

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK
CITY OF PORTLAND

Please Read
Application And
Notes, If Any,
Attached

BUILDING INSPECTION
PERMIT

Permit Number: 061765

This is to certify that OLYMPIA EQUITY INVESTORS V-P LLC /Fire Equipment Inc
 has permission to Install a fire suppression system
 AT 280 FORE ST PORTLAND, OR 97204 029 K005001

PERMIT ISSUED

DEC 15 2006

provided that the person or persons who accept this permit shall comply with all of the provisions of the Statutes of the State and of the Ordinances of the City of Portland relating to the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and when permission proceeds before this building or part thereof is started or service closed-in. 4 HOUR NOTICE REQUIRED.

A certificate of occupancy must be procured by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS

Fire Dept. Craig Cross
 Health Dept. _____
 Appeal Board _____
 Other _____
 Department Name

12/12/06
 Director - Building & Inspection Services

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 06-1765	Issue Date: PERMIT ISSUED DEC 15 2006	CBL: 029 K005001
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Location of Construction: 280 FORE ST	Owner Name: OLYMPIA EQUITY INVESTORS	Owner Address: 280 FORE ST STE 202	Phone:
Business Name:	Contractor Name: Fire Equipment Inc	Contractor Address: 88 Hicks St Newford,	Phone: 78139 8050
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression System	Zone: B-3

Past Use: Commercial / Bangor Savings <i>Suite 200</i>	Proposed Use: Commercial Install a fire suppression system <i>in the server room</i>	Permit Fee: \$180.00	Cost of Work: \$16,000.00	CEO District: 1
Proposed Project Description: Install a fire suppression system		FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <i>TO NFPA 2001</i>	INSPECTION: Use Group: <i>1</i> Type: <i>Fire</i> <i>NFPA 2001</i>	
		Signature: <i>Greg Cass</i>	Signature: <i>[Signature]</i>	
PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)				
Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied				
		Signature:	Date:	

Permit Taken By: dmartin	Date Applied For: 12/07/2006	Zoning Approval		
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<ol style="list-style-type: none"> This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules. Building permits do not include plumbing, septic or electrical work. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work.. 	Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> Date: <i>12/10/06</i>	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date: <i>any exterior work requires</i>
	<i>A separate review and approval</i>		

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 06-1765	Date Applied For: 12/07/2006	CBL: 029 K005001
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Location of Construction: 280 FORE ST	Owner Name: OLYMPIA EQUITY INVESTORS	Owner Address: 280 FORE ST STE 202	Phone:
Business Name:	Contractor Name: Fire Equipment Inc	Contractor Address: 88 Hicks St Nedford	Phone: (781) 391-8050
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression System	

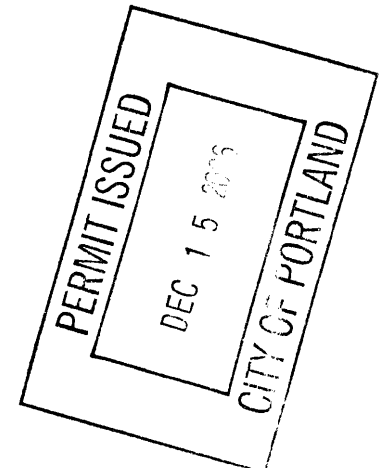
Proposed Use: Commercial Install a fire suppression system in suite #200 in the server room	Proposed Project Description: Install a fire suppression system
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Dept: Zoning **Status:** Approved **Reviewer:** Marge Schmuckal **Approval Date:** 12/08/2006
Note: **Ok to Issue:**

Dept: Building **Status:** Approved **Reviewer:** Tammy Munson **Approval Date:** 12/12/2006
Note: **Ok to Issue:**

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Cptn Greg Cass **Approval Date:** 12/10/2006
Note: **Ok to Issue:**

1) Install shall comply with NFPA 2001. Clean agent extinguishing systems





General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: <u>280 FORE STREET, SUITE 200</u>		
Total Square Footage of Proposed Structure		Square Footage of Lot
Tax Assessor's Chart, Block & Lot Chart# Block# Lot#	Owner: <u>BANGOR SAVINGS BANK</u>	Telephone:
Lessee/Buyer's Name (If Applicable)	Applicant name, address & telephone: <u>FIRE EQUIPMENT, INC.</u> <u>88 HICKS AVENUE</u> <u>MEDFORD, MA 02155</u> <u>781-391-8050</u>	Cost Of Work: \$ <u>16,000.00</u> Fee: \$ <u>180.00</u> C of O Fee: \$ _____
Current Specific use: _____ If vacant, what was the previous use? _____ Proposed Specific use: <u>SERVER ROOM</u>		
Project description: <u>INSTALL INERGEN FIRE SUPPRESSION SYSTEM FOR THE SERVER ROOM AT BANGOR SAVINGS BANK.</u>		
Contractor's name, address & telephone: <u>FIRE EQUIPMENT INC. 88 HICKS AVE MEDFORD, MA 02155</u>		
Who should we contact when the permit is ready: <u>JONATHAN BLOUNT *</u> Mailing address: _____ Phone: <u>781-391-8050 x319</u>		

Please submit all of the information outlined in the Commercial Application Checklist.
Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information visit us on-line at www.portlandmaine.gov, stop by the Building Inspections office, room 315 City Hall or call 874-8703.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature of applicant: <u>[Signature]</u>	Date: <u>12-5-06</u>
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This is not a permit; you may not commence ANY work until the permit is issued.



December 5, 2006

88 Hicks Avenue
Medford, MA
02155-6319
Tel: (781) 391-8050
Fax: (781) 391-8835
Email: sales@firefire.com
Web: www.firefire.com

City of Portland Inspection Office
389 Congress Street, Room 315
Portland, ME 04101

Attention: Inspector

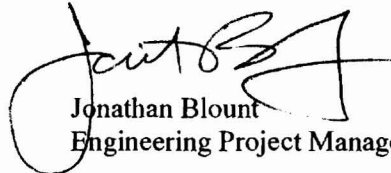
Reference: Bangor Savings Bank, 280 Fore St., Inergen System

Inspector:

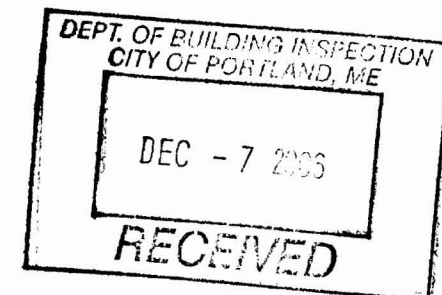
Enclosed are 1 set of prints, calculations, cut-sheets and a permit application, to install an Inergen Fire Suppression System at Bangor Savings Bank, 280 Fore Street, Suite 200. We have also enclosed a check in the amount of \$180.00.

Feel free to call with any questions at 781-391-8050 x319.

Sincerely,



Jonathan Blount
Engineering Project Manager



ANSUL
INERGEN DESIGNER
UL listed EX4510, FMRC Approved (J.I.) 2Y0A9.AF, ULC listed CEx1151
Version 2.1.2

File: Data file name: C:\Program Files\INERGEN DESIGNER\0506020A.inr
Job Number 0506020 for BANGOR SAVINGS BANK
Address: 280 FORE STREET
SUITE 200
PORTLAND ME
REMARKS: SERVER ROOM

Agent Storage Conditions

Storage pressure is 2175 psia at 70 degrees Fahrenheit.
439 cubic feet of INERGEN stored in each of 5 cylinders.
Total agent in storage is 2195 cubic feet.
Time to discharge 1976 cubic feet (90% of INERGEN) is 71.1 seconds
Maximum pressure downstream of manifold orifice is 1263 psia

Concentrations

Area	Volume	95% Time (sec)	Cu Ft INERGEN	Maximum Concentration at Max. Temp.	Minimum Concentration at Min. Temp.	Requested Concentration at Min Temp.
SERVER ROOM	4261.0	50	2195.0	40.8% at 80°F	39.7% at 60°F	34.2% at 60°F
				Sea level equivalent oxygen: 12.4% at 80°F		

Free Vent Calculation

Area	Peak Rate	Maximum Wall Strength	Minimum Free Vent Area
SERVER ROOM	4474.5 cfm	5.0 lbs./sq.ft.	171 sq. in.

Pressure Drop Results

Sec Start	Sec End	Nominal Pipe Size	Length (ft)	Equiv Length(ft)	Elev (ft)	Tee/ Mfld	Start psia	Term psia	Flow (cfm)
1	2	1/2 40 T	0.0	38.0	0.0	MFLD	1033	1001	482.9
2	3	1 80 T	1.0	3.4	0.0	MFLD	1001	1003	482.9
3	4	1 80 T	1.0	2.6	0.0	MFLD	1003	1001	965.8
4	5	1 80 T	1.0	2.6	0.0	MFLD	1001	997	1448.7
5	6	1 80 T	1.0	2.6	0.0	MFLD	997	991	1931.6
6	7	1 80 T	0.5	2.1	0.0	MFLD	991	985	2414.5
7	8	1 80 T	0.5	2.9	0.5	MFLD	985	979	2414.5

1 (Continued)

ANSUL
INERGEN DESIGNER
 UL listed EX4510, FMRC Approved (J.I.) 2Y0A9.AF, ULC listed CEx1151
 Version 2.1.2

File: Data file name: C:\Program Files\INERGEN DESIGNER\0506020A.inr
 Job Number: 0506020

Pressure Drop Results (Continued)

Sec Start	Sec End	Nominal Pipe Size	Length (ft)	Equiv Length(ft)	Elev (ft)	Tee/ Mfld	Start psia	Term psia	Flow (cfm)
8	9	ORIFICE .438 INCHES					979	443	2414.5
9	10	1 1/4 40 T	3.5	3.5	3.5		443	587	2414.5
10	11	1 1/4 40 T	10.0	13.5	0.0		587	579	2414.5
11	12	1 40 T	4.0	9.2	0.0	BULL	579	575	1208.1
12	301	1 40 T	1.0	3.6	-1.0		575	573	1208.1
11	13	1 40 T	8.0	13.2	0.0	BULL	579	572	1206.4
13	302	1 40 T	1.0	3.6	-1.0		572	570	1206.4

Calculation based on 70 degree Fahrenheit pre-discharge Pipeline Temperature

Pipe and Fittings

Sec Start	Sec End	Nominal Pipe Size	Length (ft)	90's	Side Tee	Thru Tee	Unions/ Cplgs	Eql (ft)
1	2	1/2 40 T	0.0	0	0	0	0	Cyl Valve 38 ft
2	3	1 80 T	1.0	1	0	0	0	
3	4	1 80 T	1.0	0	0	1	0	
4	5	1 80 T	1.0	0	0	1	0	
5	6	1 80 T	1.0	0	0	1	0	
6	7	1 80 T	0.5	0	0	1	0	
7	8	1 80 T	0.5	1	0	0	0	Man. Orifice
8	9	1 80 T		0	0	0	0	
9	10	1 1/4 40 T	3.5	0	0	0	0	
10	11	1 1/4 40 T	10.0	1	0	0	0	
11	12	1 40 T	4.0	0	1	0	0	
12	301	1 40 T	1.0	1	0	0	0	
11	13	1 40 T	8.0	0	1	0	0	
13	302	1 40 T	1.0	1	0	0	0	

Nozzle Performance Summary

Nozzle Number	Nominal Pipe Size	Drill Number	Drill Diameter	Quantity (cu ft) Discharged	Area Name
301	1 40 T	7/16	0.437	1098.4	SERVER ROOM

2 (Continued)

ANSUL
INERGEN DESIGNER

UL listed EX4510, FMRC Approved (J.I.) 2Y0A9.AF, ULC listed CEx1151
Version 2.1.2

File: Data file name: C:\Program Files\INERGEN DESIGNER\0506020A.inr
Job Number: 0506020

Nozzle Performance Summary (Continued)

Nozzle Number	Nominal Pipe Size	Drill Number	Drill Diameter	Quantity (cu ft) Discharged	Area Name
302	1 40 T	7/16	0.437	1096.6	SERVER ROOM

Messages/Errors

ANSUL 150 bar INERGEN DESIGNER Version number 2.1.2
Calculation based on fixed nozzle and pipe sizes.
Calculation done on 5/22/2006 at 10:50:09 AM

pipe schedule selected for pipe sizes downstream of the manifold orifice is based on the maximum pipe pressure for Grade A-53B, A-106B Seamless. To determine if other grades are acceptable, verify that the maximum pipe pressures for other grades are equal to or greater than the maximum anticipated downstream pressure.

Calculation by Fire Equipment, Inc.
Jonathan Blount
88 Hicks Ave
Medford MA 2155 USA
Telephone: 781-391-8050
Fax: 781-391-8835

ANSUL®

PRODUCT NAME

INERGEN® Fire Suppression System

ENVIRONMENTAL IMPACT

INERGEN agent is a mixture of three naturally occurring gases: nitrogen, argon, and carbon dioxide. As INERGEN agent is derived from gases present in the earth's atmosphere, it exhibits no ozone depleting potential, does not contribute to global warming, nor does it contribute unique chemical species with extended atmospheric lifetimes. Because INERGEN agent is composed of atmospheric gases, it does not pose the problems of toxicity associated with the chemically derived Halon alternative agents.

PRODUCT DESCRIPTION

The INERGEN Fire Suppression System, manufactured by Ansul, is an engineered system utilizing a fixed nozzle agent distribution network. The system is designed and installed in accordance with the National Fire Protection Association (NFPA) Standard 2001, "Clean Agent Fire Extinguishing Systems." When properly designed, the INERGEN system will extinguish surface burning fire in Class A, B, and C hazards by lowering the oxygen content below the level that supports combustion.

INERGEN agent has also been tested by FMRC for inerting capabilities. Those tests have shown that INERGEN agent, at design concentrations between 40% and 50%, has successfully inerted mixtures of propane/air, and methane/air.

The system can be actuated by detection and control equipment for automatic system operation along with providing local and remote manual operation as needed. Accessories are used to provide alarms, ventilation control, door closures, or other auxiliary shutdown or functions.

When INERGEN agent is discharged into a room, it introduces the proper mixture of gases that will allow a person to breathe in a reduced oxygen atmosphere.

A system installation and maintenance manual is available containing information on system components and procedures concerning design, operation, inspection, maintenance, and recharge.

The system is installed and serviced by authorized distributors that are trained by the manufacturer.

Basic Use – The INERGEN system is particularly useful for suppressing fires in hazards where an electrically non-conductive medium is essential or desirable; where clean-up of other agents present a problem; or where the

INERGEN® FIRE SUPPRESSION SYSTEMS DATA SHEET

hazard is normally occupied and requires a non-toxic agent.

The following are typical hazards protected by INERGEN systems:

- Computer rooms
- Subfloors
- Tape storage
- Telecommunication/Switchgear
- Vaults
- Process equipment
- All normally occupied or unoccupied electronic areas where equipment is either very sensitive or irreplaceable

Composition and Materials – The basic system consists of extinguishing agent stored in high strength alloy steel cylinders. Various types of actuators, either manual or automatic, are available for release of the agent into the hazard area. The agent is distributed and discharged into the hazard area through a network of piping and nozzles. Each nozzle is drilled with a fixed orifice designed to deliver a uniform discharge to the protected area. On large hazards, where three or more cylinders are required, a screwed or welded pipe manifold assembly is employed. The cylinder(s) is connected to the distribution piping or the manifold by means of a flexible discharge bend and check valve assembly.

Additional equipment includes – Control panels, releasing devices, remote manual pull stations, corner pulleys, door closures, pressure trips, bells and alarms, and pneumatic switches. All or some are required when designing a total system.

INERGEN Agent – INERGEN agent is a mixture of three inerting (oxygen diluting) gases: 52% nitrogen, 40% argon, and 8% carbon dioxide. INERGEN gas extinguishes fire by lowering the oxygen content below the level that supports combustion. When INERGEN agent is discharged into a room, it introduces the proper mixture of gases that still allow a person to breathe in a reduced oxygen atmosphere. It actually enhances the body's ability to assimilate oxygen. The normal atmosphere in a room contains 21% oxygen and less than 1% carbon dioxide. If the oxygen content is reduced below 15%, most ordinary combustibles will cease to burn. INERGEN agent will reduce the oxygen content to approximately 12.5% while increasing the carbon dioxide content to about 3%. The increase in the carbon dioxide content increases a person's respiration rate and the body's ability to absorb oxygen. Simply stated, the human body is stimulated by the carbon dioxide to breathe more deeply and rapidly to compensate for the lower oxygen content of the atmosphere.

SYSTEM SPECIFICATIONS

Cylinders – The cylinders are constructed, tested, and marked in accordance with applicable Dept. of Transportation (DOT) and the U.S. Bureau of Explosives specifications. As a minimum, the cylinders must meet the requirements of DOT 3AA2300 or 3AA2015+.

Cylinder Assembly – The cylinder assembly is of steel construction with a red standard finish. Four sizes are available to meet specific needs. Each is equipped with a pressure seat-type valve equipped with gauge. The valve is constructed of forged brass and is attached to the cylinder providing a leak tight seal. The valve also includes a safety pressure relief device which provides relief at 2900-3300 psi (20685-23167 kPa) per CGA test method. Cylinder charging pressure is 2175 psi at 70 °F (14997 kPa at 21 °C). The cylinders are shipped with a maintenance record card and shipping cap attached. The cap is attached to the threaded collar on the neck of each cylinder to protect the valve while in transit. The cylinder serial number and date of manufacture are stamped near the neck of each cylinder.

Electric Actuator – Electric actuation of an agent cylinder is accomplished by an electric actuator interfaced through an AUTOPULSE® Control System. This actuator can be used in hazardous environments where the ambient temperature range is between 32 °F and 130 °F (0 °C and 54 °C). In auxiliary or override applications, a manual lever actuator can be installed on top of the actuator.

Manual or Pneumatic Actuators – Three types of manual/pneumatic actuators are available for lever actuation on the cylinder valve. Manual actuation is accomplished by pulling the hand lever on the actuator.

Detection System – The AUTOPULSE Control System is used where an automatic electronic control system is required to actuate the INERGEN system. This control system is used to control a single fixed fire suppression or alarm system based on inputs received from fire detection devices. The detection circuits can be configured using cross, counting, independent or priority-zone (counting) concepts. The control system has been tested to the applicable FCC Rules and Regulations for Class A Computing devices.

ANSUL®

APPLICATION

INERGEN® extinguishing agent used in Ansul engineered systems is particularly useful for hazards where an electrical, non-conductive medium is essential or desirable; where clean-up of other agents presents a problem; where hazard obstructions require the use of a gaseous agent; or where the hazard is normally occupied and requires a non-toxic agent.

The following are typical hazards protected by INERGEN systems:

- Computer rooms
- Subfloors
- Tape storage
- Telecommunications/Switchgear
- Vaults
- Process equipment
- All normally occupied or unoccupied areas where electronic equipment is either very sensitive or irreplaceable

ENVIRONMENTAL IMPACT

INERGEN agent is a mixture of three naturally occurring gases: nitrogen, argon and carbon dioxide. As INERGEN agent is derived from gases present in the earth's atmosphere, it exhibits no ozone depleting potential, does not contribute to global warming, nor does it contribute unique chemical species with extended atmospheric lifetimes. Because INERGEN agent is composed of atmospheric gases, it does not pose the problems of toxicity associated with the chemically derived Halon alternative agents.

DESCRIPTION

INERGEN agent is a plentiful, non-corrosive gas that does not support combustion nor react with most substances. INERGEN agent contains only naturally-occurring gases which have no impact on the ozone or the environment in general. INERGEN agent is a mixture of three inerting (oxygen diluting) gases: 52% nitrogen, 40% argon, and 8% carbon dioxide. INERGEN agent extinguishes fire by lowering the oxygen content below the level that supports combustion. When INERGEN agent is discharged into a room, it introduces the proper mixture of gases that still allow a

INERGEN® FIRE SUPPRESSION SYSTEMS DATA SHEET

person to breathe in a reduced oxygen atmosphere. It actually enhances the body's ability to assimilate oxygen. The normal atmosphere in a room contains approximately 21% oxygen and less than 1% carbon dioxide. If the oxygen content is reduced below 15%, most ordinary combustibles will not burn. INERGEN agent will reduce the oxygen content to approximately 12.5% while increasing the carbon dioxide content to about 3%. The increase in the carbon dioxide content increases a person's respiration rate and the body's ability to absorb oxygen. Simply stated, the human body is stimulated by the carbon dioxide to breathe more deeply and rapidly to compensate for the lower oxygen content of the atmosphere.

PERFORMANCE

INERGEN is an effective fire extinguishing agent that can be used on many types of fires. INERGEN extinguishing system units are designed for total flooding protection against Class A surface burning, Class B flammable liquid, and Class C fires occurring within an enclosure by lowering the oxygen content below the level that supports combustion.

INERGEN agent has been tested by FMRC for inerting capabilities. Those tests have shown that INERGEN agent, at design concentrations between 40% and 50%, has successfully inerted mixtures of propane/air, and methane/air.

PHYSICAL PROPERTIES OF INERGEN

Specific gravity
0.085 lbs./cu. ft. (1.36 kg/m³)

Vapor pressure
1925 psi @ 32 °F (132.7 bar @ 0 °C)
2175 psi @ 70 °F (149.9 bar @ 21 °C)
2575 psi @ 130 °F (177.5 bar @ 54 °C)

Vapor density
1.1 (Air = 1)

Approximate molecular weight
34

EXTINGUISHING AGENT

ORDERING INFORMATION

INERGEN filled cylinders for use in engineered systems may be ordered in sizes of 200, 250, 350, 425, and 435 cu. ft. (5.7, 7.1, 9.9, 12.0, and 12.3 cu. m.).

APPROVAL

INERGEN agent complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems and EPA Program SNAP, Significant New Alternate Policy.

Agent is listed and approved by Underwriters Laboratories, Inc. (UL) and Factory Mutual Research Corporation (FMRC).

Containers meet the applicable Department of Transportation (DOT) specifications.

ANSUL and INERGEN are registered trademarks.



CV-98 Valve / Cylinder Shipping Assembly

Description

The cylinder is factory filled with INERGEN[®] agent. A single cylinder may be used or multiple cylinders can be manifolded together to obtain the required quantity of agent for total flooding. The cylinder valve can be actuated electrically, pneumatically, and/or manually with approved valve actuation components. All valves are equipped with an anti-recoil feature.

The cylinders are shipped with a maintenance record card and protective shipping cap attached to the threaded neck of each cylinder. This cap entirely encloses and protects the valve while in shipment.

The equivalent length of the valve is equal to 20 ft. (6.1 m) of 1/2 in. Sch. 40 pipe.

Component	Material	Approvals
Cylinder	Steel	Meets DOT 3AA2300
Valve	Brass	
Safety Relief Valve	Brass	
Valve/Cylinder Assembly		FMRC Approved UL Listed (EX-4510)
Shipping Cap	Steel	

Shipping Assembly Part No.	Nominal Cylinder Size		Actual INERGEN Agent Quantity		Approximate Weight		Dimension A		Dimension B	
	ft.3	(m ³)	ft.3	m ³	lb.	(kg)	in.	(cm)	in.	(cm)
Shipping Assemblies – Red Standard Paint										
426147	200	(5.7)	205	(5.8)	128	(58)	52.7	(129)	8.5	(21.6)
426148	250	(7.1)	266	(7.5)	169	(77)	57.7	(147)	9.3	(23.5)
426149	350	(9.9)	355	(10.1)	217	(98)	59.7	(152)	10.7	(27.3)
426620	LC-350	(9.9)	355	(10.1)	217	(98)	60.2	(152.9)	10.5	(26.7)
426594	LC-425	(12.0)	429	(12.1)	246	(111.6)	70.5	(179.1)	10.5	(26.7)
426150	435	(12.3)	439	(12.4)	260	(117.9)	66.9	(170.0)	11.0	(27.9)
Shipping Assemblies – Red Corrosion Resistant Paint										
426256	200	(5.7)	205	(5.8)	128	(58)	52.7	(129)	8.5	(21.6)
426257	250	(7.1)	266	(7.5)	169	(77)	57.7	(147)	9.3	(23.5)
426258	350	(9.9)	355	(10.1)	217	(98)	59.7	(152)	10.7	(27.3)
426621	LC-350	(9.9)	355	(10.1)	217	(98)	60.2	(152.9)	10.5	(26.7)
426595	LC-425	(12.0)	429	(12.1)	246	(111.6)	70.5	(179.1)	10.5	(26.7)
426259	435	(12.3)	439	(12.4)	260	(117.9)	66.9	(170.0)	11.0	(27.9)

Canadian TC Approved

Shipping Assembly Part No.	Nominal Cylinder Size		Actual INERGEN Agent Quantity		Approximate Weight		Dimension A		Dimension B	
	ft.3	(m ³)	ft.3	m ³	lb.	(kg)	in.	(cm)	in.	(cm)
Shipping Assemblies – Red Enamel Paint										
426712	200	(5.7)	205	(5.8)	128	(58)	52.7	(129)	8.5	(21.6)
426713	250	(7.1)	266	(7.5)	169	(77)	57.7	(147)	9.3	(23.5)
426714	350	(9.9)	355	(10.1)	217	(98)	59.7	(152)	10.7	(27.3)
427551	LC-425	(12.0)	429	(12.1)	246	(111.6)	70.5	(179.1)	10.5	(26.7)
426715	435	(12.3)	439	(12.4)	260	(117.9)	66.9	(170.0)	11.0	(27.9)
Shipping Assemblies – Red Epoxy CR Paint										
426716	200	(5.7)	205	(5.8)	128	(58)	52.7	(129)	8.5	(21.6)
426717	250	(7.1)	266	(7.5)	169	(77)	57.7	(147)	9.3	(23.5)
426718	350	(9.9)	355	(10.1)	217	(98)	59.7	(152)	10.7	(27.3)
427552	LC-425	(12.0)	429	(12.1)	246	(111.6)	70.5	(179.1)	10.5	(26.7)
426719	435	(12.3)	439	(12.4)	260	(117.9)	66.9	(170.0)	11.0	(27.9)



Flexible Discharge Bend

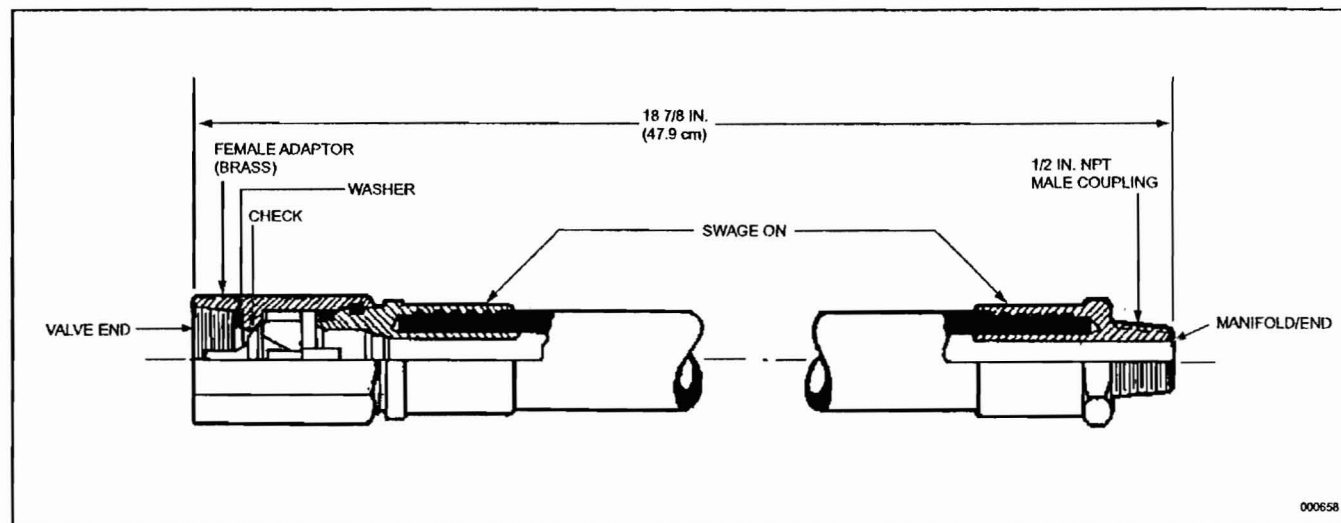
Description

- ▶ The valve Flexible Discharge Bend (Part No. 427082) is a 5/8 in. (1.59 cm) I.D. extra-heavy flexible hose which connects the valve discharge outlet to the fixed piping or header manifold. The discharge bend has a special female thread for connecting to the valve outlet and a male 1/2 in. NPT thread for connecting to the fixed piping or manifold.
- ▶ The discharge bend will withstand a pressure of 9000 psi (621 bar). Its flexible connection allows for easy alignment of multiple cylinder banks to fixed piping. Each bend has a built-in check valve that prevents loss of agent should the system discharge while any cylinder is removed.

The equivalent length of this hose is equal to 18 ft. (5.5 m) of 1/2 in. Sch. 40 pipe.

Shipping Assembly Part No.	Description
427082	Flexible discharge bend
842430	Washer

Component	Material	Thread Size/Type		Approvals
		Valve End	Manifold End	
▶ 5/8 in. Flexible Discharge Bend	SAE 100 R2 Type AT	Special to mate with CV90 and CV-98 Valve	1/2 in. NPT Male	FMRC Approved UL Listed (EX-4510)



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Cylinder Bracketing

Description

The cylinder bracketing is designed to rigidly support the installed INERGEN® agent cylinders. The bracketing components are constructed of heavy structural steel. Bracket assemblies are available in modules for two to six cylinders and can also be connected together for any combination over six. Bracketing can be assembled to support single row, double row or back-to-back rows of cylinders. Bracketing components are painted with a red enamel coating. Uprights and back frame assemblies can be bolted or

welded together, which ever makes the installation more convenient.

Component	Material	Approvals
Bracketing	Steel	FMRC Approved UL Listed (EX-4510)

Shipping Assembly Part No.	Description
845120	200 ft.3 (5.7 m ³) cylinder strap (single cylinder)
845244	200 ft.3 (5.7 m ³) cylinder channel with nuts and bolts (single cylinder)
845121	250 ft.3 (7.1 m ³) cylinder strap (single cylinder)
845261	250 ft.3 (7.1 m ³) cylinder channel with nuts and bolts (single cylinder)
▶ 845122	350 ft.3 (9.9 m ³), 425 ft.3 (12.0 m ³), 435 ft.3 (12.3 m ³) cylinder strap (single cylinder)
▶ 845245	350 ft.3 (9.9 m ³), 425 ft.3 (12.0 m ³), 435 ft.3 (12.3 m ³) cylinder channel with nuts and bolts (single cylinder)
879638	Back frame assembly (2 cylinder)
879639	Back frame assembly (3 cylinder)
879640	Back frame assembly (4 cylinder)
879641	Back frame assembly (5 cylinder)
879642	Back frame assembly (6 cylinder)
▶ 873257	Upright, for 200, 250, 350, and 435 ft.3 (12.3 m ³) cylinders (used either for right side, left side or center (center upright required when connecting seven or more cylinders in a row))
▶ 426592	Upright, for 425 ft.3 (12.0 m ³) cylinder (used either for right side, left side, or center (center upright required when connecting seven or more cylinders in a row))
873553	Single row or back-to-back row bracket foot (left side)
873554	Single row or back-to-back row bracket foot (right side)
873555	Double row bracket foot (left side)
873556	Double row bracket foot (right side)
418508	Center upright foot
879413	Connector (required to hook together back frames for seven or more cylinders)
873250	10.5 in. (26.7 cm) carriage bolt with nut (for single row 200 ft.3 (5.7 m ³) cylinders)
873251	11 in (27.9 cm) carriage bolt with nut (for single row 250 ft.3 (7.1 m ³) cylinders)
873252	12.5 in. (31.8 cm) carriage bolt with nut (for single row 350 ft.3 (9.9 m ³) and 425 ft.3 (12.0 m ³) cylinders)
▶ 418502	13 in. (33.0 cm) carriage bolt with nut (for single row 435 ft.3 (12.3 m ³) cylinders)
873253	21 in. (53.3 cm) carriage bolt with nut (for double row 200 ft.3 (5.7 m ³) cylinders)
873254	22 in. (55.9 cm) carriage bolt with nut (for double row 250 ft.2 (7.1 m ³) cylinders)
873255	26 in. (66 cm) carriage bolt with nut (for double row 350 ft.3 (9.9 m ³) and 425 ft.3 (12.0 m ³) cylinders)
▶ 418503	27 in. (68.6 cm) carriage bolt with nut (for double row 435 ft.3 (12.3 m ³) cylinders)
873091	Cylinder clamp (2 cylinders)
873092	Cylinder clamp (3 cylinders)
871683	Weigh rail support – single row
871682	Weigh rail support – double row
871684	Weigh rail support – back-to-back rows
423027	Weigh rail support back-to-back double row

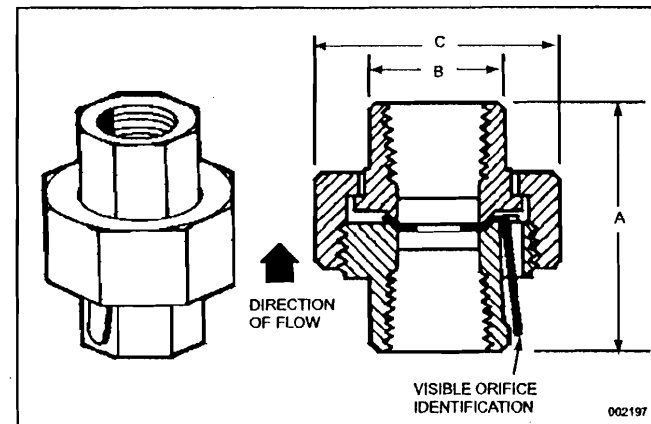


Pressure Reducer/Union

Description

The pressure reducer/union is required to restrict the flow of INERGEN® agent thus reducing the agent pressure down stream of the union. The 3000 psi (206.9 bar) NSCWP union contains a stainless steel orifice plate which is drilled to the specific size hole required based on the flow calculation.* The orifice plate provides readily visible orifice identification. The orifice union is available in six sizes: 1/2 in., 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., and 2 in. NPT.

All pressure reducer/unions must be installed in the piping with the orifice identification tab on the pressure inlet side of the system. The 1 1/4 in., 1 1/2 in. and 2 in. orifice unions must be installed per the direction of the flow arrow stamped on the body.



Shipping Assembly Part No.	Description	A	B	C
416677	1/2 in. NPT pressure reducer/union	2.06 in. (5.2 cm)	1.18 in. (2.9 cm)	1.95 in. (4.9 cm)
416678	3/4 in. NPT pressure reducer/union	2.38 in. (6.1 cm)	1.50 in. (3.8 cm)	2.38 in. (6.1 cm)
416679	1 in. NPT pressure reducer/union	2.63 in. (6.7 cm)	1.78 in. (4.5 cm)	2.77 in. (7.0 cm)
416680	1 1/4 in. NPT pressure reducer/union	2.94 in. (7.5 cm)	2.04 in. (5.2 cm)	3.31 in. (8.4 cm)
416681	1 1/2 in. NPT pressure reducer/union	3.31 in. (8.4 cm)	2.31 in. (5.9 cm)	3.70 in. (9.4 cm)
416682	2 in. NPT pressure reducer/union	3.56 in. (9.0 cm)	2.85 in. (7.2 cm)	4.39 in. (11.2 cm)

Component	Material	Thread Size	Approvals
Pressure Reducer/ Union	Body: Forged Steel Orifice Plate: Stainless Steel	1/2, 3/4, 1, 1 1/4, 1 1/2, 2 in. NPT	FMRC Approved UL Listed (EX-4510)

- ▶ NOTE: Refer to "Nozzle/Pressure Reducer Range Chart" in
- ▶ Design Section for detailed orifice range information.

* Orifice diameter must be specified when placing order.

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HF Electric Actuator

Description

Electrical actuation is accomplished by an HF electric Actuator, Part No. 73327, interfaced through an AUTOPULSE® Control System. This actuator can be used in hazardous, indoor environments where the ambient temperature range is between 0 °F to 130 °F (–18 °C to 54 °C). The HF electric actuator meets the requirements of N.E.C. Class I, Div. 1, Groups B, C, D and Class II, Div. 1, Groups E, F, G. A maximum of two HF electric actuators can be used on a single AUTOPULSE release circuit. When utilizing only one HF electric actuator, an in-line resistor, Part No. 73606, is required in the supervised release circuit.

In auxiliary or override applications, a manual-local override valve actuator or a manual cable pull actuator can be installed on top of the HF electric actuator by removing the safety cap.

An arming tool, Part No. 75433, is required to reset the actuator after operation. The actuator contains a standard 1/2 in. threaded female straight connector for electrical conduit hookup.

Technical Information

Nominal Voltage: 12 VDC @ 0.57 amps

Rated Voltage:

Minimum: 12.0 VDC

Maximum: 14.0 VDC

Thread Size/Type: 1/2 in. straight female for electrical conduit hookup

Material:

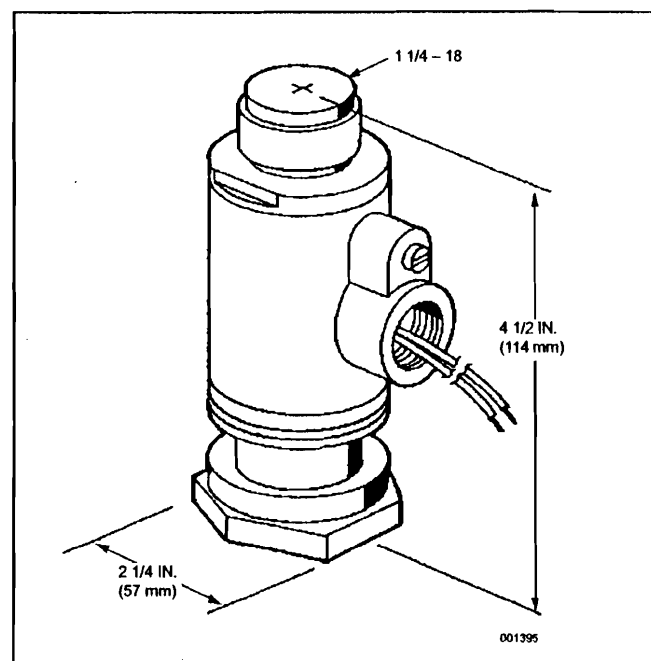
Body: Brass

Plunger: Stainless Steel

UL E91021

ULC 1165

FM 2T8A9.AF

**Listings and Approvals**

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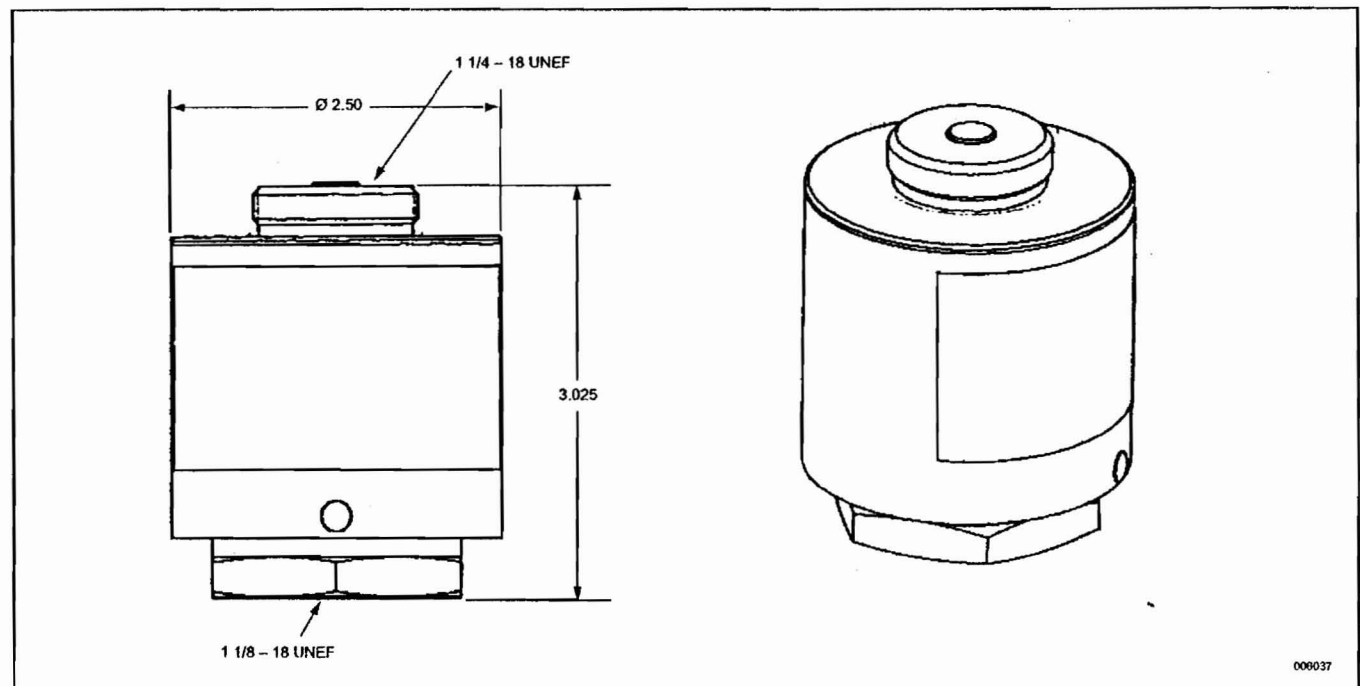


Booster Actuator

Description

The Booster Actuator, Part No. 428949, is used when electric actuation is required on the 1 in. selector valve, 2 in. selector valve, or the CV-98 cylinder valve. The actuator mounts directly to the component and then a HF electric actuator mounts to the top of the booster actuator.

The Booster Actuator requires resetting after actuation. A Reset Tool, Part No. 429847, is available for this use.



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Pressure Switch – DPST

Description

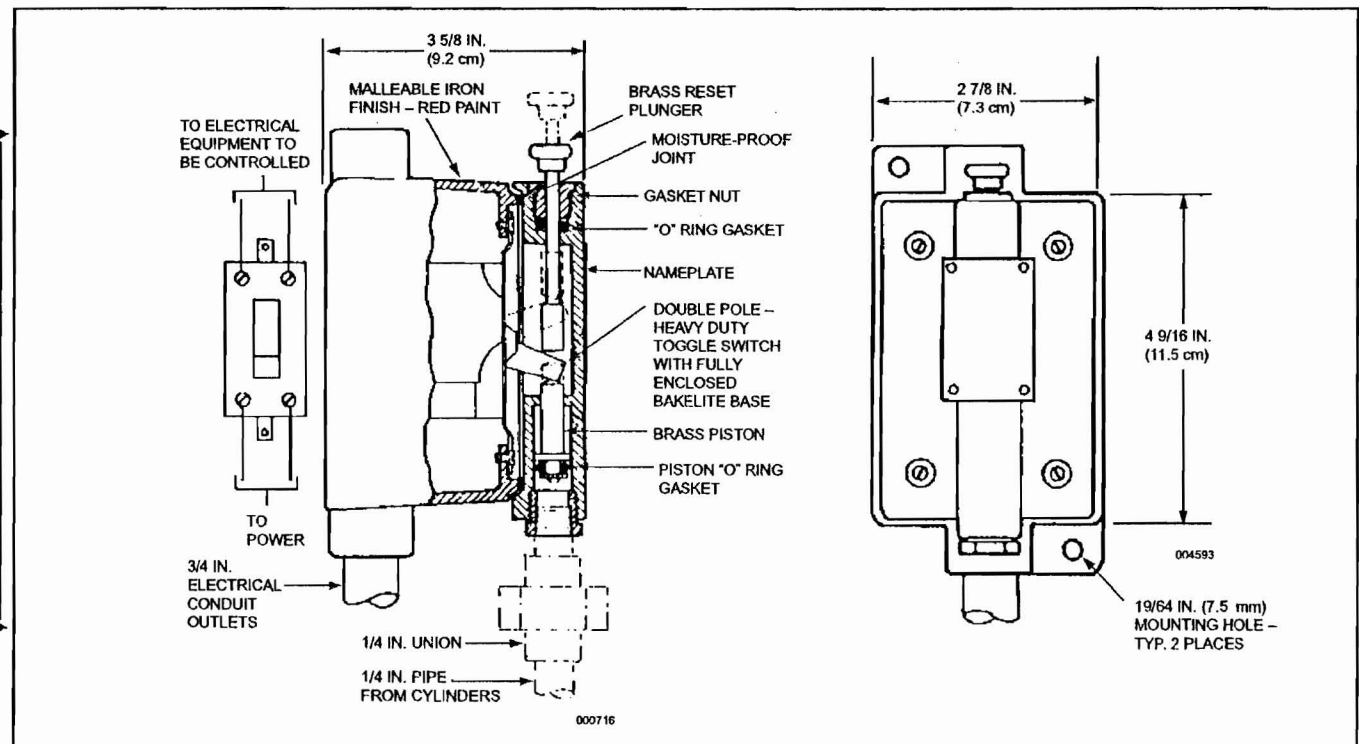
The pressure switch is operated by the INERGEN™ agent pressure when the system is discharged. The pressure switch can be used to open or close electrical circuits to either shut down equipment or turn on lights or alarms. The double pole, single throw (DPST) pressure switch is constructed with a gasketed, water tight housing. The housing is constructed of malleable iron, painted red. A 1/4 in. NPT pressure inlet is used to connect the 1/4 in. pipe from the INERGEN system.

The pressure switch can be installed either before or after the pressure reducer in the distribution piping.

Minimum operating pressure is 50 PSI (3.5 bar).

Shipping Assembly Part No.	Description
846250	Pressure switch – DPST

Component	Material	Thread Size/Type	Electrical Rating	Approvals
Pressure Switch DPST	Switch: BAKELITE Housing: Malleable Iron Piston: Brass Cover: Brass	Conduit Inlet: 3/4 in. NPT Female Pressure Inlet: 1/4 in. NPT Female	2 HP – 240 VAC/ 480 VAC 2 HP – 250 VDC, 30A – 250V AC/DC 5A – 480V AC/DC	FMRC Approved UL Listed (EX-4510)



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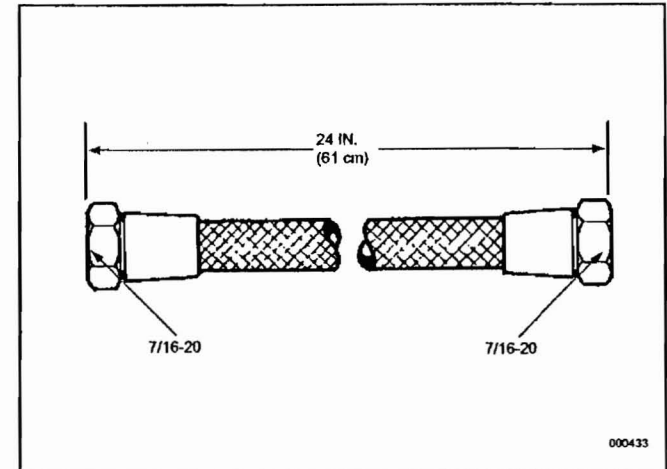


Stainless Steel Actuation Hose

Description

The Stainless Steel Actuation Hose is used to connect the actuation line flared tees between each agent tank. The hose has the same thread, 7/16-20, as the flared tees. The actuation hose allows flexibility between the rigid actuation piping and the tank valve.

Shipping Assembly Part No.	Description
831809	16 in. (40.6 cm) Stainless Steel Hose
832335	20 in. (50.8 cm) Stainless Steel Hose
832336	24 in. (60.9 cm) Stainless Steel Hose



Component	Material	Thread Size	Approvals
Stainless Steel Hose	Stainless Steel	Female 7/16-20 (Both ends)	UL Listed (EX-4510) FMRC Approved

Additional actuation fittings are available:

Part No.	Description
831810	Male Elbow (7/16-20 x 1/4 in. NPT)
831811	Male Tee (7/16-20 x 7/16-20 x 1/4 in. NPT)
832338	Male Straight Connector (7/16-20 x 1/4 in. NPT)

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360° Discharge Nozzle

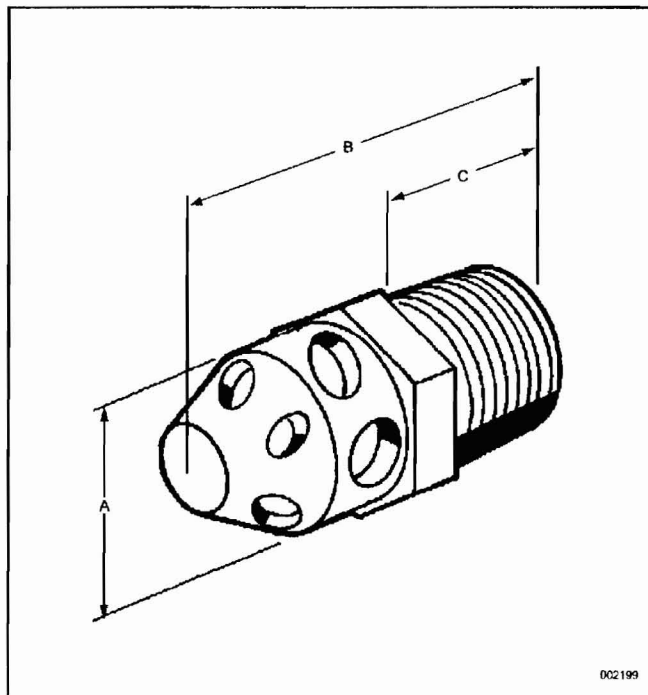
Description

Discharge nozzles are designed to direct the discharge of INERGEN® agent using the stored pressure from the cylinders. Ten sizes of nozzles are available. The system design specifies the orifice size to be used for proper flow rate and distribution pattern*. The nozzle selection depends on the hazard and location to be protected. Standard nozzles are constructed of brass.

NOTE: 2, 2 1/2, and 3 in. nozzles are not recommended in areas that are subject to damage by high velocity discharges, such as suspended ceiling tiles.

Shipping Assembly Part No.	Description
417908	1/4 in. NPT nozzle**
417723	3/8 in. NPT nozzle**
417362	1/2 in. NPT nozzle
417363	3/4 in. NPT nozzle
417364	1 in. NPT nozzle
417365	1 1/4 in. NPT nozzle
417366	1 1/2 in. NPT nozzle
426155	2 in. NPT nozzle
426156	2 1/2 in. NPT nozzle
426137	3 in. NPT nozzle

Component	Material	Thread Size	Approvals
Nozzle	Body-Brass	1/4**, 3/8**, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3 NPT	FMRC Approved UL Listed (EX-4510)



Size	A-In.	B-In.	C-In.	Hex
1/4 in.	5/8	1 9/16	21/32	5/8
3/8 in.	3/4	1 5/8	23/32	3/4
1/2 in.	15/16	1 31/32	27/32	15/16
3/4 in.	1 1/8	2 5/32	7/8	1 1/8
1 in.	1 13/32	2 9/16	1	1 7/16
1 1/4 in.	1 3/4	2 3/4	1 1/16	1 3/4
1 1/2 in.	2	2 31/32	1 1/16	2
2 in.	2 3/8	3	1	2 3/8
2 1/2 in.	3	3 1/2	1	3
3 in.	3 1/2	4 1/8	1 1/4	3 1/2

▶ NOTE: Refer to "Nozzle/Pressure Reducer Range Chart" in Design Section for detailed orifice range information.

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* Orifice diameter must be specified when ordering nozzle. Refer to Orifice Size Chart in Manual Appendix Section.

**UL/ULC listed only.



Nozzle Deflector Shield

Description

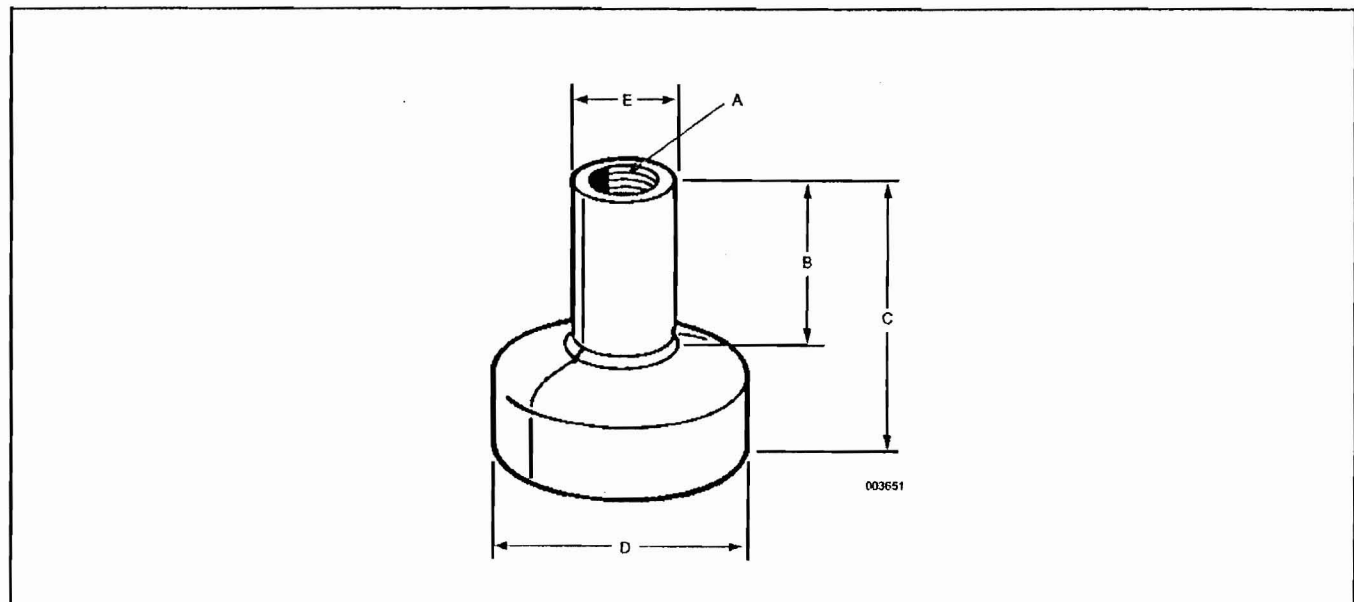
The INERGEN® system nozzle deflector shield is used to control the pattern of the discharge of the INERGEN agent. The deflector shield helps keep the agent discharge away from false ceiling tiles and fragile light fixtures, avoiding damage to them.

The deflector shields are constructed of steel and painted with a cameo cream colored paint. They are available in five sizes.

Component	Material	Approvals
Nozzle Deflector Shield	Steel	FMRC Approved UL Listed (EX-4510)

Shipping Assembly Part No.	A Inlet NPT	B Length of Coupling	C Overall Length	D Deflector O.D.	E Coupling O.D.
417708	1/2 in.	1 7/8 in. (4.8 cm)	3 in. (7.6 cm)	3 3/8 in. (8.6 cm)	1 1/8 in. (2.9 cm)
417711	3/4 in.	2 in. (5.1 cm)	3 1/4 in. (8.3 cm)	3 3/8 in. (8.6 cm)	1 3/8 in. (3.5 cm)
417714	1 in.	2 3/8 in. (6.0 cm)	3 13/16 in. (9.7 cm)	4 7/8 in. (12.4 cm)	1 3/4 in. (4.4 cm)
417717	1 1/4 in.	2 5/8 in. (6.7 cm)	4 3/16 in. (10.6 cm)	4 7/8 in. (12.4 cm)	2 1/4 in. (5.7 cm)
417720	1 1/2 in.	3 1/8 in. (7.9 cm)	4 29/32 in. (12.5 cm)	5 21/32 in. (14.4 cm)	2 1/2 in. (6.4 cm)

▶ NOTE: There are no deflector shields available for the 2, 2 1/2, or 3 in. models.



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ANSUL®

FEATURES

Agent Release Control Panel designed specifically for suppression release operation with:

- Four initiating device circuits (IDCs)
- Two notification appliance circuits (NACs)
- Two release appliance circuits (RACs)
- Two special purpose monitor inputs (SPMs) for manual release request and manual abort request
- Three auxiliary relays with selectable functions
- Easily selected activity timing options

Agent release operation includes:

- Automatic extinguishing release
- Deluge and preaction sprinkler system release
- Dual or single hazard area protection
- IDCs are selectable for cross-zoning or for activation from a single detection input

Operator interface provides:

- Status LEDs per circuit for Alarm, Trouble, and Supervisory (where appropriate)
- Acknowledge, alarm silence, and system reset
- Operating mode and timer selection when in programming mode

Compatible with Listed/Approved 24 VDC coil automatic water control valves

Required system components:

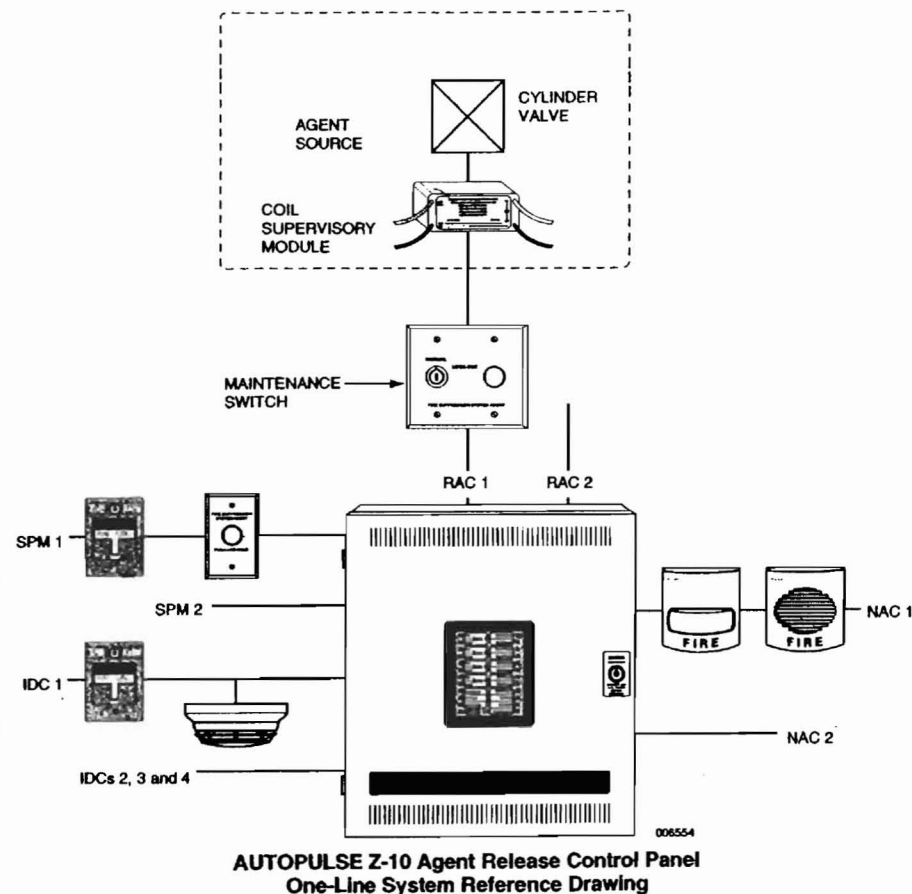
- Coil supervision module, Part No. 430687, one per solenoid control RAC
- Maintenance Switch, Part No. 76498 or 76499, one per solenoid control RAC

Recommended accessory (where appropriate):

- Abort Switch, Part No. 76494 or 76495

DETECTION AND CONTROL EQUIPMENT DATA SHEET

AUTOPULSE® Z-10 AGENT RELEASE CONTROL PANEL



INTRODUCTION

Dedicated for Agent Release. Z-10 Suppression Release Panels provide conventional fire alarm control circuits and are equipped with the features required for a wide variety of single or dual hazard suppression release applications. Capabilities include automatic extinguishing agent release and deluge and preaction sprinkler control.

Flexible I/O Capabilities. Four IDCs allow for either four separately monitored zones or two, cross-zoned connections. Two SPMs allow dedicated manual inputs for release or abort. Two release appliance circuits (RACs) supervise to the valve coils and activate the valves when required. The two NAC circuits and the three panel auxiliary relays provide status condition information.

Easy Program Selections. The operator panel has a program mode that allows selection of panel operation type and detailed operating selections using an easily selected sequential programming operation.

History Log. The last 50 events are stored in non-volatile memory. This information is accessed by connecting a technician's computer to the service port which is also used to set the date and time.

PANEL FEATURE DESCRIPTION

Operator Panel. The operator panel has alarm and trouble status indicating LEDs for each input and output, visible through the locking cabinet door. Unlocking the door provides access to the Acknowledge, Alarm Silence, and System Reset push-button switches.

Four Class B IDCs provide coverage for either two cross-zoned areas or four separately zoned areas. IDCs are capable of supporting up to 30 current-limited smoke detectors or electronic heat detectors as well as manual stations and other compatible contact closure initiating devices. IDCs are capable of Class A operation with an optional adapter module and can be programmed as Class C (short or open initiates a trouble) for use with current limited devices only.

Two Class B Special Purpose Monitoring Circuits (SPMs) are available for monitoring of manual release or abort switch inputs only. Inputs are normally open switches. An abort switch stops release while activated and upon deactivation, the release operation occurs after a selectable time delay. Manual release inputs activate release after selectable delays of from 0 to 30 seconds in 5 second increments. For Class B/A, Abort switches are assumed to be current limited. SPMs are programmable as style C and capable of Class A with the optional adapter module.

Two Class B NACs. Rated 2 A, for reverse polarity notification appliance operation. Class A operation is available with optional adapter module. NAC operation is selectable per application.

Two Class B Release Appliance Circuits (RACs). Rated 2 A, these circuits are dedicated to operating release control valves and actuators. RAC cutout timing is selectable as no cutout, or 10, 15, or 20 minutes.

Auxiliary Power Output. Rated at 750 mA, this output can be wired as continuous or as resettable. Resettable is normally used to power 4-wire smoke detectors.

Standard Auxiliary Relay Outputs. Three relays outputs are available, selectable as normally open or normally closed, rated 2 A @ 30 VDC.

Trouble Relay (Aux Relay 1) is energized when Normal and is de-energized with a Trouble condition.

For Single Hazard Operation, Aux Relay 2 is the Alarm relay and Aux Relay 3 indicates Time Delay Started or can optionally be selected as a Supervisory relay.

For Dual Hazard Operation, Aux Relay 2 is for Hazard Area 1 Alarm; Aux Relay 3 is for Hazard Area 2 Alarm.

Power Supply and Battery Charger. During alarm, the power supply provides 3 A at 25.5 VDC, filtered and regulated. The temperature compensated battery charger provides 27.5 VDC for charging batteries suitable for up to 90 hour standby and 10 minutes of alarm. External battery chargers and cabinets can be used for more battery backup.

AUTOPULSE Z-10 PRODUCT SELECTION

RELEASE CONTROL PANEL			
Part No.	Description	Reference	
430525	Basic Releasing Panel, operates with AC input of: 120/220/230/240 VAC, 50/60 Hz (auto-select)	Includes: Four IDCs, two NACs, two SPMs, two RACs, 3 A power supply with battery charger, cabinet and door	
EXPANSION MODULES			
Part No.	Description	Reference	
430529	Auxiliary Relay Module; four relays, Form C, rated 7 A @ 120 VAC, 5 A @ 30 VDC, unsupervised contacts	Two maximum	Select as required
430531	Two Circuit Class A Adapter Module for IDCs, SPMs, or NACs	Four maximum	
Batteries			
Part No.	Description	Reference	
417692	7.0 AH Battery Pack, 24 VDC	Select one battery shipping assembly per system standby requirements; two batteries are included	Requires external battery cabinet
417693	12 AH Battery Pack, 24 VDC		
417694	17 AH Battery Pack, 24 VDC		
417695	25 AH Battery Pack, 24 VDC		
417997	50 AH Battery Pack, 24 VDC		
Release Control System Modules			
Part No.	Description		
430687	Coil Supervision Module, one required per RAC; refer to pages 6 and 7 for detail		
76498 or 76499	Maintenance Switch, one required per RAC		
76494 or 76495	Abort Switch, select as required		
431196	Abort Supervision Module		

FM APPROVED WATER CONTROL VALVES

FM Group	Manufacturer	Model Number	Details
A	Skinner	LV2LBX25	24 VDC, 11 W, 458 mA, 1/2 in. NPS, 1/2 in. orifice
B	ASCO	T8210A107	24 VDC, 16.8 W, 700 mA, 1/2 in. NPS, 5/8 in. orifice
		R8210A107	
		8210A107	
C	Star Sprinkler	5550	24 VDC, part of Model D deluge valve
D	ASCO	8210G207	24 VDC, 10.6 W, 440 mA, 1/2 in. NPS, 1/2 in. orifice
		V2648571, N.C.	
		HV2648581, N.O.	
E	Skinner	73218BN4UNLVNOC111C2	24 VDC, 10 W, 420 mA, 1/2 in. NPS, 5/8 in. orifice
		73212BN4TN00NOC111C2	24 VDC, 10 W, 420 mA, 1/2 in. NPS, 5/8 in. orifice; 5-300 psi rated working pressure
F	Skinner	73212BN4TNLVNOC322C2	24 VDC, 22 W, 1/2 in. NPS, 920 mA, 250 psi (1725 kPa), 1/2 in. orifice
G	Skinner	71395SN2ENJ1NOH111C2	24 VDC, 10 W, 420 mA, 1/4 in. NPS, 1/16 in. orifice, 250 psi (1725 kPa) rated working pressure
H	Viking	HV-274-060-001	24 VDC, 22.6 W, 940 mA, 1/2 in. NPS, 250 PSI (1725 kPa), 3/4 in. orifice

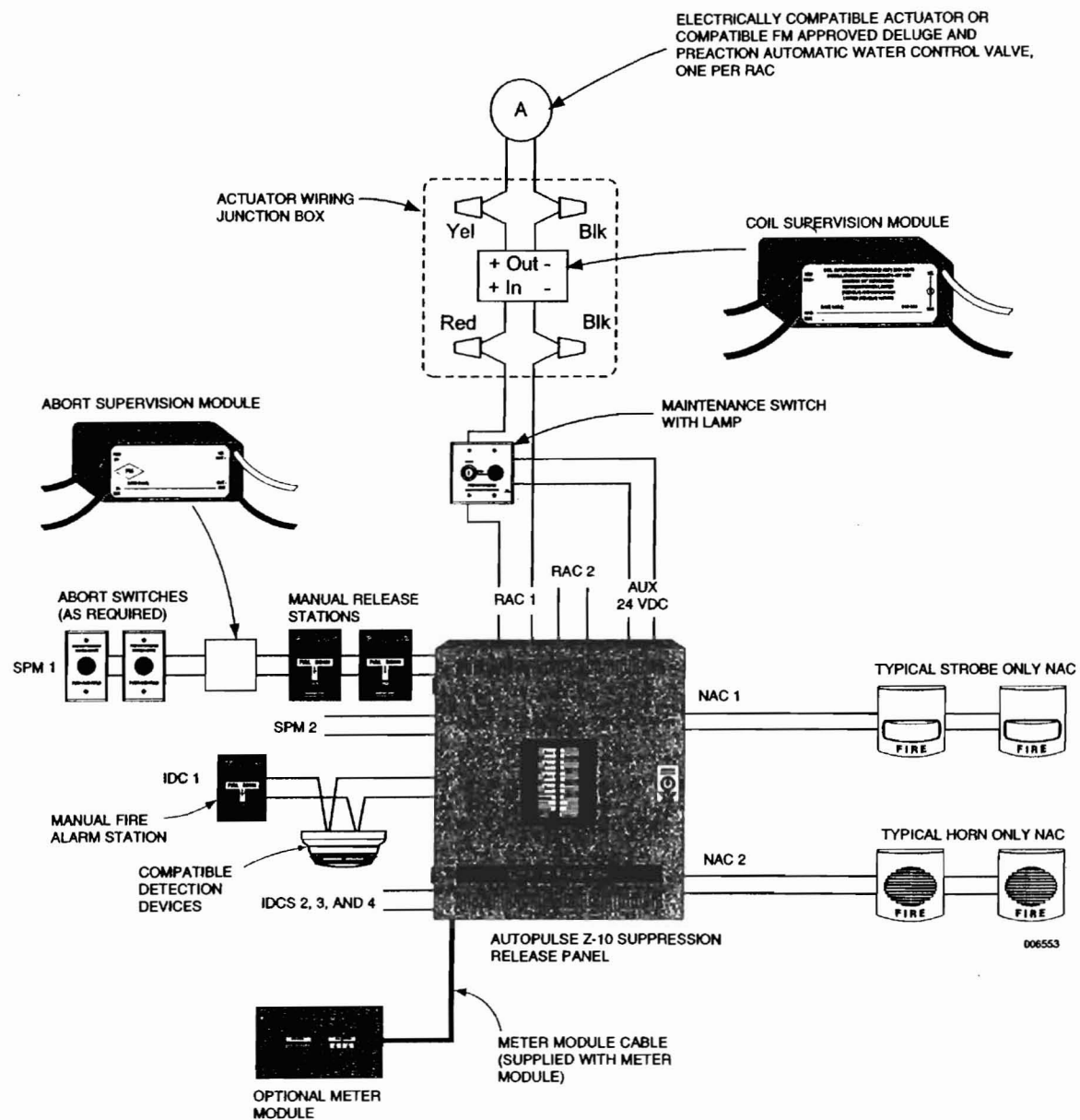
SPECIFICATIONS

Power Ratings		
AC Input	Voltage Ratings	120 VAC, 60 Hz; 220/230/240 VAC, 50/60 Hz, auto-select
	Current Rating	2 A maximum @ 120 VAC input; 1 A maximum @ 240 VAC input
Power Supply		3 A maximum @ nominal 24 VDC
Battery Charger		Temperature compensated, capable of recharging batteries required for 90 hour standby and 10 minute alarm
Standard Circuit Ratings (NOTE: Total DC current = 3 A maximum)		
Notification Appliance Circuits (NACs)		2 A maximum @ 24 VDC, per circuit
Release Appliance Circuits (RACs)		2 A maximum @ 24 VDC, per circuit
Initiating Device Circuits (IDCs)	Supervisory Current	3 mA maximum
	Alarm Current	60 mA maximum
	Capacity	Each IDC supports up to 30 detectors (smoke or electronic heat) and manual stations as required, wiring distance is limited to 50 Ω maximum
Special Purpose Monitoring Circuits (SPMs)		For Manual Release or Abort switches only; not for detectors
Auxiliary Power Output		Two outputs are available, continuous operation or resettable operation; combined output is 750 mA maximum @ 24 VDC
Auxiliary Relay Outputs (Trouble, Aux Relay 2, Aux Relay 3)		Contacts rated 2 A @ 30 VDC, selectable as N.O. or N.C. by jumper
Wiring Connections for Above Circuits and AC Input		Terminals rated for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²)
Auxiliary Module Ratings		
Class A Adapter Module, Part No. 430531		Two circuits per module, rated same as circuits (not applicable to RACs) (no additional current required)
Auxiliary Relay Module, Part No. 430529	Relay Type	Four relays with two outputs per relay; individually selectable as N.O. or N.C.
	AC Ratings	7 A @ 120 VAC, rated for pilot duty @ 0.35 power factor
	DC Ratings	5 A @ 30 VDC, rated for pilot duty @ 0.35 power factor
	Current	70 mA @ 24 VDC, all four relays energized
	Wiring	Terminals rated for 18 AWG to 12 AWG (0.82 mm ² to 3.31 mm ²)
Coil Supervision Module		
Construction		Epoxy encapsulated
Dimensions		1-3/8 in. W x 2-7/16 in. L x 1-1/16 in. H (34 mm x 62 mm x 27 mm)
Wiring		18 AWG (0.82 mm ²) wire leads, color coded
Current Rating		2 A Maximum
Environmental Ratings		
Operating Temperature Range		32° to 120°F (0° to 49° C)
Operating Humidity Range		up to 93% RH, non-condensing @ 100.4° F (38° C) maximum

REFERENCE INFORMATION, COMPATIBLE DETECTORS

Part No.	Type	Description	Data Sheet
430559	Photoelectric smoke detectors for 2-wire bases	Standard detector	F-2002159
430562		Reduced sensitivity detector	
		Combination smoke and heat detector	F-2002160
430565	Electronic heat detectors for 2-wire and 4-wire bases	135° F (57°C) Fixed heat detector	F-2002158
430566		200° F (93°C) Fixed with rate-of-rise heat detector	

AUTOPULSE Z-10 SYSTEM CONNECTION REFERENCE



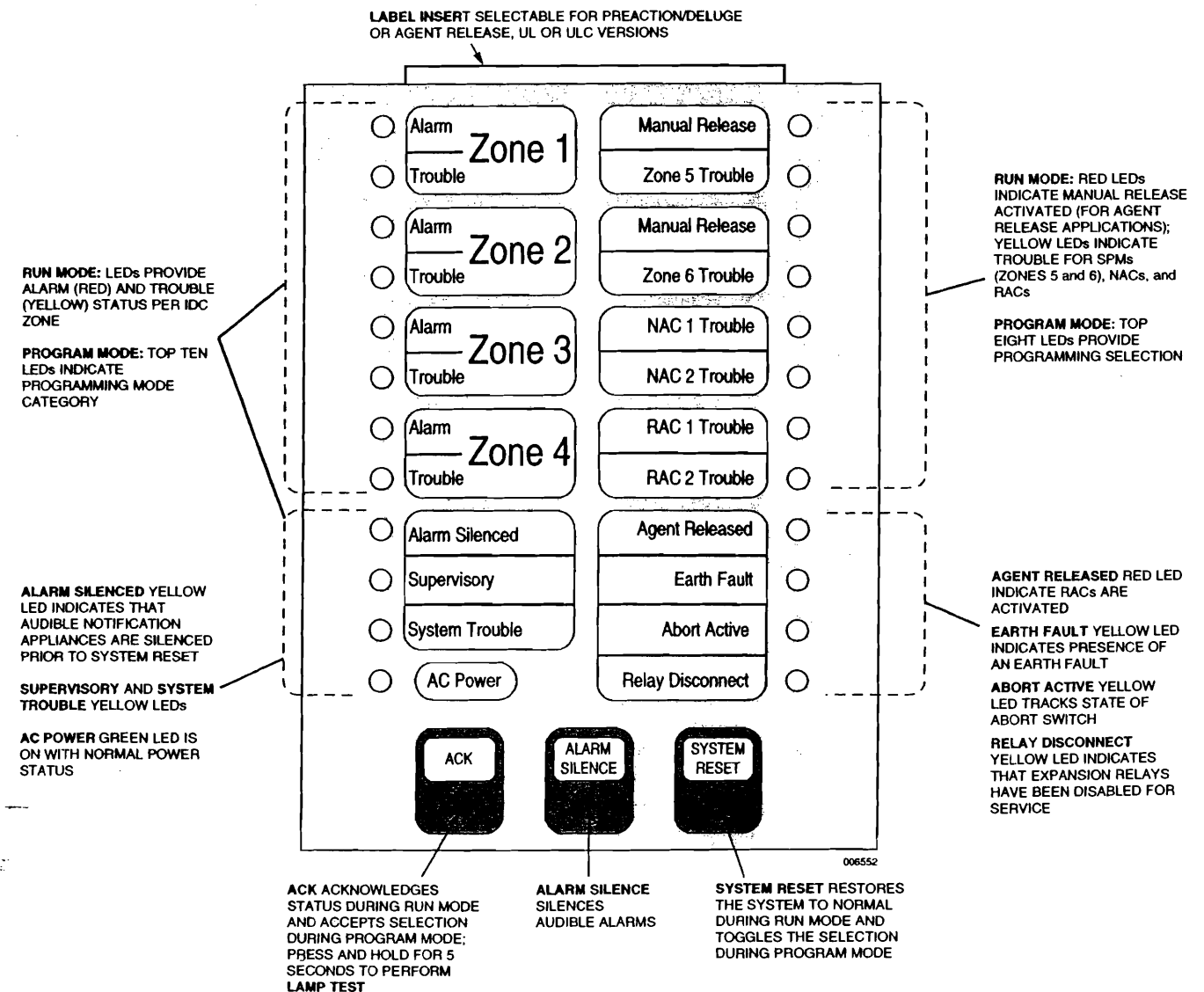
NOTE: LOCATE METER MODULE WITHIN 3 FT (1 M) OF Z-10 CABINET.

GENERAL WIRING NOTE:
WIRING SHOWN IS FOR REFERENCE ONLY, REFER TO SPECIFIC INSTALLATION INSTRUCTIONS FOR DETAILED WIRING INFORMATION.

PROGRAMMING MODES AND SELECTION CHOICES

RELEASE CONTROL PANELS			
Sequence	Programming Mode Description	Choices	
1	Application Mode	Agent release or preaction deluge; single or dual hazard; cross-zoned, combined, cross-zoned and combined, or neither (9 choices)	
2	IDC and SPM Circuit Style	Class B/Class A or Style C	
3	Automatic Release Time Delay	0, 10, 20, 30, 40, 50, or 60 seconds	
4	RAC Cutout Timer	No cutout, 10, 15, or 20 minutes	
5	Manual Release Time Delay	0, 5, 10, 15, 20, 25, or 30 seconds	
6	Abort Release Time Delay	UL Standard 864 listed	Immediate or 10 seconds remaining
		Not UL Standard 864 listed	IRI abort (cross-zoned systems only), NYC abort, or original release delay
7	NAC Coding (where selectable)	Temporal pattern or 20 beats per minute	
8	NAC Operation	No inhibit or one minute inhibit selected as: both on until silence, NAC 1 on until silence and NAC 2 on until reset, or both on until reset	
9	Supervisory Latching	Latching or non-latching	
10	Supervisory Notification	LED and tone-alert only, or with: NAC 2 also on; Aux Relay 3 also on; or both NAC 2 and Aux Relay 3 also on	

OPERATOR PANEL FUNCTION REFERENCE



RELEASE CONTROL SYSTEM REFERENCE

Automatic Agent Release Systems. These systems automatically activate solenoid control valves for the release of a fire extinguishing agent (such as dry chemical, water spray, foam, CO₂, or INERGEN) in response to fire detection device input.

UL and FM Agent Release System Panels must have a minimum of 24 hours of standby power. Initiating devices must be Listed/Approved for the application, and may be wired either Class A or B. Solenoid control valves must be electrically compatible with the control panel circuits and power supplies, and are wired Class B to provide coil supervision.

Deluge and Preaction Sprinkler Systems automatically activate water control valves in response to fire detection device input.

UL requirements for Fire Alarm Systems Listed for Automatic Release or Deluge and Preaction Sprinkler Systems are the same as described above for Automatic Extinguishing Release Systems.

FM Approved requirements for Fire Alarm Systems for Automatic Release of Deluge and Preaction Sprinkler Systems require operation of specific compatible FM Approved Automatic Water Control Valves, a minimum secondary power capacity of 90 hours, and all circuits for the automatic release initiating devices must be capable of operation during a single open circuit fault condition (Class A).

Preaction Sprinkler Systems are similar to deluge systems except that normally closed sprinkler heads are used and supervisory air pressure is maintained in the pipe. Operation requires both an activated sprinkler head and an activated fire detector (or fire detectors).

Deluge Sprinkler Systems employ open sprinkler heads and provide water flow when the fire detection system activates a common automatic water control valve. They are used to deliver water simultaneously through all of the system sprinkler heads. This type of system is applicable where the immediate application of large quantities of water over large areas is the proper fire response.

RELEASE CONTROL SYSTEM REQUIREMENTS

1. Solenoid valves are connected as 2-wire, Class B notification circuits **with only one 24 VDC solenoid valve per circuit** (or two, 12 VDC solenoids in series if applicable) to ensure supervision.
2. Coil Supervision Module, Part No. 430687, must be wired electrically before the solenoid valve and located in the solenoid valve wiring junction box.
3. For FM Approved Deluge and Preaction Sprinkler operation, initiating device circuits must be Class A, wired to Listed/Approved devices.
4. Power supply loading and wiring distances must be per Installation, Programming, and Operating Instructions, Part No. 430545.
5. For FM Approved Deluge and Preaction Sprinkler Systems, battery standby capacity must be a minimum of 90 hours with 10 minutes of alarm.

6. For FM Approved Automatic Extinguishing Release, battery standby must be a minimum of 24 hours with 5 minutes of alarm.
7. Battery standby must be selected for a minimum voltage of 23 VDC to ensure proper valve operation.
8. Maintenance Switch, Part No. 76498 or 76499, are required to ensure that notification circuits dedicated for release operation may be properly disabled prior to service. (Refer to NFPA 72, the National Fire Alarm Code, Section 3-10.4, 1996 edition or Section 3-8.4.3.4, 1999 edition.)
9. For FM Approved Deluge and Preaction Sprinkler operation, the specified compatible Automatic Water Control Valves must be used.
10. For UL Listed and FM Approved Automatic Extinguishing Release, solenoid valves must be electrically compatible.
11. Abort Switches, Part No. 76494 or 76495, are available when abort operation is required. When used, wire on Special Purpose Monitoring Circuits (SPMs) as Class A or B, the same as required for other initiating devices.
12. Manual Release Stations are used for direct activation of the release solenoids with the appropriate time delay implemented by the fire alarm control panel (typically 15 or 30 seconds).

LISTINGS AND APPROVALS

- UL Listed
- FM Approved
- CSFM (Pending)
- MEA (NYC) (Pending)

EXPANSION MODULES AND ACCESSORIES

Auxiliary Relay Module, Part No. 430529. Four relays per module are available as required. Dual hazard applications will require two modules for auxiliary relay operation. Each relay module has a manual disconnect switch that controls relays 2 through 4 (Trouble Relay is not controlled). Relay outputs are required to be connected to 15 A maximum circuit breaker.

Operation is per the following actions:

Relay 1 activates on any **trouble** associated with its hazard

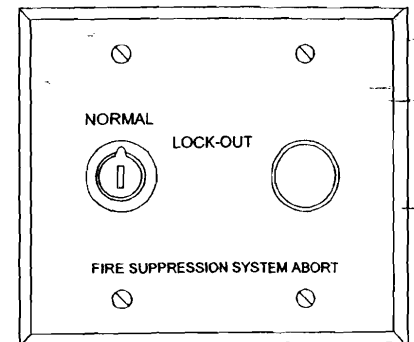
Relay 2 activates on any **alarm** associated with its hazard

Relay 3 activates with the first zone of a cross-zoned system (hazard specific)

Relay 4 activates when the hazard specific RAC activates

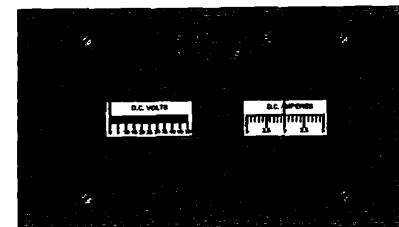
Dual Circuit Class A Adapter Module, Part No. 430531. This module converts two Class B circuits to Class A operation. It consumes no additional current and is compatible with IDCs, SPMs, and NACs. Up to four modules may be mounted within the Z-10 cabinet.

Maintenance Switch. Proper service of release appliance circuits requires the ability to securely disconnect the release circuit during installation and maintenance. This module provides a keyswitch on a stainless steel single gang plate with clear functional markings. (See following illustration.)



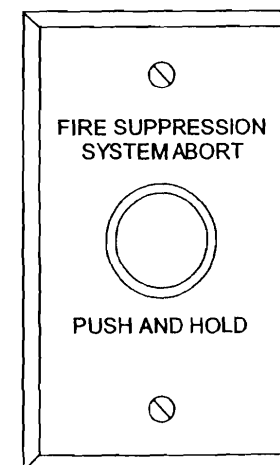
Maintenance Switch 006549

Remote Battery Meter Module. For display of battery voltage and charge and discharge current. This module mounts within 3 ft (1 m) of the Z-10 cabinet using a four-gang electrical box.



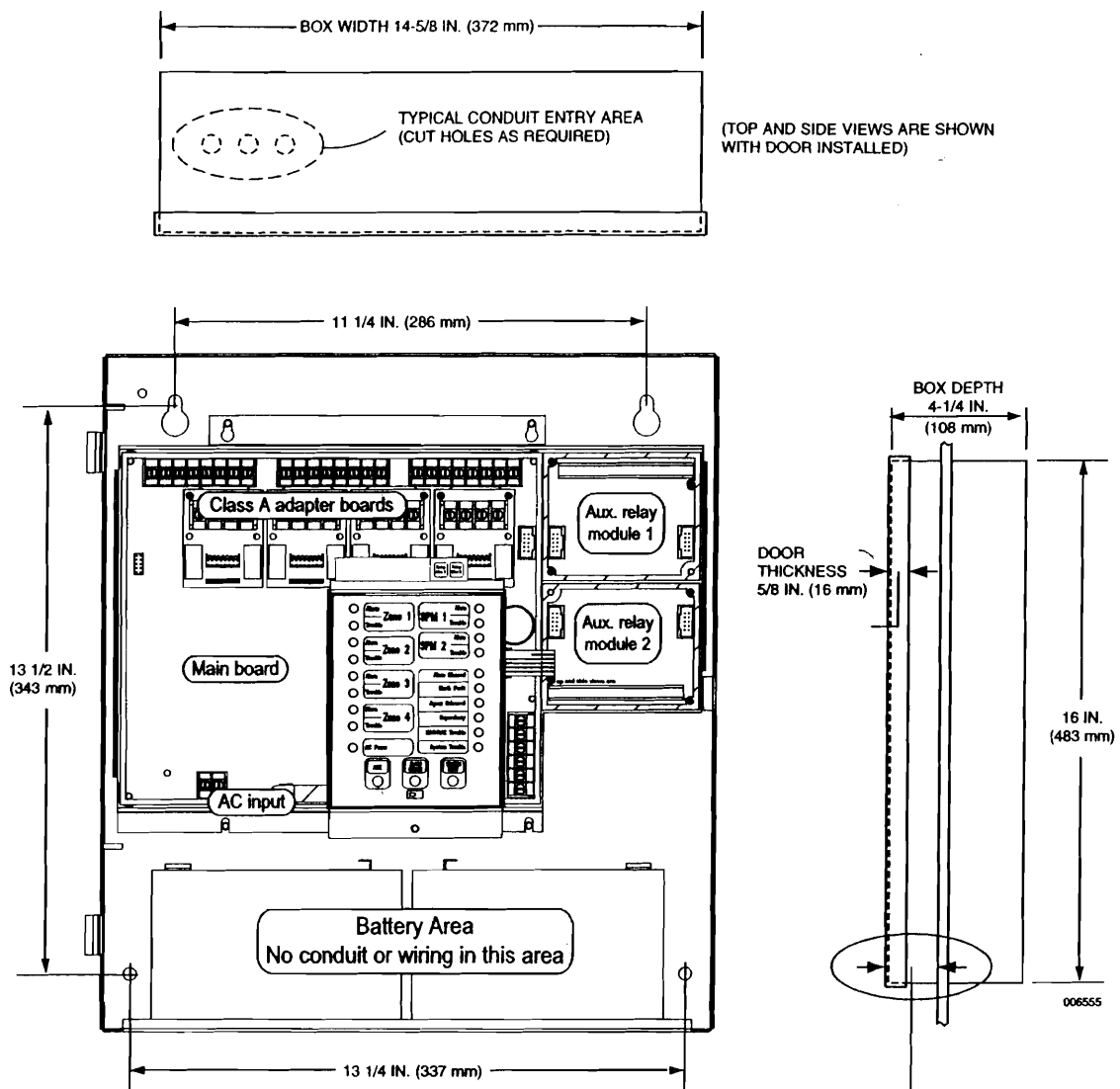
Remote Battery Meter Module 006551

Abort Switch. For manual abort requests, a large pushbutton switch is provided. Activity abort occurs while the switch is pushed and continues after releasing the switch for the selected Abort Release Time Delay. (See illustration below.)



Abort Switch 006550

MOUNTING REFERENCE INFORMATION



(FRONT VIEW MODULE PLACEMENT REFERENCE SHOWING MOUNTING HOLE DIMENSIONS, OPTIONAL CLASS A ADAPTER MODULES, AND OPTIONAL RELAY MODULES)

NOTE: FOR SEMI-FLUSH MOUNTING, CABINET MUST EXTEND 1-1/2 IN. (38 mm) MINIMUM FROM WALL SURFACE

NOTE: A SYSTEM GROUND MUST BE PROVIDED FOR EARTH DETECTION AND TRANSIENT PROTECTION DEVICES. THIS CONNECTION SHALL BE MADE TO AN APPROVED, DEDICATED EARTH CONNECTION PER NFPA 70, ARTICLE 250, AND NFPA 780.



**LIFEalarm® Photoelectric Smoke Detectors
For Two-Wire Bases**

Features

LIFEalarm® Photoelectric smoke detector with on-board sensitivity drift compensation*

Functional chamber enclosure:

- Louvered design enhances smoke capture by directing flow to chamber
- Entrance areas are minimally visible when ceiling mounted

Multi-function indicator LED indicates normal and alarm conditions

Magnetically operated functional test:

- Initiates alarm and verifies performance
- Identifies general sensitivity status using detector LED

Models available in two sensitivity settings:

- Part No. 430559 (Part No. 430695 ULC), Standard Sensitivity, nominal 2.8%/ft obscuration
- Part No. 430562, Special Application Sensitivity, nominal 3.5%/ft obscuration

Available base options:

- Bases for 2-wire operation
- Auxiliary alarm relay output

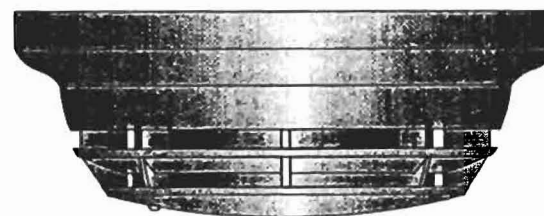
Optional remote alarm indicating LED

Description

LIFEalarm photoelectric detectors provide many of the proven analog sensing features for applications where detectors are connected to conventional 2-wire initiating device circuits (IDCs). Each detector has an on-board micro-processor that evaluates its photoelectric light scattering chamber activity and makes an intelligent decision based on light obscuration history as to whether an alarm condition is present.

LIFEalarm detectors are packaged in a patented housing that minimizes the visibility of the air intake louvers from the normal viewing locations while maintaining a high performance smoke capture ability. Bases are available for remote alarm LED indicator connections and auxiliary relay outputs.

* LIFEalarm smoke detector operation is protected by one or more of the following U.S. Patents: 5,155,468; 5,173,683; 5,400,014; 5,543,777; 5,710,541; D383,407; D388,352; D392,573.



008564

LIFEalarm Photoelectric Detector Mounted in Base

Listings and Approvals

- UL Listed
- ULC Listed
- FM Approved
- CSFM (Pending)
- MEA (NYC) (Pending)

Specifications

Voltage	15 to 32 VDC, from Control Panel IDC
Standby Current	100 µA @ 24 VDC
Alarm Current, 2-Wire Operation	Up to 86 mA maximum, exact current is determined by alarm current limiting of connected IDC
Auxiliary Relay Ratings	Refer to page 2 under Product Selection
Air Velocity Range	0-2000 ft/min (0-610 m/min)
UL Listed Temp. Range	32° to 100° F (0° to 38° C)
Operating Temp. Range	15° to 122° F (-9° to + 50° C)
Humidity Range	10% to 95% RH from 32° to 122° F (0° to 50° C) non-condensing
Color	Frost White
Dimensions	4 7/8 in. Dia. x 1 7/8 in. H, mounted in base (124 mm x 48 mm)

Condition		Status	
Pulses approximately every 4 seconds		Normal	
Steady On		Alarm	
LED Response to Magnetic Test *			
LED Indication	Followed By	Status	Action
LED turns ON	Alarm is initiated	Normal, sensitivity is within compensation range	None
LED pulses <i>quickly</i> , 6 times in 3 seconds, then turns ON	Alarm is initiated	More sensitive, out of normal compensation range	Cleaning or other service is required
LED pulses <i>slowly</i> , 4 times in 8 seconds, then turns ON	Alarm is initiated	Less sensitive, out of normal compensation range	
	Does not initiate Alarm	Detector is malfunctioning	Service is required

* Testing requires placing a magnet at the designated location on the detector cover for 4 seconds. Refer to Application Manual, Part No. 431424, for further test and maintenance information.

Dimensions and Reference Information

