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# **APPROVAL REPORT**

## **MODEL SRP4x4 FIRE ALARM CONTROL FOR LOCAL PROTECTIVE SIGNALING AND AUTOMATIC RELEASES FOR PRE-ACTION AND DELUGE SPRINKLER SYSTEMS**

### **Prepared for:**

**The Protectowire Company, Inc.  
Post Office Box 200  
Hanover, MA 02339-0200**

**Project ID. 3013817  
Class 3010  
Date: September 4, 2002**

FM Approvals  
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**MODEL SRP4x4 FIRE ALARM CONTROL  
FOR LOCAL PROTECTIVE SIGNALING  
AND AUTOMATIC RELEASES FOR  
PRE-ACTION AND DELUGE SPRINKLER SYSTEMS**

September 4, 2002

from

**THE PROTECTOWIRE COMPANY, INC.  
POST OFFICE BOX 200  
HANOVER, MA 02339-0200**

**I INTRODUCTION**

- 1.1 The Protectowire Company, Inc. requested an Approval examination of the Model SRP4x4 Fire Alarm Control for Local Protective Signaling applications and for Automatic Release of Pre-Action and Deluge Sprinkler Systems.
- 1.2 This Report may be reproduced only in its entirety and without modification.
- 1.3 **Standards:**

Title	Class Number	Date
National Fire Alarm Code	ANSI/NFPA 72	1999
Approval Standard- Deluge Systems and Preaction Systems	FM 1011 and 1012	1973

- 1.4 **Listing:** The listings for The Protectowire Company, Inc. in the FM Approval Guide will be as follows:

**AUTOMATIC RELEASES FOR PREACTION AND DELUGE SPRINKLER SYSTEMS**

Model SRP4x4 Fire Alarm Control. Control provided with four initiating device circuits (IDC), which must be configured for Class A Style D wiring. Up to three release circuits are provided. Each releasing appliance circuit is connected to a compatible 24 V dc solenoid. For Approved combinations of solenoid and water control valves, refer to the Automatic Water Control Valve listings that follow. Standby battery bank rated 24 V dc, 18 AH is required to provide 90 hours of standby power. (See control panel description under LOCAL PROTECTIVE SIGNALING)

## **AUTOMATIC WATER CONTROL VALVES: CONTROL PANELS**

**Control Panel Group [2].** These panels are compatible with Solenoid Groups [A], [B], [D], [E], and [G]:

**Protectowire Co., Box 200, Hanover, MA 02339**  
Model SRP4x4

**Control Panel Group [8].** These panels are compatible with Solenoid Groups [F] and [H]:

**Protectowire Co., Box 200, Hanover, MA 02339**  
Model SRP4x4

## **LOCAL PROTECTIVE SIGNALING**

Model SRP4x4 Fire Alarm Control. The control is suitable for ambient temperatures from 0° to 49°C (32° to 120°F). The control has four initiating device circuits capable of Class A, Style D or Class B, Styles A and B performance, one supervisory circuit capable of Class B, Style B performance, and four output circuits capable of Class B, Style Y performance. The output circuits can be configured as one notification appliance circuit, up to three release circuits, a supervisory bell circuit, a trouble bell circuit, and waterflow. Optional accessories are the PDM-1000-3 Protectowire alarm point locator digital meter, the AM-91-2 module which converts Class B notification circuits to Class A, and the RB-4 relay module which provides four additional sets of relay contacts. Suitable for use with Approved automatic fire detectors such as the Protectowire heat-sensitive cable. Compatible with the following two-wire smoke detectors: Hochiki Models SII-24, SLR-24H, SLR-24V, and SLR-835 with base Model NS6-220. Two 12 V dc, 7 AH batteries are needed for minimum 24 hour stand-by power. (See also AUTOMATIC RELEASES FOR PREACTION AND DELUGE SPRINKLER SYSTEMS)

### **II DESCRIPTION**

- 2.1 This section includes some description of the equipment covered by this report. A more detailed description of the equipment can be found in the SRP4x4 Operating and maintenance manual, Revision 08-01-02. The manufacturer has made available all necessary circuit schematics and operating specifications, which have been examined and are retained on file at FM Approvals.
- 2.2 The Model SRP4x4 control and standby batteries are housed in an 18.5 in. (47 cm) × 14.5 in. (37 cm) × 4.75 in. (12 cm) 16 gauge steel housing. The housing is equipped with a hinged, removable, locked door.
- 2.3 The Model SRP4x4 control is programmable via three 8-position DIP switches.
- 2.3.1 Releasing/notification appliance circuits can be programmed either for single zone operation or cross-zone operation.
- 2.4 The optional PDM-1000-2 Protectowire digital alarm point locator meter displays the distance

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from the start of the Protectowire run to the overheated point on the linear heat detection cable. This device was originally Approved under FM Approvals Project 0T3A8.AY. The optional PDM-1000-3 version is electrically identical to the PDM-1000-2 except for mechanical packaging.

- 2.5 A 24 V dc auxiliary power output is rated at 100 mA maximum.
- 2.6 The SRP4x4 control has four initiating device circuits capable of Class A, Style D, or Class B, Styles A & B performance, one supervisory circuit capable of Class B, Style B performance, and four output circuits capable of Class B, Style Y performance. The output circuits can be configured as one notification appliance circuit, up to three additional NAC's or three release circuits, a supervisory bell circuit, a trouble bell circuit, and waterflow. The output circuits can be converted to Class A performance by using the optional AM 91-2 module.
- 2.7 The optional RB-4 auxiliary relay module provides four individually activated sets of 1-form "C" contacts. These contacts are rated at 1 A, 24 V dc.
- 2.8 **Standby Battery Requirements -**
  - 2.8.1 **Local Protective Signaling** - Batteries must be sized to sustain 24 hours of maximum standby current, and at the end of the 24 hour period be able to operate alarm circuits at maximum alarm current for at least 5 minutes.
  - 2.8.2 **Automatic Release for Preaction and Deluge Sprinkler Systems** - Batteries must be sized to sustain 90 hours of maximum standby current, and at the end of the 90 hour period be able to operate releasing devices and operate alarm circuits at maximum alarm current for at least 10 minutes.
  - 2.8.3 Two 12 V dc, 7 AH batteries are needed for 24 hour standby power. For 90 hour standby power, two 12 V dc, 7 or 18 AH batteries are used as calculated using the selection chart on page 35 of the Operating and Maintenance Manual.

### III EXAMINATIONS AND TESTS

- 3.1 Samples as detailed below were submitted for examination and testing. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.
- 3.2 The Model SRP4x4 fire alarm control was examined and tested at The Protectowire Company, Inc. in Hanover, MA and at FM Approvals in Norwood, Massachusetts.
- 3.3 **Normal Operation** - The Model SRP4x4 fire alarm control was tested to verify proper operation under normal conditions. The system performed as described in the attached product data sheet.
  - 3.3.1 The manual programmable features of the Model SRP4x4 system were tested. These tests included input/output matrixing and verification of the cross-zone capability.

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- 3.4 **Circuit Supervision Tests** - The initiating device circuits, notification appliance circuits, and release circuits of the Model SRP4x4 fire alarm control were tested to the applicable portions of NFPA 72-1999 National Fire Alarm Code. Open, ground, wire to wire short, combination open and ground fault conditions were introduced into the external circuits. All trouble signals were annunciated by the local notification appliance, alarms activated the notification appliance circuit, and all alarm, supervisory, and trouble signals were displayed by the LEDs on the Model SRP4x4 control.
- 3.4.1 **Initiating Device Circuits** - The four initiating device circuits met the criteria for Class A Style D or Class B Styles A and B operation as defined by Table 3-5 of NFPA 72-1999.
- 3.4.2 **Notification Appliance Circuits** - The four output circuits met the criteria for Class B Style Y operation as defined by Table 3-7 of NFPA 72-1999.
- 3.4.3 **Release Circuit** - The release circuits (maximum of three) of the Model SRP4x4 were supervised for open and short circuit conditions and for a single ground fault.
- 3.5 **Alarm Signals** - Audible appliances for a fire alarm system shall produce distinctive signals. A switch for silencing the alarm signal sounding appliances shall be permitted only if it is key operated or located within a locked cabinet. Such a switch shall be permitted only if it transfers the alarm indication to a lamp or other acceptable visible indicator, and subsequent alarms in other zones will operate the alarm signal sounding devices.
- 3.5.1 Alarm signals were indicated by operation of the notification appliance (horn) circuit, and lighting of the red "Alarm" LED on the control. Silencing of the alarm signal caused the control's red LED to remain illuminated until the condition is cleared.
- 3.5.2 Subsequent alarm signals were properly displayed and sounded.
- 3.6 **Trouble Signals** - A switch for silencing the audible trouble signal is permitted only if it transfers the trouble indication to a lamp or other acceptable visible indicator adjacent to the switch. The visual indication shall persist until the trouble has been corrected. The audible trouble signal shall sound if the switch is in its "silence" position and no trouble exists.
- 3.6.1 A trouble condition resulted in continuous sounding of the electric sounder. The trouble LED illuminated.
- 3.6.2 A trouble signal was produced, silenced, and verified to resound within 24 hours as required by NFPA 72-1999, paragraph 1-5.4.6.3.3.
- 3.7 **Environmental and Voltage Variation Tests** - The Model SRP4x4 control with maximum loading, and with rated power applied, operated properly, without indication of false alarm or malfunction, when subjected to the following conditions:
- 3.7.1 Temperature extremes of 32°F (0°C) and 120°F (49°C) for 24 hours each.
- 3.7.2 Supply voltage between 20.4 V dc and the battery float voltage of 27.2 V dc and 93 V ac to 132 V ac (transfer point to 110% of nominal voltage). The equipment operated as intended over

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these entire voltage ranges.

- 3.7.3 Exposure of the control to an atmosphere of 100°F (38°C) at 90% relative humidity for a period of 24 hours.
- 3.8 **Electrical Supervision Tests** - The secondary (standby) power supply shall automatically supply energy to the system within 30 seconds whenever the primary power supply is incapable of providing the minimum voltage required for proper operation.
- 3.8.1 Low or lost AC input power caused immediate automatic transfer to standby batteries and activated a trouble signal. Transfer to battery standby and presence of a trouble signal was recorded at 93 V ac. Return to AC power was recorded at 95 V ac.
- 3.8.2 Normal operation was observed before, during, and after the transfer to battery standby.
- 3.8.3 Disconnecting the secondary power while the control continued to be powered by 120 V ac resulted in a "trouble" indication.
- 3.8.4 Loss of charger output is supervised, and the control produces a trouble signal upon loss of the charger.
- 3.9 **Battery Discharge and Recharge Tests** - After fully charged batteries are subjected to a single discharge cycle (90 hours standby and 10 minutes alarm and extinguishing system release for sprinkler system release applications) (24 hours standby and 5 minutes alarm for local protective applications), the charging current shall be such that after 48 hours the batteries are returned to a fully charged condition.
- 3.9.1 The sample was configured to draw 160 mA (the maximum standby load specified) and the AC supply was disconnected. The battery voltage on the two 12 V dc, 18 AH batteries decreased to 23.6 V dc after 90 hours of discharge. A 10 minute alarm/extinguishing release load of 2.4 A was then introduced, after which the battery voltage was 23.1 V dc. All circuits remained above 20.4 V dc.
- 3.9.2 The primary power was then reconnected and the batteries were allowed to charge for 48 hours. The initial recharge current was 450 mA. After 48 hours, the charging current was 80 mA and the voltage had returned to 27.4 V dc which indicated a fully charged battery and was satisfactory.
- 3.9.3 The sample was configured to draw 160 mA (the maximum standby load specified) and the AC supply was disconnected. The battery voltage on the two 12 V dc, 7 AH batteries decreased to 24.4 V dc after 24 hours of discharge. A 5 minute alarm load of 2.6 A was then introduced, after which the battery voltage was 24.2 V dc. All circuits remained above 20.4 V dc.
- 3.9.4 The primary power was then reconnected and the batteries were allowed to charge for 48 hours. The initial recharge current was 370 mA. After 48 hours, the charging current was 10 mA and the voltage had returned to 27.4 V dc which indicated a fully charged battery and was satisfactory.

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- 3.9.5 An additional test was conducted to verify the maximum alarm current. For this test, power to the control was supplied by a DC power supply at 23.6 V dc which was the lower of the two battery voltages obtained above. The output circuits were loaded to the maximum specified: 1A each on output circuits 1, 2, and 3, and 100 mA on the auxiliary 24 V dc circuit. The total alarm load was 3.1 A. During this test, all output circuits remained at 22 V dc or above which is satisfactory.
- 3.10 **Solenoid Compatibility Test** - The Model SRP4x4 control was tested for compatibility with the Skinner Model LV2L BX25, ASCO Model 8210A107, ASCO Model 8210G207, Skinner Model 73218BN4UNLVNOC111C2, Skinner Model 73212BN41NLVNOC322C2, Skinner Model 71395SN2ENJ1NOH111C2, and Viking Model HV-274-060-001 solenoid release valves. These models comprise representative samples of FM Approvals groups A, B, D, E, F, G, and H.
- 3.10.1 Testing confirmed that, with the maximum specified solenoid output circuit loading of 1 A, the lowest voltage of the standby batteries remained above 23.0 V dc which assured that the solenoid terminal voltage remained above the required 20.4 V dc after 90 hours at the maximum standby current followed by 10 minutes of maximum alarm current.
- 3.11 **Vibration** - The Model SRP4x4 control, powered by 120 V ac, was subjected to a four hour vibration test with a total displacement of 0.02 in. (0.5 mm) over a frequency sweep of 10-30 Hz. One complete sweep of the frequencies occurred every 30 seconds. There were no loose or broken parts, nor were there any false alarms or other indications of instability as a result of this test.
- 3.12 **Measurement of Current Draw** - The Model SRP4x4 control was tested and found to draw 60 mA (DC) and 140 mA (AC) in standby mode, 140-260 mA (DC) and 165-200 mA (AC) in alarm mode, and 70 mA (DC) and 170 mA (AC) in ground fault condition.
- 3.13 **Dielectric Test** - A representative sample of the 120 V ac powered control was subjected to the application of 1,250 V ac, 60 Hz, between the power terminals and system ground for one minute. Separate tests were conducted with the application of 500 V ac and 710 V dc into all of the Form "C" contacts of the RB-4 auxiliary relay module tied together; return was from system ground for one minute. There was no arcing, dielectric breakdown, or leakage current observed during these tests.
- 3.14 **Other Electrical Tests**
- 3.14.1 **Battery Circuit Reverse Polarization** - The batteries were connected with polarity reversed. There was a momentary spark, but no heating or other adverse condition was noted during the test. A battery trouble indication was annunciated and displayed on the control, and this trouble indication could not be cleared while the terminal connections were reversed. The 6A battery fuse was replaced, and the battery leads were connected properly. The trouble indication was then cleared, and operation was normal.
- 3.14.2 **Protective Grounding** - Accessible conductive parts of the equipment that are likely to become energized in the event of a fault shall be properly grounded. A suitably sized and properly labeled ground connection is provided in the control. The resistance from all surfaces likely to be energized was measured to the ground connector. The maximum resistance was less than one

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ohm in all cases.

- 3.14.3 **Field Wiring Terminal Spacings - Creepage and clearance spacings were found to be acceptable by visual inspection and measurement.**
- 3.14.4 **Electrical Shock - Examination showed that accessibility to the 120 V ac power supply circuit was suitably restricted by a key-locked enclosure.**
- 3.14.5 **Protection from Fire - The secondary leads of the main power transformer were shorted, and AC power was connected. The transformer's built-in fuse operated. There was no flame, sparks, or smoke evident.**
- 3.14.6 **Nameplate rating - With the maximum loading on the control, the input load drawn must not exceed 110% of the marked input load rating of 1.0 Amp. Testing showed that the maximum input load (in alarm condition) was 1.08 Amp, which is within the required 1.1 Amp.**
- 3.15 **Radio Frequency Interference (RFI) - Although not an Approval requirement, the following test was performed on the Model SRP4x4 control. The energized system was subjected to frequencies of 154 MHz, 467 MHz, and 854 MHz with radiation power levels of 5.0 Watts from a distance of 24 in. (0.61 m). The system did not false alarm or show any signs of instability as a result of this test.**
- 3.16 **Surge Transient Tests - Although not an Approval requirement, protection against surge line transients was considered. For this test, representative initiating device circuits, notification appliance circuits, releasing circuits, and auxiliary 24 V dc output terminals were subjected to 60 pulses consisting of five different transient waveforms having peak voltage levels of 100; 500; 1,000; 1,500; and 2,400 V, as delivered into a 200 ohm load. A non-latching momentary alarm signal was generated during only the positive pulse 2,400 V test on the output circuit of the AM 91-2 module.**
  - 3.16.1 **It was also shown that the power supply was able to withstand surge line transients of 6 kV superimposed on the main power line input.**
  - 3.16.2 **Protection against internally induced transients was also verified. The power to the control was cycled 500 times while monitoring the releasing circuits for instability. The test results showed that the equipment did not false alarm, operated as intended, and retained its required stored memory.**
- 3.17 **Compatibility Data Forms were completed, submitted, reviewed, and filed for the following two-wire smoke detectors: Hochiki Models SII-24, SII-R-24H, SII-R-24V, and SII-R-835 all of which use the Model NS6-220 base. These smoke detectors were found to be compatible with the Model SRP4x4 control.**



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#### IV MARKING

The following information appears on the apparatus identified in Section 3.2 and meets Standard requirements:

- Manufacturer's name
- Model number and Serial number
- Electrical ratings
- The FM Approval mark

#### V REMARKS

- 5.1 Extreme care should be taken with the installation of this equipment. The latest edition of the manufacturer's instruction manual must be followed completely and any problems should be resolved by consultation with the factory or their authorized representative.
- 5.2 Control panels for automatic release of extinguishing systems are not considered Approved by FM Approvals if they incorporate an accessible disable or abort switch. A key operated test switch, or a disable switch behind a lockable cover, or a manually operated momentary switch is permitted, but not recommended by FM Approvals for providing an intentional interruption of operation for servicing and testing.
- 5.3 When disconnecting the extinguishing system discharge for testing and/or maintenance, the extinguishing system must be isolated mechanically and not solely by electrically disconnecting the equipment.

#### IV FACILITIES AND PROCEDURES AUDIT

The Protectowire Company, Inc. manufacturing site in Hanover, MA is subject to follow-up audit inspections. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

#### VI MANUFACTURER'S RESPONSIBILITIES

- 6.1 As part of the listing requirements, FM Approvals requires assurance that subsequent systems produced will present the same quality and reliability as the system examined. The manufacturer shall maintain a Quality Assurance Program, which includes as a minimum: incoming, in-process, and final inspection and testing; equipment calibration; and drawing change control. The specific procedures used to control quality are best determined by the manufacturer.
- 6.2 A copy of the manufacturer's manual must be provided with each shipment.
- 6.3 Since the Model SRP4x4 control is rated above 30 V rms, it is required that the final assembly of all Model SRP4x4 controls be dielectric tested on 100% of production. The power input

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connections shall withstand, for one minute and with no insulation breakdown, the application of 1000 V ac (or 1400 V dc) with respect to the protective ground. Alternatively, a test potential of 1200 V ac (or 1700 V dc) may be applied for at least one second.

**WARNING:** The dielectric test required may present a hazard of injury to personnel and/or property and should only be performed under controlled conditions, and by persons knowledgeable of the potential hazards of such testing to minimize the likelihood of shock and/or fire.

- 6.4 On 100 % of production, Protecrowire manufactured electrical equipment shall be tested for continuity of the protective grounding system.

## VII DOCUMENTATION

The following drawings describe the Model SRP4x4 fire alarm control and are filed under Project ID 3013817. No changes of any nature shall be implemented unless notice of the proposed change has been given and written authorization obtained from FM Approvals. The Approved Product Revision Report, Form 797, shall be forwarded to FM Approvals as notice of proposed changes.

Drawing No.	Issue	Description
FA-1101	7/25/02	PDM-1000-3 Digital Alarm Pt Location Meter, Ass'y
PCA-1192B	7/02	Class A Audible Circuit Adapter AM-91/A/-2 Ass'y
PCA-1230	2/21/02	PC1230 Assembly for Control Panel Model SRP4X4
PCA-1232	4/2/02	RB-4 Relay Module PC Assembly Drawing
PCA-1233	7/25/02	Trouble Ring Back Timer - Assembly
SCII-1318B	7/02	AM-91/A/-2 Schematic Diagram
SCH-1616	2/21/02	Alarm Control/Releasing Panel PC-1230
SCH-1617	5/22/02	RB-4 Relay Module Schematic Diagram
SCH-1618	5/8/02	Trouble Ring Back Timer - Schematic
-----	8/1/02	SRP4x4 Operating and Maintenance Manual

## VIII CONCLUSION

The apparatus described in Section II meets FM Approvals requirements. Approval is effective when the Approval Agreement is signed and received by FM Approvals.

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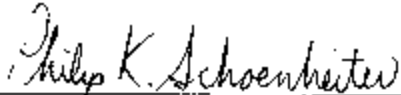
**EXAMINATION AND TESTING BY:** P. K. Schoenheiter

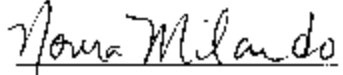
**PROJECT DATA RECORD:** 3013817

**ATTACHMENTS:** Operating and maintenance manual, Rev. 8-1-02  
(excerpts only)

**REPORT BY:**

**REPORT REVIEWED BY:**

  
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**Philip K. Schoenheiter**  
Senior Engineer - Systems  
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\_\_\_\_\_  
**Noura Milardo**  
Engineer-Systems  
FM Approvals

# MODEL SRP-4x4

## STANDARD RELEASE PANEL

### System Description & Setup

The Model SRP 4x4 is a Fire Alarm Control/Releasing Panel which is FM approved and U.L. Inc. Listed. It is designed primarily for use as a releasing panel for Pre-action and Deluge, water based extinguishing systems. This unit is in compliance with NFPA-13, NFPA-72 and UL864 and can be used as a stand alone Fire Control Panel.

The Fire Control Panel is programmable by way of three (3) eight (8) position DIP switches. Select a system programming scheme that meets your requirements as depicted on pages 21 thru 33. Special attention must be taken in positioning dip switches for proper panel operation.

### System Features

Four (4) style D or B (Class A or B) Initiating device circuits which may be configured for the following functions.

1. Standard Initiating Device Circuits Compatible with the following.
  - a. Up to 3500 Feet (1066m) of Protectowire type PHSC linear heat detector.
  - b. Up to 25 (45uA) or 12 (100uA) two wire smoke detectors.
  - c. Any combination of Normally Open contact initiating devices.Examples: Conventional Manual Stations, Waterflow Switches, Conventional Spot heat detectors.

2. Supervisory Initiating Device Circuits Compatible with the following.

- a. Any combination of Normally Open contact initiating devices.

Examples: Low air pressure switches, Valve Tamper Switches.

Four (4) Style Y (Class B) Output Zones: Each Output can be set up for any of the following:

- 1) Notification Appliance Circuit (General Alarm, Output #1 only)
- 2) Release circuit (Outputs #2, 3, and/or 4)
- 3) Supervisory Bell circuit (Outputs #3 & 4 only)
- 4) Trouble Bell circuit (Output #4 only)

Releasing Zones can be set up for either single or cross zone operation

All circuits are inherently Power Limited per NFPA 70 (nec) see 760

Initiating circuits can be wired as Class A or B

Output circuits #2, 3, and 4 have disable feature

System silence button (common alarm and trouble conditions)

Lamp/Trouble Test Button

System Reset Button

Built-in Trouble/Supervisory Buzzer

Auxiliary Contacts for Alarm/Trouble/Supervisory

On Board 24V Auxiliary Power (100mA MAX)

Ground Fault Detection

Battery Trouble circuit (low, high/disconnect)

24 or 90 hour Battery Standby operation available

Options:

- 1) AM91-A Module to convert Class B Notification Appliance circuit to Class A
- 2) PDM-1000-3 Protectowire Digital Alarm Point Location Meter.

# SPECIFICATIONS

## Housing

- Type: 16 gauge steel.
- Door: Hinged, removable, lockable.
- Dimensions: 18 1/2" x 14 1/4" x 4 3/4"
- Finish: Red enamel with red, black and white logo/label.
- Knockouts: One 1/2" and one 3/4" on each side and top.

## Visual Indicators

(Visible LED's with door closed.)

- AC-ON: (1) Green
- System Silence, System Trouble, Ground Fault Detection and Battery Trouble: (4) Yellow
- Supervisory Zone Alarm: Yellow
- Input and Output Zone Trouble: (9) Yellow
- Input and Output Zone Alarm: (8) Red

## Control Buttons

- Lamp Test: Momentary - Verifies all LED's are operational (AC ON LED normally lit).
- System Silence: Momentary - Silences alarm signaling circuits, trouble buzzer and outputs programmed as supervisory bell or trouble bell.
- System Reset: Momentary - Resets all alarm circuits if condition has been corrected. Removes power from initiating circuits.

## Initiating Device Circuits (4 TOTAL)

4 NFPA Style D or B (CLASS A or B)

- Power/current limited
- IDC loop current (IDC): 3 mA.
- IDC alarm trip current: 10 mA minimum.
- IDC alarm current (short circuit): 44 mA max.
- Normal loop voltage: 23 VDC
- Linear heat detector resistance: 700 ohms max. (3500 feet)
- Trouble (low level current): approximately 1.4 mA.
- Maximum Impedance to insure Alarm: 1500 ohms.
- End of Line Resistor: 8.2K ohms (Required in Class B configuration only).
- Two Wire Detector capacity (per zone): 25 - 0.045 mA type; or 12 - 0.1 mA type.

## Low/Disconnected Battery

- Battery and system trouble indication when removed or falls below approximately 21 volts.
- Fused battery and reverse polarity protection is provided.

## SPECIFICATIONS CONTINUED

### Output Circuit (4 TOTAL)

(ALARM INDICATING, RELEASING, SUPERVISORY and TROUBLE BELL)

4 Notification Appliance Circuits (NAC) Class B, reverses polarity on alarm (Optional Class A Module AM-91-2).

Power limited, each circuit has self resetting type fuse (PTC).

Output #1; dedicated Common (general) Alarm or area Zone 1 NAC rated 24V FWR, 1 amp continuous.

Outputs #2, 3 & 4 rated 24VDC regulated, 1 amp each, 2.1 amps combined.

Standby terminal voltage approximately -2.7VDC.

End of Line Resistor 8.2K ohms.

Increase or decrease in (NAC) resistance causes system and output trouble.

Compatible Solenoids: FM Solenoid Groups A, B, D, E, F, G & H.

### Supervisory Circuit (1 TOTAL)

Supervisory monitors the following:

High/Low Air

Tamper/Valve positioning and etal

One latching Class B Initiating Device Circuit.

Power limited.

End of Line Resistor 8.2K ohms.

Circuit loop resistance 100 ohms.

Increase in circuit resistance causes supervisory trouble and system trouble.

Maximum resistance for supervisory signal 2200 ohms to insure alarm.

Minimum current 4.5 mA to insure alarm (10 mA short circuit maximum).

Normal supervisory standby loop current 2 mA.

Normal standby loop voltage 19.5VDC.

### Input Power

120VAC +10 -15% - 100VA max.

Green AC-ON LED goes off with AC power loss, causes system trouble and buzzer to sound.

System in on battery backup.

System Trouble is also generated if voltage drops below 102V under alarm load, system is transferred to battery backup.

### Power Requirements

Standby - 60mA @24VDC 7.0AMP Batteries for 90 hour standby

Alarm - 3.5 AMP MAX. @24VDC All Zones.

### Outputs

System Remote Signaling Relay contacts rated 3A, 30VDC for Alarm, Supervisory & Trouble.

Auxiliary Power - 24VDC regulated. Rated 100mA max. Power limited.