SINGLE HAZARD PANEL

SHP PRO

Fike Protection Systems

10-063

Product Manual

Conventional Fire Alarm/Suppression System

Fike® CORPORATION

Manual P/N: 06-297
Rev. 0, 1/2004

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Copyright Information

Disclaimers

The information contained in this manual is as accurate as currently possible. This manual is intended to be an aid to Fike authorized distributors, who have been trained in an approved manner by Fike, and the user who is a customer of the Fike authorized distributor. Fike does not warrant that this manual is technically correct, complete, or free from writing problems or that the Fike products referenced therein are free from minor flaws.

In accordance with our policy of continuing product and system improvement, Fike reserves the right to change designs or specifications without obligation and without further notice.

Reader Responses

Fike encourages input from our distributors and end users on how we can improve this manual and the products themselves. Please direct all calls of this nature to Fike's Product Support Department at (816) 229-3405.

Any communication received becomes the property of Fike Corporation.

Warranties

Fike provides a one-year limited manufacturer's warranty on this product. The standard warranty is printed in each Marketing Price List. All warranty returns must be returned from an authorized Fike Distributor. Contact Fike's Marketing Department for further warranty information. Fike maintains a repair department that is available to repair and return existing electronic components or exchange/purchase previously repaired inventory component (advance replacement). All returns must be approved prior to return. A Material Return Authorization (MRA) number should be indicated on the box of the item being returned. Contact the appropriate Regional Sales Manager for further information regarding Material Return Procedures.

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1.0 PREFACE

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 1.6.

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 can not 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 (816) 229-3405, Monday through Friday, 8:00 a.m. to 5:00 p.m. CST.

1.3 REVISION HISTORY

Document Title: SHP Pro Conventional Fire Alarm/Suppression System Product Manual

Document Reorder Number: 06-297

Revision	Section	Date	Reason for Change
0	All Sections	10/2003	Initial Release

1.4 TERMS USED IN THIS MANUAL

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

Term	Description
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 wiring	Input circuits capable of transmitting an alarm signal during a single open or a non-simultaneous single ground fault on a circuit conductor shall be designated as Style D or Class A. Similarly, output circuits capable of activating during a single open or a non-simultaneous ground fault on a circuit conductor shall be designated as Style Z or Class A. Commonly referred to as redundant or 4-wire connection; this manual refers to 4-wire connections as Class A wiring.
Class B wiring	Input circuits incapable of transmitting and alarm signal beyond the location of the fault condition (listed for Class A wiring above) shall be designated as Style B or Class B. Similarly, output circuits incapable of operating beyond the location of the fault condition shall be designated as Style Y or Class B. This manual refers to 2-wire connections as Class B wiring
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.
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.
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.
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.

1.5 SYMBOLS USED IN THIS MANUAL

The following symbols are used throughout this manual.

NOTE: Used to call your attention to an important procedure, function or operational procedure.

CAUTION: Used to identify functions or procedures of utmost importance.

WARNING: Used to identify functions and/or procedures that could cause property damage or personal injury if the procedures identified in this manual are not followed.

1.6 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.

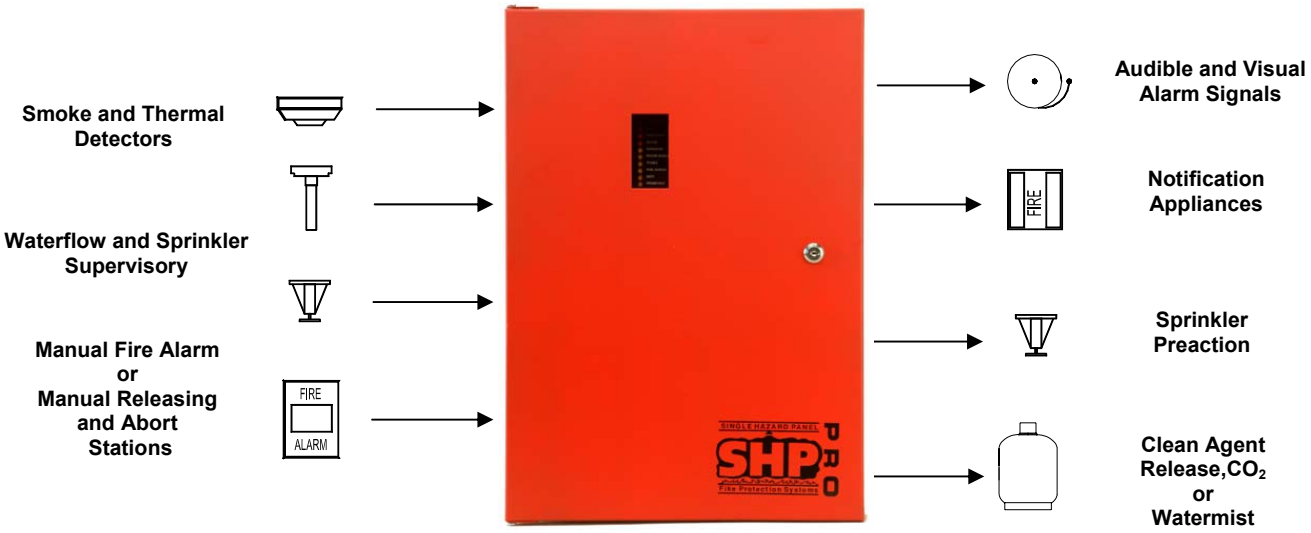
WARNING: Failure to disconnect power to the releasing circuit(s) and completely disarm the solenoid(s) or any other "critical operation" contacts prior to system testing may cause accidental activation of the system.

2.0 PRODUCT OVERVIEW

2.1 PRODUCT 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.



2.2 LISTINGS AND APPROVALS

Approval Agency		File Number
Underwriters Laboratories		S2203
Type:	Local, Remote Station, Central Station PPU	
Service Type:	A-Automatic Fire Alarm, M-Manual Fire Alarm WF-Water-flow alarm, SS-Sprinkler Supervisory Service, Releasing, DACT	
Type Signaling:	Non-coded	
Factory Mutual (FM)		3017159
California State Fire Marshall (CSFM)		planned
City of New York (MEA)		planned

2.3 AGENCY COMPLIANCE AND STANDARDS

This Fire Alarm Control Panel complies with the following NFPA, and UL standards:

NFPA 72 – National Fire Alarm Code
UL 864 – Standard for Control Units for Fire Protective Signaling Systems

The installer should also be familiar with the following documents and 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.

Document Title	Part Number	Revision No, Date
Agent Release Module (ARM III) Manual	06-106	1, 07/03
Compatible Notification Appliances and Releasing Devices	06-186	1, 01/04
The DACT/Fire Communicator Addendum	06-159	1, 04/01
The DACT/Fire Communicator Manual	06-160	1, 04/01
System Operation Posting, SHP PRO	02-11060	0, 02/04

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 pre-action sprinkler operation (10-2452-1)
    3. Pre-action sprinkler (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 regulated 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 Style 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 Style B initiating device circuits capable of monitoring closed contact devices
  - Optional Class A module that converts all five initiating device circuits to Style D wiring and operation
- **Notification Appliance Circuits**
  - Three Style Y notification appliance circuits rated at 2.0 amps each
  - Optional Class A module that converts all five output circuits to Style Z (3 NAC, 2 releasing)
- **Releasing Circuits**
  - One Agent Release circuit with maximum of 6 ARM III’s
  - 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

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3.0 EQUIPMENT/PRODUCTS

3.1 MAIN PANEL HARDWARE

The 10-063 SHP Pro control panel consists of a red (or gray) metal enclosure with removable door for ease of mounting flush or surface. The back-box is 21" high x 14.35 " wide x 4 " deep. It also includes a 0.5" lip around the back box to facilitate flush mounting. Refer to Section 3.7 for a complete detail of the back-box dimensions.

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
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
02-3468	Battery, 12VDC, 33 AH
10-2154-C	Battery Enclosure, 33 AH, where C= R for Red; G for Gray
A02-0252	Battery, 12 VDC, 40 AH (requires 66AH enclosure)
10-2236-C	Battery Enclosure, 66 AH, where C= R for Red; G for Gray

- **10-063 SHP PRO Control System**

  Includes the main controller, transformer, and steel enclosure (red or gray). The enclosure door is equipped with a standard Fike keylock and a viewing window covered with clear lexan. The enclosure includes space for installing batteries (up to 18 AH – ordered separately).

- **10-2452 Series SHP PRO Controller**

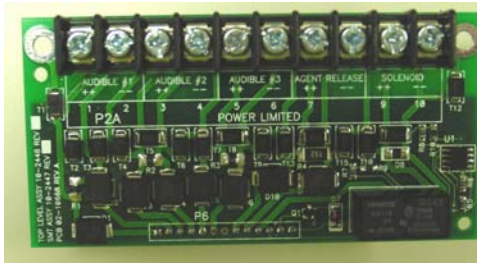
The controller is the heart of the SHP Pro control panel. It contains the system's central processing unit, power supply, and other primary components. It also includes the electronics required to support the optional Class A modules and CRM4 Relay modules.

- **10-2450 CLASS A INPUT MODULE**

The optional Class A Input Module allows any of the four initiating device circuits to be wired Class A (Style D) versus the standard Class B (Style B) method. The Class A module mounts directly onto the SHP Pro Controller at P6 utilizing two stand-offs supplied with the module.

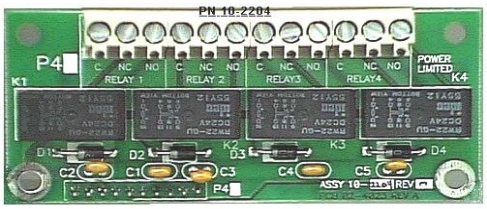
- **10-2448 CLASS A OUTPUT MODULE**

The optional Class A Output Module allows any of the three notification appliance and either releasing circuits to be wired Class A (Style Z) versus the standard Class B (Style Y) method. The Class A module mounts directly onto the SHP Pro Controller at P7utilizing two standoffs supplied with the module.

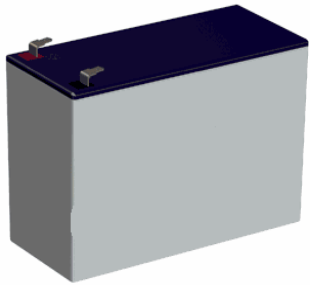


- **10-2204 CRM4 RELAY MODULE**

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.



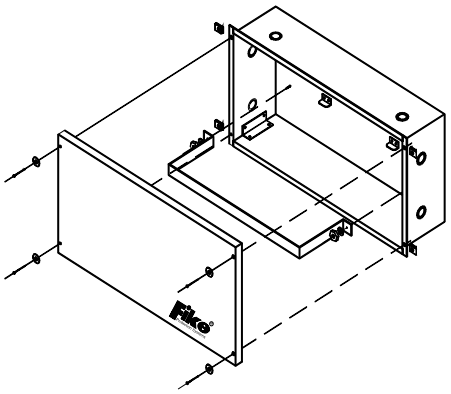
- **10-2190-B Battery Assembly,**
- **02-3468 33 AH Battery,**
- **A02-0252 40 AH Battery**



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. The 10-2190-1 consists of 2 each 7A-H, 12VDC batteries with a wiring harness. The 10-2190-2 consists of 2 each 18 A-H, 12VDC batteries with the same wiring harness. The 02-3468 and A02-0252 are a single battery part number, a pair would be required for a single SHP Pro system.

- **10-2154-C Battery Enclosure, 33 AH**

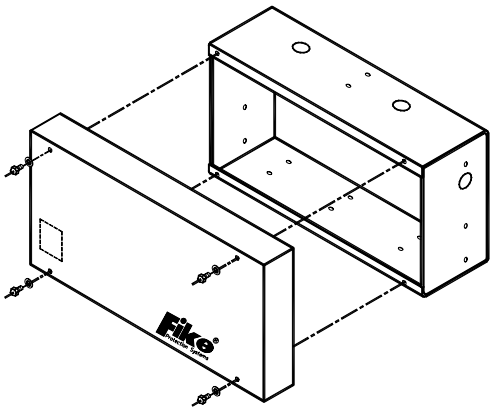
  where C=R for Red, G for Gray



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 to provide entry of battery wiring. The box lid is installed onto the back-box using the 4 mounting screws provided.

- **10-2236-C Battery Enclosure, 66 AH**

  where C=R for Red, G for Gray



The 66 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.

3.2 INPUT DEVICES

The SHP Pro is required to list compatibility with specific conventional detectors. The following items have been approved for use with the SHP Pro. Refer to the Detection Input Compatibility portion of Section 3.6, Specifications, for selecting the appropriate detector base and head. 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.

Mfg	Old Part Number	Part Number	Mfg P/N	Description
System Sensor		63-1015	2451	Photoelectric
		63-1017	2451TH	Photo/heat
		67-1025	1451	Ionization
		60-1027	5451	135° Thermal
		63-1014	2151	Photoelectric (Low Profile)
		67-1023	1151	Ionization (Low Profile)
		67-1026	B401BR470	470 Ω, 6”
		67-1029	B110RLP	470 Ω, 6” , Low Profile
		67-1031	B401B	0 Ω, 6”
Hochiki		63-1024	SLR-24	Photoelectric Detector
		67-1033	SIJ-24	Ionization Detector
		63-1025	SLR-24H	Photo/Thermal Detector
		60-1020	DFE-135	135° F Fixed Temperature Heat Detector
		60-1022	DFE-190	190° F Fixed Temperature Heat Detector
		60-1029	DCD-135	135° F Fixed, Rate of Rise Heat Detector
		60-1030	DCD-190	190° F Fixed, Rate of Rise Heat Detector
	67-1027	67-1034	NS6-224	430 Ω, 6” Base
	67-1028	67-1036	NS4-224	430 Ω, 4” Base
	67-1010	67-1035	NS6-220	220 Ω, 6” Base (SDR or Cross Zone Only)
	67-1017	67-1037	NS4-220	220 Ω, 4” Base (SDR or Cross Zone Only)
		63-1012	HSC224RA	430 Ω Relay Base

NOTE: ***If using LED graphic, it is required to use the older type bases. Please note on the order, “Using conventional graphic with panel, do not substitute bases”.***

System Sensor 400 Series Smoke Detectors

- **63-1015 Photoelectric Detector (2451)**

The 400 Series photoelectronic smoke detector contains an optical sensing chamber designed to sense the presence of smoke particles produced by a wide range of combustion sources. A custom integrated circuit incorporates signal processing to reduce false alarms.

- **63-1017 Photo/heat Detector (2451TH)**

Same as 63-1015 (2451) above, but with a 135° F (57.2 C) fixed temperature, restorable, bi-metalic heat sensor. The alarm contact will transfer if either of the detection types sense the fire.

- **67-1025 Ionization Detector (1451)**

The 400 Series ionization smoke detector includes a specially designed dual source, dual unipolar detection chamber design which will sense the presence of smoke particles produce by fast combustion as well as slow smoldering fires. This chamber exhibits increased stability, significantly reduces nuisance alarms, and provides better performance at higher velocities.

- **60-1027 135° Thermal (5451)**

The 400 Series thermal rate-of-rise with fixed heat detector contains a unique dual thermistor heat sensing circuit to provide maximum performance and solid state reliability. It is designed to initiate an alarm at 135° F and respond to a temperature increase in excess of 15° per minute. This enables the heat detector to communicate an alarm to the central control panel prior to reaching the static set point for these high rates of rise, providing a timely response to both rapid and slow temperature increases. This model should be used in applications where rapid response is desired and where rapid temperature increases would only be caused by a fire emergency.

Warning: ***Heat detectors are for property protection only, not life safety!***

System Sensor 100 Series, Low Profile , Smoke Detectors

- **63-1014 Photoelectric Detector, Low Profile (2151)**

The 100 Series photoelectronic smoke detector contains a unique optical sensing chamber designed to sense particles produced by a wide range of combustion sources. A custom integrated circuit incorporates signal processing to reduce false alarms. 1.6" deep profile. Built-in test switch. Two LED's blink in standby and constant in alarm. Field sensitivity metering using optional test module.

- **67-1023 Ionization Detector, Low Profile (1151)**

The 100 Series ionization smoke detector includes a single source, dual chamber design that senses smoke particles. This chamber exhibits excellent stability, significantly reducing nuisance alarms, and provides good performance at higher air velocities. 1.6" deep profile. Built-in test switch. Two LED's blink in standby and constant in alarm. Field sensitivity metering using optional test module.

System Sensor Bases

- **67-1026 470 Ω Base, 6" (B401BR470)**

A 6" conventional detection base for use with the **400** Series System Sensor Smoke detectors. It contains a 470 Ω current limiting resistor to provide the ability to provide sequential detection.

- **67-1029 470 Ω Base, 6" Low Profile (B110RLP)**

A 6" conventional detection base for use with the **100** Series System Sensor Smoke detectors. It contains a 470 Ω current limiting resistor to provide the ability to provide sequential detection.

- **67-1031 0 Ω Base, 6" (B401B)**

A 6" conventional detection base for use with the **400** Series System Sensor Smoke detectors. It contains NO current limiting resistor, so it provides either a single detector release or cross zoned detection if utilizing both detection circuits.

Fike private labeled Hochiki detectors

- **63-1024 Photoelectric Detector**

The photoelectric smoke detector is well suited for fires ranging from smoldering to flaming. It utilizes two bi-colored LED's for indication of status. In a normal standby condition the LED's flash Green every 3 seconds. When the detector senses that it's sensitivity has drifted outside the UL listed sensitivity window the LED's will flash Red every 3 seconds. When the detector senses smoke and goes into alarm the status LED's will latch ON Red.

- **67-1033 Ionization Detector**

The Ion Detector can be used in areas where early warning of superheated or flaming combustibles is expected. It utilizes two bi-colored LED's for status indication purposes. In a normal standby condition the LED's flash Green approximately once each second. When the detector senses smoke and goes into alarm the status LED's will latch ON Red.

- **60-1020 Heat Detector 135°F / Fixed Temperature**
- **60-1022 Heat Detector 190°F / Fixed Temperature**

The heat detector is suited for installation where high heat output fires are expected or in areas where ambient conditions would not allow use of other detection methods. Each detector is fixed temperature rated for 135°F (60-1020) where ambient temperatures do not exceed 120°F or 190°F (60-1022) where ambient temperatures exceed 120°F but not 160°F. Features mechanically operated contact closures. **Contact is not latching.**

- **60-1029 Heat Detector 135°F / Rate-of-Rise**
- **60-1030 Heat Detector 190°F / Rate-of-Rise**

The fixed temperature / rate-of-rise heat detector features electronic circuitry to close normally open contacts when the fixed temperature is reached or when the rate-of-rise is greater than 12°F / minute.

Warning: ***Heat detectors are for property protection only, not life safety!***

Fike private labeled Hochiki bases

- **67-1034 6" Base**

Electronics-free 6" base with plastic tamper-lock lug. Contains a 430Ω resistor. Can be used for Sequential or Cross Zone detection.

- **67-1036 4" Base**

4" version of the 67-1034

- **67-1035 6" Base**

  Electronics-free base with plastic tamper-lock lug. Contains a 220Ω resistor. Can be used with Cross Zone or Single Detector Release detection.

- **67-1037 4" Base**

  4" version of the 67-1035

3.3 OUTPUT DEVICE

Refer to FIKE Notification Appliance and Releasing Compatibility Document (06-186).

3.4 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	06-159	Digital Alarm Communicator Transmitter (DACT)	Complies with NFPA 72-Supervising Station Fire Alarm System
10-2475		3 Zone Digital Alarm Communicator Transmitter (DACT)	Complies with NFPA 72-Supervising Station Fire Alarm System
10-2476		5 Zone Digital Alarm Communicator Transmitter (DACT)	Complies with NFPA 72-Supervising Station Fire Alarm System
10-1832	06-106	ARM-III (Agent Release Module)	Provides primary means for Fike's Clean Agent suppression systems
10-107 – 10-110	06-019	Conventional Graphic Annunciator	Provides graphic point annunciation for detectors

- **10-2256 Digital Alarm Communicator Transmitter (DACT)**

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.

- **10-2475 3 Zone Digital Alarm Communicator Transmitter (DACT)**

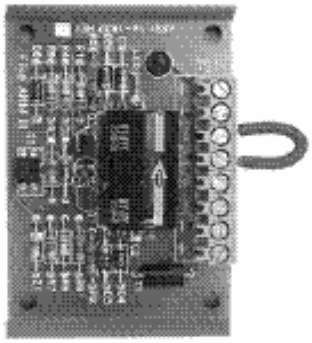
The 3 zone DACT can be used as a stand-alone DACT for sprinkler systems or as a slave communicator for existing fire alarm/suppression systems. It has connections for dual telephone lines for Central Station reporting. It is a compact unit programmable using the 10-2478 programmer.

- **10-2476 5 Zone Digital Alarm Communicator Transmitter (DACT)**

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.

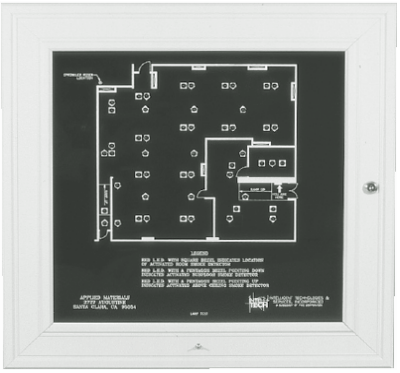
- **10-1832 Agent Release Module (ARM III)**

  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. Refer to the ARM manual, 06-106 for detailed instructions on the ARM.



- **10-107 – 10-110 Conventional Graphic Annunciator**

  Fike 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. If using the Hochiki smoke detectors with the graphic, it is necessary to use the older model bases.



3.5 SPARE PARTS

Description	Part Number
Keylock with cam	02-1606
Panel Key Only (without cam)	02-4983
Battery, 7 Amp-Hour	02-2018
Battery, 18 Amp-Hour	02-2820
Battery, 33 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 end-of-line (EOL) assembly, 1.5K	10-2462
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, 10K	10-2315
Fuse, 10 Amp, Mini Auto, Fast Acting (For F1 & F2)	02-4173
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)	
Red-Sherwin Williams - #F63VXR9951-4343 Polane 2.8T Plus Polyurethane Enamel	
Gray-Sherwin Williams - #F63VXA9975 Polane T Plus Polyurethane Enamel	

3.6 SPECIFICATIONS

Environmental:

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

Primary Input AC Power:

120 VAC, 50/60 Hertz, 2.6 Amps, 250 VA
240 VAC, 50/60 Hertz, 1.5 Amps @ 240VAC, 250 VA
System AC line power must originate from a dedicated circuit at the main building power distribution center. The circuit breaker shall be equipped with a lockout mechanism and be clearly labeled as a "Fire Protection Control Circuit."

10-2452-m Controller Board:

The controller's internal power supply provides 4.135 amps of 24VDC power. Power consumption of the controller itself is 0.135 amps at 24VDC in the normal standby mode.
8 " high x 11" wide x 3" deep; (1.2 lbs).

- **P1 - Power Supply Input:**

TERMINAL	DESCRIPTION	NOMINAL RANGE	SPECIFICATION DETAILS
24 VAC **Term. 1 & 2**	Transformer secondary	20.5-28.1VAC non-power-limited	
BATTERY **Term. 3 & 4** **+ -**	Standby Battery	24VDC nominal non-power-limited	Sealed lead-acid batteries only. 40 amp-hour maximum. Maximum supply current: 8 amps/ 27VDC Maximum charge current: 1.5 amps/ 27Vdc Batteries larger than 18 AH shall be mounted in external enclosure and the following qualifications apply: Wire Gauge shall be 14 AWG minimum. Maximum wire length shall not exceed 10 feet.

- **P2 – Relays:**

	TERMINAL	DESCRIPTION	WIRING	SPECIFICATION DETAILS
ALARM	**Term. 1 C** **Term. 2 NC** **Term. 3 NO**	Common Normally Closed Normally Open	Non Power-limited	SPDT Form C relay contact DC operation: 2 amps @30VDC (pf=.35) AC operation: .5 amps @250VAC (pf=.35)
SUPER-VISORY	**Term. 4 C** **Term. 5 NO** **Term. 6 NC**	Common Normally Open Normally Closed	Non Power-limited	SPDT Form C relay contact DC operation: 2 amps @30VDC (pf=.35) AC operation: .5 amps @250VAC (pf=.35)
TROUBLE	**Term. 7 C** **Term. 8 NO** **Term. 9 NC**	Common Normally Open Normally Closed	Non Power-limited	SPDT Form C relay contact DC operation: 2 amps @30VDC (pf=.35) AC operation: .5 amps @250VAC (pf=.35)

- **P3 – Input Circuits:**

TERMINAL	DESCRIPTION	WIRING	SPECIFICATION DETAILS
DETECT # 1 **Term. 1 & 2** **- +** **DETECT # 2** **Term. 4 & 5** **- +**	Detection inputs	Power-limited Class B (Class A with optional 10-2450 module) 4.3 K EOL resistor (yellow, orange, red)	Used for conventional detectors listed with this panel (see next section) or contact closure type detectors listed for fire alarm use. 20 Ω maximum wire resistance
SWITCH #1 **Term. 6 & 7** **- +** **SWITCH #2** **Term. 9 & 10** **- +** **SWITCH #3** **Term. 11 & 12** **- +**	Contact closure inputs	Power-limited Class B (Class A with optional 10-2450 module) 20K EOL resistor (red, black, orange)	Used for contact closure inputs such as Manual Release, Abort, Waterflow and Supervisory listed for fire alarm use. 100 Ω maximum wire resistance

DETECTION BASE COMPATIBILITY

					Maximum Bases per Circuit		
Fike P/N	**Size**	**Char . Ω**	**Manufacturer**	**Mfg. P/N**	**Sequential**	**Cross Zone**	**Single Detector Release**
67-1034	6”	430	Hochiki	NS6-224	25	25	NA
67-1036	4”	430	Hochiki	NS4-224	25	25	NA
C02-1164	6”	390	Hochiki	HS-221D	NA	25	NA
67-1035	6”	220	Hochiki	NS6-220	NA	25	25
67-1037	4”	220	Hochiki	NS4-220	NA	25	25
67-1026	6”	470	System Sensor	B401BR470	25	25	NA
67-1029	4”	470	System Sensor	B110RLP	25	25	NA
67-1031**	6”	0	System Sensor	B401B	NA	25	25

NOTE: If using LED graphic, it is required to use the older type bases as listed in Section 3.2. Please note on the order, “Using conventional graphic with panel, do not substitute bases”.

DETECTOR COMPATIBILITY

NOTE: Use Hochiki detectors with Hochiki bases and System Sensor detectors with System Sensor bases.

HOCHIKI

Fike P/N	Type	Mfg. P/N
63-1024	Photoelectric	SLR-24
63-1025	Photo/Heat	SLR-24H
67-1033	Ionization	SIJ-24
60-1029	Thermal, 135 w/Rate of Rise	DCD-135
60-1030	Thermal, 190 w/Rate of Rise	DCD-190
63-032	Photoelectric, Baseless	SLR-835B-2
60-1020	Thermal, 135 Fixed Temp	AL-DFE-135
60-1022	Thermal, 190 Fixed Temp	AL-DFE-190

SYSTEM SENSOR

Fike P/N	Type	Mfg. P/N
63-1015	Photoelectric	2451
63-1017	Photo/Heat	2451TH
67-1025	Ionization	1451
60-1027	135 Thermal	5451
63-1014	Photoelectric	2151
67-1023	Ionization	1151

- **P4 – Auxiliary Output Circuits:**

NOTE: Total current for system modules, notification appliances circuits, releasing devices, and regulated power circuits MUST NOT exceed the 4.0 Amps supplied by the SHP Pro controller .

TERMINAL	DESCRIPTION	WIRING	SPECIFICATION DETAILS
RES AUX OUTPUT Term. 1 & 2 + -	Resettable Auxiliary Output Power	24VDC nominal Power-limited	Used for 4-wire type detectors or others requiring power to drop out temporarily upon reset of the control panel. 2.0 Amp maximum
AUX OUTPUT Term. 2 & 3 - +	Auxiliary Output Power	24 VDC nominal Power-limited	Used for devices requiring constant 24VDC. 2.0 Amp maximum

NOTE: Devices connected must supervise power or use a listed End of Line Relay. (P/N 02-4667 and 02-4981)

NOTE: Resettable and non-resettable auxiliary power output share the same negative output terminal (#2)

- **P5 – Notification Appliance and Releasing Circuits:**

TERMINAL	DESCRIPTION	WIRING	SPECIFICATION DETAILS
AUDIBLE #1 Term. 1 & 2 + - **AUDIBLE #2 Term. 4 & 5 + -** **AUDIBLE #3 Term. 6 & 7 + -**	Notification outputs	24VDC nominal Power-limited Class B (Style Y) or Class A with optional module, 10-2448 Maximum wire resistance limited by the chart following 10 K Ω EOL Resistor (Brown, Black, Orange)	2.0 Amps maximum Fike tested indicating appliances compatible with the SHP Pro are detailed in the Fike compatibility document, P/N 08-186
AGENT RELEASE Term. 9 & 10 + - ***polarity shown in normal state***	Suppressant Agent Release output	24 VDC nominal Power-limited Class B (Style Y) or Class A with optional module, 10-2448 1.5 K EOL Resistor (Brown, Green, Red)	Requires Fike's ARM III, P/N 10-1832 6 ARM III's maximum Maximum wire resistance: 35 Ω
SOLENOID Term. 11 & 12 + -	Sprinkler, Foam Micromist, Inert Gas, and CO_2 Solenoid Release output	24 VDC nominal Power-limited Class B (Style Y) or Class A with optional module, 10-2448 Maximum wire resistance limited by the chart following	Fike tested and UL/FM approved valves, 0.100 – 1.4 amp valve (18-240 Ω) detailed in the Fike compatibility document. P/N 06-186 (FM Group 2 panel) The solenoid circuit does not require an EOL, it supervises through the coil for wiring integrity. ***For testing purposes only*To simulate the proper solenoid resistance, a 200 Ω, 5 watt resistor can be used (P/N 02-2686).***

FIELD WIRING LIMITATIONS FOR AUDIBLE AND SOLENOID OUTPUTS

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

- **P6 – Optional Class A Input Module**

10-2450 Class A Input Module: Optional module that provides the ability to wire input circuits in a Class A (NFPA Style D) configuration. If the module is installed on the SHP Pro, any of the circuits can be converted back to Class B by re-installing the EOL resistor. Maximum wire resistance total for the input circuits remain the same as listed in P3, Inputs above.
Dimensions: 4 7/8" long by 2 1/8" tall by 2" depth
Shipping Weight: 0.10 lbs.

- **P7 – Optional Class A Output Module**

10-2448 Class A Output Module: Optional module that provides the ability to wire output circuits in a Class A configuration. Maximum wire resistance total for the input circuits remain the same as listed in P5, Inputs above.
Dimensions: 4" long by 2" tall by 2" depth
Shipping Weight: 0.10 lbs.

- **P8 – Optional 10-2204 CRM4 Relay Module**

May be connected to power-limited or non-power-limited must segregate wiring.
4 SPDT relays
Rating: DC operation: 2 amps @30VDC (pf=.35)
AC operation @250VAC (pf=.35)
Dimensions: 3.5" long by 1.5" tall by 2" depth
Shipping Weight: 0.10 lbs.

3.7 ENCLOSURE SPECIFICATIONS

- Mounting Methods:

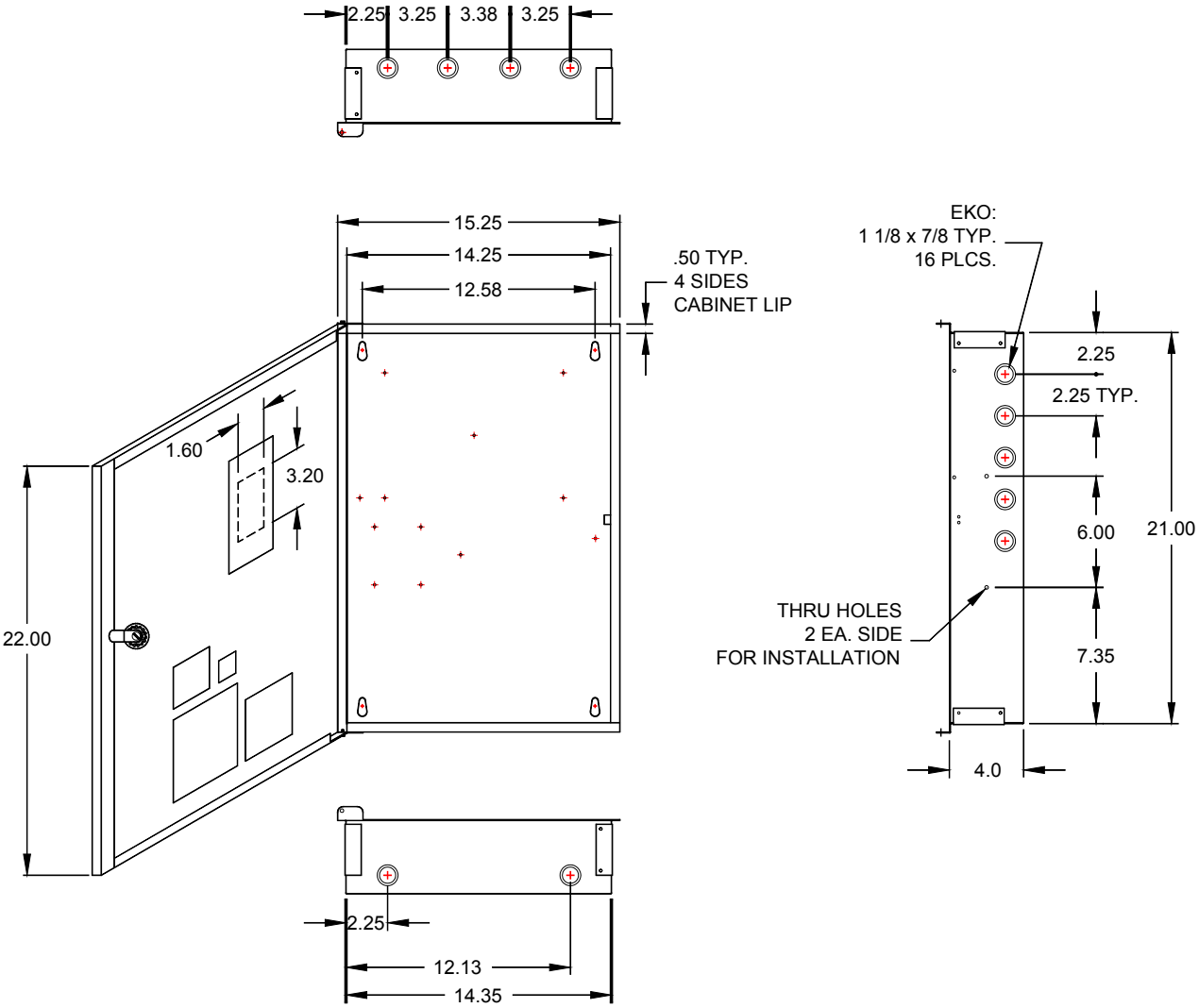
  Surface: Use tear-drop openings in back of back-box

  Flush: Use tear-drop openings in back of back-box and 3/16 dia. thru holes, 2 each side for secure installation. This method provides a ½ " lip around back-box and removable door with full swing.

- Weight: 15 lbs. empty

- Dimension: 22" High x 15.25" Wide x 4.5" Deep with attached door.
  See below for precise dimensions

The SHP Pro enclosure includes the back-box, door, and power transformer assembly. The enclosure is available in red or gray color options. Optional modules are shipped separately and must be installed in the field.



33 AH Battery Enclosure

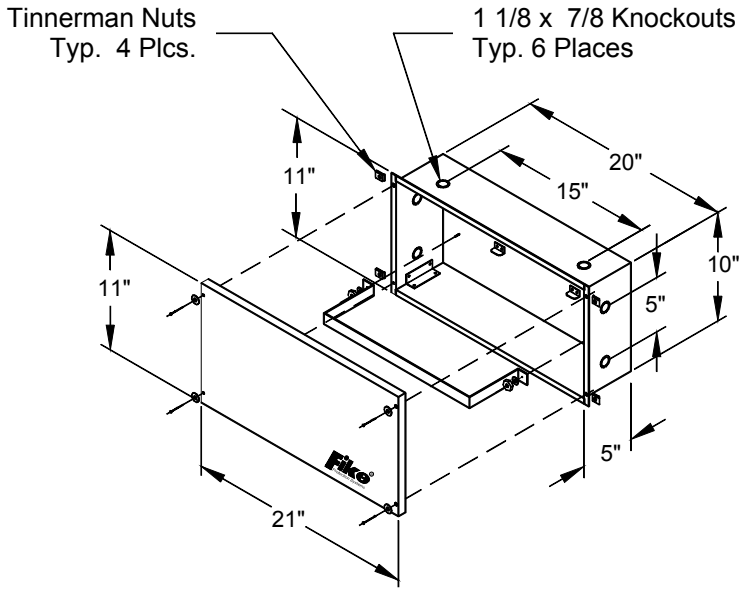
- **P/N: 10-2154-C** (C = color)
  R = Red
  G = Grey

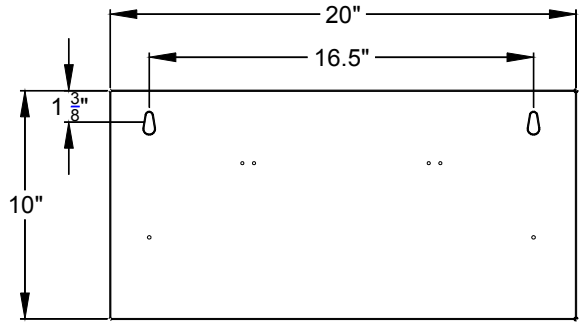
Mounting Methods:

Surface: Use tear-drop openings in back of back-box

Flush: Use tear-drop openings in back of back-box and 3/16 dia. thru holes, 2 each side for secure installation. This method provides a ½ " lip around back-box and removable door with full swing.

- Weight: 17 lbs. empty
- Dimension: 11" High x 21" Wide x 5" Deep with attached door.
  See below for precise dimensions





Back View
Tear Drop location for Mounting

66 AH Battery Enclosure

- **P/N: 10-2236-C** (C = color)
  R = Red
  G = Grey

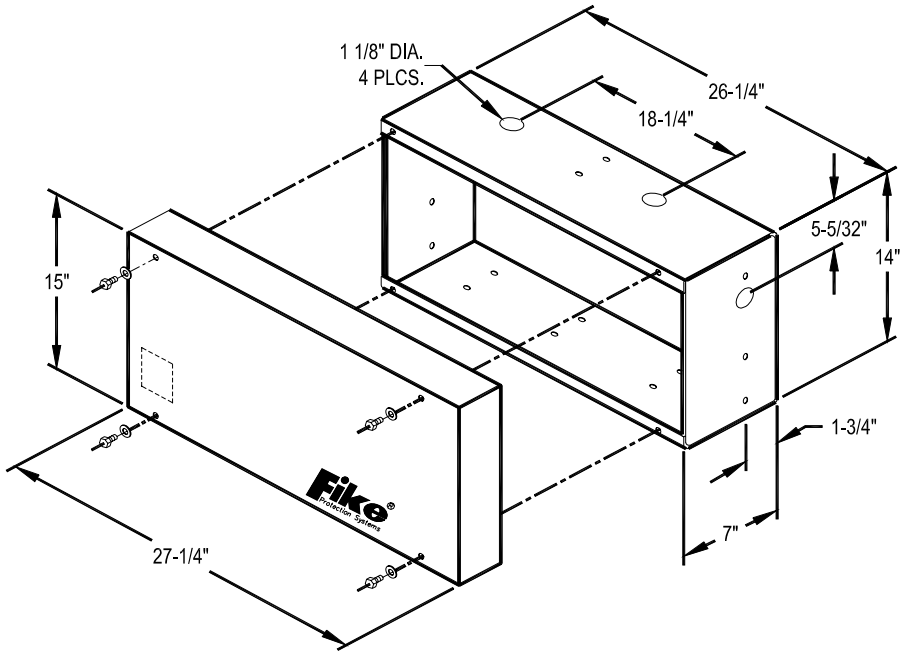
Mounting Methods:

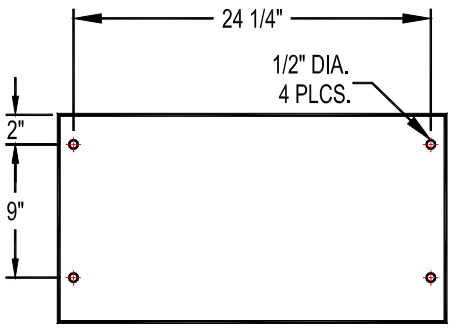
Surface: Use ½" diameter thru holes, 4 each in back of enclosure

Flush: Use ½" diameter thru holes, 4 each in back of enclosure and recess into wall for secure installation.

- Weight: 47 lbs. empty

- Dimension: 14" High x 26 1/4" Wide x 7" Deep with attached door.
  See below for precise dimensions





4.0 INSTALLATION

INSTALLATION OVERVIEW

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 4.1 – 4.11 in order.

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.

4.1 ENCLOSURE INSTALLATION

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 effect the successful operation of the equipment. Choose a mounting location that is free from environmental problems. Refer to Section 3.6, Specifications, for the exact temperature ratings of the equipment. Do not install in an environment that exceeds these temperature ranges. The SHP Pro Control System enclosure is not fire rated.

CAUTION: DO NOT INSTALL ON or IN A FIRE RATED WALL.

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. Reference Section 3.7, Enclosure Specifications, for enclosure dimensions.

Determine the maximum number of conductors needed from the design. Wire is to be routed to the control panel through back-box via knock-out openings (Reference Section 4.2). Conduit knock-outs are provided for two distinct conduit sizes. Removing just the inside hole creates a one-half inch (1/2”) opening. Removing the entire opening provides a three-quarter inch (3/4”) opening.

CAUTION: Do not install the electronic assemblies into the back-box until the environment is free from construction dust.

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.

4.2 POWER AND FIELD WIRING

Field Wiring / Power-limited Requirements:
Route all field wiring through the appropriate conduit knockouts. Provide adequate wire length for strain relief. SHP Pro terminal blocks (including CRM4 and Class-A modules) accept single wire from 14 to 30 AWG.

Non Power-limited - SHP Pro bottom side (P1) connections including AC Power, and Battery power are non-power-limited and shall be routed only in the enclosure's left side. SHP Pro left side (P2) connections including Alarm, Supervisory, and Trouble relays are non-power-limited and shall be routed only in the enclosure's left side.

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

When planning the type of wire to be used, refer to National Electrical Code, NFPA 70. This information was derived from the 1993 edition.

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

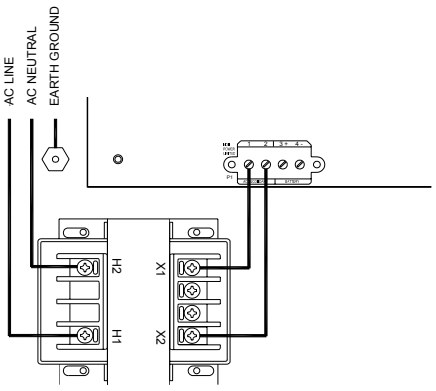
Abort Switch Wiring Criteria:
Abort input circuits are to be wired only with momentary contact switches so they cannot be left activated without human interaction.

AC Power & Chassis Wiring:
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."**

Transformer: The transformer mounts to the four press studs. Align on the studs and attach with four 6-32 nuts and washers.

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.

NOTE: 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 gas cartridge actuators or other non-restorable electrical devices until the system has been proven to be fully operational. (Also see Section 4.5 for proper wiring)



4.3 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 meggar or any means that applies voltages in excess of device ratings (to prevent damage to the devices).

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 these limits:

Detector Circuits	Input1, Input2:	Less than:	20 Ωs/10 per leg
Contact Monitor Circuits	Input3, Input4, and Input 5	Less than:	100 Ωs/50per 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. (shown near the top of the board on the wiring diagram in section 4.2).

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 these limits:

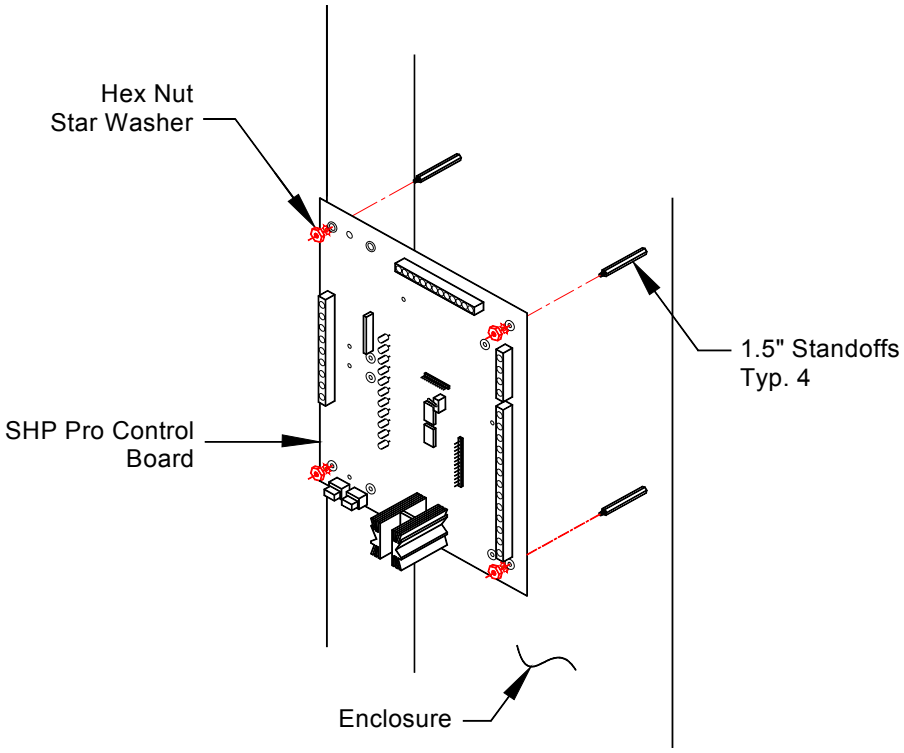
Max Current (Amps)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0
Audibles 1-3 (Max Ωs)	24	12	8	6	4.8	4.0	3.0	2.4	1.6	1.2
Agent Release (Max Ωs)	35	35	35	35	35	35	35	35	35	35
Solenoid (Max Ωs)	12	6	4	3	2.4	2.0	1.5	1.2	0.8	0.6

4.4 SYSTEM MODULE INSTALLATION

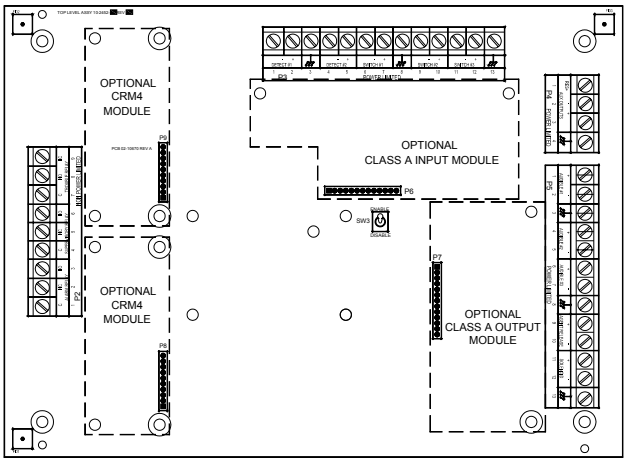
- Install system modules after the enclosure has been installed and cleaned of all dust and debris. Modules include the appropriate mounting hardware. Prior to handling or installing any modules, appropriate anti-static procedures must be followed per Section 1.6.

NOTE: Optional modules should be mounted to controller prior to mounting controller into enclosure.

SHP Pro Controller: The SHP Pro Controller mounts on the five standoffs in the upper half of the enclosure. Secure using the four 6-32 nuts & four lock washers provided.

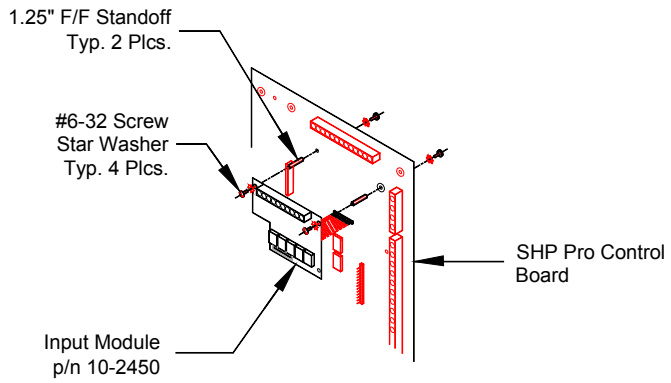


Optional Modules (4 places as shown below)



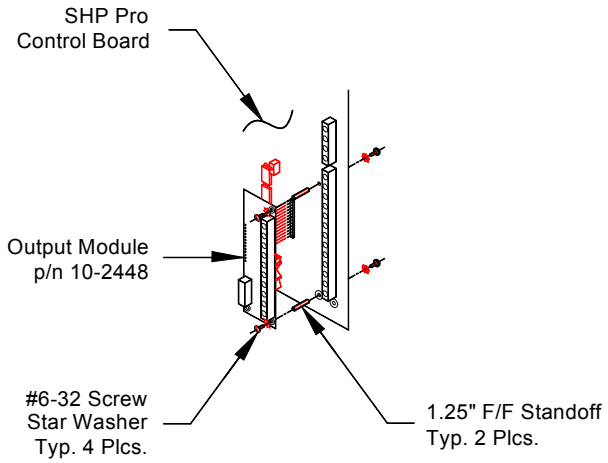
Class A Input Module:

Install the two standoffs onto the main control board as shown. The optional Class-A input module connects to header P6. Align using standoffs, and secure into place.



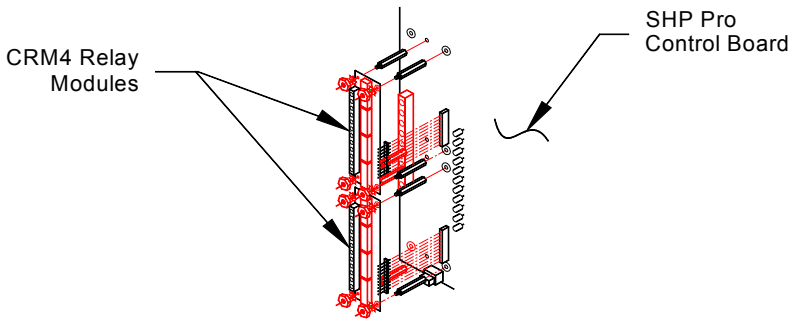
Class A Output Module:

Install the two standoffs onto the main control boards as shown. The optional Class A output module connects to header P7. Align using standoffs, and secure into place.

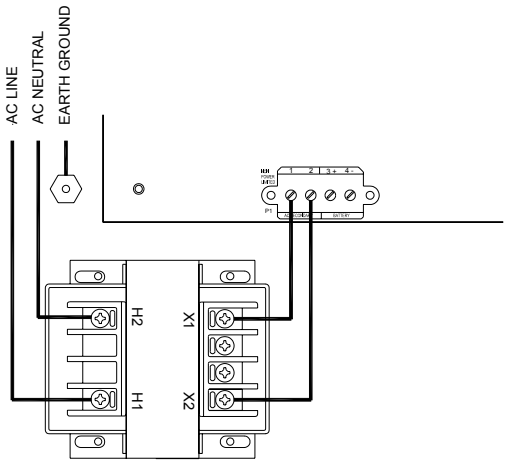


CRM4:

The optional CRM4's mount on four standoffs on the SHP Pro's left side P8 and P9 headers. Align using standoffs, press and secure into place.



4.5 INITIAL POWER-UP



Prior to power-up, interconnect the transformer secondary winding to SHP Pro P1-1 & P1-2 per the wiring diagram. Ensure AC power is wired per the wiring diagram.

With other EOL's still connected, power the system up and validate AC Normal state (green LED). Upon Power-up (or reset) all LED's and piezo are on for 2-4 seconds. Only the following troubles should be annunciated (within 30 seconds).

*Trouble LED (yellow) should be illuminated
*Diagnostic LED (**E**) since batteries are not connected

Do not proceed until system is free of troubles except these.

4.6 COMPLETE FIELD WIRING

Power the system down by removing and locking out the AC power. Determine the installation application from one of the four applications shown in this section and complete all field wiring per the wiring diagrams in this section. Do not connect any releasing hardware (such as initiators or GCA's) at this time.

4.6.1 CIRCUIT CONFIGURATION

Common specifications to all applications:

- Five initiating device circuits – compatible with Class A module

  Input 1: Compatible with either 2 wire smoke detectors as Sequential, Cross Zone (with input 2), or Single Detector Release

  Hochiki 430 Ω, 220 Ω; System Sensor 470 Ω
  Compatible with contact closure alarm devices

☞ **NOTE:** If using 0 Ω detector bases or contact closure devices on Input 1 or Input 2 circuits, clip the pertinent "0 Ω jumper". Clipping this jumper limits the current to 100 mA for the associated circuit.

  Input 2: Compatible with either 2 wire smoke detectors as Sequential, Cross Zone (with input 1), or Single Detector Release

  Hochiki 430 Ω, 220 Ω; System Sensor 470 Ω
  Compatible with contact closure alarm devices

  Input 3: Compatible with contact closure devices

  Input 4: Compatible with contact closure devices

  Input 5: Compatible with contact closure devices

- Three notification appliance circuits. Each NAC is capable of annunciating a continuous, slow, fast, or synchronized audible/visual output. Modes of operation are described in the Audible Options Table in Section 4.7.1.

- Three dedicated relays outputs configured for Alarm, Trouble, and Supervisory. Contact ratings 2A, 30VDC.

- One each, resettable and continuous 2.0A auxiliary outputs.

- Expansion slots compatible with optional Class A input module, Class A output module, and two each CRM4 modules

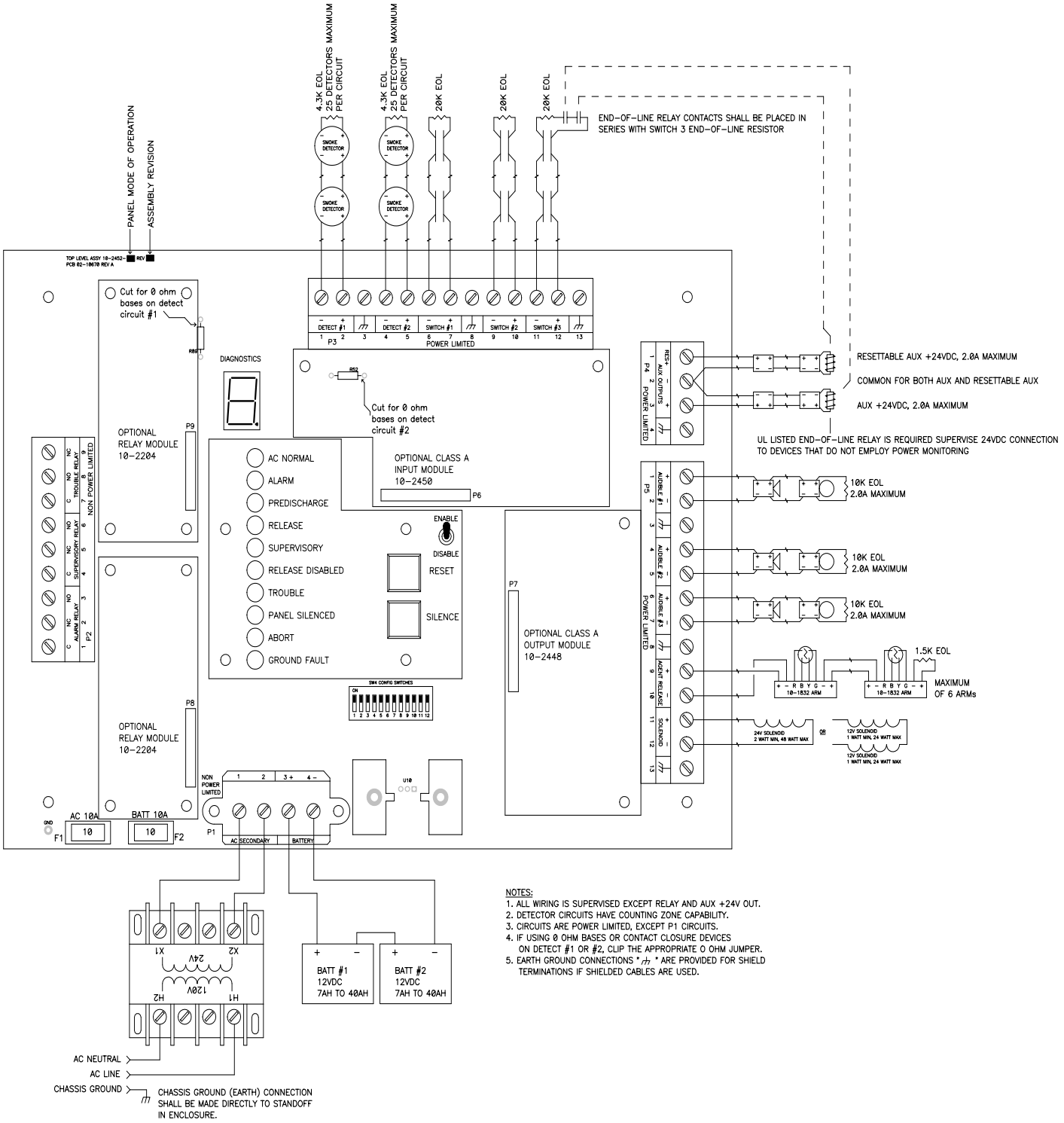
- Primary indicator LEDs
  - AC Normal
  - Alarm
  - Predischarge
  - Release
  - Supervisory
  - Releasing Disabled
  - Trouble
  - Alarms Silenced
  - Abort
  - Ground Fault

- 7 segment display for panel condition indication

  - Integral power supply capable of 4.0 amps output with 40AH battery charging capability.

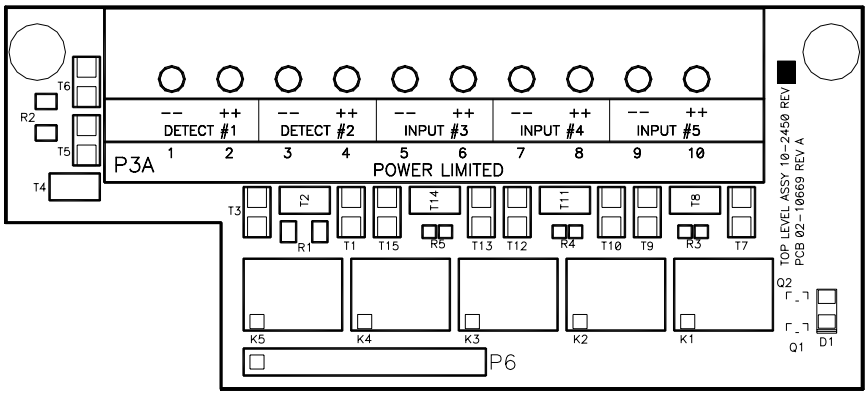
4.6.2 WIRING DIAGRAMS

SHP PRO CONTROLLER

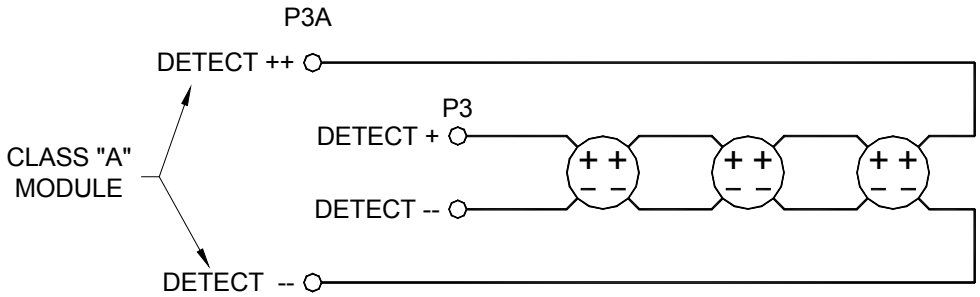


CLASS A INPUT MODULE, 10-2450

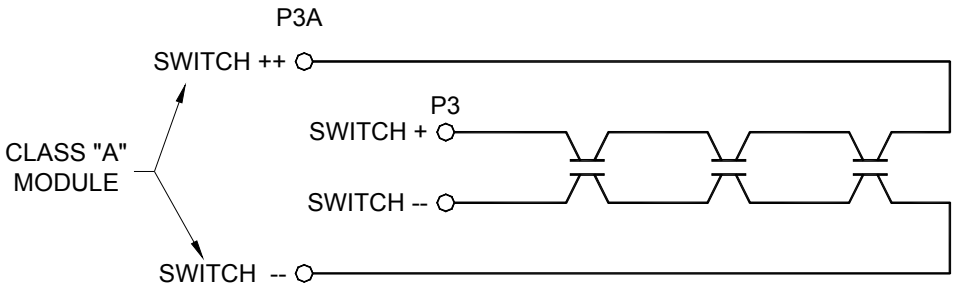
This optional module allows “Class A” wiring of any of the five initiating circuits versus the standard Class B wiring. It mounts directly onto the SHP Pro header P6. If used, any of the five circuits can be wired as class B rather than class A.



Detection Inputs 1 and 2:

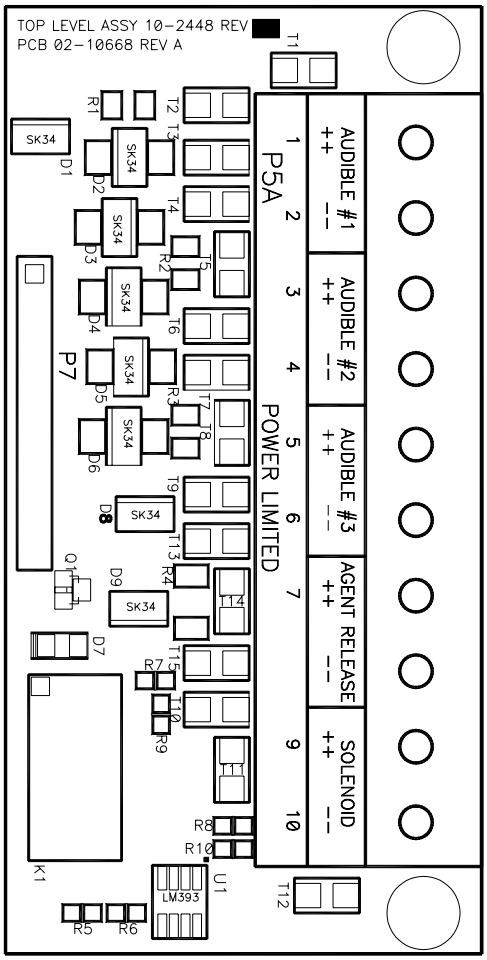


Contact Closure Inputs 3 and 4:

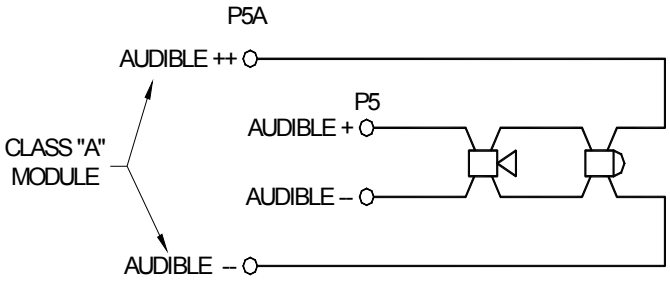


CLASS A INDICATING APPLIANCE & RELEASE CIRCUITS MODULE, 10-2448

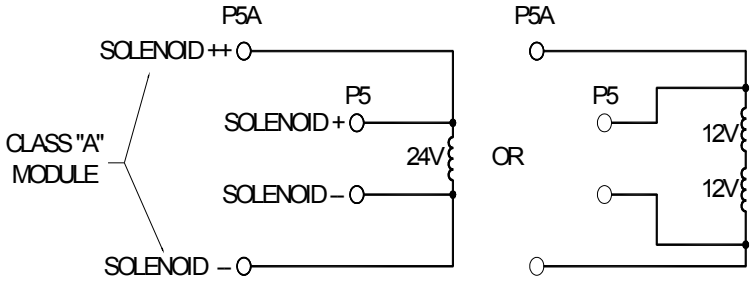
This optional module allows "Class A" wiring of the three indicating appliance, agent release and solenoid output circuits versus the standard Class B wiring. It mounts directly onto the SHP Pro header P7. If used, any of the circuits can be wired as class B rather than class A.



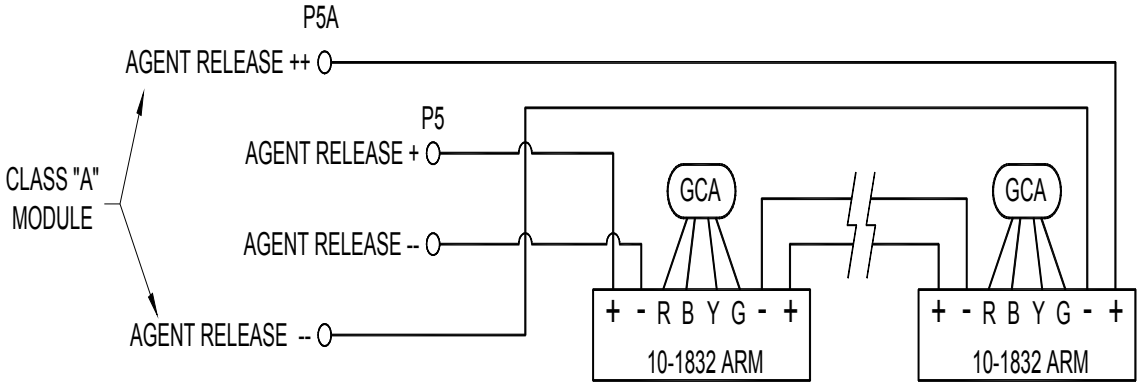
Audible Outputs 1 thru 3:



Solenoid Output:

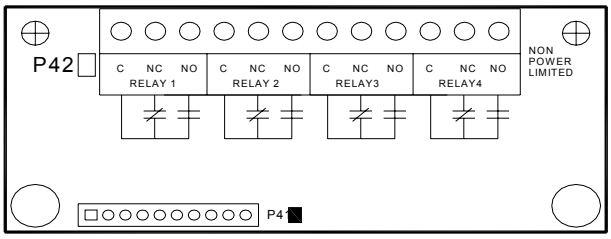


Clean Agent Release Output:



CRM4, 10-2176 RELAY MODULE

The optional Relay Module provides 4 additional dry relay contacts. The relay module is mounted to the SHP Pro main controller at header P8 and/or P9 and is mechanically secured using the (4)-supplied standoffs and screws.



4.7 SYSTEM CONFIGURATION (SW4 Settings)

Set the configuration dipswitch, SW4 to the provide the appropriate operation for the installation application:

10-063-2 This Application Only

SW4 Position	Function	0 = Off / 1 = On	Clean Agent Application 1	Clean Agent & Preaction Application 2	Preaction Application 3	Industrial Application 4	S9/10/11
S1 / S2	Application	0 / 0	Clean Agent				
		0 / 1		Clean Agent & Preaction			
		1 / 0			Preaction		
		1 / 1				Industrial Solenoid Releasing	
S3	Trouble Relay	0	No Delay				
		1		AC Delay (12 hours)			
S4 / S5	Audible Operation	0 / 0		Audible Option 1			
		0 / 1		Audible Option 2			
		1 / 0		Audible Option 3			
		1 / 1		Audible Option 4			
S6	Aud. Sync	0		Gentex Sync			
		1		Future Sync			
S7 / S8	Pre-discharge Delay	0 / 0		0 seconds	Not Applicable		
		0 / 1		15 seconds			
		1 / 0		30 seconds			
		1 / 1		60 seconds			
S9 / S10	Abort Type or SOL ON time	0 / 0		Abort - Type 1	Det1 activates SOL	Solenoid ON continuous	0 / 0 / 0
		0 / 1		Abort - Type 2	Det2 activates SOL	Solenoid ON 5 minutes	0 / 0 / 1
		1 / 0		Abort - Type 3	Det1 **OR** 2 activates SOL	Solenoid ON 10 minutes	0 / 1 / 0
		1 / 1		Abort - Type 4	Det1 **AND** 2 activates SOL	Solenoid ON 15 minutes	0 / 1 / 1
S11	WaterFlow Operation	0	Not Applicable	0 / 0 Det1 activates SOL	WF activates SOL	Solenoid ON 20 minutes	1 / 0 / 0
		1		0 / 1 WF activates SOL	WF doesn't activate SOL	Solenoid ON 30 minutes	1 / 0 / 1
				1 / 0 Det1 **OR** WF activates SOL		Micromist - Machinery Spc.	1 / 1 / 0
				1 / 1 Det1 **AND** WF activates SOL		Micromist - Turbine Gen.	1 / 1 / 1
S12	Detection Type	0	Sequential / SDR	⇧ S11/S12	Sequential / SDR		
		1	Cross Zone		Cross Zone		

NOTE: (Audible Options Table in Section 4.7.1)

4.7.1 Audible Options

Audible Options				
				Non-silenceable
Option #	**SW4/SW5**	**Audible 1**	**Audible 2**	**Audible 3 (on until reset)**
Option 1	**0/0**			
Alarm		ON (continous)		
Pre-discharge			ON (continous)	
Release			ON (continous)	ON (continous)
Option 2	**0/1**			
Alarm		ON (continous)	ON (continous)	
Pre-discharge			ON (continous)	
Release			ON (continous)	ON (continous)
Option 3	**1/0**			
Alarm		ON (slow)	ON (continous)	
Pre-discharge		ON (Fast)	ON (continous)	
Release		ON (continous)	ON (continous)	ON (continous)
Option 4	**1/1**			
Alarm		ON (slow)	ON (sync-continous)	
Pre-discharge		ON (fast)	ON (sync-continous)	
Release		ON (continous)	ON (sync-continous)	ON (sync-continous)
NOTE:	***Option 4-Audible 2 - when using this option and Gentex Commander 2 series audible/visible devices, the audible will silence and the visible will remain on until reset.***			

4.7.2 ABORT TYPES:

These abort types are programmable via SW3 configuration switches S9-S10. Countdown does not begin until the system is in the predischarge state.

TYPE 1: The abort is effective only if active upon entry into predischarge state. Countdown continues during abort activation. Upon abort deactivation (during predischarge), the release cannot again be aborted, so release occurs upon countdown completion. Conforms to Industrial Risk Insurers (IRI) 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 predischarge, 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 with "0" countdown also provides "NYC mode" as described in the note below.

NOTE: The ABORT switch delays releases initiated by automatic detection schemes. Releases initiated by activated Manual Release input circuits override the Abort Switch.

NOTE: For Abort = 4 with countdown = 00, system operates in "NYC mode" with a 90 second verification delay, then a 30 second countdown after each abort input deactivation. During the 90 second verification delay, the system emulates continuous abort activation. After the 90 second delay, the system starts a 30 second pre-discharge delay.

4.7.3 Application #1 Detail - Clean Agent Release Only

Circuit Configurations:

DETECT #1 (In 1)	Detection
DETECT #2 (In 2)	Detection
SWITCH #1 (In 3)	Manual Release
SWITCH #2 (In 4)	Abort
SWITCH #3 (In 5)	Supervisory
AUDIBLE #1	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #2	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #3	Refer to Audible Option table (Section 4.7.1)
AGENT RELEASE	Clean Agent
ALARM RELAY (main)	Alarm
SUPERVISORY RELAY (main)	Supervisory
TROUBLE RELAY (main)	Trouble
P8 Relay 1 (CRM4-1)	Alarm
Relay 2 (CRM4-1)	Predischarge
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 1	Trouble Relay – No Delay Trouble Relay – A/C Power failure delay
S4 / S5	0/0 0/1 1/0 1/1	Audible Option 1 (See Section 4.7.1) Audible Option 2 (See Section 4.7.1) Audible Option 3 (See Section 4.7.1) Audible Option 4 (See Section 4.7.1)
S6	0 1	Gentex – Sync. Protocol Future
S7 / S8	0/0 0/1 1/0 1/1	Pre-discharge Delay 0 seconds Pre-discharge Delay 15 seconds Pre-discharge Delay 30 seconds Pre-discharge Delay 60 seconds
S9 / S10	0/0 0/1 1/0 1/1	Abort – Type 1 Abort – Type 2 Abort – Type 3 Abort – Type 4
S11	0 1	Future
S12	0 1	Sequential / Single Detector Release* Cross Zone

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

4.7.4 Application #2 Detail – Clean Agent Release AND Sprinkler Preaction

Circuit Configurations:

DETECT #1 (In 1)	Detection*
DETECT #2 (In 2)	Waterflow**
SWITCH #1 (In 3)	Manual Release
SWITCH #2 (In 4)	Abort
SWITCH #3 (In 5)	Supervisory
AUDIBLE #1	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #2	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #3	Refer to Audible Option table (Section 4.7.1)
AGENT RELEASE	Clean Agent
SOLENOID	24V
ALARM RELAY (main)	Alarm
SUPERVISORY RELAY (main)	Supervisory
TROUBLE RELAY (main)	Trouble
P8 Relay 1 (CRM4-1)	Alarm
Relay 2 (CRM4-1)	Predischarge
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 1	Trouble Relay – No Delay Trouble Relay – A/C Power failure delay
S4 / S5	0/0 0/1 1/0 1/1	Audible Option 1 (See Section 4.7.1) Audible Option 2 (See Section 4.7.1) Audible Option 3 (See Section 4.7.1) Audible Option 4 (See Section 4.7.1)
S6	0 1	Gentex – Sync. Protocol Future
S7 / S8	0/0 0/1 1/0 1/1	Pre-discharge Delay 0 seconds Pre-discharge Delay 15 seconds Pre-discharge Delay 30 seconds Pre-discharge Delay 60 seconds
S9 / S10	0/0 0/1 1/0 1/1	Abort – Type 1 Abort – Type 2 for Agent Release Output Abort – Type 3 only (not Solenoid) Abort – Type 4
S11 / S12	0/0 0/1 1/0 1/1	Detect 1 activates solenoid Waterflow activates solenoid Detect 1 **OR** Waterflow activates solenoid Detect 1 **AND** Waterflow activate solenoid

* Sequential Detection shall be accomplished using 430 Ω bases. Single Detector Release shall be accomplished using 220 Ω bases.

* Waterflow input does not effect (completely independent from) clean agent releasing activities.

4.7.5 Application #3 Detail - Preaction Sprinkler, Deluge (10-063-2 this detail only)

Circuit Configurations:

DETECT #1 (In 1)	Detection
DETECT #2 (In 2)	Detection
SWITCH #1 (In 3)	Manual Release
SWITCH #2 (In 4)	Waterflow
SWITCH #3 (In 5)	Supervisory
AUDIBLE #1	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #2	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #3	Refer to Audible Option table (Section 4.7.1)
SOLENOID	24V
ALARM RELAY (main)	Alarm
SUPERVISORY RELAY (main)	Supervisory
TROUBLE RELAY (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 1	Trouble Relay – No Delay Trouble Relay – A/C Power failure delay
S4 / S5	0/0 0/1 1/0 1/1	Audible Option 1 (See Section 4.7.1) Audible Option 2 (See Section 4.7.1) Audible Option 3 (See Section 4.7.1) Audible Option 4 (See Section 4.7.1)
S6	0 1	Gentex – Sync. Protocol Future
S7 S8	0 1	Not used Not used
S9 / S10	0/0 0/1 1/0 1/1	Solenoid active on Input 1 Solenoid active on Input 2 Solenoid active on Input 1**or** Input 2 Solenoid active on Input 1 **and** Input 2
S11	0 1	Waterflow activates solenoid Waterflow **does not** activate solenoid
S12	0 1	Sequential / Single Detector Release Cross Zone / ***S9 & S10 operation is void when cross zone operation is selected***

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

NOTE: Switch 1 and 2 provide no function when 10-063-2 panel is ordered.

4.7.6 Application #4 Detail – Industrial Solenoid (CO_2, Watermist, Foam, Deluge)

Circuit Configurations:

DETECT #1 (In 1)	Detection
DETECT #2 (In 2)	Detection
SWITCH #1 (In 3)	Manual Release
SWITCH #2 (In 4)	Abort (hardcoded to type 4)
SWITCH #3 (In 5)	Supervisory
AUDIBLE #1	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #2	Refer to Audible Option table (Section 4.7.1)
AUDIBLE #3	Refer to Audible Option table (Section 4.7.1)
SOLENOID	24V
ALARM RELAY (main)	Alarm
SUPERVISORY RELAY (main)	Supervisory
TROUBLE RELAY (main)	Trouble
P8 Relay 1 (CRM4-1)	Alarm
Relay 2 (CRM4-1)	Predischarge
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 1	Trouble Relay – No Delay Trouble Relay – A/C Power failure delay
S4 / S5	0/0 0/1 1/0 1/1	Audible Option 1 (See Section 4.7.1) Audible Option 2 (See Section 4.7.1) Audible Option 3 (See Section 4.7.1) Audible Option 4 (See Section 4.7.1)
S6	0 1	Gentex – Sync. Protocol Future
S7 / S8	0/0 0/1 1/0 1/1	Pre-discharge Delay 0 seconds Pre-discharge Delay 15 seconds Pre-discharge Delay 30 seconds Pre-discharge Delay 60 seconds
S9 / S10 / S11	0/0/0 0/0/1 0/1/0 0/1/1 1/0/0 1/0/1 1/1/0 1/1/1	Solenoid on continuous Solenoid on 5 minutes Solenoid on 10 minutes Solenoid on 15 minutes Solenoid on 20 minutes Solenoid on 30 minutes Micromist – Machinery Space Micromist – Turbine Generator
S12	0 1	Sequential / Single Detector Release Cross Zone

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

4.8 CHECKOUT SYSTEM

Power the system up and again verify no troubles except for missing batteries. Connect the batteries per the Wiring diagram. After pressing reset switch, verify trouble LED does not illuminate. Perform system check-out per Chapter 6.

> **NOTE:** SW3 should be in the “disable position” upon power-up and power-down to protect against accidental release.

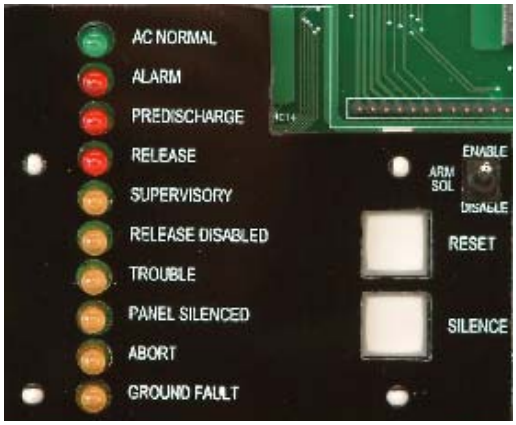
4.9 RELEASING HARDWARE

After complete system check-out, connect the releasing hardware according to the appropriate documentation, and enable the Releasing Circuits via SW3.

5.0 OPERATIONS

5.1 USER SWITCH INTERACTION

The user switches provide these capabilities:



Silence Switch: Silences audibles & piezo. Changes flashing LED's to steady. If held for 3 seconds it will toggle the panel between current history, last 20 events, and A/D conversion (Fike development use only).

Reset Switch: Resets system including turning off outputs, interrupting resettable power. Momentarily activates piezo, all LED's, and trouble relay. **Displays panel application number.** Restores system to normal state.

Enable/Disable: Disables the agent release and solenoid circuit.
Disables audible circuits and all relay outputs excluding supervisory and trouble.

5.2 SILENCING RULES

- The Silence switch silences audibles #1 and 2 (but does not effect Relays).
- After silencing, entry into new states only sounds that state's audibles (except entry into release state resounds pre-discharge audibles plus also resounds alarm audibles).
- Alarm, waterflow, supervisory, pre-discharge, release and trouble LED's stay on steady after silencing to acknowledge operator action.

5.3 SUPERVISORY AND TROUBLE STATUS LED'S

Event	LED	Piezo
Upon supervision alarm or trouble	Flashes (2 second rep)	On
Upon silence acknowledge	Steady	Off
Upon event clear	Off	Off
Upon event recurrence	Flashes (2 second rep)	On

Flashes occur for one second every 2 seconds.
Piezo operation is: {Alarm Events: Chirp} {Supervisory: Warble} {Trouble: On steady}
Piezo priority is in same order; alarm events over supervisory events over trouble events.

5.4 LATCHING VERSUS NON-LATCHING TROUBLES

Input circuit open, Solenoid Open, and IntelliFET failure are latching troubles (1,2,3,4,5,11,H diagnostic). All other troubles are non-latching (upon restoration to a normal condition). If all troubles are non-latching and all have cleared, system clears to normal. Upon clearing of non-latching troubles (including AC power loss) the diagnostic code will clear, the trouble relay will return to normal, and the LED will extinguish. Press and hold the SILENCE button for 3 seconds to display the history of the last 20 events on the diagnostics display.

5.5 SUPERVISION RESPONSE TIMES

Supervision of 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 input only.

5.6 LOW POWER CONDITIONS

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.

5.7 DIAGNOSTIC LED CODE DESIGNATORS

The current events, history events and Analog to Digital conversion can be viewed by pressing the silence switch for 3 seconds. This will toggle the panel segment diagnostic LED.

The seven segment diagnostic LED cycles through display of these codes (with or with-out a period) for the events that have occurred since the last reset. For example, if input circuit #3 is activated, the LED displays "**3.**".

NOTE: The period portion of the display is often overlooked. When viewing the diagnostic codes, do not overlook the period.

Circuit/Mode	Code	Condition	Code with period	Condition
DETECT #1	1	Open	1.	Activated
DETECT #2	2	Open	2.	Activated
SWITCH #1	3	Open	3.	Activated
SWITCH #2	4	Open	4.	Activated
SWITCH #3	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	Abort, premature	b.	Abort, late
2nd Alarm Active	C	Input Circuit 1	C.	Input Circuit 2
DISABLED (toggle switch)	d			
Battery Failure	E	Missing Battery		
System Voltage	F	Low Voltage (>19V)		
Microcontroller	H	Intelli-Fet (FAILED)	H.	5V ref./A-D failure
Ground Fault	0			
Reset	P			
Power Failure	-	A/C Brown-out (<85%)		

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

5.8 TYPICAL ALARM OPERATION

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.
Predischarge LED:	Flash. After silencing, illuminate steady.
Predischarge Relay:	Activate. Alarm relay also remains active.
Alarm Audibles:	Activate until silenced.
Predischarge 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.
Predischarge LED:	OFF
Predischarge Audibles:	Activate. (Unsilence if silenced)
Release Audibles:	Activate until silenced.
Release Circuits:	Activate AgtRel 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.

NOTE: During activation of multiple events, piezo priority is alarm over supervisory over trouble.

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

5.9 SUPERVISORY OPERATION

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.

5.10 TROUBLE OPERATION

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 5.4). 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.

5.11 SHP PRO INPUT / OUTPUT MATRIX

Single Hazard Panel PRO Panel State / Output Matrix

Panel Application 1 Clean Agent	Audible 1	Audible 2	Audible 3	Clean Agent (ARM)	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			ON	ON		ON	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 preset

SEE NEXT PAGE FOR PANEL APPLICATION #2 I/O

Panel Application 3 Preaction	Audible 1	Audible 2	Audible 3	Clean Agent (ARM)	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 preset

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

Panel Application 4 Industrial Solenoid Releasing	Audible 1	Audible 2	Audible 3	Clean Agent (ARM)	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			ON	ON		ON	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 preset

NOTE: Audible Options Table is Section 4.7.1

Panel Application 2 Det. 1 Operates Solenoid	Audible 1	Audible 2	Audible 3	Clean Agent	Solenoid	P2 Alarm Relay	P2 Supervisory Relay	P2 Trouble Relay	P8 Alarm Relay 1	P8 Pre-discharge Relay 2	P8 Release Relay 3	P8 Abort Relay 4	P9 Alarm Relay 1	P9 Waterflow Relay 2	P9 Supervisory Relay 3	P9 Trouble Relay 4
Alarm	see audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow						ON			ON				ON	ON		
Abort												ON				
SW3 Disable							ON								ON	
Supervisory							ON								ON	
Trouble								ON								ON
Manual Release				ON	ON	ON			ON	ON	ON		ON			
Panel Application 2 Waterflow Operates Solenoid																
Alarm	see audible options table					ON			ON				ON			
Pre-discharge						ON			ON	ON			ON			
Release				ON		ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort												ON				
SW3 Disable							ON								ON	
Supervisory							ON								ON	
Trouble								ON								ON
Manual Release				ON		ON			ON	ON	ON		ON			
Panel Application 2 Det. 1 or Waterflow Operates Solenoid																
Alarm	see audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort												ON				
SW3 Disable							ON								ON	
Supervisory							ON								ON	
Trouble								ON								ON
Manual Release				ON	ON	ON			ON	ON	ON		ON			
Panel Application 2 Det. 1 and Waterflow Operates Solenoid																
Alarm	see audible options table					ON			ON				ON			
Pre-discharge					ON	ON			ON	ON			ON			
Release				ON	ON	ON			ON	ON	ON		ON			
Waterflow					ON	ON			ON				ON	ON		
Abort												ON				
SW3 Disable							ON								ON	
Supervisory							ON								ON	
Trouble								ON								ON
Manual Release				ON	ON	ON			ON	ON	ON		ON			

NOTE: Audible Options Table is Section 4.7.1

6.0 SERVICING

Qualified individuals shall perform Inspection, Testing, and Maintenance. 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.

6.1 CHECKOUT

After system installation per previous chapters, verify system operation to the satisfaction of the authority having jurisdiction. As required, the ***Record of Completion*** in Chapter 1 of NFPA 72 must be completed. If using releasing initiators/GCA in conjunction with the ARM-III module:

1.) Releasing circuits should not be operated with the initiator/GCA connected during checkout. If the integrity of the releasing circuit is required to be tested, install a flashbulb (P/N 02-3799) in place of the initiator/GCA. **Do not** connect initiators/GCA to ARM III if any **ground faults** are present on the system.

2.) Follow ARM-III manual 06-106 for safety considerations and ARM-III wiring.

NOTE: Use the Arm /Disable Switch (SW4) to disable the Agent Release and Solenoid circuits during system checkout and maintenance. As a minimum, place SW4 in the “disable” position upon system power-up and power-down. After power-down, allow the ARM-III module ten minutes to self-discharge prior to maintenance to prevent accidental firing of initiators.

6.2 MAINTENANCE

Periodic maintenance shall be, as a minimum, performed per NFPA 72. Maintenance shall be performed by a trained or authorized Fike representative. Certain 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
- Initiator Replace every 5 years according to date of installation

6.3 TROUBLESHOOTING

System troubles and events are displayed via the diagnostic LED codes defined in Section 5.2. Additional troubleshooting aids are provided in Section 6.3.1,

6.3.1 EVENT DESCRIPTION / POSSIBLE RESOLUTION

Diagnostic Display Code	Description	Tips to Resolve
1 2	Detection Circuit 1 open Detection Circuit 2 open	♦ Verify correct value EOL Resistor (4.3 K - Yellow-Orange-Red) has been installed. ♦ Measure field wiring resistance = 20 Ω or less. ♦ Verify all field devices are installed properly (smoke detector heads installed on bases). ♦ Remove field wiring and install a 4.3K resistor at panel to verify SHP Pro Control Board is functioning properly.
3 4 5	Input Circuit 3 open Input Circuit 4 open Input Circuit 5 open	♦ Verify correct value EOL Resistor (20K –red, black, orange) has been installed. ♦ Measure field wiring resistance = 100Ω or less. ♦ Verify all field devices are installed properly. ♦ Remove field wiring and install a 20K resistor at panel to verify SHP Pro Control Board is functioning properly.
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. ♦ Reference Section 6.3.1, Typical Voltages and Tolerances to determine if circuit is activated or shorted. ♦ Verify correct value EOL Resistor
6 7 8 **NOTE**: The # 6 is often confused with letter “b”.	Audible Circuit 1 open Audible Circuit 2 open Audible Circuit 3 open	♦ Verify correct value EOL Resistor (10Kbrown, Black, Orange) has been installed. ♦ Measure field wiring resistance = reference Section 4.2 ♦ Verify all field devices are installed properly. ♦ Remove field wiring and install a 10K resistor at panel to verify SHP Pro Control Board is functioning properly.
9	Agent Release Circuit open	♦ Verify correct value EOL Resistor (1.5K Brown, Green, Red) has been installed. ♦ Measure field wiring resistance = reference Section 4.2 ♦ Verify all field devices are installed properly. ♦ Agent Disconnect Switch in disconnected mode. ♦ Remove field wiring and install a 1.5K resistor at panel to verify SHP Pro Control Board is functioning properly.
11	Solenoid Circuit open	♦ Measure field wiring resistance = reference Section 4.2 ♦ Verify all field devices are installed properly. ♦ Remove field wiring and install a 200 Ω 5 watt (P/N 02-2686) resistor at the panel to simulate a solenoid. This will verify SHP Pro Control Board is functioning properly.
6. 7. 8. 9. 11.	Audible Circuit 1 shorted Audible Circuit 2 shorted Audible Circuit 3 shorted Agent Release Circuit shorted (or initiator open) Solenoid Circuit shorted	♦ Check field wiring for short circuit or a faulty device. ♦ If panel has released agent replace GCA. ♦ Verify EOL Resistor value is correct.

A	Valid Abort	♦ Normal Operation Information
b **NOTE**: The letter "b" is often confused with the # 6	Abort premature	♦ Normal Operation Information
b.	Abort late	♦ Normal Operation Information
C	2nd Alarm active on input 1 if using 430Ω bases. Always activates on first alarm if using 220Ω or 0Ω devices.	♦ Input circuit 1
C.	2nd Alarm active on input 2 if using 430Ω bases. Always activates on first alarm if using 220Ω or 0Ω devices.	♦ Input Circuit 2
d	Outputs disabled	♦ Verify Switch 3 is enabled
E	Missing battery	♦ Verify batteries are installed properly. ♦ Verify each battery has approximately the same voltage. ♦ Remove battery wiring harness and replace with a 4.3K ohm, ¼ watt resistor (same as detection EOL, 10-2318) and verify charger voltage (Reference Section 6.3.1)
F	Low Voltage (<19 volts)	♦ Reference Section 5.9, 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.
H.	5V Reference/A-D Failure	♦ Reset panel, if trouble does not clear replace SHP Pro Control Board.
0	Ground Fault	♦ Remove field wiring from terminal strips to isolate the wire with the ground fault. When panel clears troubleshoot wire.
P	Reset	♦ Normal Operation Information
-	AC Brown – out (<85%)	♦ Measure primary voltage to transformer secondary

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
Auxiliary or 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 Amp-Hour Battery Pack	0.260 A	Not applicable
10-2190-2	18 Amp-Hour Battery Pack	0.590 A	0.171 A
Battery			
02-3468*	12V, 33 Amp-Hour Battery	1.106 A	0.295 A
A02-0252*	12V, 40 Amp-Hour Battery	1.346 A	0.359 A

NOTE: 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.) SRM4 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 (0.100A while in alarm)

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 0.135 Amp current includes power to activate the normally energized trouble relay and power for the maximum number of two wire detectors. The CRM4's 0.100 Amps alarm current is for the activated relays.

The following page includes a battery calculation form and illustrates a typical battery calculation example.

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SHP Pro Battery Calculation Form

Back-up Hours required: [24, 60 or 90 hours(FM Only)]

Normal Operation:

Controller Current 0.135 A
Auxiliary Output Current: _____ A
*Total Normal Standby Current = _____ X ____hours = ____A-H

Alarm Operation:

Controller Current 0.135 A
SRM4 Current (0.100 if using SRM4, else 0.0) _____ A
Output Device Current: _____ A
Auxiliary Output Current: _____ A
**Total Alarm Current = _____ X 0.166 hours = ____A-H

Total A-H used = ____A-H
(X1.2 factor)
Total Power Required → ____A-H

Power Supplied: Must exceed

Controller Supplied Current: 2.6 Amps
Auxiliary In current: _____ Amps Must exceed
Total Current Supplied = _____ Amps

Total Battery Pack A-H available (7 or 18 A-H): **____A-H**

* - Total normal standby current shall not exceed 1.000 amp.
**- Total alarm current shall not exceed 4.135 amps.

SHP Pro Battery Calculation Form

Example

Back-up Hours required: [24 or 90 hours (FM Only)]

Normal Operation:

Controller Current 0.135 A
Auxiliary Output Current: 0.10 A
Total Normal Current = 0.235 X 24 hours = 5.64 A-H

Alarm Operation:

Controller Current 0.135 A
CRM4 Current (0.100 if using SRM4, else 0.0) 0.10 A
Output Device Current: 1.00 A
Auxiliary Output Current: 0.10 A
Total Alarm Current = 1.335 X 0.083 hours = 0.111 A-H

Total A-H used = 5.75 A-H
(X1.2 factor)
Total Power Required → 6.90 A-H

Power Supplied: Must exceed

Controller Supplied Current: 2.60 Amps
Auxiliary In current: 0.00 Amps Must exceed
Total Current Supplied = 4.00 Amps

Total Battery Pack A-H available (7 or 18 A-H): **7.0 A-H**

"System Operation Posting" on the next page is offered without headers or footers so that the distributor may make copies to post adjacent to control equipment.

"System Operation Posting"

P/N 02-11060 REV 0
OPERATING INSTRUCTIONS
FIKE PROTECTION SYSTEMS
10-063 SHP PRO CONTROL SYSTEM

OPERATIONAL CONDITIONS

SYSTEM STATUS	LED's ON	AUDIBLE STATUS
Normal Standby:	AC Normal Green LED	All audibles off
System Trouble:	Trouble Yellow LED	Local piezo on, Trouble audible(s) on
System Alarm:	Alarm Red LED	Local piezo pulses, Alarm audible(s) on
Predischarge:	Alarm Red LED	Local piezo pulses, Predischarge audible(s) on In sprinkler mode, Alarm audible(s) also on
Release:	Alarm Red LED	Local piezo pulses, Release audible(s) on In sprinkler mode, predischarge and alarm audibles are on in place of release audible.
To Silence Panel:	Press SILENCE button	Silences audibles & piezo. Changes flashing LED's 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, interrupting resettable power. Momentarily activates piezo, all LED's, and trouble relay. Displays panel option number. Restores system to normal state.

CAUTION: Remove AC and battery power before servicing equipment.

Refer to System Service Label attached to inside of door for listing of Diagnostic Codes.

IN CASE OF TROUBLE CONTACT:

_____

_____

_____

Phone # _____

OR

Customer Service Department
Fike Protection Systems
Division of Fike Corporation
(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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