6. – FENWAL Protection System Specifications

SECTION 1: GENERAL

1.01 INTENT OF SPECIFICATIONS

This specification details the requirements for a Fenwal 9300 Series, Bottom-Discharge and Spherical Engineered Fire Suppression Systems total flooding fire suppression system using FM-200® as the fire extinguishing in conjunction with a Fenwal 732 Control Unit. All requirements outlined in this specification must be completed in their entirety. These requirements, which are in accordance with the items listed in Section 1.03, combined with good engineering practices shall be followed in order to produce a safe and effective fire protection and suppression system.

1.02 GENERAL DESCRIPTION

Fenwal 9300 Series, Bottom-Discharge and Spherical Engineered Fire Suppression Systems shall combine an environmentally safe fire suppression agent, highly effective detection devices and specially developed components for fast agent discharge. These systems shall be electrically, pressure and/or cable operated, with a normal design discharge time of less than ten (10) seconds. Agent storage containers shall be strategically located throughout the protected zone.

Fenwal 9300 Series, Bottom-Discharge and Spherical Systems shall be used to suppress fires in specific hazards or equipment located where an electrically non-conductive agent is required, where agent cleanup creates a problem, where extinguishing capability with low weight is a factor and where personnel normally occupy the hazard.

Fenwal 9300 Series, Bottom-Discharge and Spherical Systems shall be designed for the following classes of fire:

- Class A: Surface Type Fires—wood or other cellulose-type material
- Class B: Flammable liquids
- Class C: Energized electrical equipment

For hazards beyond the scope described above, the designer shall consult with Fenwal Protection Systems and NFPA 2001.

The Fenwal 732 conventional control unit and fire alarm/suppression system shall perform fire alarm, supervisory, and trouble event initiation; occupant notification; event annunciation; local control functions; fire extinguishing system release, and off premises transmission. The control unit shall have dual release capabilities, where each release circuits shall be capable to fully operate independently with different time delay and abort function.

1.03 CODES AND COMPLIANCE

A. The design, installation, testing and maintenance of the Fenwal 9300 Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression System and the Fenwal 732 shall be in accordance with the following applicable codes, standards and regulatory bodies:

1) NFPA 2001: *Standard for Clean Agent Fire Extinguishing Systems, 2004 Edition*

2) UL 864, 9th Edition

3) UL 2166: *Standard for Halocarbon Clean Agent Extinguishing System Units*

4) Factory Mutual Approval Guide

5) ANSI B1.20.1: *Standard for Pipe Threads, General Purpose, 1992*

6) Design and installation practices set forth by system manufacturer

7) NFPA 70: *National Electrical Code (NEC)*

8) NFPA 72: *National Fire Alarm Code*

9) Requirements of the local Authorities Having Jurisdiction (AHJ)

B. The engineered fire suppression system shall have the following listings and approvals:

1) UL: Underwriters Laboratories (Per Test Standard UL-2166)

2) FM Approved: Factory Mutual Research Center

3) ULC Listed: Underwriters Laboratories of Canada

C. The manufacturer shall meet ISO 9001 requirements for the design, production and distribution of the engineered fire suppression system.

D. All components of the total flooding suppression system shall be the products of the same manufacturer or listed by that manufacturer as compatible with those devices, components and equipment.

1.04 SYSTEM DESIGN CRITERIA

A. All system components shall be manufactured and/or supplied by Fenwal Protection Systems, 400 Main Street, Ashland, MA 01721, USA, phone (508) 881-2000
URL: http://www.fenwalfire.com/

B. The system shall be supplied and installed by a factory-authorized Fenwal Protection Systems Contractor. The Contractor shall be trained by the manufacturer to design, install, test and maintain the Fenwal 9300 Series, Bottom-Discharge and Spherical Engineered Fire Suppression Systems and the Fenwal 732 Control Unit and shall be able to produce a certificate stating such on request. Contact your local Fenwal Distributor Mike Holtz at 813-664-8989

C. The factory-authorized Fenwal Protection Systems Contractor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all equipment being furnished.

D. All materials and equipment shall be new and unused.

E. A total flooding, clean agent fire suppression system, filled with FM-200 waterless agent, shall be installed to meet a minimum design concentration of 7% by volume in all designated spaces to be protected.

1.01 QUALIFICATIONS

A. Manufacturer

1. The manufacturer/supplier of the system hardware and components shall have a minimum of fifteen (15) years experience in the design and manufacture of systems of similar type.
2. The manufacturer/supplier of the systems shall be certified to ISO 9001 for a minimum period of five (5) years for the design, production and distribution of fire detection, fire alarm and fire suppression systems.
3. The name of the manufacturer and manufacturer part numbers shall appear on all major components.
4. All devices, components and equipment shall be the products of the same manufacturer/supplier.
5. All devices, components and equipment shall be listed by the standardizing agencies (Underwriters Laboratory and/or Factory Mutual).

B. Contractor

1. The system shall be supplied and installed by a factory-authorized, Fenwal Protection Systems Distributor. The Distributor/Installer shall be trained by the manufacturer to calculate/design, install, test and maintain the fire suppression system and shall be able to produce a certificate stating such on request.
2. The installing contractor shall employ a Designer with a NICET level IV Certification, and be able to show a minimum of 10 years experience with Fenwal products.
3. The installing contractor shall employ a Supervisor with a NICET level III certification, and be able to show a minimum of 10 years experience with Fenwal products.
4. The factory-authorized Fenwal Protection Systems distributor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all equipment being furnished.
5. Contact your local Fenwal Distributor Mike Holtz at 813-664-8989

1.05 WARRANTY

The manufacturer shall warrant all Fenwal 9300 Series, Bottom-Discharge and Spherical Engineered Fire Suppression Systems products for thirty-six (36) months from date of shipment or one (1) full year from the date of installation. The manufacturer shall warranty the Fenwal 732 Control Unit and the initiating and control devices for sixty (60) months from date of shipment.

The contractor shall match the manufacturer's warranty for installation labor.

1.06 SUBMITTALS

B. Engineered Design Drawings

The factory-authorized Fenwal Protection Systems Contractor shall provide all required installation drawings per NFPA 2001 that shall include the following details:

1. Plan and riser drawings showing the location of the Fenwal 732 Control Unit and the locations of all field devices such as smoke detectors, manual-release stations and notification appliances. Include all necessary installation and mounting details. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
2. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the internal Fenwal 732. All internal wiring and communications cabling shall be shown.

3. A primary-power calculation that details the power requirements for the Fenwal 732 Control Unit and all field devices such as smoke detectors, notification appliances, and releasing solenoids. Include the required capacity of the main AC power-line feed from the commercial power and light company.

4. A secondary-power calculation that shows the quiescent- and alarm-power requirements for the Fenwal 732 Control Unit and all field devices such as smoke detectors, notification appliances, and releasing solenoids. Include the periods of time for which the quiescent- and alarm-power requirements shall be supported in order to determine the necessary standby-battery capacity.

C. Flow Calculation Reports

The Contractor shall provide the following information in the flow calculation report.

- Customer information and project data.
- Enclosure information: At a minimum, enclosure information is to include minimum and adjusted design concentrations, minimum and maximum enclosure temperatures, minimum agent required and volume of enclosures, including non-permeable volume if applicable.
- Agent information: At a minimum, agent information is to include cylinder size and part number, quantity of cylinders, main and/or reserve cylinders, pipe take off direction and the floor loading for agent cylinder.
- Pipe network information: At a minimum, pipe network information is to include pipe type, pipe diameter, pipe length, change in direction or elevation, pipe equivalent length and any added accessory equivalent length. In addition, the following nozzle information shall be provided; number of nozzles and identification of enclosure location, flow rate of associated nozzle, nozzle nominal size, nozzle type and nozzle orifice area.
- Pipes and pipe fittings: A detailed list of pipes and pipe fittings used in the design of the pipe network
- Detailed list of pipes and pipe fittings used in the design of the pipe network

D. Commissioning Equipment List

The Contractor shall provide a commissioning equipment list for each installed Fenwal 9300 Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression Systems and Fenwal 732 Control Unit. The equipment list shall identify all installed equipment and configurations.

For the Fenwal Engineered Systems, the Contractor shall provide:

1. Four (4) sets of installation drawings for each installed engineered suppression system and one (1) set of the calculation report, owner's manual and product data sheets shall be submitted to the end-user/owner.
2. Upon completion of installation and commissioning acceptance, two (2) sets of "As-Built" installation drawings and One (1) set of the calculation report for each installed engineered suppression system shall be given to the owner/end-user for use and reference.

For the Fenwal 732 Control Unit, the Contractor shall provide:

1. Product information sheets for each item of equipment.
2. A theory of operations, with a description of system functionality.

A detailed matrix of all the initiating points, control modules, and field circuits that identifies the labeling of all components and shows the relationships and activation sequences among the various initiating points and the control modules and/or field circuits.

3. The architect will review all submittals for conformance to the drawings and specifications. The contractor shall be required to resubmit any materials, with appropriate modifications, that are found to be in non-conformance with the requirements of the drawings and these specifications after review by the architect. Approval of the submittals by the architect shall not relieve the Contractor of their responsibility to meet the requirements of the drawings and specifications.

E. The Contractor shall submit a test plan that describes how the system shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. Tests shall not be scheduled or conducted until the engineer of record approves the test plan. At a minimum, the tests to be conducted shall be per NFPA 2001 and any additional supplemental tests required by the AHJ. Tests shall not be scheduled or conducted until the engineer of record approves the test plan.

F. The Contractor shall submit proper documentation as follows:
- Two (2) copies of the Fenwal Engineered System Design, Installation, Operation and Maintenance Manual shall be submitted after complete installation.
- Five (5) copies of the Fenwal 732 Installation, Operation and Maintenance Manual shall be submitted after complete installation.

SECTION 2: SUPPRESSION SYSTEM REQUIREMENTS

GENERAL

A. The system manufacturer shall have the ability to provide multiple suppression system arrangements to accommodate the performance criteria required by the project.

B. The total flooding system shall consist of FM-200, agent storage container(s), Fenwal actuation hardware and Fenwal engineered series system distribution nozzle(s) attached to a pipe network.

2.01 SYSTEM PERFORMANCE

A. System Discharge

The discharge time required to achieve 95% of the minimum design concentration for flame extinguishment shall not exceed ten (10) seconds.

B. Duration of Protection

The minimum design concentration shall be maintained for a specified period of time to allow effective emergency action by trained personnel. A level 1 certification in room integrity testing, provided by a recognized manufacturer of room integrity testing equipment, is required.

C. Minimum System Design Limits: Nozzles

1) Nozzles shall be listed and approved for a maximum ceiling height of 16 feet (4.88 m) and a minimum ceiling height of 1 foot (0.31 m).

2) Nozzle area coverage for both 360- and 180-degree nozzles shall be a maximum of 40 ft. x 44 ft. square (12.19 m x 13.41 m).

3) System Nozzles shall be listed and approved for a minimum of 74 PSIG (5.1 bar gauge) nozzle pressure.

D. Minimum System Design Limits: Tee Flow Splits

1) Side tee flow split limits shall be listed and approved to accommodate 10% to 30% of the agent through the side tee outlet.

2) Bull tee flow split limits shall be listed and approved to accommodate 30% to 70% of the agent through either bull tee outlets.

2.02 PIPE AND FITTINGS

Distribution piping, and fittings, shall be installed in accordance with NFPA 2001, approved piping standards and the engineered fire suppression system manufacturer's requirements.

2.03 ACTUATION HARDWARE

A. The FM-200 Cylinder valve assembly shall be actuated using a Fenwal electric control head, or the Spherical container employing FM-200 shall be actuated using a Fenwal 4-pin Initiator (P/N 31-19932-004).

2.04 NOZZLES

A. Fenwal engineered discharge nozzles for use with an engineered system employing FM-200 will be made of brass (Fenwal P/N 93-1940XX-XXX).

B. Each nozzle shall be located in the space per the manufacturer's guidelines. Nozzles shall have either a 180- or a 360-degree discharge pattern.

C. Each Nozzle discharge pattern shall be available in sizes ranging from 1/2 in. NPT to 2 in. NPT.

2.05 STORAGE CYLINDERS AND VALVE ASSEMBLIES

A. FM-200 shall be stored in a Fenwal engineered series cylinder (P/N 93-100XXX-XXX). The system operating pressure shall be at 360 PSIG @ 70°F (24.8 bar gauge @ 21°C), or in a Fenwal Spherical container, P/N 93-11020X-001. The system operating pressure shall be at 360 PSIG @ 70° F (24.8 bar gauge @ 21.1°C).

1) FM-200 storage cylinders shall be provided with a safety rupture disc. An increase in internal pressure due to high temperature shall rupture the safety disc and allow the contents to vent before the rupture pressure of the container is reached. The contents shall not be vented through the discharge piping and nozzles. FM-200 containers shall be equipped with a pressure gauge to display internal pressures. The gauge shall be an integral part of the equipment and shall be color-coded for fast referencing of pressure readings.

2) A low-pressure switch shall be provided as standard equipment on the Fenwal engineered cylinders. A decrease in pressure will cause the normally open contacts to close, indicating a trouble condition at the CIE. The low-pressure switch shall be field removable/replaceable while the container is still fully charged.

3) FM-200 spherical containers shall be provided with a safety rupture disc. An increase in internal pressure due to high temperature shall rupture the safety disc and allow the contents to vent before the rupture pressure of the container is reached. The contents shall not be vented through the discharge piping and nozzles. FM-200 containers shall be equipped with a pressure gauge to display internal pressures. The gauge shall be an integral part of the equipment and shall be color-coded for fast referencing of pressure readings.

4) An optional low-pressure switch shall be provided as standard equipment on the Fenwal Spherical container. A decrease in pressure will cause the normally open contacts to close, indicating a trouble condition at the CIE. The low pressure switch shall be field removable/replaceable while the container is still fully charged.

SECTION 3: ELECTRICAL SYSETM REQUIREMENTS

3.01 ELECTRICAL WORK

A. All electrical enclosures, raceways, and conduits shall be provided and installed in accordance with applicable codes and intended use, and shall contain only those electrical circuits associated with the fire-detection and control system. No circuit or circuits that are unrelated to the fire alarm or suppression system shall be routed through the enclosures, raceways, and conduits dedicated to the fire alarm or -suppression system.

B. Splicing of circuits shall be kept to a minimum, and is only permitted in an electrical box suitable for the purpose. Appropriate hardware shall be used to make the wire splices. Wires that are spliced together shall have the same color insulation.

C. White colored wire shall be used exclusively for the identification of the neutral conductor of an alternating-current circuit. Green colored wire shall be used exclusively for the identification of the earth-ground conductor of an AC or DC circuit. Appropriate color-coding shall be utilized for all other field wiring.

D. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation drawings.

3.02 SYSTEM CONFIGURATION

A. The single hazard Control Panel shall consist of a single Printed Circuit Board with the main microprocessor and an integral operator interface Module, a primary Power Supply Unit, a 24 VDC Battery backup complete with Battery Charger capable of charging 68AH batteries, in an 18 gauge painted NEMA 1 steel enclosure with door. The enclosure size shall be capable of housing the Printed Circuit Board, the Power Supply Unit and a Battery of capacity 12 AH at 24 VDC. Enclosures intended for use in Canada shall be provided an additional steel dead-front plate. Battery cabinets shall be available to accommodate batteries of capacity 17 to 68 AH at 24 VDC.

B. The power-supply / charger assembly shall be configurable to accept either 120 or 240 VAC input voltage, and shall provide 5.4 A at 24 VDC of filtered and regulated power to operate the system and charge the system's standby battery. The charger assembly shall be capable of charging batteries of capacities up to 68 AH.

C. The Control Panel shall provide two resettable Auxiliary Outputs rated at 2 Amp total at 24 VDC for external use.

D. The battery backup system shall consist of 24 VDC, maintenance free, sealed lead acid batteries of capacity such as to provide for Standby operation followed by Alarm operation for the time duration listed below in case of AC Mains failure. The battery charger shall be capable of charging a fully discharged battery within 48 hours. The calculated battery capacity must be de-rated by a minimum of 10% to arrive at the required Battery capacity:

1. Local or Central Station (protected premises) per NFPA 72:
   i. Standby operation: 24 hours
   ii. Alarm operation: 5 minutes
2. Clean Agent Suppression System per NFPA 12A and 2001
   i. Standby operation: 24 hours
   ii. Alarm operation: 5 minutes

3. Deluge/Pre-Action System per Factory Mutual
   i. Standby operation: 90 hours
   ii. Alarm operation: 10 minutes

E. The Control Panel shall supervise and control the overall system operation, including the execution of the site-specific configuration. Its printed circuit board shall contain the hazard-specific input and output circuits.

F. The control unit operator interface Module shall provide a digital display, system control switches, and Light emitting diodes (LED's) to indicate the status of individual input and output circuits and a summary of Alarm, Supervisory and Trouble events.

G. The digital display shall also provide a countdown timer to indicate the time remaining prior to an impending suppression system release. Panels that do not display releasing countdown shall not be acceptable.

H. The operator interface Module shall be provided Light Emitting Diodes (LED) to indicate Power ON, Alarm, Pre-Release, Releasing, Post-Release, Trouble, Supervisory and Signal Silenced.

I. The operator interface module shall have control keys for System Reset, Signal Silence, Alarm/Supervisory/Trouble acknowledge and output disable. It shall allow System Diagnostics, Lamp Test, and System Configuration Menu Controls. All access to the Menu System shall be password protected.

J. A system buzzer shall annunciate each Alarm, Supervisory, or Trouble event.

K. Activation of the control panel signal silence shall silence the system local buzzer and activate the system signal silence LED on the user interface. Subsequent system alarm or trouble activation shall re-sound the local buzzer and repeat the alarm/trouble sequences.

L. The Control panel shall be provided the following Input and Output circuits:

- Three (3) Detection Circuits
- One (1) Manual Release Circuit
- One (1) Abort Circuit
- Two (2) Supervisory Circuits
- Two (3) notification-appliance circuits (NACs)
- Two (2) Independent Releasing Circuits
- Three (3) programmable relays
- One (1) trouble relay
- Battery-charging circuit
- AC-input-power connections.
- Two (2) Auxiliary Power Output circuits

M. 3 Detection Initiating Device Circuits in Style B or Style D supervision.

N. 2 Detection circuits (DET1& 2)

O. 1 Waterflow / Detection circuit (DET 3/WF)

P. The Initiating Device Circuits shall all be power limited, and shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted. Each circuit shall allow a minimum field wiring resistance of 100 ohms per loop and shall be capable of supporting Normally Open contact-type alarm devices as well as a minimum of 25 Fenwal Conventional point-type smoke detectors in any combination. The Initiating Device Circuits shall be configurable to activate the Suppression System on the occurrence of any of the alarm and supervisory combination as described in subsequent paragraphs.

Q. The contractor shall only utilize Fenwal smoke or electronic heat detectors that have been UL listed for compatibility with the Fenwal 732 panel.

R. The Waterflow/Detection Circuit shall be field-configurable in either a water flow or general alarm detection in a style B or style D of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted. The circuit shall be capable of supporting switches using Normally Open contacts and shall allow a field wire resistance of 100 ohms per loop.

S. When the Waterflow/Detection circuit is configured as a General Alarm Detection, Alarm activation shall NOT drive the release of the suppression system.

1. 1 Manual Release Circuit in Style B or style D supervision.

T. The circuit shall be power limited and shall be capable of supporting Fenwal Manual Pull Stations using Normally Open contacts. The release of Agent subsequent to the operation of the Manual Release shall be configurable to be either instantaneous or delayed. If delayed, the time delay shall be 10 seconds, 20 seconds, or 30 seconds. The operation of the Manual Release shall override any existing Abort Station input.

U. The contractor shall only utilize Fenwal Pull Stations that have been UL listed for compatibility with the Fenwal 732 panel.

V. 1 Abort Circuit in Style B or style D supervision.

W. The circuit shall be power limited and shall be capable of being user-configurable to abort either a single release output, or both. In applications where the 732 control unit dually controls a clean agent system and a water based system, activation of the abort circuit shall not affect the release of the water based system.

X. The abort circuit shall be capable of supporting Fenwal Abort Stations using momentary Normally Open. When enabled, the abort circuit shall be configurable to operate in one of the following five modes:

1. Abort Mode 1 per UL 864. On activation, timer holds at 10 seconds. On release, countdown continues to zero.
2. Abort Mode 2. On activation, timer resets to initial value. On release, countdown continues to zero.
3. Abort Mode 3 per IRI for cross-zoned systems. Shall be similar to Abort Mode 1. Activation must be during pre-release.
4. Abort Mode 4 per NYC. On activation, timer is reset to 2 minutes. On release, the timer restarts.
5. Abort Mode 5: Abort function disabled.

6. The contractor shall only utilize Fenwal Abort Stations that have been UL listed for compatibility with the Fenwal 732 panel.

3.07 CONDUCTORS AND CONDUITS

A. All conductors shall be enclosed in rigid or thin-walled, steel conduit unless open wiring is permitted by the local electrical code.
B. Any conduit or raceway exposed to dampness or other similar conditions shall be properly sealed and installed to prevent moisture entrapment. Provisions for draining and drying shall be employed as required.
C. All wiring shall be of the proper size to conduct the circuit current, but shall not be smaller than #18 AWG unless permitted by the local electrical code. Wiring for the signaling line circuit shall be in accordance with the FENWALNET 6000 Installation, Operation, and Maintenance Manual. Wire that has scrapes, nicks, gouges, or crushed insulation shall not be used. The manufacturer's minimum wire-bending radii shall be observed in all enclosures, raceways, and conduits. Aluminum wire shall not be used.

SECTION 4: EXECUTION

4.01 SUPPRESSION SYSTEM INSTALLATION

The system shall be supplied and installed by a factory-authorized, Fenwal Protection Systems Distributor. The Distributor shall be trained and certified by Fenwal Protection Systems to design, install and maintain the Fenwal 9300 Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression System. The distributor shall install the system in accordance with the manufacturer's design, installation, operation and maintenance manual.
Contact your local Fenwal Distributor Mike Holtz at 813-664-8989

4.02 ELECTRICAL SYSTEM INSTALLATION

A. The contractor shall install the system in accordance with the appropriate Fenwal Protection Systems installation, operation and maintenance manual.
B. Locations of all electrical equipment, the Fenwal 732 Control Unit, and all system components are subject to the approval of the architect.
C. All final-acceptance tests shall be performed in the presence of the architect and the authority having jurisdiction. The contractor shall record all equipment, tests and system configurations in a format approved by the manufacturer and/or the local Authority Having Jurisdiction. A copy of the commissioning tests and results shall be provided to the architect, the authority having jurisdiction, and the end-user.

4.03 TRAINING REQUIREMENTS

The contractor shall be certified and trained by Fenwal Protection Systems on installation, design and maintenance of the Fenwal 9300 Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression Systems and the Fenwal 732 System and shall be able to produce a certificate stating such on request.

The contractor shall provide one (1) training session on site for the owners personnel. In addition a Training DVD shall be provided for the owner including site specific training.

4.04 ROUTINE MAINTAINANCE

Routine maintenance on equipment shall be performed as recommended by the manufacturer's installation, operation and maintenance manual.

At a minimum the routine maintenance for the Fenwal 9300Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression Systems will include the following by a certified Fenwal Protection System Distributor:

1) Visual Check of Pipe network and distribution nozzles per the operation and maintenance manual.
2) Weight and pressure of the Fenwal 9300 Series, Bottom-Discharge and/or Spherical Engineered Fire Suppression Systems cylinders per the operation and maintenance manual.
3) Inspect all cylinders and equipment for damage per the operation and maintenance manual.

Routine maintenance on the suppression system as a whole shall be preformed as recommended by NFPA 2001, current edition. System maintenance and periodic testing of the FENWALNET 6000 shall be performed as required by NFPA 72 and NFPA 2001, current editions.

Effective: May 2007

FM-200 COMPONENT DESCRIPTION

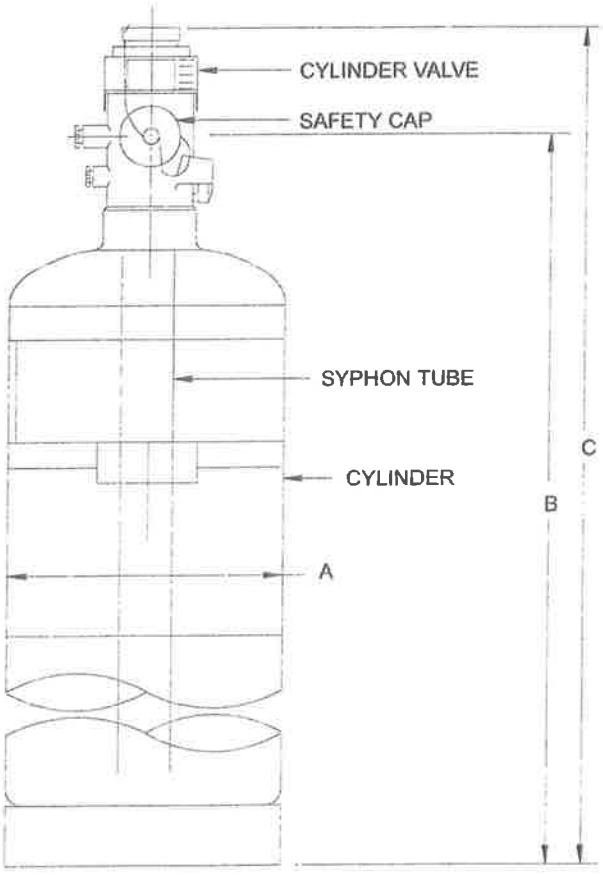
Cylinder and Valve Assemblies 10 lb. (4.5 kg) to 70 lb. (31.7 kg) Capacity, Vertical Mount Only

FENWAL Protection Systems
A UTC Fire & Security Company

F-93-2010

FEATURES

- **For Use with UL Listed, ULC Listed & FMRC Approved Systems**



Notes:

1. The safety cap must be installed on the valve outlet at all times except when the cylinders are connected to the system piping or being filled. The safety cap must not be removed from its chain.
2. See F-90-2070 for additional information.
3. Cylinders are vertical mount only.

ORDERING INFORMATION

Part Number	Cyl. Size	Dimensions		
		A*	B*	C*
93-100010-001	10 Lbs.	7.07	13.34	17.30
93-100020-001	20 Lbs.	7.07	21.01	24.97
93-100040-001	40 Lbs.	9.00	22.80	26.76
93-100070-001	70 Lbs.	9.00	34.87	38.83

* Dimensions are in inches.

P/N: 93-1000X0-001

MATERIALS

- Valve Body: Brass
- Cylinder: Steel, Painted Red

Printed in USA

Fenwal Protection Systems
A UTC Fire & Security Company
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
www.fenwalfire.com

FM-200 COMPONENT DESCRIPTION

Effective June 1999

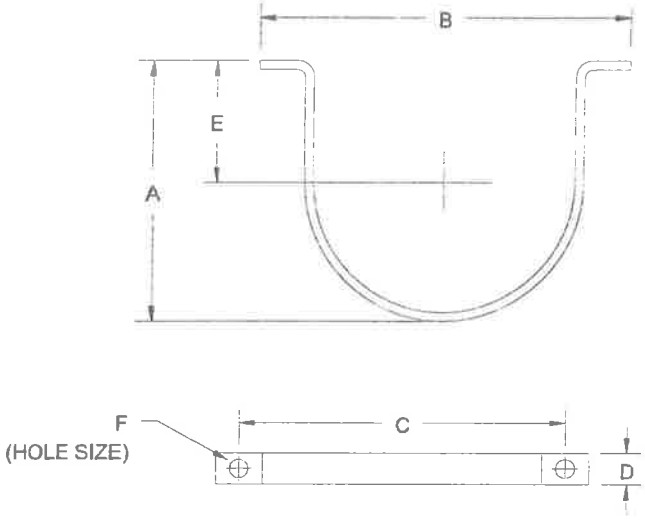
Cylinder Mounting Straps

F-93-8130

FENWAL®

FEATURES

- ***FOR USE WITH UL LISTED, ULC LISTED & FMRC APPROVED SYSTEMS***



PART NO.	CYL SIZE	CYL O.D.*	A*	B*	C*	D*	E*	F*
283945	10,20	7.07	6.48	9.62	8.62	1.00	2.78	.437
283934	40,70	9.00	8.16	11.69	10.69	1.00	3.50	.437
235317	125,200	12.75	12.93	16.18	14.56	1.75	5.59	.625
292971	200 pre3/98	13.60	13.09	17.06	15.44	1.75	6.06	.625
281866	350	16.00	15.50	19.50	17.88	1.75	7.25	.625
294651	600	22.00	21.56	25.75	24.12	1.75	10.25	.625

* DIMENSIONS ARE IN INCHES

MATERIAL: STEEL, PAINTED BLACK SAE 1020

FENWAL®
KIDDE-FENWAL, INC.
400 MAIN STREET, ASHLAND, MA 01721
TEL. (508) 881-2000 FAX: (508) 881-8920
www.kiddefire.com

FENWAL® Protection Systems

FM-200 COMPONENT DESCRIPTION

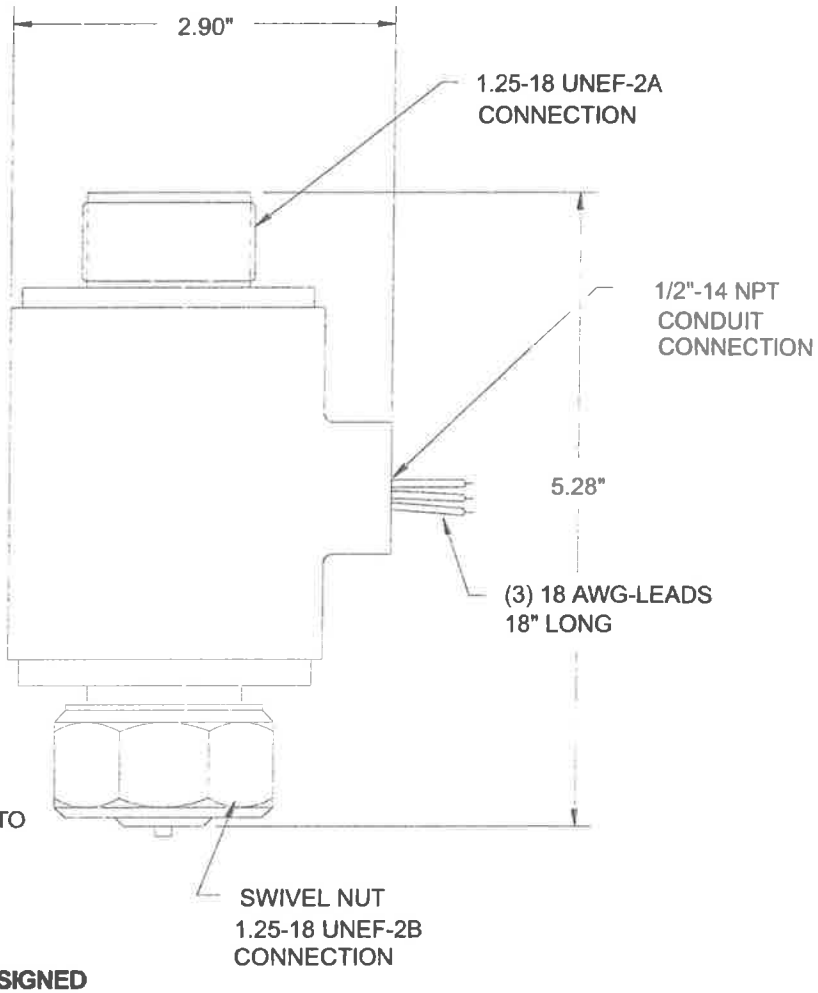
Effective June 1999

Electric Control Head, Stackable Explosion Proof

F-93-8017

FEATURES

- ***FOR USE WITH UL LISTED, ULC LISTED & FMRC APPROVED SYSTEMS***



ELECTRIC CONTROL HEAD, PART NO. 486500-01 IS RATED FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS CLASS 1, DIV. I, GROUPS C, D AND CLASS II, DIV. II, GROUPS E, F, G BETWEEN -40F AND 140F. USE CONDUIT SEAL WITHIN 18 IN. (45cm) OF THIS DEVICE.

NOTE:
THIS CONTROL HEAD IS POLARIZED. IMPROPER WIRING WILL RESULT IN FAILURE OF THIS DEVICE TO OPERATE

⚠ WARNING

ELECTRIC CONTROL HEAD, P/N: 486500-01, IS DESIGNED FOR INSTALLATION DIRECTLY ON 487 SERIES HALON AND MODEL 9300 FM-200 VALVES ONLY. THIS CONTROL HEAD MUST NOT BE INSTALLED ON ANY OTHER TYPE OF HALON OR FM-200 CYLINDER VALVE, NITROGEN VALVE, CARBON DIOXIDE CYLINDER VALVE, FE-13 CYLINDER VALVE OR STOP (DIRECTIONAL) VALVE. INSTALLATION OF THIS CONTROL HEAD TO ANY OTHER DEVICE (E.G., PRESSURE OPERATED CONTROL HEAD) WILL RESULT IN FAILURE OF DEVICE TO OPERATE.

VOLTAGE: 24VDC
CURRENT: 0.2A CONTINUOUS DRAW

P/N: 486500-01

FENWAL®
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TEL: (508) 881-2000 FAX: (508) 881-8920
www.fenwalfire.com

FENWAL® Protection Systems

FM-200®
Fire Suppression Agent

Effective: February 2004

F-93-1900

FEATURES

- **Non-Ozone Depleting**
- **Safe for Total Flooding of Occupied Spaces**
- **Clean-No Residue to Clean Up**
- **Non-Damaging to Hazard Contents**
- **Fast Acting**
- **Active Fire Suppression Agent**
- **UL Component Recognized**
- **FM Approved**

EXTINGUISHING AGENT

FM-200 (1,1,1,2,3,3,3-heptafluoropropane) is a compound of carbon, fluorine and hydrogen (CF3CHFCF3). It is colorless, odorless and electrically non-conductive. It suppresses fire by a combination of chemical and physical mechanisms without affecting the available oxygen. This allows personnel to see and breathe, permitting them to leave the fire area safely. FM-200 has acceptable toxicity for use in occupied spaces when used as specified in the United States Environmental Protection Agency (EPA) Significant New Alternative Policy (SNAP) program rules. Although FM-200 is considered non-toxic to humans in concentrations necessary to extinguish most fires, certain safety considerations should be observed when applying and handling the agent. The discharge of FM-200 may create a hazard to personnel from the undecomposed agent itself and from the decomposition products which result when the agent is exposed to fire and other hot surfaces. Exposure to the agent is generally of less concern than is exposure to the decomposition products. Unnecessary exposure to the agent or the decomposition products should be avoided.

Toxicity: In tests, the acute toxicity of FM-200 was shown to be equivalent to that of Halon 1301. FM-200 has been evaluated for cardiac sensitization through test protocols approved by the US EPA. The EPA's SNAP Program classifies FM-200 as acceptable for use as a total flooding agent in occupied spaces. Refer to the SNAP program rules for more information.

Cleanliness: FM-200 is clean, leaves no residue, thereby eliminating costly after-fire clean-up, and keeping expensive "down-time" to a minimum. Most materials such as steel, stainless steel, aluminum, brass, and other metals as well as plastics, rubber and electronic components are unaffected by exposure to FM-200.

Approvals: FM-200 agent complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems, EPA SNAP Program, (Significant New Alternate Policy), Underwriters Laboratories, Inc. (UL) Factory Mutual Research Corporation (FMRC).

Use: FM-200 is used in total flooding fire suppression systems. It is stored in steel containers, and is super-pressurized with nitrogen to aid in expelling the agent. The discharge time is 10 seconds or less. The maximum fill density of the agent storage is 70 lb./ft.3.

FM-200 Physical Properties	
Chemical Formula	CF3CHFCF3
Molecular Weight	170.03
Freezing Point	-204°F (-131°C)
Boiling Point at 1 Atm.	2.6°F (-16.4°C)
Critical Temperature	215.1°F (101.7°C)
Critical Density	38.76 lb./ft.3 (621 kg/m3)
Critical Pressure	422 PSIA (29.0 bar absolute)
Critical Volume	0.0258 cu.ft./lb. (1.61 L/kg)
Ozone Depletion Potential	0

FM-200 Fire Protection Properties	
Cup Burner Concentration (n-Heptane)	6.70% v/v
Use Concentration for n-Heptane	8.00% v/v
Use Concentration for Acetone	8.30% v/v
Use Concentration for Isopropanol	9.00% v/v
Use Concentration for Toluene	7.00% v/v
Use Concentration for Class A (Surface Fires)	6.25% v/v

FM-200 Toxicity Properties	
NOAEL (No Observable Adverse Effect Level)	9.00%
LOAEL (Lowest Observable Adverse Effect Level)	10.50%

FM-200 is a registered trademark of Great Lakes Chemical Corporation

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MATERIAL SAFETY DATA SHEET

MSDS Number: 00057
Product Name: FM-200®

Effective Date: 06/09/2006

SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**FM-200®**		
Supplier:	Chemtura USA Corporation		
Address:	199 Benson Road	**City:**	Middlebury
State:	Connecticut	**Zip:**	06749
Emergency Telephone Number:	**1-800-949-5167**		
Information Telephone Number:	1-765-497-6100	**Fax:**	1-765-497-6123
Chemtrec Phone:	**1-800-424-9300; Internationally call 703-527-3887**		
Effective Date:	06/09/2006	**Supercede Date:**	01/12/2006
MSDS Prepared By:	Chemtura Product Safety Group		
Synonyms:	1,1,1,2,3,3,3-Heptafluoropropane, 2H-Heptafluoropropane		
Product Use:	Fire extinguishing, fire suppression, explosion suppression and inerting agent		
Chemical Name:	1,1,1,2,3,3,3-Heptafluoropropane		
Chemical Family:	Halogenated alkane		

Additional Information

Manufacturer:
Great Lakes Chemical Corporation, A Chemtura Company
P.O. Box 2200
West Lafayette, Indiana 47996-2200

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NO.	%	EXPOSURE LIMITS
1,1,1,2,3,3,3-Heptafluoropropane	431890	> or = 99.9	Y (Hazardous) Not established (OSHA PEL TWA) Not established (OSHA PEL STEL) Not established (OSHA PEL CEIL) Not established (ACGIH TLV TWA) Not established (ACGIH TLV STEL) Not established (ACGIH TLV CEIL)

*Indented chemicals are components of previous ingredient.

Additional Information

No information available

SECTION III - HAZARDS IDENTIFICATION

Emergency Overview:
Colorless gas
Odorless
Direct eye or skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.
May cause central nervous system effects.
Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities.

Relevant Routes of Exposure:
Inhalation

Signs and Symptoms of Overexposure:
Symptoms similar to oxygen deprivation (headache, nausea, dizziness or loss of consciousness) may result from overexposure by inhalation. Heart irregularities such as irregular pulse or heart palpitations may indicate cardiac sensitivity.

SECTION III - HAZARDS IDENTIFICATION

Cold, white or discolored skin or in severe cases blistering, can be a sign of frostbite caused by cold liquids or gases.

Medical Conditions Generally Aggravated By Exposure: Persons with preexisting cardiac, respiratory, or central nervous system disorders may be more susceptible to effects of an overexposure. The use of epinephrine or similar compounds can increase susceptibility to heart irregularities caused by excessive exposure to these types of compounds.

Potential Health Effects: See Section XI for additional information.

Eyes: Direct eye contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.

Skin: Direct skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues.

Ingestion: Not expected to be a hazard in normal industrial use.

Inhalation: Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities (arrhythmias). Misuse of the product by deliberately inhaling high concentrations of this gas could cause death without warning.

Chronic Health Effects: None known

Carcinogenicity:

NTP:	No	**ACGIH:**	No
IARC:	No	**OTHER:**	No
OSHA:	No		

Additional Information

No information available

SECTION IV - FIRST AID MEASURES

Eyes: Flush with water. Get medical attention.

Skin: Flush with water; if frostbite occurs get medical attention.

Ingestion: No information available

Inhalation: Remove person to fresh air; if not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Antidotes: No information available

Notes to Physicians and/or Protection for First-Aiders: The use of epinephrine or similar compounds can increase susceptibility to heart irregularities caused by excessive exposure to these types of compounds.

Additional Information

No information available

SECTION V - FIRE FIGHTING MEASURES

Flammable Limits in Air (% by Volume): Not applicable

Flash Point: Nonflammable gas

Autoignition Temperature: Not available

Extinguishing Media: All conventional media are suitable.

Fire Fighting Instructions: Keep cylinders cool with a water spray applied from a safe distance. Use a self-contained breathing apparatus if containers rupture or release under fire conditions. Do not allow reentry into areas where this material has been released without first ventilating to remove products of combustion/decomposition.

Unusual Fire and Explosion Hazards: Although containers of our product are provided with pressure and temperature relief devices, containers can rupture if exposed to localized heat. Thermal decomposition will generate toxic and corrosive gases.

Flammability Classification: Nonflammable gas

SECTION V - FIRE FIGHTING MEASURES

Known or Anticipated Hazardous Products of Combustion: Decomposition by elevated temperatures (fire conditions, glowing metal surfaces) may generate hazardous decomposition products common to other CFCs, HCFCs or HBFCs. These can include hydrogen fluoride (ACGIH TLV = 3 ppm), carbon monoxide, carbon dioxide and others.

Additional Information

No information available

SECTION VI - ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Evacuate the area and ventilate. Do not enter areas where high concentrations may exist (especially confined or poorly ventilated areas) without appropriate protective equipment including a self-contained breathing apparatus.

Personal Precautions: See Section VIII.

Environmental Precautions: No information available

Additional Information

No information available

SECTION VII - HANDLING AND STORAGE

Handling: Use the same type of precautions as would be used in handling any cryogenic gas. Protect container from damage. Handle in well-ventilated areas. When this material is used as a firefighting agent in fixed or portable extinguishing systems, follow manufacturer's instructions for operation, inspection, maintenance and repair of the system.

Storage: Store in a cool, dry, well-ventilated area away from incompatible materials. Keep container tightly closed.

Other Precautions: No information available

Additional Information

No information available

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: No information available

Ventilation Requirements: Use local ventilation to minimize exposure to gas. Use mechanical ventilation for general area control.

Personal Protective Equipment:

Eye/Face Protection: Chemical splash goggles when handling liquid

Skin Protection: Use lined neoprene gloves if handling liquid. Clothing designed to minimize skin contact

Respiratory Protection: Wear a NIOSH/MSHA approved self-contained breathing apparatus in emergency situations. Consult the OSHA respiratory protection information located at 29CFR 1910.134 and the American National Standard Institute's Practices of Respiratory Protection Z88.2.

Other Protective Clothing or Equipment: No information available

Exposure Guidelines: See Section II.

Work Hygienic Practices: Wash thoroughly after handling. Wash contaminated clothing before reuse. Make sure piping is empty before doing maintenance work.

Additional Information

No information available

SECTION IX - PHYSICAL & CHEMICAL PROPERTIES

Appearance:	Colorless gas	**Percent Volatile:**	Not available
Boiling Point:	-16.4 degrees C (2.5 degrees F)	**pH Value:**	Not available
Bulk Density:	See Below	**pH Concentration:**	Not available
Color:	Colorless	**Physical State:**	Gas
Decomposition Temperature:	Not available	**Reactivity in Water:**	Not water reactive
Evaporation Rate:	Not available	**Saturated Vapor Concentration:**	Not available
Freezing Point:	-131 degrees C (-204 degrees F)	**Softening Point:**	Not available
Heat Value:	See Below	**Solubility in Water:**	260 mg/L
Melting Point:	-131 degrees C (-204 degrees F)	**Specific Gravity or Density (Water=1):**	1.46 (liquid)
Molecular/Chemical Formula:	C3HF7	**Vapor Density:**	6.04
Molecular Weight:	170	**Vapor Pressure:**	58.8 psia at 70 degrees F (21 degreesC)
Octanol/Water Partition Coefficient:	Not available	**Viscosity:**	Not available
Odor:	Odorless	**Volatile Organic Compounds:**	Not available
Odor Threshold:	Not available	**Water/Oil Distribution Coefficient:**	Not available
Particle Size:	Not available	**Weight Per Gallon:**	Not available

Additional Information

Bulk density of liquid = 87.6 lb/ft3 at 70 degrees F (21 degrees C)
Bulk density of gas = 2.01 lb/ft3 at 70 degrees F (21 degrees C)
Heat of vaporization at boiling point = 57.0 Btu/lb

SECTION X - STABILITY AND REACTIVITY

Stability: Stable under normal conditions of handling and use.

Conditions to Avoid: None

Incompatibility With Other Materials:

Powdered metals (ex. Al, Mg, or Zn) and strong alkalis, oxidizers or reducing agents are not compatible with this and most other halogenated organic compounds.

Hazardous Decomposition Products:

Thermal decomposition may produce the following:
Hydrogen fluoride
Carbon monoxide and carbon dioxide

Hazardous Polymerization: Will not occur

Conditions to Avoid: None

Additional Information

No information available

SECTION XI - TOXICOLOGICAL INFORMATION

VALUE (LD50 OR LC50)	ANIMAL	ROUTES	COMPONENTS
>788,696 ppm/4H	Rat	Acute Inhalation	1,1,1,2,3,3,3-Heptafluoropropane

Toxicological Information:
The human health hazards of this product are expected to be similar to other liquified gases including N2, CO2, CFCs, HCFCs, and HBFCs. Therefore, direct eye or skin contact with the liquid or cold gas can cause chilling or possibly frostbite of exposed tissues. Inhalation of high concentrations can be harmful or fatal due to oxygen deprivation and/or heart irregularities (arrhythmias). Misuse of the product by deliberately inhaling high concentrations of this gas could cause death without warning. Persons with preexisting cardiac or central nervous system disorders may be more susceptible to effects of an overexposure.

When tested with and without metabolic activation over a concentration range of 43.9-93.5%, heptafluoropropane was not mutagenic in S. typhimurium. Neither toxicity nor mutagenicity was observed in a mouse lymphoma assay when heptafluoropropane was tested to a concentration of 56.8%. Neither toxicity nor an increase in micronuclei was observed in mice exposed to 10.5% heptafluoropropane. Therefore, there is no evidence that heptafluoropropane is capable of inducing gene or chromosomal mutations in vitro or chromosomal effects in vivo. In other studies, heptafluoropropane did not show genotoxicity or cytotoxicity.

Animal studies have found the rat 4 hour LC50 to be >788,696 ppm (~80%), the highest level tested. A cardiac sensitization study in dogs found the No Observable Adverse Effect Level (NOAEL) to be 9.0%. The Lowest Observable Adverse Effect Level (LOAEL) for this study was reported to be 10.5%. A 90 day inhalation study did not find any exposure related effects at 105,000 ppm (10.5% vol./vol.), the highest level tested. Inhalation studies looking for developmental effects on pregnant rabbits and rats or their offspring did not show any exposure related effects at the highest concentrations tested (105,000 ppm).

Additional Information

No information available

SECTION XII - ECOLOGICAL INFORMATION

Ecological Information: No information available

Additional Information

No information available

SECTION XIII - DISPOSAL CONSIDERATIONS

Disposal Considerations: Non-contaminated product is reclaimable. Contact Great Lakes Chemical Corporation for information. Otherwise, dispose of waste in an approved chemical incinerator equipped with a scrubber as allowed by current Local, State/Province, Federal/Canadian laws and regulations.

Additional Information

No information available

SECTION XIV - TRANSPORT INFORMATION

U.S. DOT

Proper Shipping Name:	Heptafluoropropane		
Hazard Class:	2.2	**ID Number:**	UN3296
Packing Group:	N/A	**Labels:**	Nonflammable gas
Special Provisions:	T50	**Packaging Exceptions:**	306
Non-Bulk Packaging:	304	**Bulk Packaging:**	314, 315
Passenger Air/Rail Limit:	75 kg	**Air Cargo Limit:**	150 kg
Vessel Stowage:	A	**Other Stowage:**	N/A
Reportable Quantity:	N/A		

AIR - ICAO OR IATA

Proper Shipping Name:	Heptafluoropropane		
Hazard Class:	2.2	**ID Number:**	UN3296
Subsidiary Risk:	N/A	**Packing Group:**	N/A
Hazard Labels:	Nonflammable gas	**Packing Instructions:**	200
Air Passenger Limit Per Package:	75 kg	**Packing Instruction - Cargo:**	200
Air Cargo Limit Per Package:	150 kg	**Special Provisions Code:**	N/A

WATER - IMDG

Proper Shipping Name:	Heptafluoropropane		
Hazard Class:	2.2	**ID Number:**	UN3296
Packing Group:	N/A	**Subsidiary Risk:**	N/A
Medical First Aid Guide Code:	NA		

Additional Information

Emergency Procedures Code: F-C, S-V

SECTION XV - REGULATORY INFORMATION

U.S. Federal Regulations:
The components of this product are either on the TSCA Inventory or exempt (i.e. impurities, a polymer complying with the exemption rule at 40 CFR 723.250) from the Inventory.

State Regulations:
None known

International Regulations:
This material (or each component) is listed on the following inventories:
Canada - NDSL
EU - EINECS
Australia - AICS
Japan - ENCS
Korea - ECL
China - List I

Canadian WHMIS Hazard Class and Division = A.

SARA Hazards:

Acute:	Yes	**Chronic:**	No
Reactive:	No	**Fire:**	No
Pressure:	No		

Additional Information

The above regulatory information represents only selected regulations and is not meant to be a complete list.

SECTION XVI - OTHER INFORMATION

NFPA Codes:

Health:	1	**Flammability:**	0
Reactivity:	0	**Other:**	0

HMIS Codes:

Health:	1	**Flammability:**	0
Reactivity:	0	**Protection:**	X

* indicates chronic health hazard.

Label Statements:
Not available

Other Information:
Abbreviations:
(L) = Loose bulk density in g/ml
LOEC = Lowest observed effect concentration
MATC = Maximum acceptable toxicant concentration
NA = Not available
N/A = Not applicable
NL = Not limited
NOAEL = No observable adverse effect level
NOEC = No observed effect concentration
NOEL = No observable effect level
NR = Not rated
(P) = Packed bulk density in g/ml
PNOR = Particulates Not Otherwise Regulated
PNOS = Particulates Not Otherwise Specified
REL = Recommended exposure limit
TS = Trade secret

Additional Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200 and the Canadian Hazardous Products Act and associated Controlled Products Regulations and shall not be used for any other purpose.
Revision information:
General review and update

FM-200™ Pendant Nozzles

Effective: August 1999

P/N 93-1940.1

93.1940.1

FEATURES

- 180° and 360° Styles
- Six Pipe Sizes - 1/2" to 2" NPT
- Specially designed for FM-200
- Uniform Agent Distribution
- Custom Orifice Sizing
- UL Listed
- FMRC Approved

DESCRIPTION

These nozzles are used in Fenwal FM-200 Fire Suppression Systems to disperse FM-200 uniformly throughout the hazard area. Patterns direct discharged FM-200 parallel to the ceiling. Nozzles are available to discharge in either 180° or 360° patterns, depending on location within the hazard area. A selection of orifices is available for each nozzle size to provide correct sizing for appropriate agent distribution.

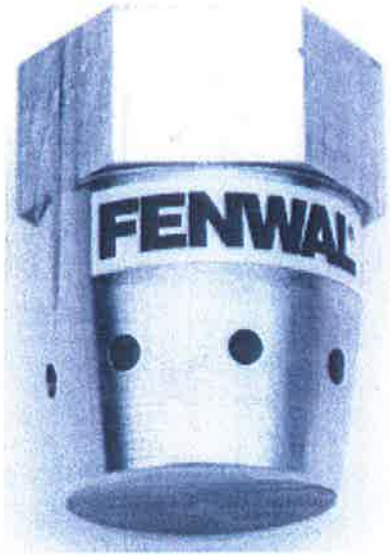
Nozzles are constructed of brass, nozzle sizes are 1/2, 3/4, 1/ 1-1/4, 1-1/2 and 2 inch NPT. See Ordering Information for sizes and part numbers.

DESIGN/INSTALLATION

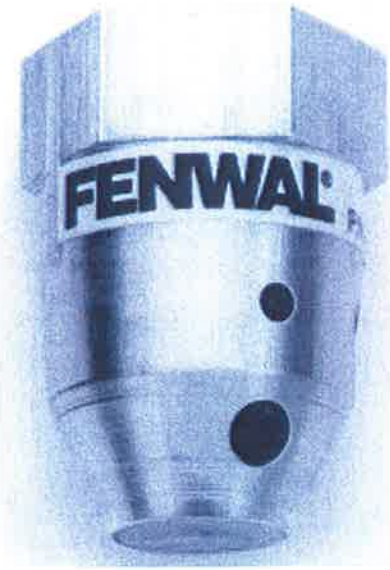
The nozzles are equipped with female National Pipe Threads and provide and equal distribution of agent throughout the protected area. Nozzles should be mounted in a downward vertical position only. The Placement of the nozzles for adequate coverage to all portions of the hazard area is determined by considering the indicated throw of each nozzle. When using large nozzles in an area where smaller nozzles have a sufficient throw, care should be used to avoid any unnecessary and unwanted turbulence.

ARCHITECT/ENGINEER SPECIFICATION

This FM-200 Fire Suppression System shall use discharge nozzles that distributed the FM-200 uniformly throughout the protected area. The nozzle shall be Fenwal P/N 93-1940XX-XXX.

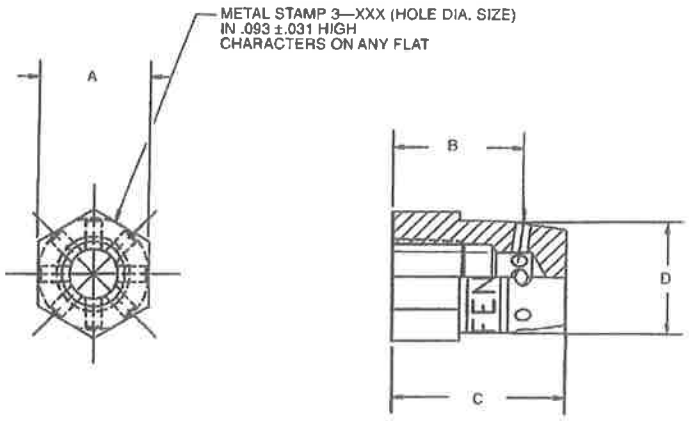


360° Nozzle

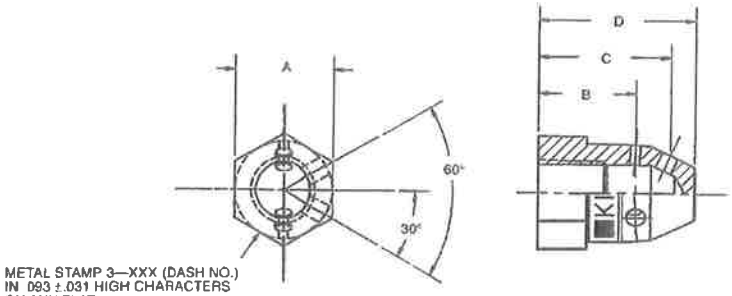


180° Nozzle

OUTLINE DIMENSIONS (INCHES)



360° NOZZLE				
Pipe Size	**A**	**B**	**C**	**D**
1/2" (12.2mm)	1.250" (31.75mm)	1.468" (37.28mm)	1.937" (49.19mm)	1.250" (31.75mm)
3/4" (19.05mm)	1.500" (38.1mm)	1.578" (40.08mm)	2.125" (53.97mm)	1.500" (38.1mm)
1" (25.4mm)	1.750" (44.45mm)	1.718" (43.63mm)	2.375" (60.32mm)	1.750" (44.45mm)
1-1/4" (31.75mm)	2.250" (57.15mm)	1.950" (49.53mm)	2.750" (69.85mm)	2.250" (57.15mm)
1-1/2" (38.1mm)	2.500" (63.50mm)	2.000" (50.80mm)	2.937" (74.59mm)	2.500" (63.50mm)
2" (50.8mm)	3.000" (76.20mm)	2.062" (52.37mm)	3.125" (79.37mm)	3.000" (76.20mm)



180° NOZZLE				
Pipe Size	**A**	**B**	**C**	**D**
1/2" (12.2mm)	1.250" (31.75mm)	1.250" (31.75mm)	1.687" (42.84mm)	2.000" (50.8mm)
3/4" (19.05mm)	1.500" (38.1mm)	1.375" (34.92mm)	1.950" (48.89mm)	2.296 (58.31mm)
1" (25.4mm)	1.750" (44.45mm)	1.562" (39.67mm)	2.218" (56.33)	2.671" (67.84mm)
1-1/4" (31.75mm)	2.250" (57.15mm)	1.750" (44.45mm)	2.656" (67.46mm)	3.250" (82.55mm)
1-1/2" (38.1mm)	2.500" (63.50mm)	1.950" (48.89mm)	2.950" (74.93mm)	3.625" (92.07mm)
2" (50.8mm)	3.000" (76.20mm)	1.968" (49.98mm	2.875" (73.02mm)	3.656" (92.86mm)

*FM-200 is a Registered Trademark of Great Lakes Chemical Corporation

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FENWAL Protection Systems

93.1940.1 8/99 Printed in U.S.A.

Fenwal 732™

Effective: March 2007

Conventional Fire Alarm-Suppression Control Unit

30-6000.0

FENWAL® Protection Systems

A UTC Fire & Security Company

FEATURES

- **Agency Approvals**
  - **FM Approved**
  - **FM Approved to ANSI/UL 864, 9th edition**
  - **FM Approved to ULC-S527-99**
  - **Other domestic U.S. approvals/listings pending/ in-process**
- **Suppression focused Control Unit**
- **Listed for a Wide Range of Suppression Systems**
  - **FM-200™, FE13™, Novec™ 1230 Fire Protection Fluid, Argonite™, and Halon Clean Agents**
  - **Sprinkler Supervisory Service**
  - **Deluge, Preaction, Foam, Foam-Water Systems**
- **Combination Clean Agent plus Pre-Action System**
- **Built-In Class-A and Class-B Circuitry**
- **Sophisticated Programmable Notification Appliance Circuits**
- **Independently Programmable Agent Releasing Circuits with Triple-R Protection**
- **Input and Output**
  - **3 Detection Circuits**
  - **2 Supervisory Circuits**
  - **1 Manual Release Circuit**
  - **1 Abort Input Circuit**
  - **3 Notification Appliance Circuits**
  - **2 Release Circuits**
  - **4 Form-C Relays**
- **Programmable Relays**
- **Robust Power Supply**
- **Elegant User-Interface**
- **Simple Configuration**
- **Password Protected**
- **Digital Release Countdown**
- **Battery Voltage and Charging Current Display**
- **Extensive Diagnostics**
- **Backwards Compatible**
- **Improved and Enlarged Cabinet Design**
- **5-Year Warranty**

DESCRIPTION

The Fenwal 732 is the technologically most advanced Conventional Single Hazard Agent Releasing Unit available to the Fire-Alarm Suppression industry today. It combines the high quality, system reliability, and flexibility required by modern commercial, high-tech and industrial applications in an aesthetically pleasing and physically robust package.

The Fenwal 732 is well equipped to handle all special hazard extinguishing systems due to the high degree of programming flexibility provided and the following full complement of input and output circuits:

- Three (3) Class A or Class B Detection Circuits
- Two (2) Class A or Class B Supervisory Circuits
- One (1) Class A or Class B Manual Release Circuit
- One (1) Class A or Class B Abort Input Circuit
- Three (3) Class A or Class B Notification Appliance Circuits
- Two (2) Class B Agent Release Circuits
- Four (4) Form-C Relays

DETECTION CIRCUITS

The Detection Circuits can support up to 25 Conventional CPD-705x Ionization Smoke, PSD-715x Photoelectric Smoke, or THD-705x Heat Detectors each as well as Normally Open contact closure type devices. Two circuits are dedicated to the main suppression function and can be programmed to activate the release circuits by either single-shot or cross-zone input. The user-configuration allows automatic release via detection to be delayed from 0 to 60 seconds in 10-second intervals and also allows a choice of which of the two Agent Release Circuits to activate.

The third Detection Circuit is programmable for either Waterflow or as an independent Detection circuit. When programmed for Waterflow, Notification Appliance Circuits can be programmed as Non-Silenceable as required by certain jurisdictions.

SUPERVISORY CIRCUITS

The Supervisory Circuits accept Normally Open contact closure type devices such as pressure switches on the agent cylinders or on the water or air pipe network. The system configuration enables the supervisory input to be a participant in the suppression function. For example, low air supervisory can be included with detection for release of pre-action systems as required by certain jurisdictions.

MANUAL RELEASE AND ABORT CIRCUITS

Both the Manual Release and Abort Circuits accept Normally Open contact closure type devices. Activation of the Agent Release Circuits can either be instantaneous or delayed up to 30 seconds (maximum) upon receipt of Manual Release input. Agent release can be temporarily delayed by activating the Abort Circuit. The Abort input can be programmed for 5 modes of operation. These include the UL 10-second mode, the full-delay mode, the IRI mode, the NYC mode, or the abort can be disabled. Aborts can also be programmed to be applicable for either one or both Agent Release Circuits thereby allowing use with Deluge/Pre-Action systems.

NOTIFICATION APPLIANCE CIRCUITS (NAC)

The three Notification Appliance Circuits are rated 1.5 Amps each and accept polarized 24 VDC Notification Appliances. Of the three circuits, NAC 1 activates on First Alarm, NAC 2 in Pre-Release condition and NAC 3 in Releasing condition. Each circuit is driven independently and is user configurable for 60 BPM, 120 BPM, Temporal, or Continuous pattern.

The MT and NS series appliances provide the option to use silenceable horns and non-silenceable strobes on the same NAC. Multiple NAC circuits (connected to audible devices only) programmed with the same master code pattern are synchronized, regardless of any differing starting times that preceded their concurrent operation. The NACs configuration includes a user-selectable intelligent synchronization feature which allows a silenceable horn to be shut off while the strobe continues to flash in synchronized fashion.

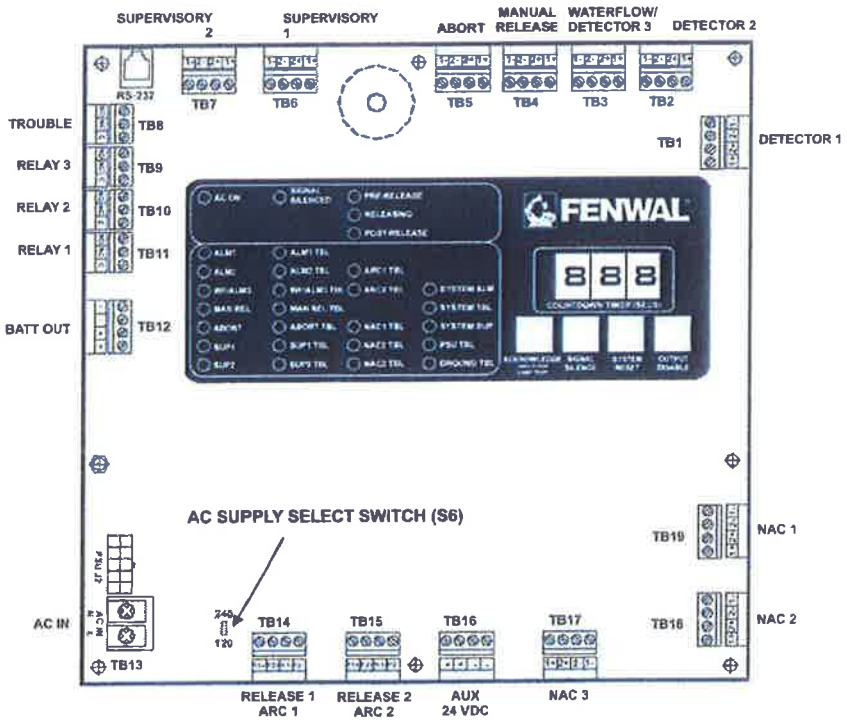

Figure 1. Printed Circuit Board (PCB)

BUILT-IN CLASS A AND B CIRCUITRY

For the input and NAC circuits, the choice of Class A or Class B supervision is made at site on the board itself by selecting the terminals used for wiring. Neither conversion boards nor additional hardware nor jumper selection is required for this purpose.

AGENT RELEASE CIRCUITS (ARC)

The two circuits can be programmed for activation by different inputs, with independent time delays and abort modes to fire combinations of two of the following releasing devices:

- 1 or 2 Fenwal Continuous and Momentary Solenoid Control Heads
- 1 set of Fenwal Initiators
- 1 Factory Mutual Group A, B, D, E, F, G, I, J, or K Solenoid

In other words, operating in tandem, the two circuits can release:

- 1 or 2 Control Heads on ARC1 and 1 or 2 Control Heads on ARC2
- 1 or 2 Control Heads on ARC1 and 1 Initiator set on ARC2 or vice-versa
- 1 or 2 Control Heads on ARC1 and 1 FM Sprinkler Solenoid on ARC2 or vice-versa
- 1 Initiator set on ARC1 and 1 Initiator set on ARC2
- 1 FM Solenoid on ARC1 and 1 FM Solenoid on ARC2

This configurability is useful for those jurisdictions where the gaseous suppression agent is required to be supplemented with a pre-action system.

TRIPLE-R PROTECTION FOR AGENT RELEASING CIRCUITS (ARC)

The two ARCs feature a triple failure redundancy safeguard system to protect them from inadvertent activation by the main microprocessor. The Triple-R system requires that in order to activate an ARC, the main microprocessor issues two release commands of opposing polarity via separate channels and that these commands be combined with a third signal from the panel watchdog timer to confirm the microprocessor operation. The Triple-R system ensures that electrical transients or disturbances such as power surges that could interfere with the operation of the main microprocessor will not inadvertently activate the connected suppression system. The result is a more robust and reliable suppression-focused panel.

PROGRAMMABLE RELAYS

Of the 4 relays, three are user-programmable for a variety of alarm related conditions and the fourth is a dedicated trouble relay. All relay contacts are rated 3.0 Amps at 30 VDC/120 VAC (resistive).

POWER-LIMITED CIRCUITRY

All circuits, excluding ARCs are inherently power-limited. Agent Release Circuits, except when firing Initiators, can also be made power-limited by a field located inline releasing diode device thereby allowing cost effective installation with all wiring in the same conduit.

ROBUST POWER SUPPLY UNIT (PSU)

The Fenwal 732 features a universal 120/240 V, 50/60 Hz AC Power Supply Unit with a robust 5.4 Amps of 24 VDC power. Input voltage selection is via a slider switch with no jumper cutting required. The on-board battery charger is able to charge 24 VDC (2 x 12) batteries of capacity up to 68 AH thereby allowing from 24 hours of supervision plus 5 minutes of alarm to 90 hours of supervision plus 10 minutes of alarm required by some jurisdictions.

AUXILIARY POWER SUPPLY

Up to 1 Amp of auxiliary power at 24 VDC is available to power external 4-wire devices such as Flame Detectors, AlarmLine modules, Duct Detectors, etc.

ELEGANT USER-INTERFACE

The user-interface consists of an array of LED Indicators, Control Switches, a Digital Display, and Buzzer. Over and above the System, Power Supply status, Input circuit Fire and Trouble and Output circuit Trouble LEDs, the Fenwal 732 annunciates its suppression state-of-alarm via three additional Pre-Release, Releasing and Post Release LEDs. Four switches are provided, one each for Acknowledge, Signal Silence, System Reset and Output Disable. The 3-digit display provides a countdown of impending agent release. On command from the user-interface switches, it also indicates the battery open circuit voltage and charging current.

SIMPLE SITE-SPECIFIC CONFIGURATION

Accessed via the digital display and user-interface switches, site-specific configuration is simple, yet detailed and can typically be performed in a matter of minutes. To prevent unauthorized use, the configuration menu is protected by a user-changeable password. Factory technical support can provide assistance with lost or forgotten passwords.

Apart from the input voltage selection performed on both the PSU and main board via a slider switch, no other on-board settings or jumper cuttings are required.

EXTENSIVE DIAGNOSTICS

Also initiated via the digital display and user-interface switches, the troubleshooting function displays diagnostic codes that assist in determining causes of trouble. A complete list of diagnostic codes and their meanings ships factory installed on the inside of the enclosure door for easy reference.

BACKWARDS COMPATIBILITY

Consistent with previous generation Fenwal control equipment, the Fenwal 732 is listed to be backwards compatible with the full range of Fenwal conventional detectors, alarm devices and suppression accessories. Going forward, this will allow older generation panels to be replaced with relative ease.

IMPROVED AND ENLARGED CABINET DESIGN

The cabinet design allows for easy installation by fitting between the studs of a standard 16 inch studded wall. It is large enough to house two 12 VDC, 12 AH Batteries and provides up to 2 inches (50 mm) of wiring and finger space between the circuit board and the cabinet wall.

An optional door design features a factory installed Manual Release and Abort switch for applications with space constraints. Both switches incorporate guards that prevent their inadvertent activation.

Other cabinet options include a flush mounting trim-ring and a dead-front plate required for Canadian applications.

TECHNICAL SPECIFICATIONS

- Hazards Protected
  - One
- Power Supply
  - 120/240 Vac, 50/60 Hz (90 to 264 Vrms, 47 to 63 Hz) AC Main Input
  - 5.4 Amps at 27 Vdc Output
  - Battery capacity up to 68 AH @ 24 Vdc
  - Auxiliary power output rated at 1 Amp at 18.8 - 27.6 Vdc (resettable)
- Three (3) Detection Circuits
  - Compatible with up to 25 CPD-705x, PSD-715x, and THD-705x detectors and normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power limited
  - DET 1 and DET 2 used for suppression
  - DET3/WF configurable for detection or waterflow
- One (1) Manual Release Circuit
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power limited

TECHNICAL SPECIFICATIONS (CONT'D)

- One (1) Abort Circuit
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power-limited
- Two (2) Supervisory Circuits
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power-limited
- Three (3) Notification Appliance Circuits (NACs)
  - Compatible with polarized 24 VDC Audio-Visual devices
  - Rated at 1.5 Amps each
  - Configurable as Class A/Style Z or Class B/Style Y
  - Supervised for ground faults, shorts, and open circuits
  - Power-limited
  - First Alarm operates NAC 1, Pre-Release operates NAC 2, Releasing operates NAC 3
  - Common NAC/ARC output disconnect switch
- Two (2) Agent Release Circuits
  - Each compatible with 1 or 2 control heads, or 1 set of initiators, or 1 FM sprinkler solenoid
  - Circuits electrically capable of simultaneously releasing any combination of two of the above devices
  - Factory configured as Class B/Style Y
  - Supervised for ground faults and open circuits
  - Non-power-limited. May be power-limited (except with initiators) and supervised for short circuit using inline releasing resistor-diode device
  - Common NAC/ARC output disconnect switch
- Four (4) Relays
  - 3 independently programmable, normally de-energized Form-C
  - 1 dedicated normally energized Form-C Trouble Relay
  - Relay contacts rated 3 Amps at 30 Vdc/120 Vac (resistive)

TECHNICAL SPECIFICATIONS (CONT'D)

- Enclosure
  - NEMA 1 rated 18 gauge sheet steel with door
  - Blue, except NYC enclosure which is red color
  - Suitable for wall and surface mounting
  - Optional Trim Ring
  - Optional Dead-Front Panel
  - Optional door with Manual Release and Abort switches
  - Dimensions:
    - **with Standard Door:**
      14-1/4 in. W x 5 in. D x 19 in. H
      (362 mm x 127 mm x 483 mm)
    - **with Switch Door**
      14-1/4 in. W x 6 in. D x 19 in. H
      (362 mm x 152 mm x 483 mm)
- Environmental Criteria
  - Indoor/Dry use only
  - Operating temperature range: 32°F to 120°F (0°C to 49°C)
  - Humidity: 93 ± 2% RH at 90 ± 3°F (32 ± 2°C)
- Packaging/Shipping
  - Enclosure, PCB, and PSU packaged in individual cartons
  - Accessories shipped include mounting hardware, battery leads, IOM manual on CD-ROM, operating instruction sheet, and EOL resistor kit
  - Order inline releasing resistor-diode device (if required) and batteries separately

ORDERING INFORMATION

DESCRIPTION	PART NUMBER
Fenwal 732 Control Unit (Blue)	30-732001-001
Fenwal 732 Control Unit (Red)	30-732001-101
Fenwal 732 Control Unit with Switches	30-732001-201
In-Line Releasing Diode (10K) Kit	06-220023-001
Trim Ring	76-600000-007
Dead-Front Panel*	06-236725-001
Battery Enclosure	76-100010-001
Fenwal 732 Conventional Fire Alarm-Suppression Control Unit IOM Manual	06-236717-001
Fenwal 732 User's CD	06-236726-001
*For Canadian applications, order Control Unit and Dead-Front Panel separately.	

For detailed installation, operation, and configuration information, refer to the Fenwal 732 Conventional Fire Alarm-Suppression Conventional Unit Installation, Operation, and Maintenance Manual P/N 06-236717-001.

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Fax: 508.881.8920
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Effective: May 2007

Series 1930 Suppression System Abort Station

FENWAL Protection Systems
A UTC Fire & Security Company

F-30-050

FEATURES

- **UL Listed, File # S3743**
- **Flush or Surface Mount**
- **Sized for Double Gang Box**
- **Large Yellow Push Button Switch**
- **One Normally Open Contact**

DESCRIPTION

The Fenwal Series 1930 Abort Station features a large, easy-to-operate abort push button. The momentary type switch is very easy to see due to its highly visible yellow color. The abort station stainless steel faceplate is clearly labelled with operation procedures—eliminating indecision and hesitation.

The Backbox is painted with red enamel and is provided with four 1/2-inch knockouts. The pre-drilled and tapped mounting tabs allow for easy attachment of the abort station.

TECHNICAL SPECIFICATIONS

Electrical Ratings:
One normally open momentary contact rated 2.5 Amps @ 120 Vdc

Ambient Temperature:
-13°F to 158°F (-25°C to 70°C)

Terminals:
Captive screws and saddle clamps accept 14 AWG to 24 AWG wire

Mounting:
Four 6-32 x 1/2-inch mounting screws included

ORDERING INFORMATION

Part Number	Description	Shipping Weight
30-193000-001	Abort Station	2 lb. (.9 kg)
30-193000-002	Abort Station with Backbox	3 lb. (1.4 kg)
30-193000-003	Backbox	1 lb. (.45 kg)

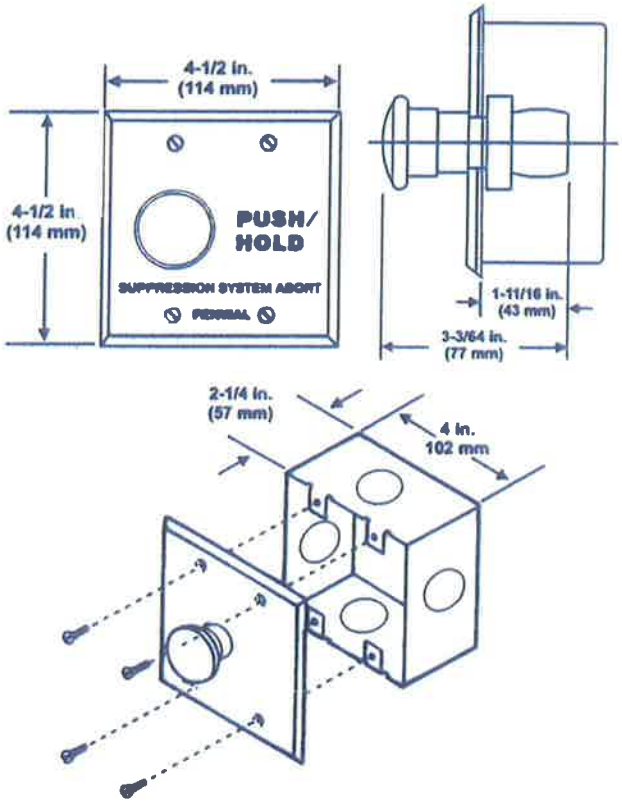

Figure 1. Dimension Details

Fenwal Protection Systems
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Manual Pull Stations
Series 3300

F-30-1000

FENWAL Protection Systems
A UTC Fire & Security Company

FEATURES

- **Exclusive FENWAL® Design**
- **Unique Field Labeling for either Fire Alarm or Suppression Applications**
- **Dual Action Operation**
- **Single Pole or Double Pole**
- **Keylock for Reset**
- **cULus Listed for US and Canada**
- **FM Approved**
- **Other domestic approvals in process**
- **Surface and Weatherproof Backboxes**
- **Backwards compatible mounting with the 1950 Series**

DESCRIPTION

The Fenwal Conventional SPST and DPST Series 3300 Manual Pull Stations are high quality, non-coded alarm initiating devices. The Manual Pull Stations are constructed of heavy die-cast aluminum for long life and use an internal toggle switch for reliable operation.

The SPST Manual Pull Station provides an Single Pole, Single Throw switch with screw terminal connections for wiring to the Fire Alarm/Suppression Control Unit.

The DPST Manual Pull Station provides a Dual Pole, Single Throw switch with screw terminal connections. One set of contacts must be wired to the Fire Alarm/Suppresion Control Unit and the other may be used for local or remote annunciation.

These Manual Pull Stations are designed for quick, efficient response by personnel in an emergency, while the double action PUSH/PULL levers prevent accidental operation. This unit should use a break rod as an indicator of operation.

The Manual Pull Stations can be mounted in an indoor or outdoor weatherproof backbox (Model SBG-32S or Model SGB-32C) or a North American 2-1/2 in. (64 mm) deep 1-gang box. The Manual Pull Station terminal block accepts 14, 16 and 18 AWG wire.

OPERATION

The dual action Series 3300 manual stations are operated by simply pushing the PUSH bar inwards, allowing the PULL handle to be grasped in a one-handed motion. The handle is then pulled down as far as it will go. If the optional breakrod is installed, it would break at this point. The handle is now locked in place, and is easily visible from up to 50 feet away. The handle is reset by opening the station with the key and placing the handle in the normal upright position. Place the switch actuator in the down position, insert breakrod into cavity beneath handle (if applicable), and re-lock the station.

FIRE ALARM OR SUPPRESSION RELEASE LABELING

The Fenwal Series 3300 Manual Pull Stations have a unique labeling method which provides the installer the greatest amount of flexibility. Six labels are shipped with each station:

- **FIRE ALARM**
- **FM-200 RELEASE**
- **NOVEC 1230 RELEASE**
- **FE-13 RELEASE**
- **FIRE SYSTEMS RELEASE**
- **HALON RELEASE**

These permanent, heavy-duty Lexan® self-adhesive labels are die-cut with raised lettering. During installation, the installer simply chooses the appropriate label, removes the protective backing, and places the label into the space on the top of the station. This flexibility allows installations to be customized for each customer, without the expense of having to carry extra inventory.

SPECIFICATIONS

Station Type:	Double Action, Non-coded
Switch Type:	P/N 30-330001-001: SPST P/N 30-330001-002: DPST
Switch rating:	2 Amp @ 240 Vac or 125 Vdc
Operating Temperature Range:	-40°F to 150°F (-40°C to 66°C)
Operating Humidity Range:	0-95% RH
Construction:	Die-cast metal housing
Compatible Electrical Boxes:	Indoor: Sheet metal Model SGB-32S Outdoor: Weatherproof Die-cast Model SGB-32C
Shipping Weight:	1.12 lbs. (510 g)

SGB-32S INTERIOR SURFACE BACKBOX

Dimensions:	4.75 in. H x 3.25 in. W x 2.25 in. D
Construction:	Steel sheet metal.
Conduit:	Two knockouts for 1/2 in. conduit connectors, one on top and bottom.
Mounting:	Mounts to the box with (4) 8/32 screws, which ship with each box.

SGB-32C WEATHERPROOF SURFACE BACKBOX

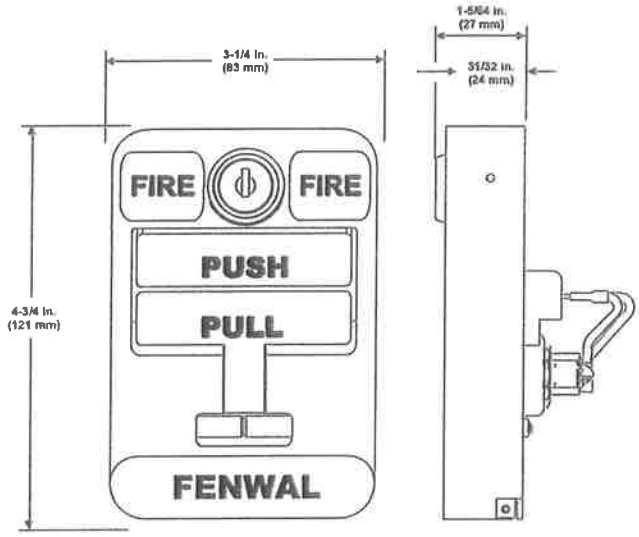
Dimensions:	4.75 in. H x 3.25 in. W x 2.25 in. D
Construction:	Cast aluminum.
Conduit:	One threaded opening for 1/2 in. conduit connector.
Mounting:	Mounts to the box with (4) 8/32 screws and a foam gasket, which ship with each box.

ORDERING INFORMATION

Part Number	Description
30-330001-001	Double Action Manual Pull Station with SPST Switch — ships with mounting hardware, 2 keys, 1 break rod, and label set.
30-330001-002	Double Action Manual Pull Station with DPST Switch — ships with mounting hardware, 2 keys, 1 break rod, and label set.
30-195001-001	SGB-32S Indoor Backbox
30-195001-002	SGB-32C Outdoor Waterproof Backbox
30195002-001	Pkg. of (12) Breakrods
06-118013-001	Spare Key
06-231866-931	Label Set

DIMENSIONS

(shown with Fire System Release Label installed)



F-30-1000 Rev AA

Printed in USA

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www.fenwalfire.com

Model 43T Vibrating Bell

75-009

FEATURES

- **UL Listed for Fire Protective Service**
- **10" Shell, 115 VAC**
- **Mounting options for surface, semi-flush, outdoor, and concealed conduit installation**
- **Screw terminals permit fast in-out field wiring of 12 to 18 AWG wire**
- **Red textured finish to improve appearance and durability**

DESCRIPTION

The Model 43T Vibrating Bell provides a superior engineered vibrating bell for fire and life safety alarm systems. Incorporating higher dBA, low current draw and using low frequency aluminum shells for better audibility, it offers durable operation and reliable performance.

ORDERING INFORMATION

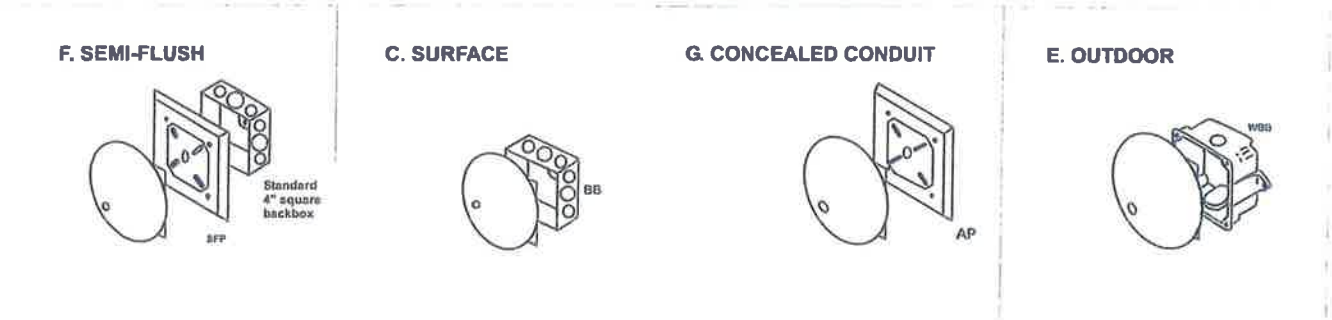
Model Number	Part Number	Input Voltage	Shell Size	dBA @ 10 ft.	Current (Amps)
43T-G10-115-R	75-000031-001	115 VAC	10"	88	0.085

Note: Typical dBA @ 10 ft. is measured in anechoic chamber.

MOUNTING OPTIONS

Model Number	Part Number	Mounting Option
SFP-R	75-000000-005	F
BB-R	75-000000-006	C
AP-R	75-000000-007	G
WBB-R	75-000000-008	E

Figure 1. Mounting Details



Note: Refer to Datasheet 75-008.A for mounting hardware dimensions.

FENWAL®
Protection Systems
KIDDE-FENWAL, INC.
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www.fenwalfire.com

75-009 03/02 Printed in USA

Series NS Horn-Strobes & Series NH Horn Appliances

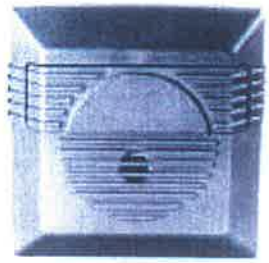
Effective: March 2002

75-013

FEATURES

- **Approvals: UL 1971 and UL 464**
- **FM, CSFM and MEA Pending**
- **ADA/NFPA/UFC/ANSI compliant**
- **Meets OSHA 29 Part 1910.165**
- **Meets FCC Part 15, Class B**
- **Field Selectable Candela Settings of 15, 30, 75 or 100 cd on Multi-Candela models; 15/75 cd models also available**
- **Selectable Continuous Horn or Temporal (Code 3)**
- **Two Selectable dBA settings of 90 and 95 dBA in both tones**
- **Non-Sync and Sync in one (synchronization requires a SM or DSM Sync Module)**
- **24 Vdc models with new UL "Regulated Voltage" using filtered DC or unfiltered VRMS input voltage**
- **Polarized inputs for compatibility with standard reverse polarity type supervision of circuit wiring by an alarm panel**
- **Zero Inrush above peak**
- **Wall Mount**
- **Low cost installation via standard electrical boxes.**
- **Attractive flush or surface mounting options. No additional trimplate required for flush mounting**
- **Strobe markings for fire and suppression applications**
- **IN and OUT wiring terminations accept two #12 to #18 AWG wires at each terminal**
- **Red and white color options**

Series NS Strobe


Series NH

DESCRIPTION

The Series NS Horn-Strobe Appliances will satisfy virtually all requirements for indoor, wall mount applications. The Series NH Horn and the horn portion of the Series NS include a selectable continuous horn tone or temporal pattern (Code 3) with selectable dBA settings of 90 or 95 dBA. Strobe options include 15/75 cd or a patented multi-candela strobe with field selectable candela settings of 15, 30, 75 or 100 cd.

These versatile horn strobe appliances may be synchronized when used in conjunction with the Fenwal SM or DSM Sync Modules. Additionally, the audible may be silenced while maintaining strobe activation.

All models of the Series NS are designed for maximum performance, reliability and cost-effectiveness while meeting or exceeding the latest requirements of NFPA 72 (1999), ANSI 117.1, UFC (2000) and UL Standards 1971 and 464 as well as meeting ADA requirements concerning photosensitive epilepsy.

The patented 2-wire Series NS Horn-Strobes and Series NH Horns offer more features with less current draw and zero inrush.

While the Series NH Horns operate on both 12 and 24 Vdc, the Series NS Horn-Strobes operate with 24 Vdc and may be used with filtered or unfiltered (full-wave-rectified) input voltages. Separate input terminals are available and shunt wires are provided to enable both tone and strobe to operate simultaneously from a single input.

When used with the Fenwal's Series SM or DSM Sync Modules, the continuous horn tone produces a synchronized temporal (Code 3) tone. This ensures a distinct temporal (Code 3) pattern when 2 or more horns are within hearing distance. If not synchronized, the temporal sound could overlap and not be distinctive. At the same time the strobes on the circuit may be synchronized. This provides the ability to comply with ADA recommendations concerning photosensitive epilepsy and meet NFPA requirements when installing 2 or more visual appliances within the field of view. All of this plus the ability to silence the horn is achieved by using only 2 wires.

The Series NS Horn-Strobe Signals are UL Listed for indoor use, wall mount, under Standard 1971 for Emergency Devices for the Hearing Impaired and Standard 464 for Audible Signal Appliances. This device uses a Xenon flashtube with solid state circuitry enclosed in a rugged Lexan® lens to provide maximum reliability for effective visible signaling. Strobe lens markings are available for "Fire" and "Agent" labeled applications. Inputs are polarized for compatibility with standard reverse polarity type supervision.

SPECIFICATIONS

Table 1. dBA Ratings for Series NS/NH Horns

Sound/Tone	dBA Setting	Reverberant dBA @10 ft. per UL 864		Anechoic dBA @10 ft.	
		12 Vdc	24 Vdc	12 Vdc	24 Vdc
Continuous Horn	High 95	83	87	89	95
	Low 90	76	81	84	90
Code 3 Horn	High 95	79	82	89	95
	Low 90	72*	76	84	90

* Model NH-12/24 Horns when set on Code 3-Low at 12 Vdc DO NOT meet the minimum UL reverberant sound level required for Public Mode Fire Protection Service.

Table 2. Candela Ratings for Series NS Strobes

Model	Input Voltage Vdc	Regulated Voltage Range Vdc/FWR	Strobe Candela (cd) per UL 1971
NS-24MCW	24	16.0-33.0	15/30/75/110
NS-241575W	24	16.0-33.0	15 (75 on Axis)

Table 3. Average Current Ratings (Amps) for Series NH Horns**

Voltage	High (95) dBA	Low (90) dBA
16 Vdc	0.019	0.012
24 Vdc	0.028	0.015
33 Vdc	0.039	0.018

** Average current per actual production testing.

Table 4. Average Current Ratings (Amps) for Series NS-241575W**

dBA Setting	Voltage		
	16 Vdc	24 Vdc	33 Vdc
High (95 dBA)	0.114	0.086	0.081
Low (90 dBA)	0.111	0.079	0.075

** Average current per actual production testing.

Table 5. Average Current Ratings (Amps) for Series NS-24MCW**

Voltage	With High (95 dBA) Setting			
	15 cd	30 cd	75 cd	110 cd
16 Vdc	0.080	0.128	0.226	0.304
24 Vdc	0.072	0.094	0.153	0.183
33 Vdc	0.068	0.092	0.148	0.166
	With Low (90 dBA) Setting			
16 Vdc	0.078	0.123	0.219	0.287
24 Vdc	0.058	0.082	0.140	0.174
33 Vdc	0.052	0.075	0.128	0.161

** Average current per actual production testing.

INSTALLATION NOTES

⚠ WARNING

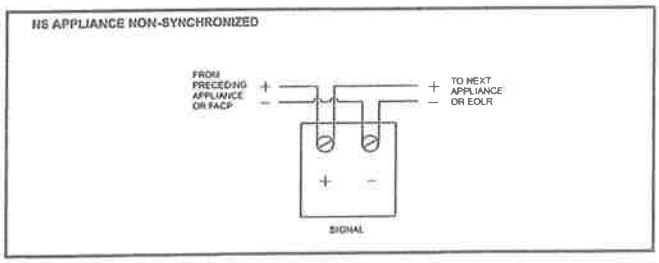
Failure to comply with the Installation Instructions could result in improper installation, application, and/or operation of these products in an emergency situation, which could result in property damage and serious injury or death.

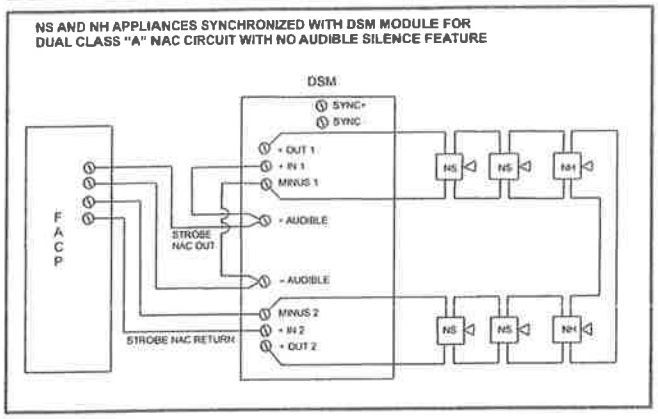
1. The product "Installation Instructions" should be read prior to specifying or installing these products. These documents contain important information including:
   - Total current required by all devices connected to system primary and secondary power sources.
   - Fuse ratings on signaling circuits to handle maximum inrush or peak currents from all devices on those circuits.
   - Composite flash rate from multiple strobes within a person's field of view.
   - Installation in office areas and other specification and installation issues.
2. Use strobes only on circuits with continuously applied operating voltage. Do not use strobe on coded or interrupted circuits in which the applied voltage is cycled on and off as the strobe may not flash.
3. NS/NH must be set on continuous horn tone to achieve synchronized temporal (Code 3) tone.
4. Fenwal products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with their installation instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and law. Specification, application, installation, operation, maintenance and

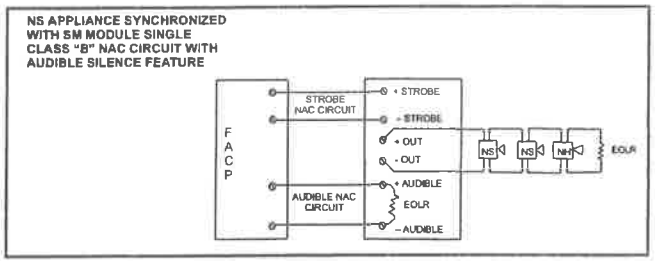
testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, laws and codes including, but not limited to, all appendices and amendments ant the requirements of the local authority having jurisdiction (AHJ).

5. Strobes are designed to flash at 1 flash per second minimum over their "Regulated Voltage Range". Note that NFPA-72 (1999) specifies a flash rate of 1 to 2 flashes per second and ADA Guidelines specify a flash rate of 1 to 3 flashes per second.
6. All candela ratings represent minimum effective Strobe intensity based on UL 1971.
7. Series NS Strobe products are listed under UL 1971 for indoor use with a temperature range of 32°F to 120°F (0°C to 49°C) and maximum humidity of 93±2%.
8. Series NH horns are listed under UL 464 for audible signal appliances for Indoor use only.
9. "Regulated Voltage Range" is the newest terminology used by UL to identify the voltage range. Prior to this change UL used the terminology "Listed Voltage Range".

WIRING DIAGRAMS







ARCHITECTS AND ENGINEERS SPECIFICATIONS

The audible/visual notification appliances shall be Fenwal Series NS Horn Strobe appliances and Series NH Horn appliances or approved equals. The Series NS appliances shall meet and be listed for UL Standard 1971 (Emergency Devices for the Hearing-Impaired for Indoor Fire Protection Service). The Series NH Horn shall be UL Listed under Standard 464 (Fire Protective Signaling). The horn strobe shall be listed for indoor use and shall meet the requirements of FCC Part 15 Class B. All inputs shall be compatible with standard reverse polarity supervision of circuit wiring by the Fire Alarm Control Panel (FACP).

The audible portion of the appliance shall have a minimum of two (2) field selectable settings for dBA levels and shall have a choice of continuous or temporal (Code 3) audible outputs.

The strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens. The Series NS shall be of low current design and shall have Zero Inrush. Where wall mount, Multi-Candela appliances are specified, the strobe intensity shall have a minimum of four (4) field selectable settings and shall be rated per UL 1971 for: 15, 30, 75 or 110 candela. The selector switch for selecting the candela setting shall be tamper resistant and not accessible from the front of the appliance. The 15/75 candela strobe shall be specified when 15 candela UL 1971 listing with 75 candela on-axis is required (e.g., ADA compliance).

When synchronization is required, the appliance shall be compatible with Fenwal SM or DSM Sync Modules. The strobes shall not drift out of synchronization at any time during operation. If the sync module fails to operate, (i.e., contacts remain closed), the strobes shall revert to a non-synchronized flash-rate. The appliance shall also be designed so that the audible signal may be silenced while maintaining strobe activation.

The Series NS Horn Strobes shall incorporate a Patented Universal Mounting Plate that shall allow mounting to a single-gang, double-gang, 4-inch square, 100 mm European type backboxes, or the SHBB Surface Backbox.

ORDERING INFORMATION

Table 6. Ordering Information

Part Number	Model Number	Input Voltage	Rated Candela	Strobe Label	Color	Mounting Position	Mounting Options
75-000080-001	NH-12/24-R	12/24 Vdc	—	—	Red	Ceiling/Wall	C, F, G, J, M
75-000082-001	NS-241575W-FR	24 Vdc	15 (75 on axis)	FIRE	Red	Wall	C, F, G, J, M
75-000082-002	NS-241575W-AR	24 Vdc	15 (75 on axis)	AGENT	Red	Wall	C, F, G, J, M
75-000086-001	NS-24MCW-FR	24 Vdc	15/30/75/110	FIRE	Red	Wall	C, F, G, J, M
75-000086-002	NS-24MCW-AR	24 Vdc	15/30/75/110	AGENT	Red	Wall	C, F, G, J, M
75-000087-001	NS-24MCW-FW	24 Vdc	15/30/75/110	FIRE	White	Wall	C, F, G, J, M
75-000087-002	NS-24MCW-AW	24 Vdc	15/30/75/110	AGENT	White	Wall	C, F, G, J, M

MOUNTING OPTIONS

Table 7. Mounting Options

Model Number	Part Number	Mounting Options
BB-R	75-000000-006	C
SFP-R	75-000000-005	F
AP-R	75-000000-007	G
RP-R	75-000000-003	J
SHBB-R	75-000000-013	M

Note: For complete installation options, refer to the Alarm Signals Installation Data Sheet 75-008.A.

FENWAL®
Protection Systems
KIDDE-FENWAL, INC.
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75-013 03/02 Printed in U.S.A

Photoelectric Smoke Detectors

Effective: August 2002

Series PSD-7155 and PSD-7156

71.55

FENWAL®

FEATURES

- UL 268 and 268A Listed #S1064, Vol 12/13, Sec 1
- FM Approved #OW3A2-AY (3230)
- CSFM Listed #07272-1076:117
- MEA Accepted #346-92E
- ULC Listed #3810 D19 - File CS 194
- In Place Sensitivity (% per foot obscuration)
- Optional thermistor heat detector
- Functional Test Capability - Remote and Local (magnet test)
- Input voltage range 10.2 to 36.8 Vdc
- Low Profile Appearance with SMT- Surface Mount Technology
- Electrically and Mechanically compatible with all Fenwal detectors and bases
- Three year warranty
- Optional 2- and 4-wire relay bases
- Universal relay modules
- Nonpolarized
- High air velocity rating
- Low-current design
- Interchangeable bases
- Flashing LED for visual supervision
- EMI/RFI resistant
- Tamper Resistant, Fine Mesh Insect Screen
- Locking feature for vandal resistance
- Nominal sensitivity 3.25% obscuration/foot

DESCRIPTION

The Series PSD-7155 and PSD-7156 photoelectric smoke detectors respond to a broad spectrum of both flaming and smoldering fire conditions. They incorporate state-of-the-art, solid state, low-voltage circuitry featuring SMT (Surface Mount Technology) and are designed for 2-wire and 4-wire installation with the proper base. The detectors are designed for open area protection (UL 268) and for duct applications (UL 268A). They may be installed in fire protection systems and systems intended for releasing device service with commercially available fire suppression or detection control units, provided compatibility has been established.

These models operate over a 10.2 to 36.8 Vdc range (2WB base only, 24 V nominal) with compatible control units. EMI/RFI noise immunity up to 20 volts/meter assures virtual elimination of false alarms from electrical interference.

High signal-to-noise ratio permits a significant reduction in light baffling, thereby improving smoke entry characteristics

while reducing nuisance alarms. The Fenwal photoelectric smoke detectors are, therefore, ideal for fire alarm and suppression systems service.

The models PSD-7155 and PSD-7156 are set at a nominal sensitivity of 3.25% per foot smoke obscuration. The PSD-7155P has a nominal sensitivity of 1.45% per foot. Sensitivity ranges can be measured in place using a voltmeter and a Fenwal meter (ST-001). Readings found to be within specified limits are acceptable for normal field applications. The models PSD-7155 and PSD-7156 are rated for 0-300 fpm air velocity while the model PSD-7155P is rated for 0-4000 fpm air velocity.

The model PSD-7156 includes a thermistor heat detector with 135°F (57°C) set point. Operation of the thermistor detector is independent of smoke detector circuitry. For releasing service applications, thermistor actuation electrically shorts the detector circuit and may be used to release suppressant.

Base installation is both simple and fast because of screw-type connections. The detector is fitted to the base by a twist-to-lock action. A removable locking tab secures the head to base to provide a high degree of vandal resistance. An extra fine mesh insect screen protecting the chamber area reduces potential nuisance alarms.

Photoelectric detectors may be interchanged with Fenwal ionization detectors when using multifunction base configuration. Optional bases are shown in Table 4.

ELECTRICAL SPECIFICATIONS

These detectors are designed for operation with control units and releasing devices having specific voltage and current characteristics that are compatible with the detector circuitry. The information provided under the heading CONTROL UNITS and Table 3 are intended to assist in proper application of the detector in a system. Reference the UL compatibility listing for other panels listed.

TECHNICAL SPECIFICATIONS

Table 1. Technical Specifications

	PHOTOELECTRIC MODEL PSD 7155 P/N 71-560000-001	PHOTO w/HEAT MODEL PSD 7156 P/N 71-560000-001	PHOTOELECTRIC MODEL PSD 7155P P/N 71-560000-002	PHOTOELECTRIC MODEL PSD 7155C P/N 71-560000-011	PHOTOELECTRIC MODEL PSD 7156C P/N 71-560000-011
Standby Voltage	2WB: 10.2 to 36.8 Vdc/4WB: 16.8 to 36.8 Vdc				
Maximum Ripple	50% of DC input				
Standby Current	55µA (typical) 100µA peak @ 24 Vdc				
Start-up Current	0.1 mA max.				
Alarm Current*	10-100 mA max.				
Alarm Indicator	LED				
Operating Temperature	32°F (0°C) to 100°F (37.8°C) as per UL268				
Operating Relative Humidity	0 to 93%(noncondensing)				
Reset Voltage	3V (typical) min.				
Reset Time	1.0 sec. Max.				
Start-up Time	20 sec. Max.				
Detector Alarm Voltage	5.5V (typical)				
Finish	Smooth, Off White, High-Impact Plastic				
Weight	2.82 oz. (80 g) w/o base				
Approvals	UL 268, FM, CSFM, MEA	UL 268, FM, CSFM, MEA	UL 268A, FM, CSFM, MEA	ULC	ULC
UL Sensitivity Window	1.47 - 3.75%/ft.	1.47 - 3.75%/ft.	0.83 - 2.00%/ft.	1.47 - 3.75%/ft.	1.47 - 3.75%/ft.
Compatibility ID	P55FE1	P56FE1	P55FE1	P55FE1	P56FE1
Height	35mm, 1.38"	48mm, 1.89"	35mm, 1.38"	35mm, 1.38"	48mm, 1.89"
Diameter	99mm, 3.90" (w/o base)				
EMI Immunity:	20 volts/meter to 1 GHz, 10 volts/meter from 1GHz to 2GHz, Spikes to 2400 volts or 1 joule				
Smooth Ceiling Spacing:	30 ft. center (900 sq. ft.) max.				
Storage Temperature:	-20° to 180°F (-29° to 82°C)				
*Alarm currents below 19mA result in diminished brilliance of LED alarm indicator and precludes the use of the auxiliary relay option.					

ENVIRONMENTAL SPECIFICATIONS

Models PSD-715X have been tested by Underwriters Laboratories for environmental stability. Some of the basic conditions that must be met for compliance are listed below and are presented to help serve as application guidelines:

Table 2. Environmental Specifications

Temperature:	
UL Test	32° to 120°F (0°C to 49°C)
Operating	32° to 100°F (0°C to 37.8°C)
Humidity:	0-93% (non-condensing)
Air Velocity:	
PSD-7155, PSD-7156	0-300 ft./min. for open area detection
PSD-7155P	0-4000 ft./min. for open area protection
PSD-7155D	500-4000 ft./min. for duct applications
Altitudes:	For altitudes above 7500 ft., consult factory.

CONTROL UNITS

These detectors are compatible with the Fenwal control units and interface modules listed in Table 3.

Table 3. Control Units

CONTROL UNIT MODEL NUMBER	COMPATIBILITY IDENTIFIER NUMBER	MAX. NUMBER OF DETECTORS PER LOOP
2210	C10FE1	40
2212	C12FE1	40
3210	ZDM01, ZDMD01, VZM01	25
2320	C30FE1	15
3220	C32FE1	40
Contact Fenwal for information on compatibility for other manufacturers' panels or refer to the compatibility cross reference list (DOC. #70.63).		

BASE OPTIONS

Control units in Table 3 can be used with the detector base options in Table 4. Various base options are available to provide auxiliary relay and/or remote indication and remote test feature.

Table 4. Detector Base Options

UL PART NO./MODEL ULC PART NO./MODEL	COMPATIBILITY IDENTIFIER	DESCRIPTION
70-501000-001, 2 WB 70-501000-011, 2 WBC	FE51A	Connects to 2-wire detection circuit via screw terminals
70-501000-002, 2 WRLT 70-501000-012, 2 WRLTC	FE52A	Same as above plus provision for remote LED indicator and remote functional test. Minimum alarm current: 15mA, 24 Vdc.
70-501000-005, 2 WRB 70-501000-015, 2 WRBC	FE55A	Connects to 2-wire detection circuit via pigtail leads. Equipped with 2 WRM. Minimum alarm current: 19mA, 24 Vdc. Remote LED and test capable.
70-501000-101, 4 WRB 70-501000-111, 4 WRBC	N/A	Connects to 4-wire detection circuit via pigtail leads. Equipped with 4 WRM. Minimum alarm current: 19mA, 24 Vdc. Remote LED and test capable.
70-500000-004, 2 WRM	N/A	SPDT Relay with 2 WRB & 2 WRBC bases. Contacts rated 1A @ 30 Vdc/0.5A @ 125 Vac.
70-500000-102, 4 WRM	N/A	SPDT Relay with 4 WRB & 4 WRBC bases. Contacts rated 1A @ 30 Vdc/0.5A @ 125 Vac.
70-501000-003, MA-001	MAFE1	Mechanical retrofit adapter allows PSD-7155 and PSD-7156 to physically connect to all Fenwal Series 70 bases.

SPACING (OPEN AREA LOCATION)

The PSD-715X Series detectors are intended for use on 30 foot centers, smooth ceilings up to 15 feet high with minimum air circulation. Resultant 900 square foot spacing may be used as a reasonable guide for comparable applications. Where special conditions exist (ceiling obstruction, high air exchange rates, etc.), reduced square footage spacing must be used to achieve adequate protection. Computer rooms and other such installations may require spacing with a maximum of 200 square feet due to high air exchange rates. For additional information, consult NFPA Standard 72 and the Fenwal Automatic Fire Detector Application Engineering Manual. For special applications, consult your Fenwal technical representative.

TYPICAL WIRING DIAGRAMS

Figures 1 thru 5 are typical wiring diagrams of 2- and 4-wire detector systems. For greater clarity and detail, refer to Installation Sheet 7X.5X.A.

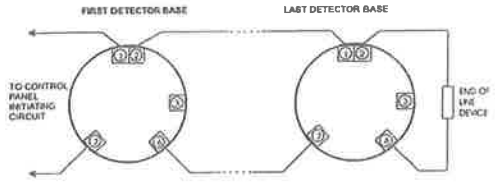

Figure 1. 2WB/2WBC Wiring

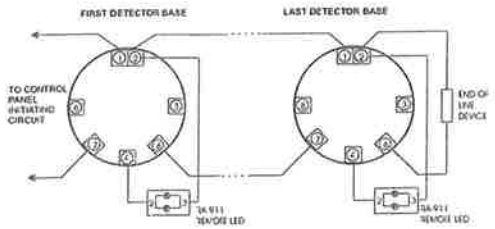

Figure 2. 2WRLT/2WRLTC Wiring with Remote Indicator

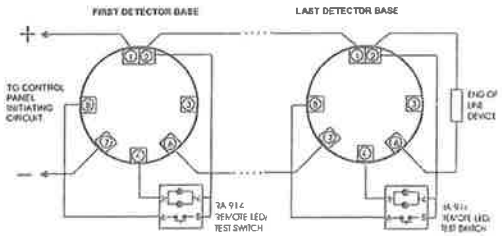

Figure 3. 2WRLT/2WRLTC Wiring with Remote Indicator and Test Switch

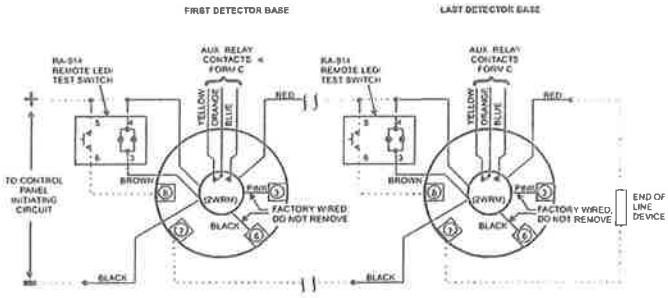

Figure 4. 2WRB/2WRBC Wiring

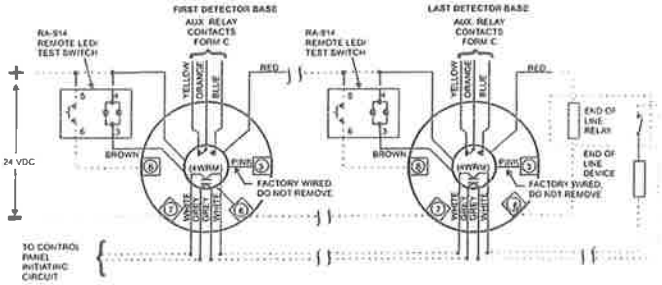

Figure 5. 4WRB/4WRBC Wiring

Note: All relays shown in normal position (power on).

INSTALLATION OF DETECTORS AND BASES

Detector bases are directly mounted on the electrical junction boxes (3, 3.5 and 4 inch octagonal; 3 inch round; 4 inch square) without the need for any mechanical adapter required. Refer to Data Sheet 7X.5X.A for complete installation details.

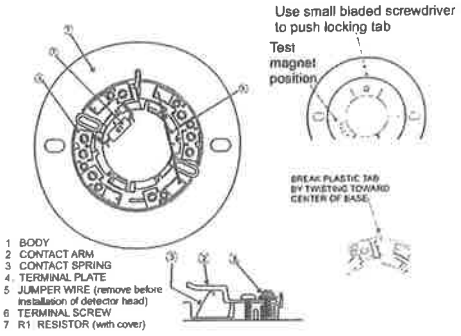

Figure 6. Detector Installation & Removal

These detector bases also include a locking feature that prevents removal of the detector without use of a tool.

TESTING AND MAINTENANCE

Testing shall be performed upon installation of the detector and once a year thereafter as stated in NFPA-72 latest edition. All alarm signal devices, releasing devices, and extinguishing systems should be disengaged while the test is being performed and re-engaged at the conclusion of testing.

Detector sensitivity shall be checked within one year of installation and every alternative year thereafter as stated in NFPA 72. To conduct sensitivity testing, Sensitivity Tester, Model ST-001 (P/N 70-500000-002) is required as shown in Figure 7. (Refer to Data Sheet 70.50.A for details.)

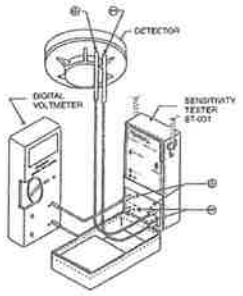

Figure 7. Sensitivity Measurement

If sensitivity readings are out of limits specified on detector label, contact the Fenwal customer service department for details concerning the detector EXCHANGE PROGRAM. The detector EXCHANGE PROGRAM offers the customer new product of the latest design as direct replacement for existing detectors. The EXCHANGE PROGRAM is available to all end-users for a nominal fee, regardless of the age of the detector.

The recommended requirement for detector maintenance consists of an annual cleaning of dust from the detector head by using the suction of a vacuum cleaner. Cleaning programs should be geared to the individual environment in conformance with NFPA 72.

⚠ CAUTION

Do not attempt disassembly of the factory sealed smoke detector. This assembly is sealed for your protection and is not intended to be opened for servicing. Opening of the detector will void the warranty.

Refer to Installation Sheet 7X.5X.A for details.

ARCHITECT/ENGINEER SPECIFICATIONS

The contractor shall furnish and install photoelectric smoke detectors, Fenwal Series PSD-7155 or PSD-7156 where indicated on the plans. The combination detector head and twist-lock base shall be UL Listed compatible with a UL Listed fire alarm control unit. PSD-715X series photoelectric detectors and CPD-705X series ionization detectors shall share an interchangeable base.

The Fenwal smoke detector shall have a flashing status indicating LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel reset switch. The vandal-resistant security locking feature shall be used in those areas as indicated on the drawings. The locking feature shall be field removable when not required.

It shall be possible to measure the sensitivity level of the detector without removal from the base. Metering test points shall be accessible on the exterior of the detector head. Measurement shall be accomplished with a commercially available voltmeter and a Fenwal Sensitivity Tester (ST-001) allowing direct measurement in percent per foot obscuration. It shall also be possible to perform a functional test of the detector without the need for generating smoke. The test method must simulate effects of products of combustion in the optical chamber to ensure testing of all detector circuits. This test can be performed locally and/or remotely.

By using a furnished wire jumper, it shall be possible to check circuit loop continuity prior to installing the detector head. The detector shall be listed and approved for wall and ceiling mounting.

Models PSD-7155 and 7156 shall operate over an input voltage range from 10.2 to 36.8 Vdc. Voltage and RF transient suppression techniques to withstand up to 20 volt/meter shall be employed to minimize susceptibility to false alarms.

The smoke detector may contain an optional 135°F thermistor temperature, self-restoring heat detector. Actuation of this device shall activate an alarm and function independent of the smoke detector electronic circuit.

Supplementary SPDT relays, remote test, and/or remote LED alarm indicators shall be installed where indicated.

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71-55 8/02 Printed in U.S.A.

Series RSS Strobes
Series RSSP Strobe Plates

Effective: March 2002

75-011

FEATURES

- **Approvals include: UL 1971. New York City (MEA), California State Fire Marshal (CSFM) and Factory Mutual Pending.**
- **ADA/NFPA/UFC/ANSI compliant**
- **Meets OSHA 29 Part 1910.165**
- **15/75 single candela devices provide 75 cd on axis**
- **Multi-candela models are available with Field Selectable Candela Settings of 15, 30, 75 or 110 cd.**
- **Low current draw with temperature compensation to reduce power consumption and wiring costs.**
- **Strobes produce 1 flash per second over the regulated voltage range**
- **24 Vdc models with wide New UL "Regulated Voltage" using filtered (DC) or unfiltered VRMS input voltage**
- **Synchronize with Fenwal SM or DSM Sync Module**
- **Zero inrush above peak**
- **Convenient wall mounting to standard backboxes**
- **Fast installation with IN/OUT screw terminals using #12 to #18 AWG wires.**
- **Weatherproof models available**
- **"Fire" and "Agent" label options**
- **Red and white color options**

DESCRIPTION

Fenwal Series RSS Strobes and Series RSSP Strobe Plates have been enhanced with lower current draw and zero inrush while maintaining their outstanding performance, reliability, and cost effectiveness.

These versatile appliances will satisfy virtually all requirements for indoor, wall or ceiling mount applications.

Strobe options include 15/75 cd or the patented Multi-Candela strobe with field selectable candela settings of 15, 30, 75 or 110 cd.

All models may be synchronized when used in conjunction with the Fenwal SM or DSM Sync Modules. Synchronized strobes can eliminate possible restrictions on the number of strobes in the field of view. Fenwal synchronized strobes offer an easy way to comply with ADA recommendations concerning photosensitive epilepsy as well as meeting the requirements of NFPA 72 (1999).

Fenwal Series RSS Strobes employ a Patented Integral Strobe Mounting Plate that can be mounted to a single gang, double gang, 4" square, 100 mm European backboxes or the SHBB surface backbox. An attractive cover plate is provided for a clean, finished appearance on all models.

Series RSS

Series RSSP

The Series RSSP Multi-Candela Strobe Plates are a cost effective way to retrofit required strobe appliances to bells, horns, multitones or speakers and easily mount to standard 4" backboxes or to Fenwal SBL2 surface backboxes for surface mounting.

All strobes use a Xenon flashtube enclosed in a rugged Lexan® lens to provide maximum reliability for effective visible signaling.

Fenwal also offers the Series RSSWP Single Candela Strobe for outdoor installations requiring weatherproof devices and private mode locations where UL 1971 Strobes are not required. They are Listed to UL 1638/UL 464 for wall mounting indoors or outdoors with an extended temperature range of -31°F to 150°F (-35°C to 66°C).

GENERAL NOTES

- Strobes are designed to flash at 1 flash per second minimum over the Regulated Voltage Range. Note that NFPA-72 (1999) specifies a flash rate of 1 to 2 flashes per second and ADA Guidelines specify a flash rate of 1 to 3 flashes per second.
- All candela ratings represent minimum effective Strobe intensity based on UL 1971.
- Series RSS & RSSP Strobe products are listed under UL 1971 for indoor use with a temperature range of 32°F to 120°F (0°C to 49 C) and maximum humidity of 93% (± 2%).
- "Regulated Voltage Range" is the newest terminology used by UL to identify the voltage range. Prior to this change, UL used the terminology "Listed Voltage Range".

SPECIFICATIONS

Table 1. Series RSS and RSSP Current Requirements

Model No.	Input Voltage	Regulated Voltage Range Vdc/FWR	Strobe Candela cd	Average Current* at 24 V Vdc			
				15 cd	30 cd	75 cd	110 cd
RSS-241575W-FR	24 Vdc	16.0 - 33.0	15 (75 on axis)	0.065			
RSS-241575W-AR	24 Vdc	16.0 - 33.0	15 (75 on axis)	0.065			
RSS-24MCW-FR	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSS-24MCW-AR	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSS-24MCW-FW	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSS-24MCW-AW	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSSP-241575W-FR	24 Vdc	16.0 - 33.0	15 (75 on axis)	0.065			
RSSP-24MCW-FR	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSSP-24MCW-AR	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSSP-24MCW-FW	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSSP-24MCW-AW	24 Vdc	16.0 - 33.0	15/30/75/110	0.050	0.081	0.133	0.161
RSSWP-2475W-FR	24 Vdc	16.0 - 33.0	75	—	—	0.102	—
RSSWP-2475W-AR	24 Vdc	16.0 - 33.0	75	—	—	0.102	—

* Average Current per actual production testing at Listed VDC. For Rated Average and Peak Current across UL regulated voltage range for both Filtered DC and unfiltered VRMS, see Installation Instructions.

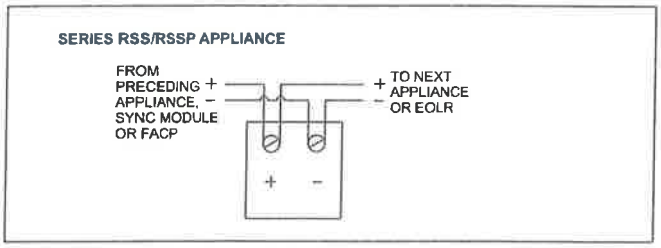
INSTALLATION NOTES

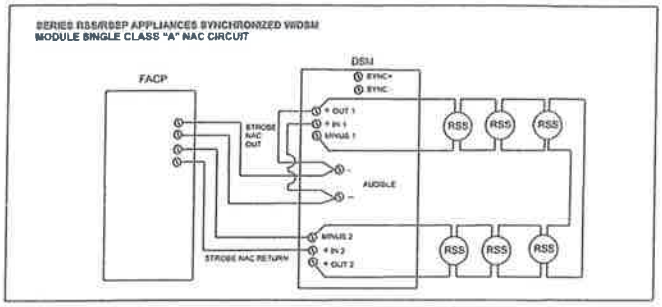
⚠ WARNING

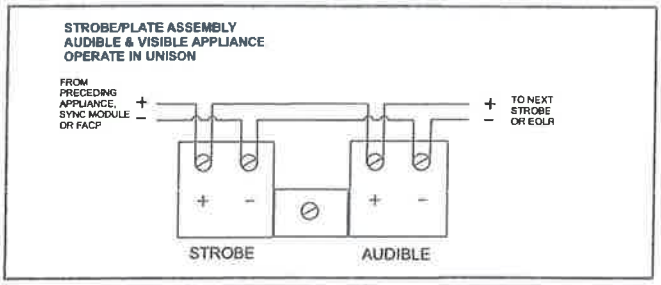
Failure to comply with the installation instructions or general information sheets could result in improper Installation, application, and/or operation of these products in an emergency situation, which could result In property damage and serious injury or death.

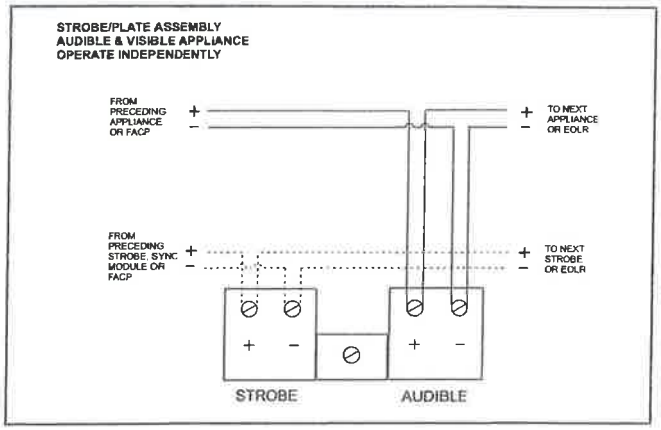
1. Contact Fenwal for the current "Installation Instructions" on these products. These materials contain important Information that should be read prior to specifying or installing these products, including:
   - Total current required by all appliances connected to system secondary power sources.
   - Fuse ratings on notification appliance circuits to handle peak currents from all appliances on those Circuits.
   - Composite flash rate from multiple strobes within a person's field of view.
   - Adding, replacing or changing appliances or changing candela settings will effect current draw. Recalculate current draw to insure that the total average current and total peak required by all Appliances do not exceed the rated capacity of the power sources or fuses.
   - The voltage applied to these products must be within their "regulated voltage range".
   - Installation of 110 candela strobe products in sleeping areas.
   - Installation in office areas and other specification and installation issues.
2. Use strobes only on circuits with continuously applied operating voltage. Do not use strobes on coded or Interrupted circuits in which the applied voltage is cycled on and off as the strobes may not flash.
3. Conductor size (AWG), length and ampacity should be taken into consideration prior to design and Installation of these products, particularly in retrofit installations.
4. Fenwal Notification Appliances must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with their installation instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ).

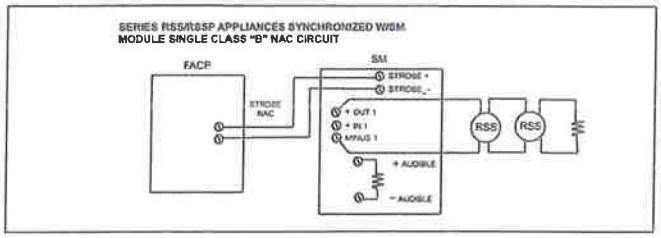
WIRING DIAGRAMS











ARCHITECTS AND ENGINEERS SPECIFICATIONS

The visual notification appliances shall be Fenwal Series RSS Strobe Appliances or approved equal. The Series RSS shall meet and be listed for UL Standard 1971 (Emergency Devices for the Hearing-Impaired) for Indoor Fire Protection Service. The strobe shall be listed for indoor use and shall meet the requirements of FCC Part 15 Class B. The strobe appliances shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens. All inputs shall be compatible with standard reverse polarity supervision of circuit wiring by a Fire Alarm Control Panel (FACP). When Strobe Plates are to be installed, they shall be the Fenwal Series RSSP Strobe Plate and shall have the same electronic circuitry as the Fenwal Series RSS.

The Series RSS Strobe shall be of low current design and shall have Zero Inrush. Where wall mount, Multi-Candela appliances are specified, the strobe intensity shall have a minimum of four (4) field selectable settings and shall be rated per UL 1971 for: 15, 30, 75 or 110 candela. The selector switch for selecting the candela shall be tamper resistant and not accessible from the front of the appliance. The 15/75 candela strobe shall be specified when 15 candela UL 1971 listing with 75 candela on-axis is required (e.g. ADA compliance).

When synchronization is required, the appliance shall be compatible with Fenwal SM or DSM Sync Modules. The strobes shall not drift out of synchronization at any time during operation. If the sync module or Power Supply fails to operate, (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate. The strobes shall be designed for indoor surface of flush mounting.

The Series RSS Strobe Appliances shall incorporate a Patented, Integral Strobe Mounting Plate that shall allow mounting to single-gang, double-gang, 4-inch square, 100 mm European type backboxes, or the SHBB Surface Backbox. The Appliance shall not have any mounting holes or screw heads visible when the installation is completed.

The Series RSSP Multi-Candela or single candela Strobe Plate shall mount to either a standard 4 inch square backbox for flush mounting, or the Fenwal SBL2 backbox for surface mounting.

ORDERING INFORMATION

Table 2. Ordering Information

Part No.	Model No.	Input Voltage	Rated Candela	Strobe Label	Color	Mounting	Mounting Options
Series RSS							
75-000002-011	RSS-241575W-FR	24 Vdc	15 (75 on axis)	FIRE	Red	Wall	B, C, F, J, M
75-000002-013	RSS-241575W-AR	24 Vdc	15 (75 on axis)	AGENT	Red	Wall	B, C, F, J, M
75-000005-021	RSS-24MCW-FR	24 Vdc	15/30/75/110	FIRE	Red	Wall	B, C, F, J, M
75-000005-022	RSS-24MCW-AR	24 Vdc	15/30/75/110	AGENT	Red	Wall	B, C, F, J, M
75-000005-031	RSS-24MCW-FW	24 Vdc	15/30/75/110	FIRE	White	Wall	B, C, F, J, M
75-000005-032	RSS-24MCW-AW	24 Vdc	15/30/75/110	AGENT	White	Wall	B, C, F, J, M
Series RSSP							
75-000002-012	RSSP-241575W-FR	24 Vdc	15 (75 on axis)	FIRE	Red	Wall	N
75-000005-023	RSSP-24MCW-FR	24 Vdc	15/30/75/110	FIRE	Red	Wall	N
75-000005-024	RSSP-24MCW-AR	24 Vdc	15/30/75/110	AGENT	Red	Wall	N
75-000005-033	RSSP-24MCW-FW	24 Vdc	15/30/75/110	FIRE	White	Wall	N
75-000005-034	RSSP-24MCW-AW	24 Vdc	15/30/75/110	AGENT	White	Wall	N
Series RSSWP							
75-000005-041	RSSWP-2475W-FR	24 Vdc	75	FIRE	Red	Wall	R
75-000005-042	RSSWP-2475W-AR	24 Vdc	75	AGENT	Red	Wall	R

Table 4. Compatible Devices for RSSP Plates

Multitones Electronic Signals	Series MT
Motor Bells (6" or 10")	Series MB
Voice Evacuation Speakers	Series E-70, ET-70
Horns	Series NH

MOUNTING OPTIONS

Table 3. Mounting Options

Model Number	Part Number	Designation
BB-R	75-000000-006	C
SHBB-R	75-000000-013	M
SBL-2	75-000000-012	N
ISP-R	75-000000-002	B
RP-R	75-000000-003	J
SFP-R	75-000000-005	F
WPSBB-R	75-000000-014	R

Note: For complete installation options refer to the Alarm Signals Installation Data Sheet (75-008-A)

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