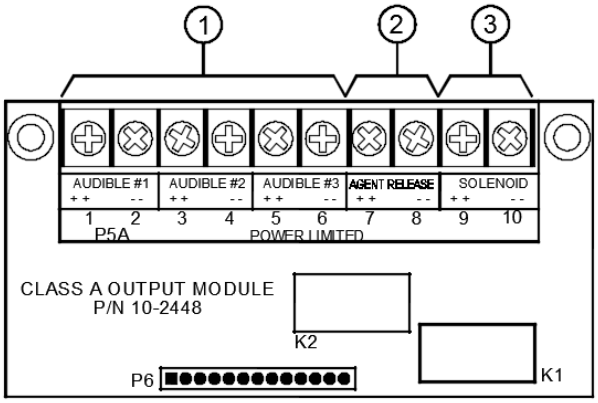

Figure 22 Class A Output Card

Figure 23 Class-A Input Card Specifications

Index	Terminal	Description	Specifications
1	P5A-1(++) and P5A-2(--) P5A-3(++) and P5A-4(--) P5A-5(++) and P5A-6(--)	Audible #1 Audible #2 Audible #3	• Output Voltage: 24 VDC nominal, 27.9 VDC maximum (16 – 33 maximum RMS) • Output Current: 2 A maximum, regulated • Wire Resistance: Refer to Section 4.1.2 • Supervised and power limited • Compatible Devices: Refer to Fike's compatibility document (P/N 06-186)
2	P5A-7(++) and P5A-8(--)	Agent Release	• Output Voltage: 24 VDC nominal, special application • Output Current: 2 A maximum • Wire Resistance: 35 Ω maximum • Supervised and power limited • Compatible Devices: ARM III (P/N 10-1832) and IRM (P/N 10-2748), maximum 6 any combination
3	P5A-9(++) and P5A-10(--)	Solenoid	• Output Voltage: 24 VDC nominal, special application • Output Current: 2 A maximum • Wire Resistance: Refer to Section 4.1.2 • Compatible Devices: Refer to Fike's compatibility document (P/N 06-186) • Testing: Install 200 Ω, 5 watt resistor (P/N 02-2686) to simulate solenoid resistance

4.4. CRM4 Relay Card (P/N 10-2204)

The CRM4 Relay Card (Figure 24) mounts directly to the SHP-Pro control board and receives its control and operating power directly from the board via the P8 and P9 terminal connections. The CRM4 relays can be connected to either power limited or non-power limited sources, not both.

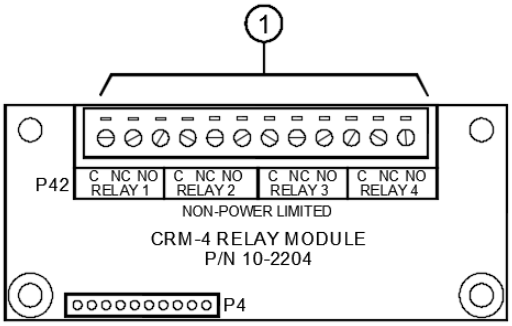

Figure 24 CRM4 Relay Card

Figure 25 CRM4 Relay Card Specifications

Index	Terminal	Description	Specifications
1	P42	Relays 1 thru 4	• Programmable (function defined by dip-switch configuration) • Style: Form C, SPDT • Contact Rating (DC operation): 2 A @ 30 VDC (pf = .35) • Contact Rating (AC operation): 0.5 A @ 250 VAC (pf = .35) • Non-supervised • Can be connected to power limited or non-power limited source

NOTE: All connections to the P42 CRM4 relay terminal block shall be either power limited or non-power limited, not both.

4.5. Enclosure

- Material: 18 gauge steel
- Weight: 15 lbs. (6.4 kg) empty, back box and door
- Finish: Red or gray painted
- Mounting: Flush or Surface
- Cable Entrance: ½" & ¾" conduit knockout on all sides
- Door: Removable with 180 degree swing

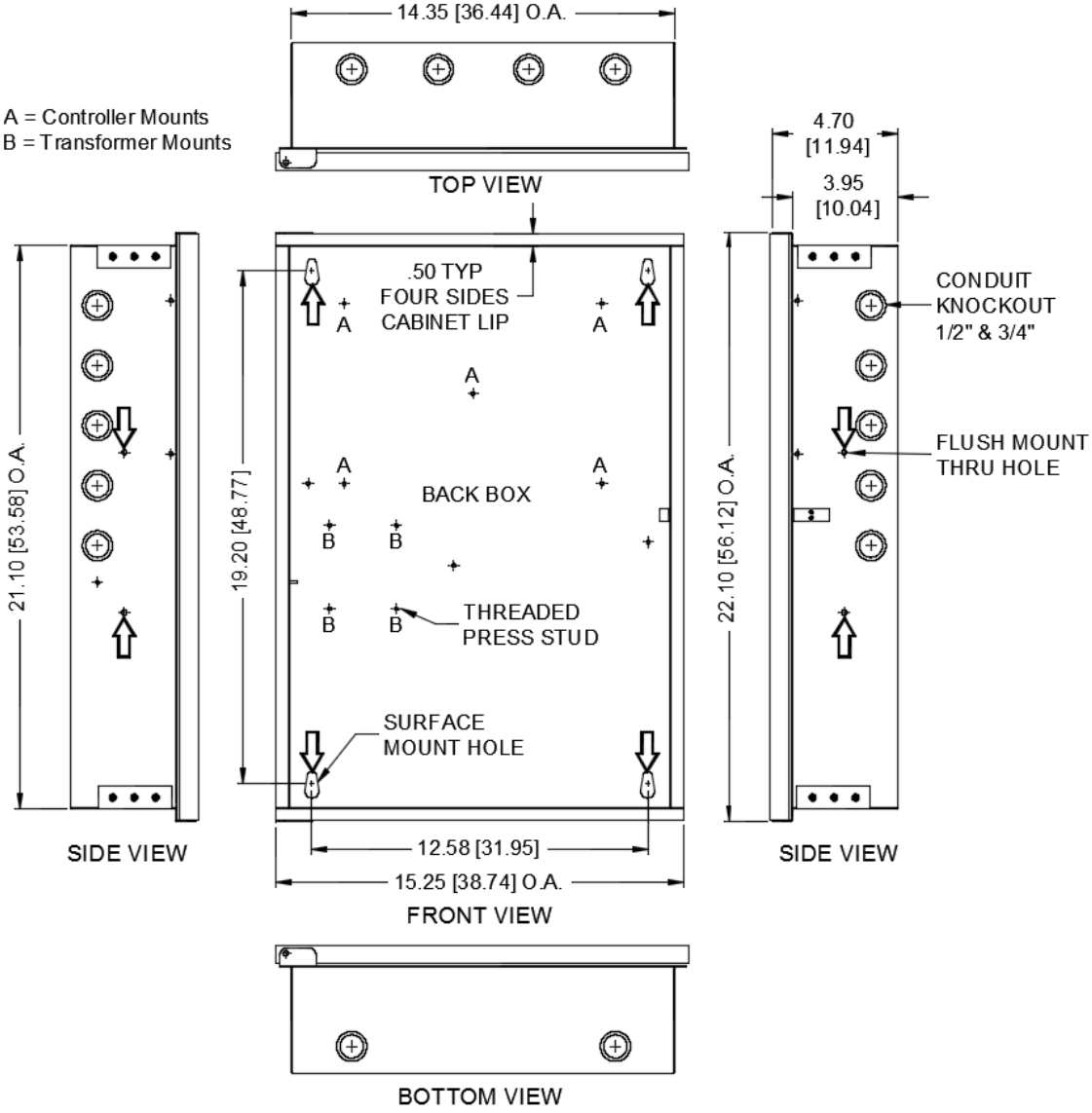

Figure 26 Enclosure Dimensions

The SHP-Pro enclosure is capable of housing up to two 18 amp-hour, sealed lead-acid (SLA) batteries in the bottom of the enclosure. If installing batteries inside the enclosure, the conduit knock-outs in the bottom of the enclosure must not be used.

Where the system requires batteries larger than 18 AH, and external battery enclosure must be purchased to house the batteries. See Sections 3.1.6 and 3.1.7. External battery enclosure must be mounted so that the wiring between the batteries and the SHP-Pro controller does not exceed 10 feet (3 m) using 14 AWG wire minimum.

5. INSTALLATION

System installation is independent of whether the modules were ordered separately or as part of a complete SHP-Pro system. For optional modules not used, skip the instructions detailing their installation. Proper system installation requires following steps outlined in this section of the manual in order.

Unless otherwise detailed in this manual, or in other documents relating to this control panel, the technician shall utilize published standards and references such as NFPA 70 National Electrical Code, NFPA 72 National Fire Alarm Code, NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems, and others which may be relevant to the Local Authority Having Jurisdiction for installation of the system.

5.1. Enclosure

Mounting Location - The mounting location for the control panel enclosure is very important. Vibration, dust, moisture, electromagnetic interference, and radio frequency interference are all types of problems that could adversely affect the successful operation of the equipment. Choose a mounting location that is free from environmental problems. Refer to Section 4.0, Specifications, for the exact temperature ratings of the equipment. Do not install in an environment that exceeds these temperature ranges.

CAUTION: The SHP-Pro Control System enclosure is not fire rated. Do not install on or in a Fire Rated Wall.

Mounting - The control panel should be installed so the viewing window is approximately 60” above the floor. The back-box can be surface or flush mounted as desired. For surface mounting, utilize the four ‘tear-drop’ openings in the back of the box. For flush mounting, cut the opening in the wall to fit the 21” high by 14.35" wide back-box. Refer to Section 4.5 for enclosure specifications and dimensions.

Electrical Entrance - Determine the maximum number of conductors needed from the design. Wire is to be routed into the enclosure via knock-out openings provided in the back-box. Refer to Section 4.5. Conduit knock-outs are provided on all four sides of the enclosure back-box for two distinct conduit sizes. Removing just the inside hole creates a ½”inch (12.7 mm) opening. Removing the entire opening provides a ¾” inch (19 mm) opening.

5.2. Modules

System modules shall not be installed until after the enclosure has been installed and thoroughly cleaned of all dust and debris. Each module is shipped with the appropriate mounting hardware to facilitate component installation.

CAUTION: The SHP-Pro Control System contains static sensitive components. Handle the module by the edges only and avoid touching the integrated components. Keep the module in the protective static bags it was shipped in until time for installation. Always ground yourself with a proper wrist strap before handling the module(s). If the installer is properly grounded at all times, damage due to static discharge will not occur. If the module requires repair or return to Fike, it must be shipped in an anti-static bag.

5.2.1. Optional Modules

When using the optional modules (i.e., CRM4 or Class-A modules), they must be installed onto the SHP-Pro control board prior to its installation. Figure 27 shows the correct mounting locations for the optional modules.

CAUTION: Do not attempt to install the optional modules to the SHP-Pro control board with power applied. Doing so could cause irreparable damage to the modules or cause injury to the installing technician. Remove all power (AC and DC) before working on the system.

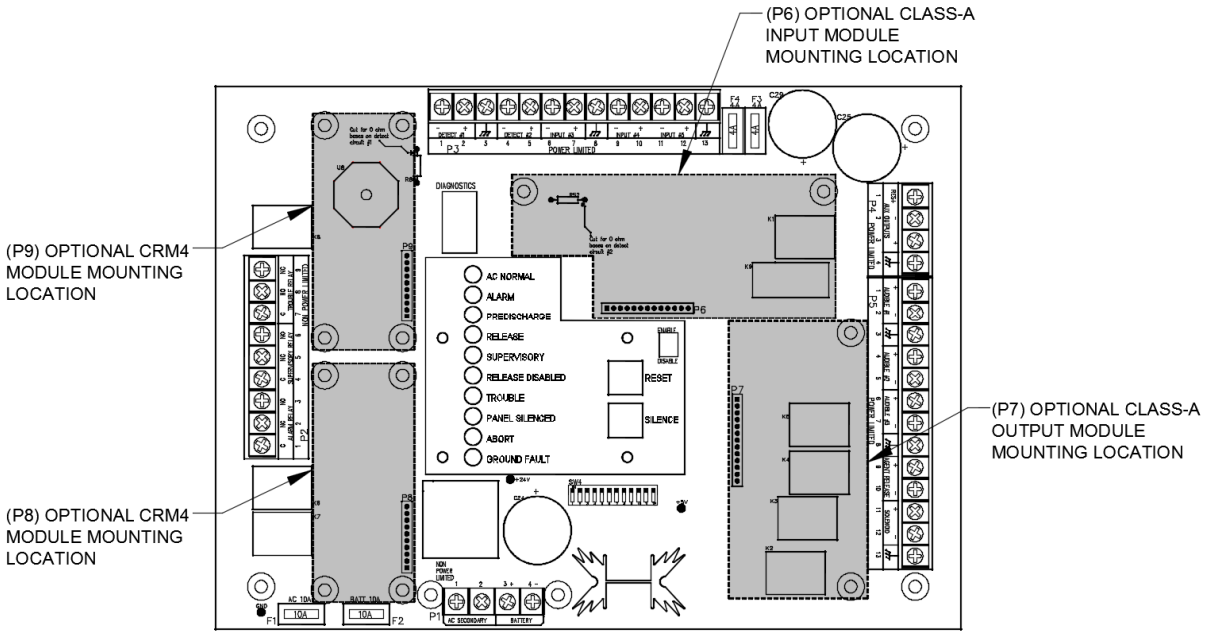

Figure 27 Optional Module Mounting Locations

5.2.1.1. Class-A Input Module

Use the following steps to install the Class-A Input module:

Step 1 - Secure the two F/F hex standoffs onto the main control board with the screws provided, as shown in Figure 28.

Step 2 – Align the header pins on the Class-A module with the P6 header connector on the SHP-Pro control board.

Step 3 – Gently press the pins into the header until the module is properly seated. Do not bend or force the pins into the header.

Step 4 - Align the module mounting holes with the standoffs and secure in place with the screws and lock-washers provided.

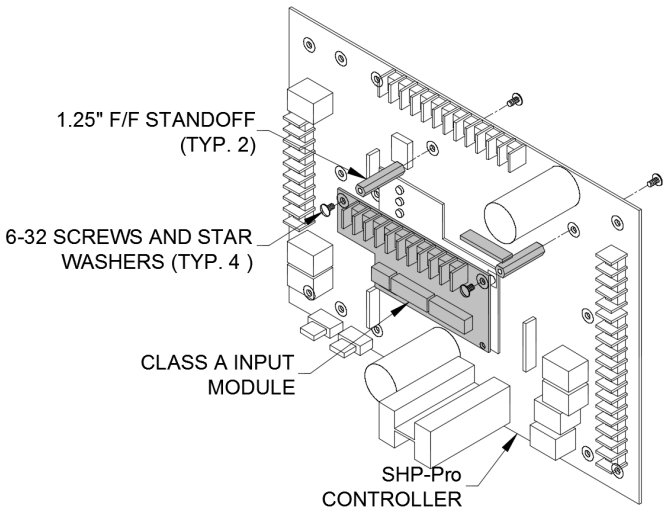

Figure 28 Class-A Input Module Mounting

5.2.1.2. Class-A Output Module

Use the following steps to install the Class-A Output module:

Step 1 - Secure the two F/F hex standoffs onto the main control board with the screws provided, as shown in Figure 29.

Step 2 – Align the header pins on the Class-A module with the P7 header connector on the SHP-Pro control board. Do not bend or force the pins into the header.

Step 3 – Gently press the pins into the header until the module is properly seated.

Step 4 - Align the module mounting holes with the standoffs and secure in place with the screws and lock-washers provided.

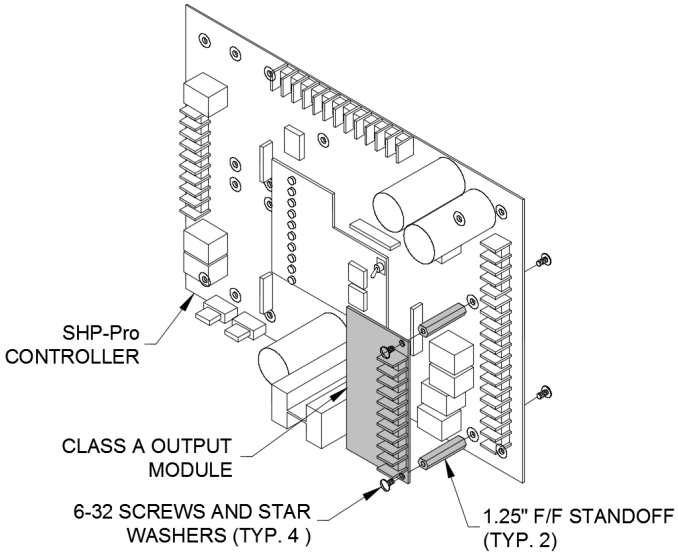

Figure 29 Class-A Output Module Mounting

CAUTION: To ensure proper operation of the SHP-Pro system, it is imperative that the revision level of the SHP-Pro controller and the Class-A Output module be checked for compatibility. The revision level of these components is clearly marked on each circuit board. The table below identifies the revision levels of the SHP-Pro controller in one row and the compatible revision level of the Class-A Output module in the row below.

Component	Revision Level		
10-2452-m SHP-Pro Controller	NC-L	M	N
10-2448 Class-A Output Module	NC-E	F-G	H

5.2.1.3. CRM4 Relay Module(s)

Use the following steps to install the CRM4 Relay module:

Step 1 - Secure the four F/F hex standoffs onto the main control board with the screws provided, as shown in Figure 30.

Step 2 – Align the header pins on the CRM4 module with the P8 or P9 header connector on the SHP-Pro control board.

Step 3 – Gently press the pins into the header until the module is properly seated. Do not bend or force the pins into the header.

Step 4 - Align the module mounting holes with the standoffs and secure in place with the screws and lock-washers provided.

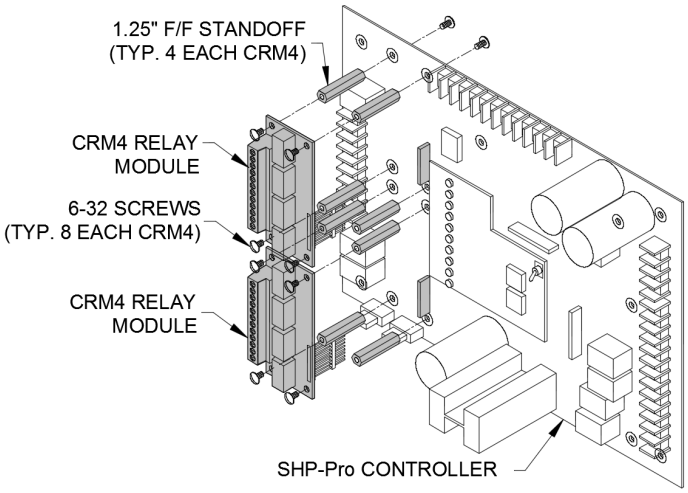

Figure 30 CRM4 Module Mounting

Proceed with installation of the SHP-Pro control board after all optional modules have been installed.

5.2.2. SHP-Pro Control Board

Use the following steps to install the SHP-Pro control board:

Step 1 – Locate the five threaded press-studs provided in the enclosure back-box for mounting of the SHP-Pro controller. See Figure 26.

Step 2 - Secure the five M/F hex standoffs onto the main control board, as shown in Figure 31.

Step 3 - Align the mounting holes on the SHP-Pro control board with the standoffs and secure in place with the hex nuts and lock-washers provided.

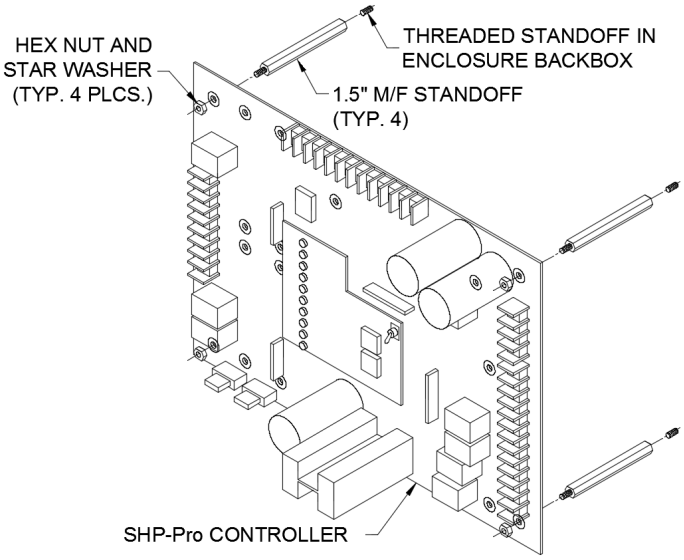

Figure 31 SHP-Pro Board Mounting

5.3. AC Transformer

Step 1 – Locate the four threaded press-studs provided in the enclosure back-box for mounting of the AC Transformer. See Figure 26.

Step 2 – Align the transformer on the press-studs with the primary AC side (H1 and H2) facing the left side of the enclosure back-box.

Step 3 - Secure the transformer in place using the four 6-32 nuts and washers provided with the enclosure.

5.4. Standby Batteries

The SHP-Pro enclosure is cable of housing up to two 18 amp-hour, sealed lead-acid (SLA) batteries in the bottom of the enclosure. If installing batteries inside the enclosure, the conduit knock-outs in the bottom of the enclosure must not be used.

NOTE: Where the system requires batteries larger than 18 AH, and external battery enclosure must be purchased to house the batteries. See Sections 3.1.6 and 3.1.7.

5.5. Field Wiring

NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems requires that all initiating and releasing circuit wiring be installed in raceways to protect the circuit against physical damage. Where circuit survivability is required per NFPA 72, equal protection shall be provided for power supply circuits.

Route all field wiring through the appropriate conduit knockouts providing adequate wire length for strain relief. Maintain separation between power limited and non-power limited wiring within the enclosure as described below and per the requirements of NFPA 70, National Electrical Code.

Non-power limited wiring - SHP-Pro bottom side (P1) connections including AC Power, and standby batteries are non-power limited and shall be routed only in the enclosure's left side as shown in Figure 32.

Power limited wiring - SHP-Pro top (P3) and right side (P4 & P5) connections are power limited and shall not be routed within 2" (51 mm) of the enclosure's left side to ensure segregation from the non-power limited wiring as shown in Figure 32.

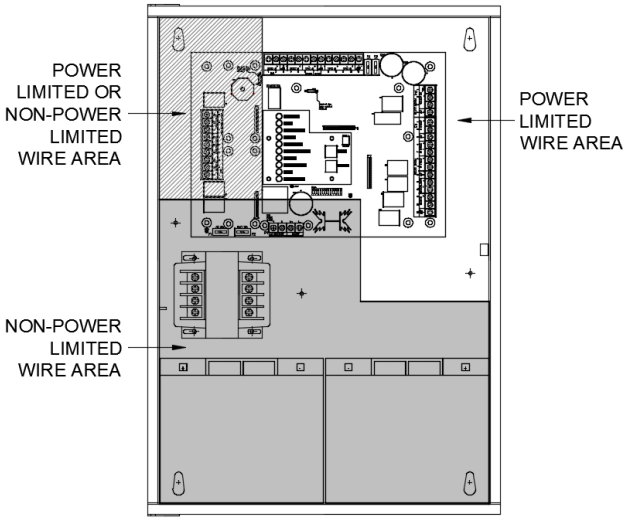

Figure 32 Power Limited vs. Non-Power Limited Wire Segregation

Relay wiring – The SHP-Pro left side (P2) connections including Alarm, Supervisory, and Trouble relays and CRM4 relays can be connected to power limited or non-power limited sources. All connections to the relays shall be either power limited or non-power-limited, not both. If connected to power-limited sources, the wiring MUST be segregated from the non-power limited wiring feeding the AC transformer and P1 bottom side connections by a minimum of 2 inches (51 mm).

5.5.1. Wire Selection

The terminal blocks on the SHP-Pro controller (including CRM4 and Class-A modules) accept a single wire from 14 to 30 AWG. When planning the type of wire to be used, refer to NFPA 70, National Electrical Code. The information in the table below is taken from the 2005 edition of NFPA 70 and can be used to select the appropriate wire type.

AWG	Stranding	Nominal Diameter	Uncoated Copper (Ωs /1000')	Coated Copper (Ωs /1000')
18	solid	0.040"	7.77	8.08
18	7	0.046"	7.95	8.45
16	solid	0.051"	4.89	5.08
16	7	0.058"	4.99	5.29
14	solid	0.064"	3.07	3.19
14	7	0.073"	3.14	3.26

Figure 33 Conductor Properties

5.5.2. Wiring Verification

After pulling the wire into the enclosure, verify wire for ground-fault absence and acceptable impedances prior to connecting the initiating and indicating circuits.

CAUTION: Field devices shall NOT be connected if using a megohmmeter or any means that applies voltages in excess of device ratings to prevent damage to the devices during testing.

NOTE: To test for ground fault use a resistor or jumper valued at 0 Ω.

Input Circuits:

1. Verify no stray voltages exist on any field wiring prior to device installation.
2. Verify each conductor is free from shorts between all other conductors and chassis.
3. Measure wire resistance with a short across the circuit at a point furthest from circuit start. This is typically across EOL for Class B and at the panel for Class A. Verify per the following limits:

   Detector Circuits (Input 1 & Input 2): less than 20 Ω / 10 Ω per leg

   Contact Monitor Circuits (Input 4 & Input 5): less than 100 Ω / 50 Ω per leg
4. If using contact closure type devices on Detection input #1 or #2, clip the respective "0 ohm resistor" to limit the current flowing through the circuit. See Figure 33.
5. If using linear heat detection cable on Input 1 or Input 2 circuits, do NOT clip the "0 Ω jumper".

Output Circuits:

1. Verify no stray voltages exist on any field wiring prior to device installation.
2. Verify each conductor is free from shorts between all other conductors and chassis.
3. Measure circuit impedance with a short across loop at point furthest from circuit start. This is typically across the EOL or Solenoid for class B and at the panel for Class A. Verify per the limits indicated in Figure 34.

Max Current (Amps)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0
Audibles 1-3 (Max Ωs)	24	12	8	6	4.8	4.0	3.0	2.4	1.6	1.2
Agent Release (Max Ωs)	35	35	35	35	35	35	35	35	35	35
Solenoid (Max Ωs)	12	6	4	3	2.4	2.0	1.5	1.2	0.8	0.6

Figure 34 Maximum Circuit Current

5.5.3. Initial Power-Up

Connect AC power wiring to the transformer primary; then connect the transformer secondary to the SHP-Pro P1-1 & P1-2 terminals. See Figure 35. With no field wiring connected and all panel EOL's still connected, apply AC power to the controller. Upon initial power-up (or reset) all controller LED's and the piezo will turn on for 2 to 4 seconds then the controller should enter the AC Normal State (green LED). Within 30 seconds of the initial power-up, the yellow TROUBLE LED should illuminate and the diagnostic LED should display an "E" since no batteries are connected.

Do NOT proceed with the connection of field wiring to the controller until the system is free of troubles except those previously stated; then power down the system by removing and locking out the AC power. Install field wiring per the wiring diagrams in Section 5.5.4.

CAUTION: Do NOT connect any releasing hardware (such as initiators or GCA's) at this time.

5.5.4. Wiring Diagrams

Complete wiring with AC power off and locked-out. Likewise, remove F2 fuse from the controller board to ensure the batteries cannot provide system power until wiring is completed and system is ready for checkout. Do not attach releasing devices or other non-restorable electrical devices until the system has been proven to be fully operational.

5.5.4.1. AC Power and Chassis Wiring (P1)

AC power must originate from a dedicated 10 - 20 amp circuit at the main building power distribution center. The circuit breaker must be equipped with a lockout mechanism and be clearly labeled as a **"Fire Protection Control Circuit."** Ensure the power to be used is compatible with the transformer assembly (120VAC or 240VAC). For 120VAC or 240VAC operation, connect the AC hot (line) and neutral directly to the transformer. Connect ground to the chassis standoff. When completed, verify continuity from chassis (green wire) to enclosure and to conduit.

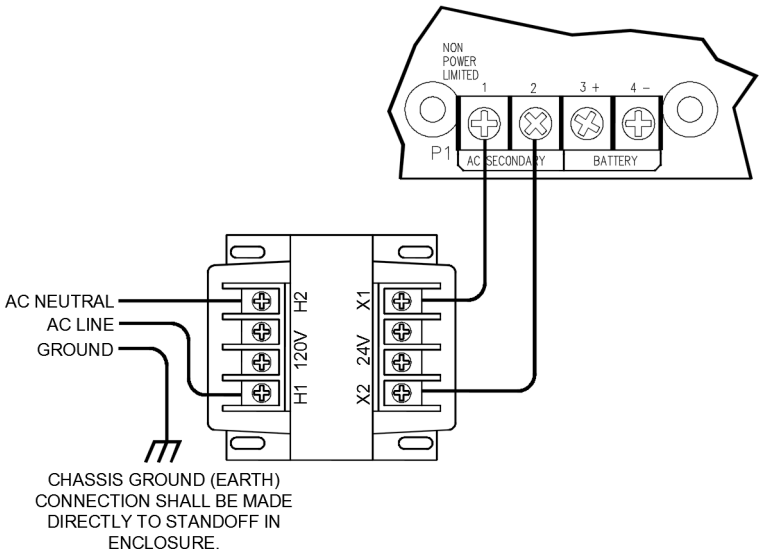

Figure 35 AC Power and Transformer Wiring

5.5.4.2. Battery Wiring (P1)

For Fike supplied batteries, utilize the wiring harness supplied to connect the batteries to the SHP-Pro controller. Batteries larger than 18 AH must be mounted in an external battery enclosure.

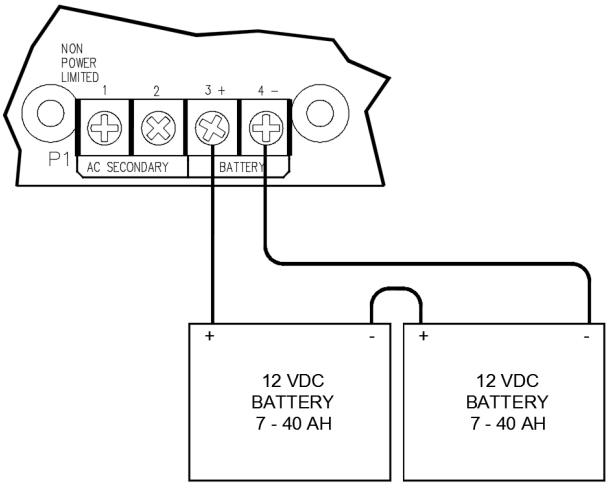

Figure 36 Standby Battery Wiring

5.5.4.3. Relay Wiring (P2)

The SHP-Pro's three common relays (Alarm, Supervisory and Trouble) can be connected to either power limited or non-power limited sources, not both. For example: If one relay is connected to a non-power limited source, the other two relays can only be connected to non-power limited sources. If connected to power-limited sources, the relay wiring MUST be segregated from the non-power limited wiring feeding the AC transformer and P1 terminal connections by a minimum of 2 inches (51 mm).

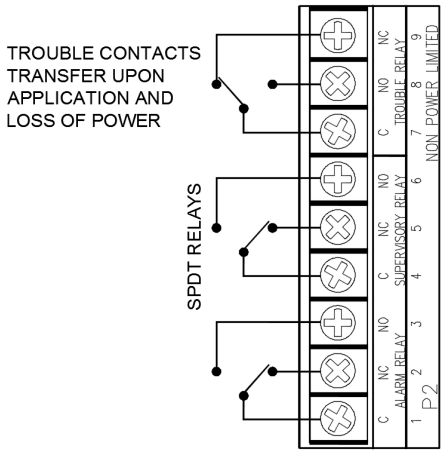

Figure 37 Common Relay Wiring (shown with power applied)

5.5.4.4. Detection and Input Circuits Wiring (P3)

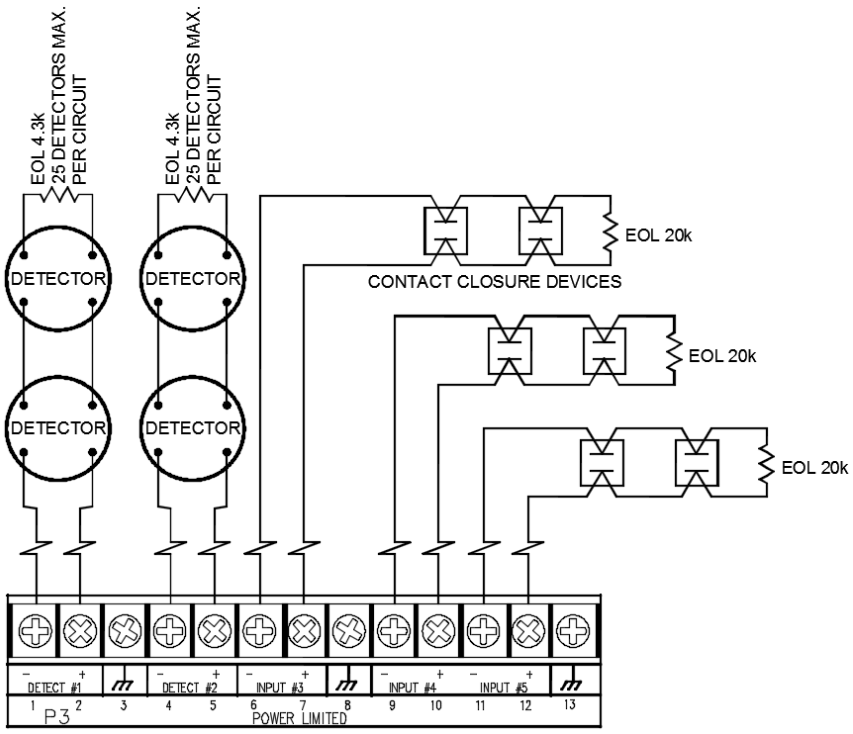

Figure 38 Detection and Input Circuits Wiring

NOTE: If shielded wire is used, land shield wire at the controller; then tie shield wires together and insulate from ground at each field device. Do not terminate shield at last device or at control panel for Class-A wiring.

NOTE: Only abort switches with momentary contacts can be connected to the SHP-Pro's input circuits. This is so they cannot be left activated without human interaction.

If using 0 Ω detector bases or contact closure devices on Detection #1 or #2 inputs, clip the pertinent "0 Ω" jumper as shown in Figure 39. Clipping this jumper is required to limit the circuit current to 100 mA for the associated circuit. If using linear heat detection cable on Detection #1 or #2 inputs, DO NOT clip the "0 Ω" jumper.

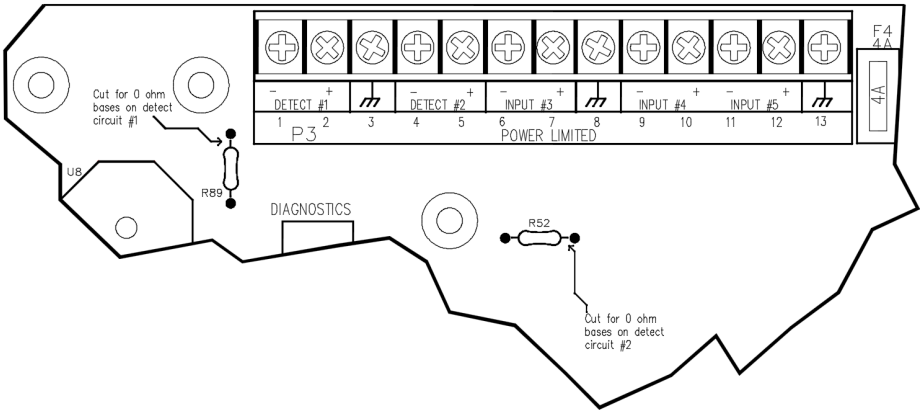

Figure 39 0 Ω Jumper Locations

5.5.4.5. Auxiliary Power Circuit Wiring (P4)

Resettable and non-resettable auxiliary power outputs share a common negative output terminal. Total current for system modules, notification appliance circuits, releasing devices, and auxiliary power circuits **MUST NOT** exceed the 4.135 amps supplied by the SHP-Pro controller.

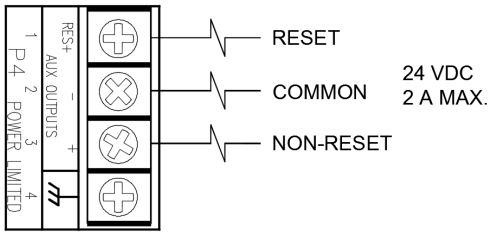

Figure 40 Auxiliary Power Circuit Wiring

5.5.4.6. Audible and Releasing Circuits Wiring (P5)

The end-of-line resistor values used on the SHP-Pro's Audible and Releasing circuits varies depending upon the revision level of the SHP-Pro controller. Figure 41 shows the different EOL values that should be installed according to the controller revision level. Installing the wrong EOL value will result in improper circuit operation; therefore, it is imperative that the EOL value installed is compatible with the SHP-Pro controller revision level.

NOTE: If shielded wire is used, land shield wire at the controller; then tie shield wires together and insulate from ground at each field device. Do not terminate shield at last device or at control panel for Class-A wiring.

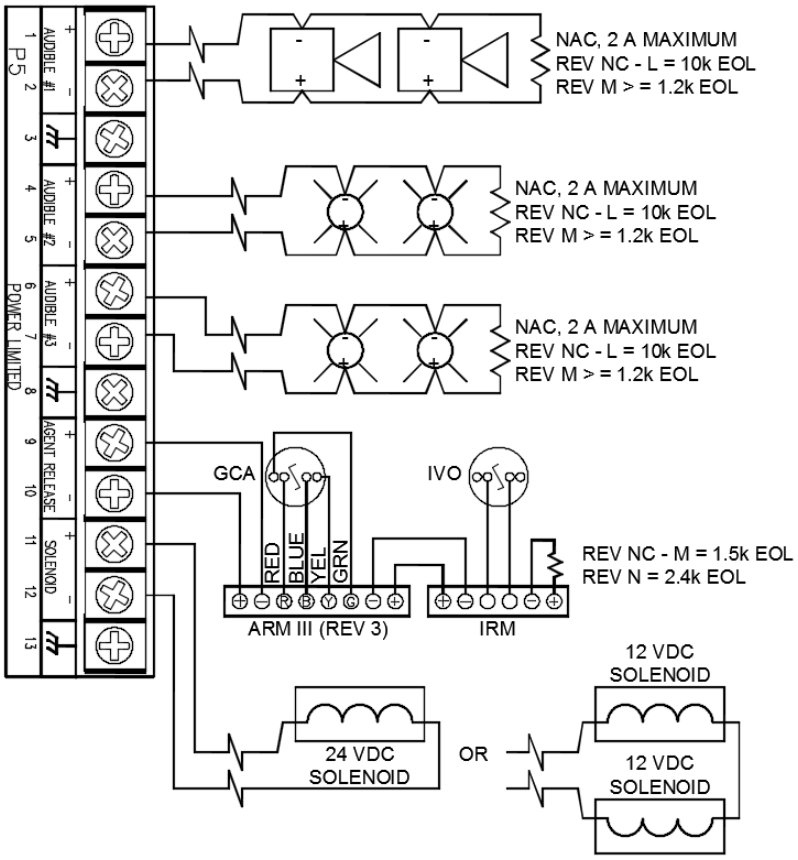

Figure 41 Audible and Release Circuit Wiring

In certain circumstances it may be necessary to momentarily drop all voltage to the solenoid circuit to allow full reset (closure) of the connected solenoid(s). Fike recommends adding a field relay (P/N 20-1169) in series with the solenoid coil and powered by the SHP-Pro's 24 V resettable auxiliary power supply circuit as shown in Figure 42. Upon reset of the SHP-Pro, the 24 V auxiliary power to the field relay will removed and the relay contacts will open long enough to remove power from the solenoid valve allowing it to fully reset (close).

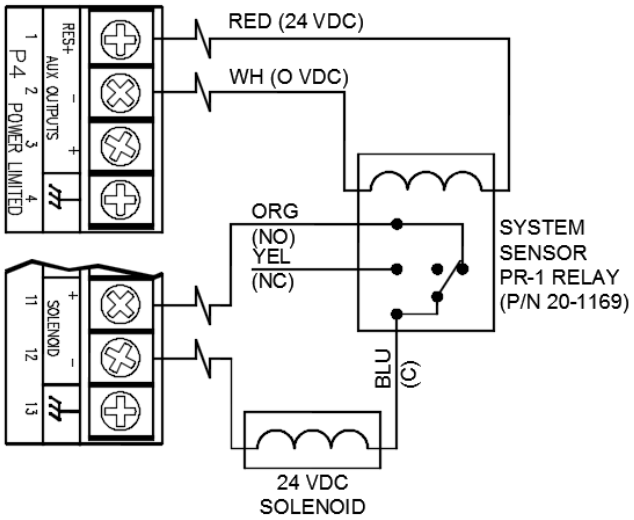

Figure 42 Solenoid Circuit Disconnect Wiring

5.5.4.7. Class-A Input Module Wiring (P6)

If using the Class-A Input module P/N 10-2450, all of the five input circuits on the SHP-Pro controller (P3) must be wired Class-A rather than Class-B as shown in the following figures.

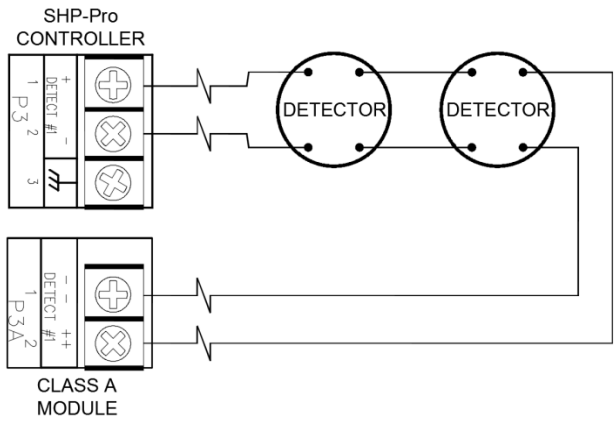

Figure 43 Class A Detection Input #1 and #2 Wiring

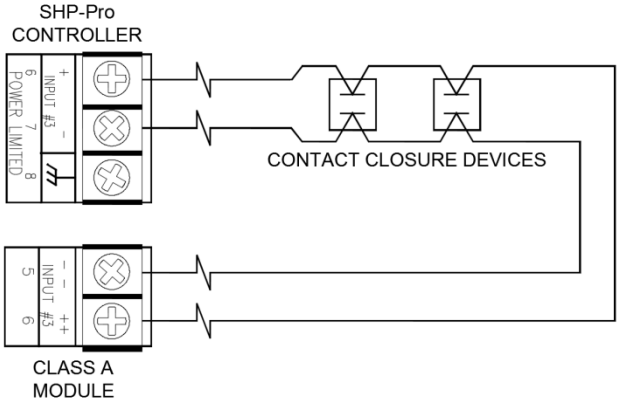

Figure 44 Class A Input #3, #4 and #5 Wiring

NOTE: Class A and Class X circuits shall be installed in accordance with the requirements of NFPA 72 to provide adequate separation between outgoing and return conductors.

5.5.4.8. Class-A Output Module Wiring (P7)

If using the Class-A Output module P/N 10-2448, the three notification appliance, agent release and solenoid output circuits on the SHP-Pro controller (P5) must be wired Class-A rather than Class-B as shown in the following figures.

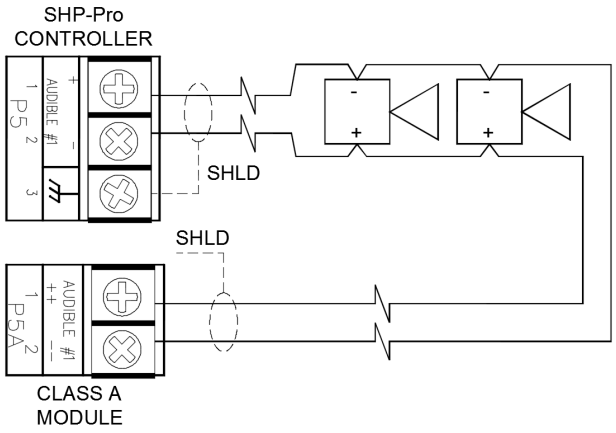

Figure 46 Class A Audible Outputs #1 Thru #3 Wiring

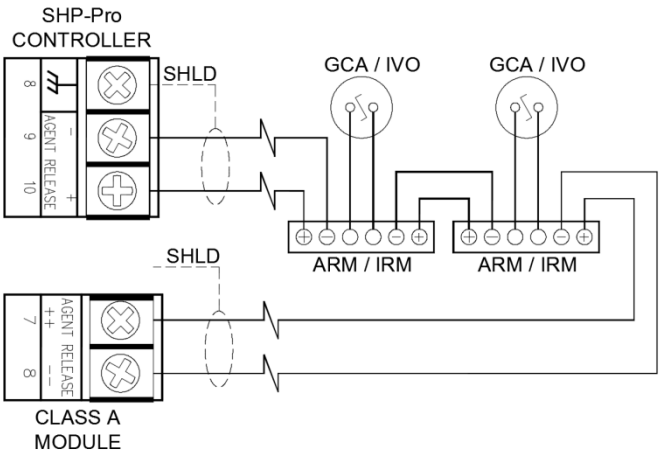

Figure 45 Class A Agent Release Output Wiring

NOTE: ARMs and IRMs can be intermixed on the same agent release output any combination (six maximum).

NOTE: Class A and Class X circuits shall be installed in accordance with the requirements of NFPA 72 to provide adequate separation between outgoing and return conductors.

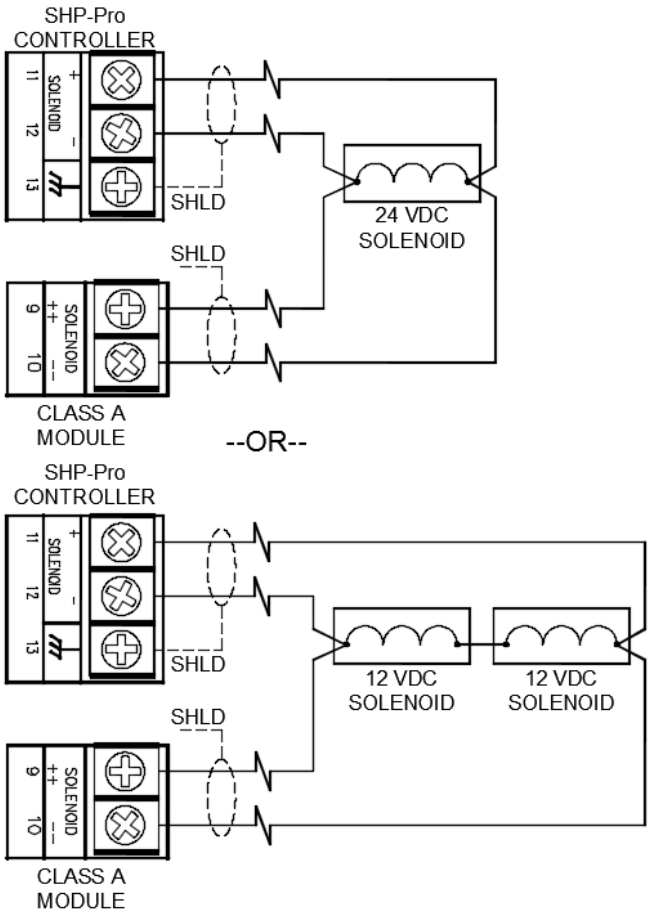

Figure 47 Class A Solenoid Output Wiring

5.5.4.9. CRM4 Relay Module Wiring (P8 or P9)

The CRM4 relays can be connected to either power limited or non-power limited sources, not both. For Example: If one relay is connected to a non-power limited source, the other relays can only be connected to non-power limited sources. In addition, if any of the P2 relays are connected to non-power limited sources, the CRM4 relays can only be connected to non-power limited sources. If connected to power-limited sources, the CRM4 relay wiring MUST be segregated from the non-power limited wiring feeding the AC transformer and P1 terminal connections by a minimum of 2 inches (51 mm).

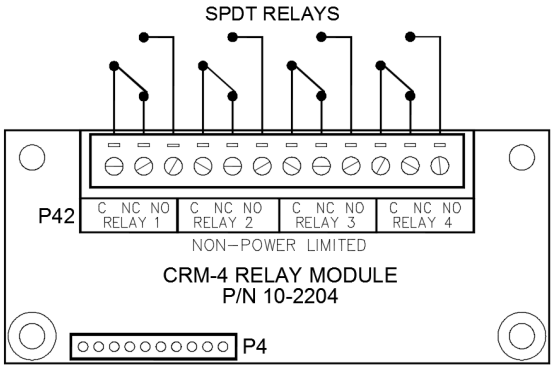

Figure 48 CRM4 Relay Module Wiring

6. SYSTEM CONFIGURATION

Notice to Users, Installers, Authorities Having Jurisdiction and Other Involved Parties.			
This product incorporates field-programmable firmware. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.			
Program feature or option	Permitted in UL	Possible Settings	Setting Permitted by UL
Abort Types	Yes	Types 1 - 4	Types 2 or 3
Micromist Operation	No	Use or do not use	No allowed

Figure 49 UL Non-complying features

Configuration is accomplished using the SW4 dip-switches on the SHP-Pro controller. The following table shows the function of each dip-switch.

SW4 Position	Function	0=Off 1=On	Application 1 Clean Agent	Application 2 Clean Agent & Preaction	Application 3 Preaction	Application 4 Industrial
S1 / S2	Application (See Section 6.1)	0 / 0	Application 1			
		0 / 1		Application 2		
		1 / 0			Application 3	
		1 / 1				Application 4
S3	Trouble Relay	0	No Delay			
		1	AC Delay (2 hours)			
S4 / S5	Audible Operation	0 / 0	Audible Option 1 (See Section 6.2)			
		0 / 1	Audible Option 2 (See Section 6.2)			
		1 / 0	Audible Option 3 (See Section 6.2)			
		1 / 1	Audible Option 4 (See Section 6.2)			
S6	Audible Sync.	0	Gentex Synchronization Protocol			
		1	System Sensor Synchronization Protocol			
S7 / S8	Pre-discharge Delay	0 / 0	0 Seconds		N/A	N/A
		0 / 1	15 Seconds			15 Seconds
		1 / 0	30 Seconds			30 Seconds
		1 / 1	60 Seconds			60 Seconds
S9 / S10	Abort Type or Solenoid On Time	0 / 0	Abort - Type 1 (See Section 6.3)		Detect 1 activates Solenoid	See S9 / S10 / S11
		0 / 1	Abort – Type 2 (See Section 6.3)		Detect 2 activates Solenoid	
		1 / 0	Abort – Type 3 (See Section 6.3)		Detect 1 **or** 2 activates Solenoid	
		1 / 1	Abort – Type 4 (See Section 6.3)		Detect 1 **and** 2 activates Solenoid	
S11	Activation Control	0	Agent Release	See S11 / S12	Waterflow activates Solenoid	
		1	24 VDC Solenoid		Waterflow **does not** activate Solenoid	
S12	Detection Type	0	Sequential / Single Detector Release	See S11 / S12	Sequential / Single Detector Release	
		1	Cross Zone		Cross Zone	
S9/S10/S11	Solenoid On Time	0 / 0 / 0	N/A	N/A	N/A	Continuous
		0 / 0 / 1				5 minutes
		0 / 1 / 0				10 minutes
		0 / 1 / 1				15 minutes
		1 / 0 / 0				20 minutes
		1 / 0 / 1				30 minutes
		1 / 1 / 0				Micromist Machinery Space
		1 / 1 / 1				Micromist Turbine Generator Space
S11 / S12	Activation Control	0 / 0	N/A	Detect 1 activates Solenoid	N/A	N/A
		0 / 1		Waterflow activates Solenoid		
		1 / 0		Detect 1 **or** Wateflow activates Solenoid		
		1 / 1		Detect 1 **and** Waterflow activates Solenoid		

Figure 50 Dip-Switch Configuration Table

6.1. Application Details

The SHP-Pro can be configured to operate in any of the following application modes.

6.1.1. Application #1 Detail – Clean Agent Release Only

Circuit Configurations

Detect 1		Detection
Detect 2		Detection
Input 3		Manual Release
Input 4		Abort (Refer to Section 6.3)
Input 5		Supervisory
Audible 1		Refer to Audible Option table, Section 6.2
Audible 2		Refer to Audible Option table, Section 6.2
Audible 3		Refer to Audible Option table, Section 6.2
Agent Release		Clean Agent
Solenoid		Clean Agent
Relay 1 (main)		Alarm
Relay 2 (main)		Supervisory
Relay 3 (main)		Trouble
P8	Relay 1 (CRM4-1)	Alarm
	Relay 2 (CRM4-1)	Pre-discharge
	Relay 3 (CRM4-1)	Release
	Relay 4 (CRM4-1)	Abort
P9	Relay 1 (CRM4-2)	Alarm
	Relay 2 (CRM4-2)	Release
	Relay 3 (CRM4-2)	Supervisory
	Relay 4 (CRM4-2)	Trouble

Configuration Selections

Switch Position	0 = OFF 1 = ON	Operational Characteristics
S1/S2	0/0	Mode 1 Select
S3	0	Trouble Relay - No Delay
	1	Trouble Relay - AC Power Failure Delay (2 hours)
S4/S5	0/0	Audible Option 1
	0/1	Audible Option 2
	1/0	Audible Option 3
	1/1	Audible Option 4
S6	0	Sync Protocol - Gentex*
	1	Sync Protocol - System Sensor*
S7/S8	0/0	Pre-discharge Delay - 0 seconds
	0/1	Pre-discharge Delay - 15 seconds
	1/0	Pre-discharge Delay - 30 seconds
	1/1	Pre-discharge Delay - 60 seconds
S9/S10	0/0	Abort Type - 1
	0/1	Abort Type - 2
	1/0	Abort Type - 3
	1/1	Abort Type - 4
S11	0	Agent Release
	1	24 VDC Solenoid
S12	0	Sequential or Single Detector Release**
	1	Cross-Zone

*Requires Audible Option 4

**Sequential Detection shall be accomplished using 430 Ω bases.

**Single Detector Release shall be accomplished using 220 Ω bases.

6.1.2. Application #2 Detail – Clean Agent and Sprinkler Preaction

Circuit Configurations

Detect 1		Detection**
Detect 2		Waterflow***
Input 3		Manual Release
Input 4		Abort (Refer to Section 6.3)
Input 5		Supervisory
Audible 1		Refer to Audible Option table, Section 6.2
Audible 2		Refer to Audible Option table, Section 6.2
Audible 3		Refer to Audible Option table, Section 6.2
Agent Release		Clean Agent
Solenoid		24 V
Relay 1 (main)		Alarm
Relay 2 (main)		Supervisory
Relay 3 (main)		Trouble
P8	Relay 1 (CRM4-1)	Alarm
	Relay 2 (CRM4-1)	Pre-discharge
	Relay 3 (CRM4-1)	Release
	Relay 4 (CRM4-1)	Abort
P9	Relay 1 (CRM4-2)	Alarm
	Relay 2 (CRM4-2)	Waterflow
	Relay 3 (CRM4-2)	Supervisory
	Relay 4 (CRM4-2)	Trouble

Configuration Selections

Switch Position	0 = OFF 1 = ON	Operational Characteristics
S1/S2	0/1	Mode 2 Select
S3	0	Trouble Relay - No Delay
	1	Trouble Relay - AC Power Failure Delay (2 hours)
S4/S5	0/0	Audible Option 1
	0/1	Audible Option 2
	1/0	Audible Option 3
	1/1	Audible Option 4
S6	0	Sync Protocol - Gentex*
	1	Sync Protocol - System Sensor*
S7/S8	0/0	Pre-discharge Delay - 0 seconds
	0/1	Pre-discharge Delay - 15 seconds
	1/0	Pre-discharge Delay - 30 seconds
	1/1	Pre-discharge Delay - 60 seconds
S9/S10	0/0	Abort Type - 1
	0/1	Abort Type - 2 (for Agent Release Ouput)
	1/0	Abort Type - 3 only (not Solenoid)
	1/1	Abort Type - 4
S11/S12	0/0	Detect 1 activates solenoid**
	0/1	Waterflow activates solenoid
	1/0	Detect 1 **OR** Waterflow activates solenoid
	1/1	Detect 1 **AND** Waterflow activate solenoid

*Requires Audible Option 4

**Sequential Detection shall be accomplished using 430 Ω bases.

**Single Detector Release shall be accomplished using 220 Ω bases.

***Waterflow input does not affect clean agent releasing activities. Waterflow input will initiate a 2 second alarm verification delay in order to prevent signal activation caused by water surges or pressure fluctuations.

6.1.3. Application #3 Detail – Preaction Sprinkler/Deluge (10-063-2 only)

Circuit Configurations

Detect 1		Detection
Detect 2		Detection
Input 3		Manual Release
Input 4		Waterflow***
Input 5		Supervisory
Audible 1		Refer to Audible Option table, Section 6.2
Audible 2		Refer to Audible Option table, Section 6.2
Audible 3		Refer to Audible Option table, Section 6.2
Agent Release		N/A
Solenoid		24 V
Relay 1 (main)		Alarm
Relay 2 (main)		Supervisory
Relay 3 (main)		Trouble
P8	Relay 1 (CRM4-1)	Alarm
	Relay 2 (CRM4-1)	Waterflow
	Relay 3 (CRM4-1)	Supervisory
	Relay 4 (CRM4-1)	Trouble
P9	Relay 1 (CRM4-2)	Alarm
	Relay 2 (CRM4-2)	Waterflow
	Relay 3 (CRM4-2)	Supervisory
	Relay 4 (CRM4-2)	Trouble

Configuration Selections

Switch Position	**0 = OFF 1 = ON**	**Operational Characteristics**
S1/S2	1/0	Mode 3 Select
S3	0	Trouble Relay - No Delay
	1	Trouble Relay - AC Power Failure Delay (2 hours)
S4/S5	0/0	Audible Option 1
	0/1	Audible Option 2
	1/0	Audible Option 3
	1/1	Audible Option 4
S6	0	Sync Protocol - Gentex*
	1	Sync Protocol - System Sensor*
S7	x	Not Used
S8	x	Not Used
S9/S10	0/0	Input 1 activates solenoid
	0/1	Input 2 activates solenoid
	1/0	Input 1 **OR** Input 2 activates solenoid
	1/1	Input 1 **AND** Input 2 activates solenoid
S11	0	Waterflow activates solenoid
	1	Waterflow **does not** activate solenoid
S12	0	Sequential or Single Detector Release**
	1	Cross-Zone
		S9 & S10 operation is void when cross-zone operation is selected

*Requires Audible Option 4

**Sequential Detection shall be accomplished using 430 Ω bases.

**Single Detetector Release shall be accomplished using 220 Ω bases.

***Waterflow input will initiate a 2 second alarm verification delay in order to prevent signal activation caused by water surges or pressure fluctuations.

6.1.4. Application #4 Detail – Industrial Solenoid (CO_2, Watermist, Foam and Deluge Sprinkler)

Circuit Configurations

Detect 1		Detection
Detect 2		Detection
Input 3		Manual Release
Input 4		Abort **(hardcoded Type 4),** refer to Section 6.3
Input 5		Supervisory
Audible 1		Refer to Audible Option table, Section 6.2
Audible 2		Refer to Audible Option table, Section 6.2
Audible 3		Refer to Audible Option table, Section 6.2
Agent Release		N/A
Solenoid		24 V
Relay 1 (main)		Alarm
Relay 2 (main)		Supervisory
Relay 3 (main)		Trouble
P8	Relay 1 (CRM4-1)	Alarm
	Relay 2 (CRM4-1)	Pre-discharge
	Relay 3 (CRM4-1)	Release
	Relay 4 (CRM4-1)	Abort
P9	Relay 1 (CRM4-2)	Alarm
	Relay 2 (CRM4-2)	Release
	Relay 3 (CRM4-2)	Supervisory
	Relay 4 (CRM4-2)	Trouble

Configuration Selections

Switch Position	0 = OFF 1 = ON	Operational Characteristics
S1/S2	1/1	Mode 4 Select
S3	0	Trouble Relay - No Delay
	1	Trouble Relay - AC Power Failure Delay (2 hours)
S4/S5	0/0	Audible Option 1
	0/1	Audible Option 2
	1/0	Audible Option 3
	1/1	Audible Option 4
S6	0	Sync Protocol - Gentex*
	1	Sync Protocol - System Sensor*
S7/S8	0/0	**N/A** - See 2nd note in section 4.7.2
	0/1	Pre-discharge Delay - 15 seconds
	1/0	Pre-discharge Delay - 30 seconds
	1/1	Pre-discharge Delay - 60 seconds
S9/S10/S11	0/0/0	Solenoid on continuous
	0/0/1	Solenoid on 5 minutes
	0/1/0	Solenoid on 10 minutes
	0/1/1	Solenoid on 15 minutes
	1/0/0	Solenoid on 20 minutes
	1/0/1	Solenoid on 30 minutes
	1/1/0	Micromist - Machinery Space***
	1/1/1	Micromist - Turbine Generator***
S12	0	Sequential or Single Detector Release**
	1	Cross-Zone

*Requires Audible Option 4

**Sequential Detection shall be accomplished using 430 Ω bases.

**Single Detetector Release shall be accomplished using 220 Ω bases.

***Micromist operation not UL 864 9th Edition approved. Cycles watermist system on for 37 seconds followed by 41 seconds off. This sequence is repeated for 30 minutes.

6.2. Audible Options

Audible Options					
Option #	**SW4 / SW5**	**Alarm State**	**Audible 1**	**Audible 2**	**Audible 3 Non-silenceable (on until reset)**
1	0 / 0	Alarm	ON (continuous)		
		Pre-discharge		ON (continuous)	
		Release		ON (continuous)	ON (continuous)
2	0 / 1	Alarm	ON (continuous)	ON (continuous)	
		Pre-discharge		ON (continuous)	
		Release		ON (continuous)	ON (continuous)
3	1 / 0	Alarm	ON (slow)	ON (continuous)	
		Pre-discharge	ON (fast)	ON (continuous)	
		Release	ON (continuous)	ON (continuous)	ON (continuous)
4	1 / 1	Alarm	ON (slow)	ON (sync-continuous)	
		Pre-discharge	ON (fast)	ON (sync-continuous)	
		Release	ON (continuous)	ON (sync-continuous)	ON (sync-continuous)

Figure 51 Table of Audible Options

NOTE: Option 4, Audible circuit 2 – When using this option with compatible combination horn/strobes, and the panel is silenced, the horn will turn off but the strobe will remain on until the system is reset.

NOTE: When using more than on audible circuit for audible device operation (horn or bell), the installation shall not allow two circuits to provide different audible indications during the same state in the same area of protection. For example, using Audible Option 3 with horns attached to audible circuits 1 and 2 would provide different annunciation during the Alarm state (e.g., slow on Audible 1 and continuous on Audible 2).

6.3. Abort Types

Activation of an ABORT switch delays releases initiated by the SHP-Pro's automatic detection schemes as described below. Activation of a Manual Release input circuit will override the system abort operation and initiate agent release immediately.

Abort types are programmable via the SW4 configuration switches S9 and S10. Countdown starts when the system enters the pre-discharge state.

TYPE 1: The abort is effective only if active upon entry into pre-discharge state. Countdown continues during abort activation. Upon abort deactivation (during pre-discharge), the release cannot again be aborted, so release occurs upon countdown completion. Conforms to Industrial Risk Insurers (IRI) requirements. **Does not conform to UL requirements.**

TYPE 2: Countdown continues during abort activation. Release occurs when both the countdown is completed and the abort is deactivated.

TYPE 3: If the abort is active during pre-discharge, release occurs upon abort deactivation.

TYPE 4: Upon abort deactivation, countdown occurs from the full programmed countdown time. Prior to countdown completion, abort activation extends the countdown time to the programmed length. **Does not conform to UL requirements, but is allowed by some Local Authority Having Jurisdiction.**

Type 4 (NYC mode): When the SHP-Pro is set for Application #4 – Industrial operation, the panel abort type is hardcoded to Abort Type 4 as indicated in Section 6.1.4. Setting SW4 Pre-discharge delay dip-switches 7 and 8 to the "OFF" position will not give the 0 second pre-discharge delay as indicated. It will cause the system to operate using a "NYC" abort mode. In this mode the panel will initiate a 90 second Alarm verification delay followed by a 30 second countdown after abort input deactivation. During the 90 second Alarm verification delay, the system emulates continuous abort activation. After the 90 second delay, the system starts a 30 second Pre-discharge delay.

7. SYSTEM CHECKOUT

After system installation per previous chapters, verify system operation to the satisfaction of the authority having jurisdiction. As required, a Record of Completion per NFPA 72 must be completed. For systems utilizing an ARM or IRM module to release a suppression system, properly disconnect the releasing mechanisms (i.e., initiator, GCA, IVO) prior to testing the integrity of the releasing circuit.

After testing is complete, check the system for the presence of ground faults. Do not re-connect the releasing device if any ground faults are present on the system. This could cause inadvertent activation of the suppression system. Once the system is free from faults and is operating normally, connect the releasing mechanism to the releasing circuit according to the appropriate documentation (See below). Enable the releasing circuits via switch SW3.

Refer to Fike document 06-106, “Agent Release Module (ARM-III) manual” for installation and testing instructions.

Refer to Fike document 06-552, “Impulse Releasing Module (IRM) manual” for installation and testing instructions.

CAUTION: When an ARM or IRM releasing mechanism is used, do NOT flip the ENABLE/DISABLE switch to the DISABLE position when a ground fault is present on the system. Depending on the source of the ground fault, disabling the release circuit could inadvertently activate the ARM.

NOTE: Use the Arm/Disable Switch (SW3) to disable the Agent Release and Solenoid circuits during system checkout and maintenance. As a minimum, place SW3 in the “disable” position upon system power-up and power-down. After power-down, allow the ARM/IRM module ten minutes to self-discharge prior to maintenance to prevent accidental firing of the system.

8. OPERATION

8.1. CONTROLS AND INDICATORS

The SHP-Pro provides the following control switches and status LEDs. The function of each is described below.

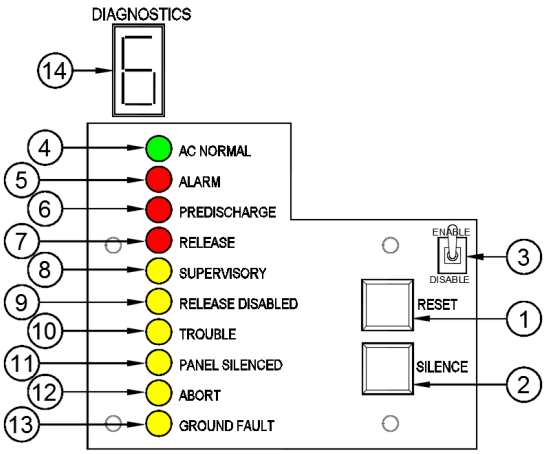

Figure 52 SHP-Pro Control Switches and Status LEDs

Figure 53 Control Switches and Status LEDs Descriptions

Index	Control or Indicator	Functional Description
1	Reset Switch	Resets the system including turning off outputs and interrupting resettable power. Momentarily activates the panel piezo, all LEDs and P2 Trouble relay. Displays panel application number on Diagnostic LED and restores system to normal operation.
2	Silence Switch	Silences system audibles #1 and #2 and panel piezo, but does not affect relays. Changes flashing LEDs to steady. If held for 3 seconds, it will toggle the information displayed by the Diagnostic LED between current history, last twenty events, and A/D conversion (Fike development use only). When viewing the last twenty events, the most recent event is shown first. After silencing, entry into new states will only sound that states audible. Except entry into Release state resounds Pre-discharge audible. If panel is left silenced for a period of 18 hours ±, the panel will resound.
3	Enable / Disable Switch	Enables and disables the agent release and solenoid output circuits. Enables and disables audible circuits and all relay outputs, excluding P2 Supervisory and Trouble relays. This is a hardware disable and will create a “Supervisory” state on the panel. **CAUTION:** When and ARM or IRM releasing mechanism is used, DO NOT flip the Enable / Disable switch to the disable position if a ground fault is present on the system. Depending upon the source of the ground fault, disabling the release circuit could inadvertently activate the ARM or IRM.
4	AC Normal LED (green)	Illuminates steady to indicate the panel has AC power.
5	Alarm LED (red)	Flashes to indicate the panel has recorded an Alarm event. Refer to Diagnostic LED for event code. Illuminates steady after panel silence.
6	Pre-discharge LED (red)	Flashes to indicate the panel has entered the Pre-discharge state. Refer to Diagnostic LED for event code. Illuminates steady after panel silence.
7	Release LED (red)	Flashes to indicate the panel has entered the Release state. Refer to Diagnostic LED for event code. Illuminates steady after panel silence.

Figure 54 Control Switches and Status LED Descriptions - Continued

Index	Control or Indicator	Functional Description
8	Supervisory LED (yellow)	Flashes to indicate the panel has recorded a Supervisory event. Refer to Diagnostic LED for event code. Illuminates steady after panel silence.
9	Release Disabled (yellow)	Flashes to indicate the panel's releasing circuits (agent release and solenoid) have been disabled by the panel's Enable/Disable switch.
10	Trouble LED (yellow)	Flashes to indicate the panel has recorded a Trouble Event. Refer to Diagnostic LED for event code. Illuminates steady after panel silence.
11	Panel Silenced LED (yellow)	Illuminates steady to indicate that the panel's silence switch has been pressed.
12	Abort LED (yellow)	Flashes to indicate the panel has recorded an Abort event.
13	Ground Fault LED (yellow)	Flashes to indicate the panel has recorded a ground fault event.
14	Diagnostic LED	Displays codes for the events that have occurred on the system since the last Reset. Refer to Section 8.2 for further clarification.

8.2. Diagnostic LED Code Designators

The SHP-Pro's Diagnostic LED allows you to view the current history event, last twenty history events, and the systems analog to digital conversions (used for Fike development use only). The seven segment diagnostic LED cycles through the display of these codes, with or without a period, for the events that have occurred since the last Reset. For example: If Input circuit #3 is activated, the LED will display "**3.**" It is important not to overlook the period on the Diagnostic LED. Doing so will lead to an incorrect interpretation of the event.

NOTE: The letter "**b**" is often misinterpreted as the number "**6**".

Figure 55 Diagnostic LED Codes

Circuit / Mode	Code	Condition	Code with Period	Condition
DETECT #1	1	Open*	1.	Activated*
DETECT #2	2	Open*	2.	Activated*
INPUT #3	3	Open*	3.	Activated*
INPUT #4	4	Open*	4.	Activated**
INPUT #5	5	Open*	5.	Activated
AUDIBLE #1	6	Open	6.	Shorted
AUDIBLE #2	7	Open	7.	Shorted
AUDIBLE #3	8	Open	8.	Shorted
AGENT RELEASE	9	Open*	9.	Shorted
SOLENOID	11	Open*	11.	Shorted
Abort Input	A	Valid Abort		
Invalid Abort	b	Premature Abort	b.	Late Abort
2nd Alarm Active	C	Input Circuit 1*	C.	Input Circuit 2*
DISABLED	d	Enable/Disable switch set to disable.		
Battery Failure	E	Missing Battery		
System Voltage	F	Low Voltage (<19 vdc)		
Microcontroller	h	Intelli-FET failed*	h.	5V ref./ADC failed
Ground Fault	O	Ground fault detected		
Reset	P	Reset switch pressed.		
Power Failure	-	AC Brown-out (<85%)		
Auxiliary Output	o	AUX Output #1 Open	o.	AUX Output #2 Open

*Latching Condition. Requires Reset to clear.

**Latching only for Application #3.

8.3. Latching Versus Non-latching Troubles

The following Trouble events are latching, which requires the panel to be Reset after the event has been cleared to return the system to normal operation.

- Input Circuit Open (LED Diagnostic Codes 1 – 5)
- Agent Release Circuit Open (LED Diagnostic Code 9)
- Solenoid Circuit Open (LED Diagnostic Code 11)
- Intelli-FET Failure (LED Diagnostic Code H)

All other trouble events are non-latching (upon restoration to a normal condition). If all trouble events are non-latching and all have cleared, the system will automatically return to normal operation which includes clearing of the Diagnostic LED, turning off the Trouble relay, and turning off the Trouble LED.

8.4. Supervision Response Times

Supervision of the SHP-Pro circuits is designed to be within 90 seconds on all circuits. Supervision is delayed up to 15 seconds immediately after a Reset or power-up for detection inputs only.

NOTE: Audible circuits are NOT supervised during any active Alarm condition.

8.5. Low Power Conditions

AC POWER

The system is designed to suspend detector operation if AC power is missing and system battery power falls below 20.4V ("F" trouble) since detector operation is not guaranteed at these voltages. System field design and maintenance should be such to prevent this occurrence. After occurrence, restarting the system requires return of AC power in conjunction with a manual system reset.

System will register brown-out trouble if AC voltage is less than approximately 85% of rating. Both AC power and battery power are enabled at all times, allowing each to supplement the other. Partial fall-out of one power source permits the other to provide most of the needed power.

BATTERY POWER

The system is designed to monitor the battery charging circuit. (Older panels used to monitor voltage only instead of current.) If the batteries do not monitor enough current being drawn by the batteries, the panel will produce a battery failure trouble.

NOTE: During any active Alarm or Supervisory event, the panel does NOT supervise for loss of battery charging current.

8.6. Linear Heat Detection Cable

Linear heat detection (LHD) cable, for the most part, is connected to the SHP-Pro's DETECT #1 and DETECT #2 input circuits. Each circuit can be configured to operate using a Cross Zone or Single Detector Release detection scheme, based on project requirements. The operation of the SHP-Pro will vary depending upon the selected detection scheme as described below.

Cross Zone detection – With a maximum cable impedance of 440Ω connected to each DETECT input, activation of the LHD cable will create an Alarm state on the respective DETECT input circuit. Advancement to Pre-discharge state requires an Alarm from both DETECT input circuits.

Single Detector Release – With a maximum cable impedance of 220Ω connected to each DETECT input, activation of the LHD cable will create both an Alarm AND Predischarge state on the respective DETECT input circuit.

8.7. Typical System Operation

ALARM

Upon alarm of a first detector, system enters ALARM state. Typical response includes:

Piezo:	Chirp (On & Off pattern) until silenced.
Alarm LED:	Flash. After silencing, illuminate steady.
Alarm Relay:	Activate.
Alarm Audibles:	Activate until silenced.

Upon alarm of a second detector meeting the cross-zone or sequential alarm detection criteria (or alarm of the first SDR detector), system enters PRE-DISCHARGE state. Typical response changes to:

Piezo:	Chirp (On & Off pattern) until silenced.
Pre-discharge LED:	Flash. After silencing, illuminate steady.
Pre-discharge Relay:	Activate. Alarm relay also remains active.
Alarm Audibles:	Activate until silenced.
Pre-discharge Audibles:	Activate until silenced.

Upon completion of pre-discharge countdown (or activation of a manual release), system enters RELEASE state. Typical response changes to:

Piezo:	Chirp (On & Off pattern) until silenced.
Release LED:	Flash. After silencing, illuminate steady.
Release Relay:	Activate. Alarm & Pre-discharge relays also remain active.
Alarm Audible:	Activate until silenced.
Pre-discharge LED:	OFF
Pre-discharge Audibles:	Activate. (Unsilence if silenced)
Release Audibles:	Activate until silenced.
Release Circuits:	Activate Agent Release or Solenoid circuit.

Upon activation of the Abort Switch, system responds with a trouble condition if it is not a valid abort time. While activated during a valid abort time, typical system response includes:

Piezo:	Chirp (On & Off pattern) until silenced.
Abort LED:	Flash while Abort is active. Steady after silencing.
Abort Relay:	Activated while Abort is held.
Count-down timer:	Modified (or paused) per abort type description.
Pre-discharge Audibles:	Unsilenced upon deactivation of abort switch, if pertinent.

Alarm events are latching and require the operator to reset the panel to clear the event.

NOTE: During activation of multiple events, piezo priority is Alarm over Supervisory over Trouble.

SUPERVISORY

Upon activation of a supervisory input, system enters SUPERVISORY state. Typical response includes:

Piezo:	Warble (On & Off pattern) until silenced.
Supervisory LED:	Flash. After silencing, illuminate steady.
Supervisory Relay:	Activate.

A supervisory input is non-latching and the panel will follow the status of the input.

TROUBLE

Upon occurrence of a trouble condition, system enters TROUBLE state. Typical response includes:

Piezo:	Steady on until silenced.
Trouble LED:	Flash. After silencing, illuminate steady.
Trouble Relay:	Activate.
Diagnostic LED:	Displays code or codes corresponding to trouble conditions.

Many trouble events are non-latching (See Section 7.3). If the trouble is non-latching and it clears, the panel will return to normal. If the trouble is latching, the operator will be required to press the RESET switch to clear the trouble event.

8.8. SHP-Pro Input / Output Matrix

Panel Application 1 Agent	Clean	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm		See audible options table					ON			ON				ON			
Pre-discharge							ON			ON	ON			ON			
Valid Abort													ON				
Release	S11 = 0				ON		ON			ON	ON	ON		ON	ON		
	S11 = 1					ON	ON			ON	ON	ON		ON	ON		
Invalid Abort*									ON *				ON				ON *
Supervisory								ON								ON	
SW3 Disable		Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble									ON								ON

*A trouble condition will be created if the Abort is initiated with no alarm present.

See next page for Application #2 - Clean Agent Release AND Sprinkler Preaction

Panel Application 3	Preaction	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Waterflow	P8 Relay 3 - Supervisory	P8 Relay 4 - Trouble	P9 Relay 1 - Alarm	P9 Relay 2 - Waterflow	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm		See audible options table					ON			ON				ON			
Pre-discharge						ON	ON			ON				ON			
Release						ON	ON			ON				ON			
Waterflow (alarm)						ON **	ON			ON	ON			ON	ON		
Supervisory								ON				ON				ON	
SW3 Disable		Disabled	Disabled	Disabled		Disabled	Disabled	ON	ON	Disabled	Disabled	ON	ON	Disabled	Disabled	ON	ON
Trouble									ON								ON

*A trouble condition will be created if the Abort is initiated with no alarm present.

**Switch 11 determines the operation of the Solenoid with the Waterflow input (SW11 = OFF, Solenoid will activate with Waterflow input active)

Panel Application 4 Solenoid Releasing	Industrial	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm		See audible options table					ON			ON				ON			
Pre-discharge							ON			ON	ON			ON			
Valid Abort													ON				
Release						ON	ON			ON	ON	ON		ON	ON		
Invalid Abort*									ON *				ON				ON *
Supervisory								ON								ON	
SW3 Disable		Disabled	Disabled	Disabled		Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble									ON								ON

*A trouble condition will be created if the Abort is initiated with no alarm present.

Panel Application 2 Detector 1 Operates Solenoid	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm	See audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Manual Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow						ON			ON				ON	ON		
Abort								ON *				ON				ON *
Supervisory							ON								ON	
SW3 Disable	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble								ON								ON

Panel Application 2 Waterflow Operates Solenoid	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm	See audible options table					ON			ON				ON			
Pre-discharge						ON			ON	ON			ON			
Release				ON		ON			ON	ON	ON		ON			
Manual Release				ON		ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort								ON *				ON				ON *
Supervisory							ON								ON	
SW3 Disable	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble								ON								ON

Panel Application 2 Detector 1 OR Waterflow Operates Solenoid	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm	See audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Manual Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort								ON *				ON				ON *
Supervisory							ON								ON	
SW3 Disable	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble								ON								ON

Panel Application 2 Detector 1 AND Waterflow Operates Solenoid	Audible 1	Audible 2	Audible 3	Agent Release	Solenoid (2-12V or 1-24V)	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Relay 1 - Alarm	P8 Relay 2 - Predischarge	P8 Relay 3 - Release	P8 Relay 4 - Abort	P9 Relay 1 - Alarm	P9 Relay 2 - Release	P9 Relay 3 - Supervisory	P9 Relay 4 - Trouble
Alarm	See audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Manual Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort								ON *				ON				ON *
Supervisory							ON								ON	
SW3 Disable	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	ON	ON
Trouble								ON								ON

9. SERVICING

The SHP-Pro system shall be serviced at regular intervals in accordance with the applicable codes and standards or more often if required by the authority having jurisdiction. Only qualified individuals shall perform Inspection, Testing, and Maintenance of the SHP-Pro system.

Fike provides a training class on the SHP-Pro for Factory Authorized Distributors. The training class provides certification for Installation, Service and Maintenance of the SHP-Pro. The certified individual performing the service must have also read this entire manual and understand the basics of Fire Alarm Systems, codes, and standards. Before proceeding with any testing, notify all building occupants and any parties monitoring the Fire Control System. Notification must also be performed at the conclusion of the testing.

10. Maintenance

Periodic maintenance, replacement, and testing shall be performed per NFPA 72 as a minimum. Maintenance shall be performed by a trained or authorized Fike representative. The following components of the SHP-Pro require replacement, even though no obvious sign of failure is present.

Batteries (Lead Acid):	Replace every 3 years according to date of manufacture
Gas Cartridge Actuator (GCA):	Replace every 10 years according to date of manufacture

11. Troubleshooting

System Troubles and events are displayed on the Diagnostic LED on the SHP-Pro controller. Refer to the following table for potential resolutions for each code displayed on the Diagnostic LED.

Figure 56 Fault Resolutions

Diagnostic Display Code	Description	Tips For Resolution
1 2	Detection Circuit 1 open Detection Circuit 2 open	• Verify correct value EOL resistor (4.3K Ω - Yellow, Orange, Red) • Measure field wiring resistance = 20 Ω or less. • Verify all devices are installed properly (smoke detector heads installed on bases). • Remove field wiring and install a 4.3K Ω resistor at the panel to verify the SHP-Pro Control Board is functioning properly. • Latching, requires Reset to clear
3 4 5	Input Circuit 3 open Input Circuit 4 open Input Circuit 5 open	• Verify correct value EOL resistor (20K Ω - Red, Black, Orange) • Measure field wiring resistance = 100 Ω or less. • Verify all field devices are installed properly. • Remove field wiring and install a 20K Ω resistor at the panel to verify the SHP-Pro Control Board is functioning properly. • Latching, requires Reset to clear
1. 2. 3. 4. 5.	Detection Circuit 1 activated Detection Circuit 2 activated Input Circuit 3 activated Input Circuit 4 activated Input Circuit 5 activated	• If device was not the cause of the activation, check field wiring for shorts, or a faulty device. • Verify correct value EOL resistor • Input 1, 2, & 3 latching, requires Reset to clear • If Application 3, input 4 latching, requires Reset to clear
6 7 8 NOTE: The number 6 is often confused with the letter "b".	Audible Circuit 1 open Audible Circuit 2 open Audible Circuit 3 open	• Verify correct value EOL resistor (1.2K Ω - Red, Violet, Red) • Measure field wiring resistance = reference section 4.2. • Verify all field devices are installed properly. • Remove field wiring and install a 1.2K Ω resistor at the panel to verify the SHP-Pro Control Board is functioning properly.
9	Agent Release Circuit open	• Verify correct value EOL resistor (2.4K Ω - Red, Yellow, Red) • Measure field wiring resistance = reference section 4.2. • Verify all field devices are installed properly. • Is Agent Disconnect Switch in DISCONNECTED mode? • Remove field wiring and install a 2.4K Ω resistor at the panel to verify the SHP-Pro Control Board is functioning properly. • Latching, requires Reset to clear
11	Solenoid Circuit open	• Measure field wiring resistance = Refer to Section 5.5.2. • Verify all field devices are installed properly. • Remove field wiring and install a 200 Ω, 5 watt resistor (p/n 02-2686) at the panel to simulate the solenoid and verify the SHP-Pro Control Board is functioning properly. • Latching, requires Reset to clear

Figure 57 Fault Resolutions - Continued

Diagnostic Display Code	Description	Tips For Resolution
5.	Audible Circuit 1 shorted	• Check field wiring for short circuit or a faulty device • If panel has released agent, replace GCA. • Verify EOL resistor value is correct.
7.	Audible Circuit 2 shorted	
8.	Audible Circuit 3 shorted	
9.	Agent Release Circuit shorted **OR** Actuator Circuit is Open	
11.	Solenoid Circuit shorted	
A	Valid abort	• Normal Operation. No resolution required.
b	Abort premature **NOTE:** The letter "b" is often confused with the number 6.	• Normal Operation. No resolution required.
b.	Abort late	• Normal Operation. No resolution required.
C	2nd Alarm active on input 1 if using 430 Ω bases. Only one 430 Ω base active Always activates on first alarm if using 220 Ω or 0 Ω bases.	• Input Circuit 1 active. Verify cause from input device and not a short. • Check base wiring - Hochiki bases use terminals 3 & 4 for negative wiring. • Latching, requires Reset to clear
C.	2nd Alarm active on input 2 if using 430 Ω bases. Only one 430 Ω base active Always activates on first alarm if using 220 Ω or 0 Ω bases.	• Input Circuit 2 active. Verify cause from input device and not a short. • Check base wiring - Hochiki bases use terminals 3 & 4 for negative wiring. • Latching, requires Reset to clear
d	Outputs disabled	• Check Switch 3 (Enable/Disable) to see if it is in the Disable position
E	Battery missing **OR** battery charging failure **NOTE:** This error commonly occurs with batteries that have deteriorated while sitting on the shelf not in use and are no longer cable of meeting the manufacturer's specifications or passing the discharge test required by NFPA.	• Verify batteries are installed and properly connected • Verify each battery has approximately the same voltage (12.9-13.8VDC fully charged) • Check date code on battery. Replace if >5 yrs from manufacture • Measure battery current draw. If <2.5 mA, consult your battery supplier • Perform a load test on the batteries (per battery mfg. instructions) • Remove battery wiring harness and replace with a 4.3K Ω, 1/4 watt resistor (same as detection EOL, 10-2318) and verify charger voltage is >20.4 VDC
F	Low Voltage (<19 VDC)	• Reference Section 8.5, Low Power Conditions • Check AC and DC power input
h	Intelli-FET lost	• Reset panel, if trouble does not clear, replace SHP-Pro Control Board • Latching, requires Reset to clear
h.	5V Reference / ADC failure	• Reset panel, if trouble does not clear, replace SHP-Pro Control Board
O	Ground Fault	• Remove field wiring from terminal strips to isolate the wire with the ground fault. When panel clears, troubleshoot wire.
o	Resettable AUX power missing	• Remove field wiring from Resettable AUX circuit and check fuse F3. If fuse is blown, replace fuse and check field wiring for short.
o.	Continuous AUX power missing	• Remove field wiring from Continuous AUX circuit and check fuse F4. If fuse is blown, replace fuse and check field wiring for short.
P	Reset	• Normal Operation. No resolution required.
-	AC Brown-out (<85% AC)	• Measure primary voltage to transformer and secondary voltage off transformer.

APPENDIX 1 – Battery Calculations

The SHP-Pro is designed for use with batteries up to 40 AH in capacity. Each battery pack contains two 12V batteries which can be installed in the SHP-Pro enclosure. Battery back-up duration must be extended for sprinkler supervisory systems. Minimum battery capacity must exceed (by more than 10%) normal operation power followed by alarm operation power for these durations:

Operation Type	**Normal Operation**	**Alarm Operation**
Local & Sprinkler Supervisory	90 hours (FM only)	5 minutes
Remote Station	60 hours	5 minutes
Local Operation Only	24 hours	5 minutes

Each battery pack's maximum current consumption for normal operation is:

		-- Max. Normal Operation Current --	
Battery Pack	Description	24 Hour back-up	90 hour back-up (FM only)
10-2190-1	7 AH Battery Pack	0.260 A	Not applicable
10-2190-2	18 AH Battery Pack	0.590 A	0.171 A
Battery	Description	24 Hour back-up	90 hour back-up (FM only)
02-3468*	12V, 33 AH Battery	1.106 A	0.295 A
A02-0252*	12V, 40 AH Battery	1.346 A	0.359 A

*SHP-Pro requires 2, 12V batteries for operation.

"Total normal current" and "total alarm current" can each be calculated as the sum of:

A.) SHP-Pro controller current
B.) CRM4 current for relays activated while in alarm
C.) Output current to activated indicating devices.
D.) Auxiliary current from Aux Power Out circuit.

Module Type	Module Current Consumption
10-2452 Controller	0.135 Amps
10-2450 Class-A Module	0.000 Amps
10-2448 Class-A Module	0.000 Amps
10-2204 CRM4 Module	0.000 Amps (0.010A each relay while active)

Normal operation power (in Amp-Hours) = (total normal current) x [24, 60, or 90 hours (FM Only)].
Alarm operation power = (total alarm current) x (0.0833 hours).

The selected battery capacity must exceed the sum of the Normal and Alarm power plus a 20% battery power derating safety margin to ensure adequate system voltages are maintained. If using an uninterruptable power supply that supplies power in excess of the above time durations; NFPA 72 allows lesser amounts of system internal battery capacity.

NOTE: The SHP-Pro's 0.135 Amp current draw includes power to activate the normally energized P2 Trouble relay and power for the maximum number of two wire detectors connected to DETECT #1 and DETECT #2 input circuits. The CRM4's 0.010 Amps alarm current per relay is for the activated relays.

A battery calculation form that illustrates a typical battery calculation example is shown on the following page.

SHP-Pro Battery Calculation Form

Normal Operation								
Controller Current	0.135*	A						
Auxiliary Output Current		A						
**Total Normal Standby Current =		A	x		hours =		AH	

Alarm Operation								
Controller Current	0.135*	A						
CRM4 Current (0.010 A for each relay used)		A						
Output Device Current		A						
Auxiliary Output Current		A						
***Total Alarm Current =		A	x	0.083	hours =		AH	
Total AH used (Normal + Alarm Operation) =		AH						
x 1.2 safety factor								
Total Power Required =		AH						
Total Battery Pack AH Supplied (7 or 18 AH) =		AH						

Power Supplied		
Controller Supplied Current	4.135	A
Auxiliary In Current		A
Total Current Supplied =		A

*Controller current includes power for the maximum number of two-wire detectors connected to the DETECT #1 and DETECT #2 circuits and for operation of the normally energized P2 Trouble relay.

**Total normal Standby current shall not exceed 1 A.

***Total Alarm current shall not exceed 4.135 A.

Battery Calculation Example

Normal Operation								
Controller Current	0.135	A						
Auxiliary Output Current	0.100	A						
*Total Normal Standby Current =	0.235	A	x	24	hours =	5.64	AH	

Alarm Operation								
Controller Current	0.135	A						
CRM4 Current (0.010 A for each relay used)	0.040	A						
Output Device Current	1.00	A						
Auxiliary Output Current	0.100	A						
**Total Alarm Current =	1.335	A	x	0.083	hours =	0.111	AH	
Total AH used (Normal + Alarm Operation) =						5.75	AH	
x 1.2 safety factor								
Total Power Required =						6.90	AH	
Total Battery Pack AH Supplied (7 or 18 AH) =						7	AH	

Power Supplied		
Controller Supplied Current	4.135	A
Auxiliary In Current	0.000	A
Total Current Supplied =	4.135	A

APPENDIX 2 – System Operation Posting

The System Operation Posting on the next page should be filled out, framed, and posted adjacent to the SHP-Pro panel.

"System Operation Posting"

P/N 02-11060 REV 2
OPERATING INSTRUCTIONS
FIKE
10-063 SHP-PRO CONTROL SYSTEM

OPERATIONAL CONDITIONS

SYSTEM STATUS	LED's ON	AUDIBLE STATUS
Normal Standby:	AC Normal LED (green)	All audibles off
System Trouble:	Trouble LED (yellow)	Local piezo on, Trouble audible(s) on
System Alarm:	Alarm LED (red)	Local piezo pulses, Alarm audible(s) on
Pre-discharge:	Alarm LED (red)	Local piezo pulses, Pre-discharge audible(s) on In sprinkler mode, Alarm audible(s) also on
Release:	Alarm LED (red)	Local piezo pulses, Release audible(s) on In sprinkler mode, Pre-discharge and Alarm audibles are on in place of release audible.
Abort:	Abort LED (yellow)	Local piezo on, Trouble audible(s) on Delays release initiated by detection scheme.
To SILENCE Panel:	Press SILENCE button	Silences audible and piezo. Changes flashing LEDs to steady. If held for 3 seconds it will toggle the panel between current history, last 20 events, and A/D conversion.
To RESET Panel:	Press RESET button	Resets system including turning off outputs and interrupting resettable power. Momentarily activates piezo, all LEDs, and trouble relay. Display panel option number on Diagnostic LED. Restores system to Normal state.
To DISABLE Releasing and Audible Circuits:	Flip Enable/Disable Switch (SW3)	Panel still operates normally. Audible and releasing or solenoid circuits will not activate in this state.

CAUTION: Remove AC and battery power before servicing equipment.

NOTE: The ABORT switch delays releases initiated by automatic detection schemes. Releases initiated by activation of the Manual Release input circuit OVERRIDES the abort switch. See Operation Manual (P/N 06-297) for functionality of different abort types.

Refer to System Service Label attached to inside of the SHP-Pro enclosure door for listing of Diagnostic Codes.

IN CASE OF TROUBLE CONTACT:

_____
_____ OR
_____

Phone No: _____

Customer Service Department
Fike Corporation
+1.816.229.3405

Refer to Fike Installation, Operation and Maintenance Manual #06-297

Frame this sheet and place adjacent to control equipment.

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