ANSULEX Low pH Liquid Fire Suppressant

Features

- Fast flame knock-down and securement of grease-related fires
- Provides a cooling effect which further enhances its ability to prevent reflash
- Designed for a wide variety of restaurant hazards
- Listed by Underwriters Laboratories (UL/ULC) as part of the R-102 Restaurant System
- Ease of recharge and post-fire cleanup
- Non-corrosive

Application

ANSULEX Low pH Liquid Fire Suppressant is designed for use only in ANSUL® R-102 restaurant fire suppression systems. This "liquid" agent will combat grease-related fires as found in restaurant appliances and ventilating equipment. It should not be used for fires involving energized electrical hazards.

Description

ANSULEX Low pH Liquid Fire Suppressant is a specially-formulated, aqueous solution of organic salts. The agent is pre-mixed, eliminating the need for dilution before system charging. When used as an extinguishing agent, it will produce no toxic by-products.

Agent Properties

Appearance . . . . . Color-Coded Fluorescent Yellow-Green
Storage Life . . . . . 12 Years
Refractive Index. 1.4040
Freeze Point . . . . . –40 °F (–40 °C)
Boiling Point . . . . . 230 °F (110 °C)
Specific Gravity 1.32
Kinematic Viscosity. . . . . 5.26 centistokes
pH . . . . . 7.7 – 8.7

Note: Care should be taken when handling the agent. If contact is made with the eyes or skin, flush with water. If the agent is swallowed, dilute with water or milk and contact a physician.

Performance

When used in the ANSUL R-102 restaurant system, ANSULEX Low pH Liquid Fire Suppressant is extremely effective on fires in restaurant ventilating equipment – hoods and ductwork, as well as in a variety of cooking appliances – deep-fat fryers, griddles, range tops, and several types of broilers and char-broilers.

As the agent is sprayed in fine droplets (atomized) onto an appliance grease fire, it provides excellent flame knock-down, surface-cooling, and fire-securing capabilities. When the agent reacts with the hot grease, it forms a layer of foam on the surface of the fat. This soap-like blanket of foam acts as an insulator between the hot grease and the atmosphere, helping to prevent flammable vapors from escaping and reducing the chance for flame reignition.

Post-fire cleanup can be readily accomplished by flushing the area with water or steam.

Because of the composition of ANSULEX Low pH Liquid Fire Suppressant, it is compatible with metals commonly found in restaurant kitchen environments (i.e., stainless steel, aluminum, galvanized metal, mild steel, copper and brass).

Approvals and Listings

ANSULEX Low pH Liquid Fire Suppressant has been tested, and is listed with Underwriters Laboratories (UL) and Underwriters Laboratories of Canada (ULC) as part of the ANSUL R-102 Restaurant Fire Suppression System.

Ordering Information

ANSULEX Low pH Liquid Fire Suppressant is available in sealed containers.

Part No. 79694 1.5 gallon (5.7 L)

Part No. 79372 3.0 gallon (11.4 L)

Recharge services are available from authorized ANSUL distributors.

One Stanton Street / Marinette, WI 54143-2542, USA / +1-715-735-7411 / www.ansul.com

Technical Bulletin

ANSUL®

Number 63

Clean-Up Procedures For Ansul Wet Chemical Restaurant Agents

ANSUL INCORPORATED
MARINETTE, WI 54143-2542

Ansul wet chemical restaurant agents are proven fire extinguishing agents used in pre-engineered restaurant fire suppression systems. The agent discharge is typically confined to a localized area.

Ansul wet chemical restaurant agents are mild alkaline liquids posing limited corrosion effects to common materials such as steel and aluminum. Cleanup should occur as soon as possible to avoid long-time exposure of the wet chemical agent to metal surfaces such as steel and aluminum. Long periods of exposure could be apparent by the presence of discoloration or dulling to the finishes of your appliances and cooking equipment.

When a restaurant system discharge occurs, there is no unusual cleanup procedure for ANSULEX® agent (used in R-102 systems) or PRX™ agent (used in PIRANHA® systems). The agent should be cleaned from kitchen surfaces as soon as possible after a system discharge:

Before attempting any cleanup procedure, make certain that all fuel sources to the equipment to be cleaned have been shut off. Also, make certain that the exhaust hood and all appliance electrical controls have been de-energized to avoid electrical shock resulting from the cleaning process. Also, prior to any cleaning procedure, make certain that all surfaces to be cleaned have cooled down to room temperature.

Wear rubber gloves during cleanup as sensitive skin may become irritated. If the liquid agent or its residue comes in contact with your skin or eyes, flush thoroughly with water.

Using hot, soapy water and either a clean cloth or sponge, wipe away all foamy residue and thoroughly scrub all surfaces that have come in contact with the fire extinguishing agent.

After thoroughly cleaning all affected surfaces, adequately rinse and allow them to completely dry before re-energizing the equipment.

The agent is non-toxic; however, food product and cooking grease/oil that has come in contact with the agent should be discarded.

Be sure to contact your local Ansul authorized Restaurant System distributor as soon as possible to recharge and reset your system. Once the system is reset, your cooking appliances can once again be turned on.

Questions concerning the above procedures should be directed to Ansul Technical Services in Marinette, Wisconsin, USA at 1-800-TO-ANSUL or 1-715-735-7415.

Form No. F-200094 Litho in U.S.A.

R-102 Restaurant Fire Suppression Systems

Features

- Low pH Agent
- Proven Design
- Reliable Gas Cartridge Operation
- Aesthetically Appealing
- UL Listed – Meets Requirements of UL 300
- ULC Listed – Meets Requirements of ULC/ORD-C1254.6
- CE Marked

Application

The ANSUL® R-102 Restaurant Fire Suppression System is an automatic, pre-engineered, fire suppression system designed to protect areas associated with ventilating equipment including hoods, ducts, plenums, and filters. The system also protects auxiliary grease extraction equipment and cooking equipment such as fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite, or gas-radiant char-broilers; and woks.

The system is ideally suitable for use in restaurants, hospitals, nursing homes, hotels, schools, airports, and other similar facilities.

Use of the R-102 system is limited to indoor applications or locations that provide weatherproof protection within tested temperature limitations. The regulated release and tank assemblies must be mounted in an area where the air temperature will not fall below 32 °F (0 °C) or exceed 130 °F (54 °C). The system must be designed and installed within the guidelines of the UL/ULC Listed Design, Installation, Recharge, and Maintenance Manual.

System Description

The restaurant fire suppression system is a pre-engineered, wet chemical, cartridge-operated, regulated pressure type with a fixed nozzle agent distribution network. It is listed with Underwriters Laboratories, Inc. (UL/ULC).

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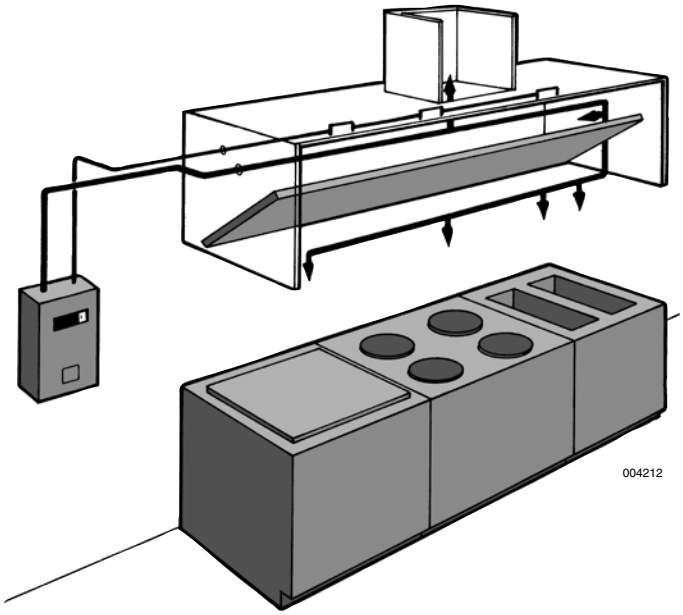

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The system is capable of automatic detection and actuation as well as remote manual actuation. Additional equipment is available for building fire alarm panel connections, electrical shutdown and/or interface, and mechanical or electrical gas line shut-off applications.

The detection portion of the fire suppression system allows for automatic detection by means of specific temperature-rated alloy type fusible links, which separate when the temperature exceeds the rating of the link, allowing the regulated release to actuate.

A system owner's guide is available containing basic information pertaining to system operation and maintenance. A detailed technical manual, including system description, design, installation, recharge and resetting instructions, and maintenance procedures, is available to qualified individuals.

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

The basic system consists of an AUTOMAN regulated release assembly which includes a regulated release mechanism and a wet chemical storage tank housed within a single enclosure. Nozzles with blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows are supplied in separate packages in the quantities needed for fire suppression system arrangements.

Additional equipment includes a remote manual pull station(s), mechanical and electrical gas valves, and electrical switches for automatic equipment and gas line shut-off. Accessories can be added such as alarms, warning lights, etc., to installations where required.

Additional tanks and corresponding equipment can be used in multiple arrangements to allow for larger hazard coverage. Each tank is limited to a listed maximum amount of flow numbers.

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Component Description

Wet Chemical Agent – The extinguishing agent is a mixture of organic salts designed for rapid flame knockdown and foam securement of grease related fires. It is available in plastic containers with instructions for wet chemical handling and usage.

Agent Tank – The agent tank is installed in a stainless steel enclosure or wall bracket. The tank is constructed of stainless steel.

Tanks are available in two sizes: 1.5 gallon (5.7 L) and 3.0 gallon (11.4 L). The tanks have a working pressure of 110 psi (7.6 bar), a test pressure of 330 psi (22.8 bar), and a minimum burst pressure of 660 psi (45.5 bar).

The tank includes an adaptor/tube assembly. The adaptor assembly includes a chrome-plated steel adaptor with a 1/4 in. NPT female gas inlet, a 3/8 in. NPT female agent outlet, and a stainless steel agent pick-up tube. The adaptor also contains a bursting disc seal which helps to prevent the siphoning of agent up the pipe during extreme temperature variations.

Regulated Release Mechanism – The regulated release mechanism is a spring-loaded, mechanical/pneumatic type capable of providing the expellant gas supply to one, two, or three agent tanks depending on the capacity of the gas cartridge used. It contains a factory installed regulator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated release mechanism contains a release assembly, regulator, expellant gas hose, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure contains knock-outs for 1/2 in. conduit. The cover contains an opening for a visual status indicator.

It is compatible with mechanical gas shut-off devices; or, when equipped with a field or factory-installed switch and manual reset relay, it is compatible with electric gas line or appliance shut-off devices.

Regulated Actuator Assembly – When more than two agent tanks (or three 3.0 gallon (11.4 L) tanks in certain applications) are required, the regulated actuator is available to provide expellant gas for additional tanks. It is connected to the cartridge receiver outlet of the regulated release mechanism providing simultaneous agent discharge. It contains a regulated actuator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities using pressure from the regulated release mechanism cartridge.

The regulated actuator assembly contains an actuator, regulator, expellant gas hose, and agent tank housed in a stainless steel enclosure with cover. The enclosure contains knockouts to permit installation of the expellant gas line.

Discharge Nozzles – Each discharge nozzle is tested and listed with the R-102 system for a specific application. Nozzle tips are stamped with the flow number designation (1/2, 1, 2, or 3). Each nozzle must have a metal or rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up.

Agent Distribution Hose – Kitchen appliances manufactured with or resting on casters (wheels/rollers) may include an agent distribution hose as a component of the suppression system. This allows the appliance to be moved for cleaning purposes without disconnecting the appliance fire suppression protection. The hose assembly includes a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose.

Flexible Conduit – Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

Flexible conduit can be used only with the Molded Remote Manual Pull Station.

Pull Station Assembly – The remote manual pull station is made out of a molded red composite material. The red color makes the pull station more readily identifiable as the manual means for fire suppression system operation.

The pull station is compatible with the ANSUL Flexible Conduit.

Approvals

- UL/ULC Listed
- CE Marked
- New York City Department of Buildings
- LPCB
- TFRI
- Marine Equipment Directive (MED)
- DNV
- ABS
- Lloyd's Register
- Meets requirements of NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment)
- Meets requirements of NFPA 17A (Standard on Wet Chemical Extinguishing Systems)

Ordering Information

Order all system components through your local authorized ANSUL Distributor.

Specifications

An ANSUL R-102 Fire Suppression System shall be furnished. The system shall be capable of protecting all hazard areas associated with cooking equipment.

1.0 GENERAL

1.1 References

1.1.1 Underwriters Laboratories, Inc. (UL)
- 1.1.1.1 UL Standard 1254
- 1.1.1.2 UL Standard 300

1.1.2 Underwriters Laboratories of Canada (ULC)
- 1.1.2.1 ULC/ORD-C 1254.6

1.1.3 National Fire Protection Association (NFPA)
- 1.1.3.1 NFPA 96
- 1.1.3.2 NFPA 17A

1.2 Submittals

1.2.1 Submit two sets of manufacturer's data sheets

1.2.2 Submit two sets of piping design drawings

1.3 System Description

1.3.1 The system shall be an automatic fire suppression system using a wet chemical agent for cooking grease related fires.

1.3.2 The system shall be capable of suppressing fires in the areas associated with ventilating equipment including hoods, ducts, plenums, and filters as well as auxiliary grease extraction equipment. The system shall also be capable of suppressing fires in areas associated with cooking equipment, such as fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite or gas-radiant char-broilers; and woks.

1.3.3 The system shall be the pre-engineered type having minimum and maximum guidelines established by the manufacturer and listed by Underwriters Laboratories (UL/ULC).

1.3.4 The system shall be installed and serviced by personnel trained by the manufacturer.

1.3.5 The system shall be capable of protecting cooking appliances by utilizing either dedicated appliance protection and/or overlapping appliance protection.

1.4 Quality Control

1.4.1 Manufacturer: The R-102 Restaurant Fire Suppression System shall be manufactured by a company with at least forty years experience in the design and manufacture of pre-engineered fire suppression systems. The manufacturer shall be ISO 9001 registered.

1.4.2 Certificates: The wet agent shall be a specially formulated, aqueous solution of organic salts with a pH range between 7.7 – 8.7, designed for flame knockdown and foam securement of grease-related fires.

1.5 Warranty, Disclaimer, and Limitations

1.5.1 The pre-engineered restaurant fire suppression system components shall be warranted for five years from date of delivery against defects in workmanship and material.

1.6 Delivery

1.6.1 Packaging: All system components shall be securely packaged to provide protection during shipment.

1.7 Environmental Conditions

1.7.1 The R-102 system shall be capable of operating within a temperature range of 32 °F to 130 °F (0 °C to 54 °C).

2.0 PRODUCT

2.1 Manufacturer

2.1.1 Tyco Fire Protection Products, One Stanton Street, Marinette, Wisconsin 54143-2542, Telephone (715) 735-7411.

2.2 Components

2.2.1 The basic system shall consist of an AUTOMAN regulated release assembly which includes a regulated release mechanism and a wet chemical storage tank housed within a single enclosure. Nozzles, blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows shall be supplied in separate packages in the quantities needed for fire suppression system arrangements. Additional equipment shall include remote manual pull station, mechanical and electrical gas valves, and electrical switches for automatic equipment and gas line shut-off, and building fire alarm control panel interface.

2.2.2 Wet Chemical Agent: The extinguishing agent shall be a specially formulated, aqueous solution of organic salts with a pH range between 7.7 – 8.7, designed for flame knockdown and foam securement of grease related fires.

2.2.3 Agent Tank: The agent tank shall be installed in a stainless steel enclosure or wall bracket. The tank shall be constructed of stainless steel. Tanks shall be available in two sizes; 1.5 gallon (5.7 L) and 3.0 gal (11.4 L).The tank shall have a working pressure of 110 psi (7.6 bar), a test pressure of 330 psi (22.8 bar), and a minimum burst pressure of 660 psi (45.5 bar). The tank shall include an adaptor/tube assembly containing a burst disc union.

2.2.4 Regulated Release Mechanism: The regulated release mechanism shall be a spring-loaded, mechanical/pneumatic type capable of providing the expellant gas supply to one or two agent tanks depending on the capacity of the gas cartridge used or three 3.0 gallon (11.4 L) agent storage tanks in certain applications. It shall contain a factory installed regulator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar).

It shall have the following actuation capabilities: automatic actuation by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated release mechanism shall contain a release assembly, regulator, expellant gas hose, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure shall contain knock-outs for 1/2 in. conduit. The cover shall contain an opening for a visual status indicator.

It shall be compatible with mechanical gas shut-off devices; or, when equipped with a field or factory-installed switch(es), it shall be compatible with electric gas line or appliance shut-off devices, or connections to a building fire alarm control panel.

Specifications (Continued)

2.2.5 Regulated Actuator Assembly: When more than two agent tanks or three agent tanks in certain applications are required, the regulated actuator shall be available to provide expellant gas for additional tanks. It shall be connected to the cartridge receiver outlet of the regulated release mechanism providing simultaneous agent discharge. The regulator shall be deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar).The regulated actuator assembly shall contain an actuator, regulator, expellant gas hose, and agent tank housed in a stainless steel enclosure with cover. The enclosure shall contain knockouts to permit installation of the expellant gas line.

2.2.6 Discharge Nozzles: Each discharge nozzle shall be tested and listed with the R-102 system for a specific application. Nozzles tips shall be stamped with the flow number designation (1/2, 1, 2, or 3). Each nozzle shall have a metal or rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up.

2.2.7 Distribution Piping: Distribution piping shall be Schedule 40 black iron, chrome-plated, or stainless steel conforming to ASTM A120, A53, or A106.

2.2.8 Detectors: The detectors shall be the fusible link style designed to separate at a specific temperature.

2.2.9 Cartridges: The cartridge shall be a sealed steel pressure vessel containing either carbon dioxide or nitrogen gas. The cartridge seal shall be designed to be punctured by the releasing device supplying the required pressure to expel wet chemical agent from the storage tank.

2.2.10 Agent Distribution Hose: An optional agent distribution hose shall be available for kitchen appliances manufactured with or resting on casters (wheels/rollers). This shall allow the appliance to be moved for cleaning purposes without disconnecting the appliance fire suppression protection. Hose assembly shall include a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose.

2.2.11 Flexible Conduit: The manufacturer supplying the Restaurant Fire Suppression System shall offer flexible conduit as an option to rigid EMT conduit for the installation of pull stations and/or mechanical gas valves. The flexible conduit shall be UL Listed and include all approved components for proper installation.

2.2.12 Pull Station Assembly: The Fire Suppression System shall include a remote pull station for manual system actuation. The pull station shall be designed to include a built-in guard to protect the pull handle. The pull station shall also be designed with a pull handle to allow for three finger operation and shall be red in color for quick visibility.

3.0 IMPLEMENTATION

3.1 Installation

3.1.1 The R-102 fire suppression system shall be designed, installed, inspected, maintained, and recharged in accordance with the manufacturer's listed instruction manual.

3.2 Training

3.2.1 Training shall be conducted by representatives of the manufacturer.

Agent Distribution Hose for Restaurant Fire Suppression Systems

Features

- Tested and listed for use with ANSUL® R-102 and PIRANHA Restaurant Fire Suppression Systems through Underwriters Laboratories (UL/ULC), and LPCB (Loss Prevention Certification Board)
- Hose diameter of 1/2 in. (13 mm) and length of 5 ft (1.5 m)
- Two male NPT swivels assembled to hose ends for easy installation
- Includes 3 ft (0.9 m) long restraining cable
- Includes restraining cable hardware kit for various mounting options
- Offers convenience of rolling out castered appliances for cleaning without disconnecting agent piping

Application

NFPA 17A Standard for Wet Chemical Extinguishing Systems requires that movable cooking equipment shall be provided with a means to ensure that it is correctly repositioned in relation to the appliance discharge nozzle during cooking operations. In many cases, the appliance discharge nozzle is hard piped to the appliance and renders the movement of the appliance difficult, requiring disconnection of the discharge piping.

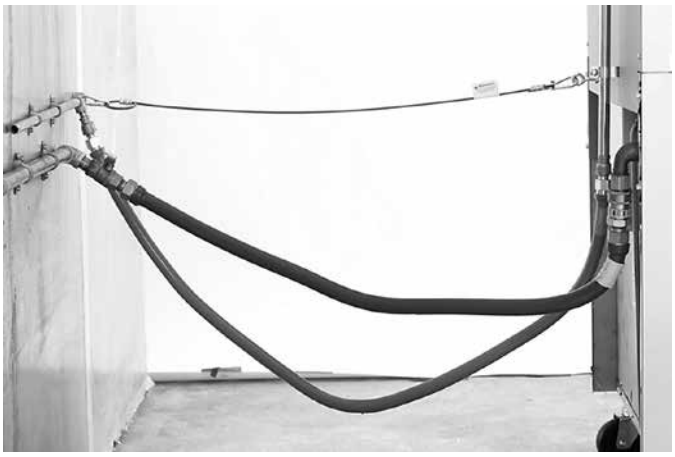
The Agent Distribution Hose is designed for use with commercial kitchen appliances manufactured with or resting on casters (wheels/rollers) that have hard piped fire suppression systems.

Description

The Agent Distribution Hose is a component of the suppression system that allows the appliance to be moved for cleaning purposes without disconnecting the appliance fire suppression discharge piping and ensures positive positioning of the appliance nozzle.

The hose features 1/2 in. (13 mm) swivel connectors which reduce stress at both ends of the hose connector. An outer coating inhibits growth of bacteria, mold and mildew on the discharge hose.

Underneath the covering, the hose is comprised of heavy-duty, flexible, corrugated 304 stainless steel tubing. A tightly woven stainless steel braid prevents corrugations from stretching as the appliance is moved. The temperature range in which the agent distribution hose will function properly is 32 °F to 130 °F (0 °C to 54 °C). The hose must not be kinked, twisted, or have sharp bends when installed or when equipment is pulled away from the wall. The hose must also not be concealed within or run through any wall, floor, or partition, and must not have any direct exposure to excessive heat or radiant flame from the cooking appliances.



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The hose assembly includes a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose. The agent discharge hose can be easily installed at initial installation or as a retrofit to your current fire suppression system.

Ordering Information

Part No.	Description	Shipping Weight
435982	Agent Distribution Hose and Restraining Cable Kit – Consists of a 5 ft (1.5 m) long Agent Discharge Hose, a 3 ft (0.9 m) long Restraining Cable, and a Restraining Cable Hardware Kit	3.5 lb (1.6 kg)

Agent Distribution Hose for Restaurant Fire Suppression Systems

Features

- Tested and listed for use with ANSUL® R-102 and PIRANHA Restaurant Fire Suppression Systems through Underwriters Laboratories (UL/ULC), and LPCB (Loss Prevention Certification Board)
- Hose diameter of 1/2 in. (13 mm) and length of 5 ft (1.5 m)
- Two male NPT swivels assembled to hose ends for easy installation
- Includes 3 ft (0.9 m) long restraining cable
- Includes restraining cable hardware kit for various mounting options
- Offers convenience of rolling out castered appliances for cleaning without disconnecting agent piping

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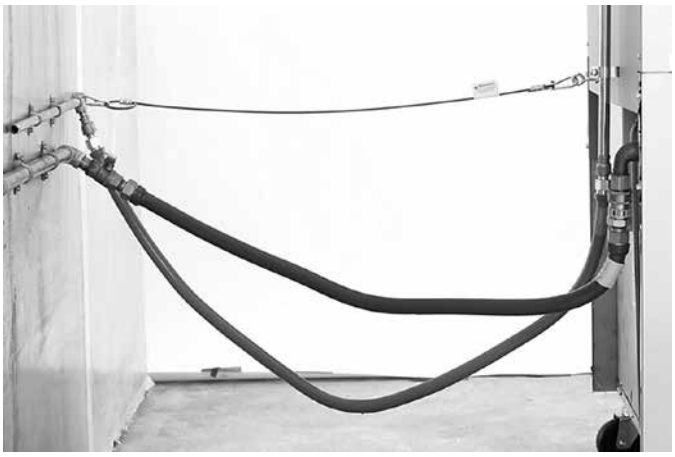

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Ordering Information

Part No.	Description	Shipping Weight
435982	Agent Distribution Hose and Restraining Cable Kit – Consists of a 5 ft (1.5 m) long Agent Discharge Hose, a 3 ft (0.9 m) long Restraining Cable, and a Restraining Cable Hardware Kit	3.5 lb (1.6 kg)

Model SL and Model HL Fusible Links

Features

- Tested and Listed for use with ANSUL® R-102 and PIRANHA Restaurant Fire Suppression Systems, and the I-101 Industrial Fire Suppression System through Underwriters Laboratories (UL/ULC)
- Manufactured and tested in accordance with the applicable standards of Underwriters Laboratories
- Designed for straight pull load applications
- Fixed temperature releasing device

Model SL

- Maximum continuous load of 50 lb (22.7 kg)
- Minimum continuous load of 3 lb (1.4 kg)
- Color-coded for easy temperature rating identification

Model HL

- Maximum continuous load of 40 lb (18.1 kg)
- Minimum continuous load of 5 lb (2.3 kg)

Description

The Model SL and Model HL Fusible Links are fixed temperature releasing devices that are thermally actuated. They are tested and listed for use with ANSUL restaurant and industrial fire suppression systems through Underwriters Laboratories (UL/ULC).

The fusible links are designed for straight pull load applications. The SL link can withstand a maximum continuous load of 50 lb (22.7 kg) and a minimum continuous load of 3 lb (1.4 kg). The HL link can withstand a maximum continuous load of 40 lb (18.1 kg) and a minimum continuous load of 5 lb (2.3 kg).

Both the SL and HL links operate in the same manner. When the fusible alloy melts due to exposure to heat, the fusible assembly compresses, allowing the assembly to release from between the two halves of the fusible link. The two halves of the link are then separated by the tension force exerted by the continuous duty load.

Application

The fusible links are installed over cooking appliances and in the ducts of kitchen cooking equipment in restaurant fire suppression systems. They are also installed in vehicle and open face paint spray booths, and in total flooding/local applications in industrial fire suppression systems.

MODEL SL FUSIBLE LINKS

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MODEL HL FUSIBLE LINKS

008983

The links must be installed and maintained in compliance with the applicable standards of the National Fire Protection Association (NFPA), in addition to any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

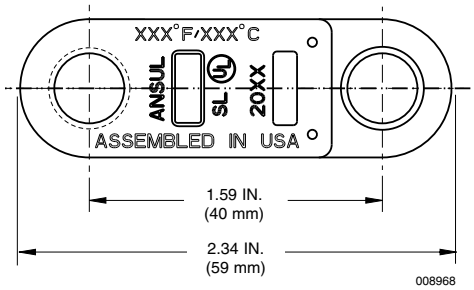
Fusible links installed per NFPA 96, "Standard for Ventilation Control Fire Protection of Commercial Cooking Operations," are to be inspected and replaced in accordance with NFPA 96. For installations other than per NFPA 96, the applicable NFPA Standard and supporting technical manual recommendations must be followed.

Note: No attempt is to be made to disassemble, repair, or clean a Model SL or HL fusible link. The complete assembly must be replaced if there is any indication of potential malfunction.

Application (Continued)

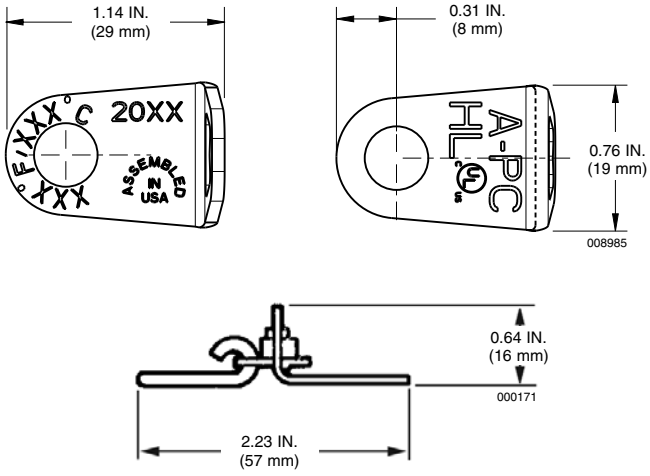
MODEL SL FUSIBLE LINK

Part No.	Link Temperature Rating °F	(°C)	Maximum Allowable Temperature Exposure °F	(°C)	Color of Link
439241	165	(74)	100	(38)	Black
439242	212	(100)	150	(66)	White
439243	280	(138)	225	(107)	Blue
439244	360	(182)	290	(143)	Red
439245	450	(232)	360	(182)	Green



MODEL HL FUSIBLE LINK

Part No.	Link Temperature Rating °F	(°C)	Maximum Allowable Temperature Exposure °F	(°C)
439234	165	(74)	100	(38)
439235	212	(100)	150	(66)
439236	280	(138)	225	(107)
439237	360	(182)	290	(143)
439238	450	(232)	360	(182)
439239	500	(260)	400	(204)



1. Install one or two of the electrical (snap-action) switches into the switch cover for the upper tab of the switch mounting bracket. See Figure 1.

   Note: When applicable, always place the low voltage alarm initiating switch(es) on the upper tab of the switch mounting bracket. Never place low voltage alarm initiating switch(es) on the lower tab of the switch mounting bracket.

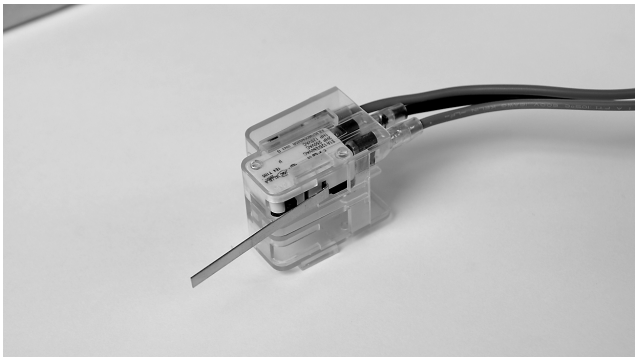


FIGURE 1
009128

2. Slide switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 2.

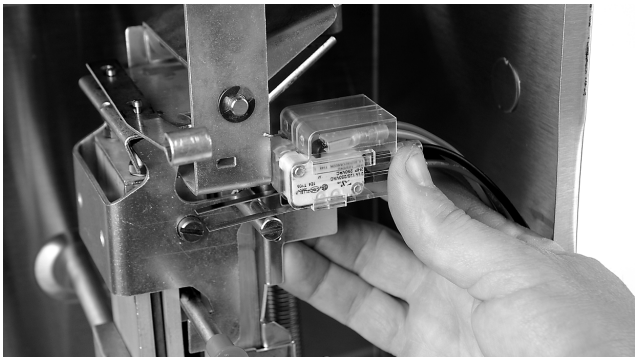


FIGURE 2
009129

3. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. See Figure 3. Tighten screws securely.

   Note: To meet UL requirements, the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.

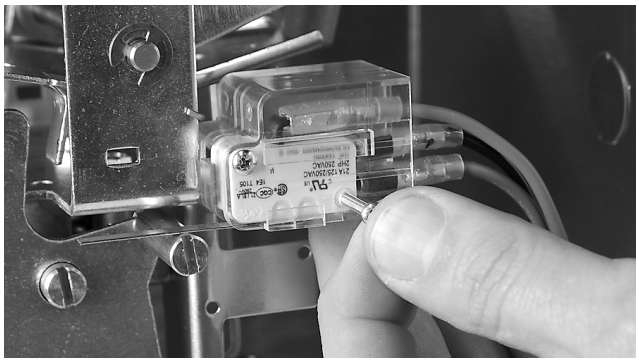


FIGURE 3
009130

4. Wire the upper switch(es) according to the switch wiring diagram provided with each release mechanism. See Figure 4.

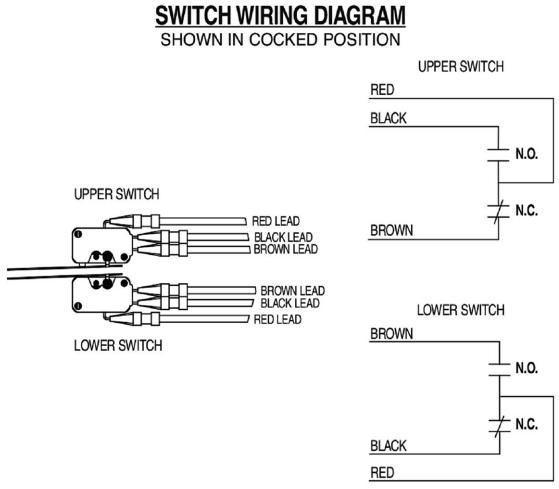


FIGURE 4
009145

5. If necessary, install one or two of the snap-action switches into the switch cover for the lower tab of the switch mounting bracket. These switches will be oriented opposite of the upper switch(es) so that the levers will appear on the top side of the switch when mounted to the lower tab of the switch mounting bracket.

   Note: Never place low voltage alarm initiating switch(es) on the lower tab of the switch mounting bracket.

6. Slide switch cover onto the lower tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5.

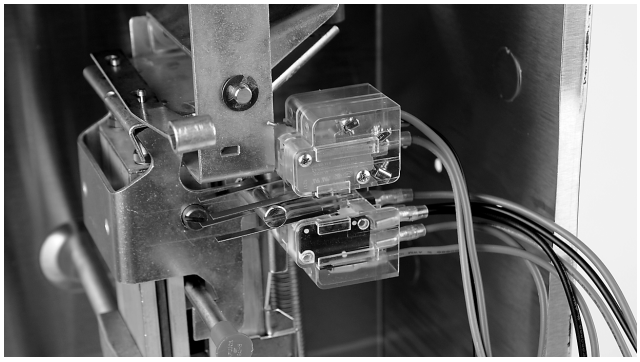


FIGURE 5
009131

7. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. Tighten screws securely.

   Note: To meet UL requirements, the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.

8. Wire the lower switches according to the switch wiring diagram provided with each release mechanism. See Figure 4.

   Note: All wiring to be performed by a certified individual(s).

9. Restore power to release assembly.

10. Test switch actuation and function. If necessary, bend switch lever to achieve proper switch actuation. See Figure 6.

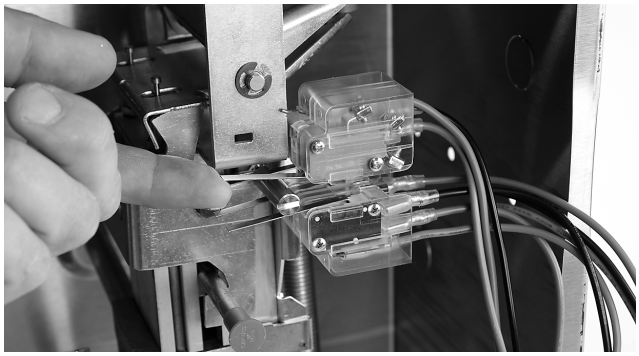


FIGURE 6
009133

R-102 RESTAURANT SYSTEM SUMMARY SHEET

NOZZLE COVERAGES

Cooking Hazard Coverage													
Application Type		**Nozzle Type**	**Flow Points**	**Width Max. Side** in.	(mm)	**Multiple Length Max. Side** in.	(mm)	**Multiple Nozzle w/o Drip Board Area** in.^{2}	(m^2)	**Nozzle w/ Drip Board Area** in.^{2}	(m^2)	**Minimum Nozzle Height** in.	(mm)	**Maximum Nozzle Height** in.	(mm)
Fryers [1]	without drip boards	230/290 [1]	2	14	(356)	15	(381)	—		—		27/13	(686/330)	47/16	(1194/406)
	Split or no Split Vat	245/290 [1]	2	14/14.5	(356/368)	15/14	(381/356)	—		—		20/16	(508/406)	27/27	(686/686)
Fryers	with drip boards	290	2	19.5	(495)	19	(483)	—		—		13	(330)	16	(406)
	Non-Split Vat (ONLY)	3N	3	19.5	(495)	19	(483)	—		—		21	(533)	34	(864)
		3N	3	18	(457)	18	(457)	—		—		25	(635)	35	(889)
Fryers [1]	with drip boards	230/290 [1]	2	14	(356)	21	(533)	210	(0.14)	294	(0.19)	27/13	(686/330)	47/16	(1194/406)
	Split or no Split Vat [3]	245/290 [1]	2	14/14.5	(356/368)	21/26.5	(533/673)	210/203	(0.14/0.13)	294/384.2	(0.19/0.25)	20/16	(508/406)	27/27	(686/686)
Fryers	with drip boards	290	2	14.5	(368)	16.5	(419)	—		384.3	(0.25)	16	(406)	21	(533)
		3N	3	18	(457)	27.75	(705)	324	(0.21)	497	(0.32)	25	(635)	35	(889)
Tilt Skillet/Braising Pan [4]		Coverage limitation are based on fryer sizes including drip boards. Exception: Tilt Skillets and Braising Pans may exceed the maximum of 6 ft^2 (0.56m^2)													
						Longest Side in.	(mm)	**Max. Area** in.^{2}	(m^2)						
Range		1N	1	12	(305)	32	(813)	384	(0.25)	—		30	(762)	40	(1016)
	With or without back shelf [2]	1N	1	18	(457)	24	(610)	—	—	—		15	(381)	20	(508)
	Without back shelf	1F	1	12	(305)	28	(711)	336	(0.22)	—		30	(762)	50	(1270)
	With back shelf [8]	1F	1	12	(305)	28	(711)	336	(0.22)	—		40	(1016)	48	(1219)
		245	2	24	(610)	28	(711)	—		—		40	(1016)	50	(1270)
	Without back shelf	260	2	24	(610)	32	(813)	768	(0.50)	—		30	(762)	40	(1016)
	With back shelf [9]	260	2	12	(305)	32	(813)	384	(0.25)	—		30	(762)	40	(1016)
		2 x 290	4	36	(914)	28	(711)	1008	(0.65)	—		15	(381)	20	(508)
Griddle		2W	2	30	(762)	36	(914)	1080	(0.70)	—		10	(254)	20	(508)
		1W	1	20.5	(521)	26	(660)	—		—		15	(381)	20	(508)
		2120	2	48	(1219)	30	(762)	—		—		10	(254)	20	(508)
		IN	1	30	(762)	36	(914)	1080	(0.70)	—		35	(889)	40	(1016)
		290	2	24	(610)	30	(762)	720	(0.46)	—		30	(762)	50	(1270)
		290	2	30	(762)	48	(1219)	1440	(0.92)	—		20	(508)	30	(762)
		260	2	30	(762)	48	(1219)	1440	(0.92)	—		30	(762)	50	(1270)
Chain Broiler [5] (Overhead Protection)		2 x 1W	2	34	(864)	30	(762)	—		—		10	(254)	26	(660)
Chain Broiler (Horizontal Protection)		2 x 1N	2	31	(787)	43	(1092)	—		—		Front edge; 1 in. to 3 in. (25 mm to 76 mm) above the chain			
Char Broiler	Gas-Radiant	1N/1NSS	1	24	(610)	36	(914)	—		—		15	(381)	40	(1016)
	Electric	1N/1NSS	1	20	(508)	34	(864)	—		—		20	(508)	50	(1270)
	Lava-Rock (Ceramic)	1N/1NSS	1	13	(330)	24	(610)	—		—		18	(457)	35	(889)
	Natural Charcoal [6]	1N/1NSS	1	12	(305)	24	(610)	—		—		18	(457)	40	(1016)
Alternate Ceramic/Natural Charcoal [6]		3N	3	24	(610)	30	(762)	—		—		14	(356)	40	(1016)
	Wood Fueled [7]	3N	3	24	(610)	30	(762)	—		—		14	(356)	40	(1016)
Upright Broiler		2 x 1/2N	1	30	(762)	32.5	(826)					Front edge; above the grate			
Salamander Broiler		2 x 1/2N	1	30	(762)	32.5	(826)	—		—					
Internal Chamber		1N	1	16	(406)	29	(737)	—		—		—		—	
		1N nozzle location to be on the vertical edge 6 in. to 12 in. (152 mm to 305 mm) in front and 0 in. to 12 in. (0 mm to 305 mm) above the top of broiler													
See manual for nozzle location		1F	1	31	(787)	15.5	(393)	—		—		—		—	
Wok	3.75 in. to 8 in. (95 mm to 203 mm) 3 in. to 6 in. (76 mm to 152 mm) deep	260	2	14 in. to 30 in. (356 mm to 762 mm) diameter				—		—		35	(889)	45	(1143)
		1N/1NSS	1	11 in. to 24 in. (279 mm to 610 mm) diameter				—		—		30	(762)	40	(1016)

[1] Low Proximity

[2] A back-shelf can only be utilized if the nozzle(s) is installed below the shelf.

[3] For multiple nozzle protection of single fryers, see detailed information on pages 4-10 to 4-12 of manual.

[4] See Figure 1 for nozzle location.

[5] Minimum chain broiler exhaust opening - 12 in. x 12 in. (305 mm x 305 mm), and not less than 60% of internal broiler size.

[6] 4 in. (102 mm) maximum fuel depth.

[7] 6 in. (152 mm) maximum fuel depth.

[8] Shelf can overhang burner(s) by maximum of 11 in. (279 mm) and height limitation of 20 in. (508 mm) from bottom of lowest part of shelf to the top of burner grate.

[9] Shelf can overhang burner(s) by maximum of 11 in. (279 mm) and height limitation of 18 in. (457 mm) from bottom of lowest part of shelf to the top of burner grate.

R-102 RESTAURANT SYSTEM SUMMARY SHEET

NOZZLE COVERAGES (Continued)

Plenum	Nozzle Type	Flow Points	Width Max. Side in. (mm)	Length Max. Side in. (mm)	Nozzle Placement (See manual for more detail)	Min. Height in. (mm)	Max. Height in. (mm)
Horizontal Protection Single Bank	1N	1	48 (1219)	120 (3048)	0 in. to 6 in (0 mm to 152 mm) from end of plenum	2 (51)	4 (102)
Perpendicular Protection Single Bank	1W	1	48 (1219)	48 (1219)	See manual for more detail	1 (25)	20 (508)
Horizontal Protection V-Bank	2 x 1N	2	48 (1219)	120 (3048)	0 in. to 6 in (0 mm to 152 mm) from end of plenum	2 (51)	4 (102)
Horizontal Protection V-Bank	1W	1	48 (1219)	72 (1829)	0 in. to 6 in (0 mm to 152 mm) from end of plenum	1/3 the height of filter	
Perpendicular Protection V-Bank	1W	1	48 (1219)	48 (1219)	See manual for more detail	1 (25)	20 (508)

Duct	Nozzle Type	Flow Points	Perimeter in. (mm)	Diameter in. (mm)	Nozzle Placement (See manual for more detail)	Duct Length in. (mm)
Single Nozzle 1 Flow Nozzle	1W	1	50 (1270)	—	See manual for more detail	Unlimited
Single Nozzle 2 Flow Nozzle	2W	2	100 (2540)	32 (813)	See manual for more detail	Unlimited
Multiple Nozzle	2W + 1W	3	135 (3429)	—	See manual for more detail	Unlimited
Multiple 2W Nozzle	2W	—	>135 (3429)	—	See manual for more detail	Unlimited

R-102 OVERLAPPING PROTECTION

The 245 nozzle must be used for “end of zone” protection, and the 260 nozzle must be used for “zone” protection.

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (864 mm) Deep x 5.8 ft^2 (0.54 m^2)
Griddle	30 in. (762 mm) Deep x Unlimited Length
Range	30 in. (762 mm) Deep x Unlimited Length
Wok, Maximum	30 in. (762 mm) Diameter x 8 in. (203 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Tilt Skillet/Braising Pan [1]	34 in. (864 mm) Deep x Unlimited Length
Lava Rock Char-Broiler	26 in. (660 mm) Deep x Unlimited Length
Charcoal Broiler	30 in. (762 mm) Deep x Unlimited Length (4 in. (102 mm) Maximum Fuel Depth)
Mesquite Wood Broiler	30 in. (762 mm) Deep x Unlimited Length (6 in. (152 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in (914 mm) Deep x Unlimited Length
Electric Char-Broiler	34 in. (864 mm) Deep x Unlimited Length

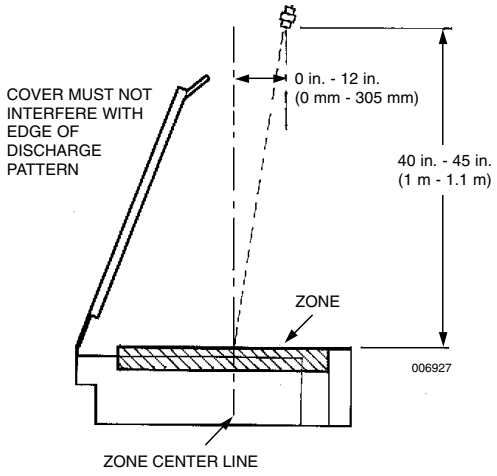


FIGURE 1

[1] See Figure 1 for nozzle location.

Note: Group protection option is required for appliances on either side of an appliance(s) using dedicated protection – see manual for details.

Overlapping System Piping Limitations

System Size	Total Flow Numbers	Max. 3/8 in. Pipe Length	Max. No. of Elbows	Maximum Elevation Rise	Cartridge Size
3 gal (11 L)	6	75 ft (22.9 m)	25	10 ft (3.0 m)	LT-30-R
6 gal (23 L) Manifolded	12	75 ft (22.9 m)	25	10 ft (3.0 m)	Double Tank
9 gal (34 L)	18	75 ft (22.9 m)	25	10 ft (3.0 m)	Double Tank

50 ft (15.2 m) maximum pipe from first to last nozzle.

50 ft (15.2 m) maximum pipe after the split on a split system.

R-102 RESTAURANT SYSTEM SUMMARY SHEET

DISTRIBUTION PIPING REQUIREMENTS

Distribution Piping Requirements - 1.5 gal (5.6 L) System

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.2 m)	6 ft (1.8 m)	4 ft (1.2 m)	10 ft (3.0 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbow	9	4	4	6
Maximum Tees	1	1	2	3
Maximum Flow Numbers	5*	2	2	3

***Exceptions:**

1. Six (6) flow numbers are allowed when a duct branch line is the last branch line on the piping network and no 1N nozzles are used to protect woks or griddles.
2. Six (6) flow numbers are allowed when six (6) 1N nozzles are used and none of the nozzles are used to protect woks, griddles, ranges, or salamanders. **Note:** Only five (5) flow numbers are allowed if a 1N nozzle is used for wok, griddle, range, or salamander protection.
3. Six (6) flow numbers are allowed when only two (2) 3N nozzles are used.

Distribution Piping Requirements – 1.5 gal (5.6 L) System

1. This option allows for duct protection, plenum protection, appliance protection, or any combination.
2. When using a combination of plenum and duct protection only, only one duct nozzle, either a 1W, 1100, or a 2W, may be used.
3. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 8 ft (2.4 m). When the supply line is split, the combined total of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 8 ft (2.4 m).
4. The total length of all branch lines must not exceed 22 ft (6.7 m).
5. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.

Distribution Piping Requirements - 3.0 gal (11.3 L) System

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.2 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.7 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbow	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

***Exceptions:**

1. Twelve (12) flow numbers are allowed in any one tank for hood and duct protection.
2. Twelve (12) flow numbers are allowed with any one tank using only two-flow appliance nozzles.
3. Twelve (12) flow numbers are allowed with any one tank using only three-flow appliance nozzles.

Special Instructions:

1. Twelve (12) flow numbers are allowed when four (4) Dean Industries GTI Gas Fryers are protected at low proximity.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one (1) 2W duct nozzle, one (1) 1/2N electrostatic precipitator nozzle, one (1) 1N plenum nozzle, and four (4) two-flow appliance nozzles. Contact ANSUL® Applications Engineering Department for additional information.

Distribution Piping Requirements – 3.0 gal (11.3 L) System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the combined total of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m).
2. The total length of all branch lines must not exceed 36 ft (10.9 m).
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.

R-102 RESTAURANT SYSTEM SUMMARY SHEET

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements - 6.0 gal (22.7 L) System

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	32 ft (9.8 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.7 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbow	8	4	4	6
Maximum Tees	2	2	2	4
Maximum Flow Numbers	22	4	2	4

Distribution Piping Requirements – 6.0 gal (22.7 L) System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the combined total of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m).
2. The total length of all branch lines must not exceed 36 ft (10.9 m).
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.

Distribution Piping Requirements - 9.0 gal (34 L) System

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.7 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbow	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

***Exceptions:**

1. Twelve (12) flow numbers are allowed in any one tank for hood and duct protection.
2. Twelve (12) flow numbers are allowed with any one tank using only two-flow appliance nozzles.
3. Twelve (12) flow numbers are allowed with any one tank using only three-flow appliance nozzles.

Special Instructions:

1. Twelve (12) flow numbers are allowed when four (4) Dean Industries GTI Gas Fryers are protected at low proximity.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one (1) 2W duct nozzle, one (1) 1/2N electrostatic precipitator nozzle, one (1) 1N plenum nozzle, and four (4) two-flow appliance nozzles. Contact ANSUL Applications Engineering Department for additional information.

Distribution Piping Requirements – 9.0 gal (34 L) System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the combined total of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m).
2. The total length of all branch lines must not exceed 36 ft (10.9 m).
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.

General Piping Requirements

1. All R-102 system piping is straight line. Therefore, the need for critical lengths and balancing is minimized.
2. Two 45° elbows count as one 90° elbow.
3. Each branch line includes the tee or elbow leading to it, and all fittings within the branch line itself.
4. The minimum piping length of Schedule 40, 3/8 in. pipe from the tank outlet to any nozzle protecting a range, fryer, or wok must be 6 ft (1.8 m).
5. Pipe lengths are measured from center of fitting to center of fitting.
6. All distribution piping must be Schedule 40 black iron, chromeplated, or stainless steel. Do not use hot dipped galvanized pipe on the distribution piping.
7. All threaded connections located in and above the protected area must be sealed with pipe tape. Tape should be applied to male threads only. Make certain tape does not extend over the end of the thread, as this could cause possible blockage of the agent distribution.

Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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FAX BULLETIN

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PRODUCT SERVICES BULLETIN NO. 4240

DATE: March 14, 2000

TO: All Ansul Authorized Restaurant Systems Distributors and OEMs

FROM: Distributor Technical Services

SUBJECT: Upgrade Modifications to Pre-UL 300 R-102 Systems

Many questions have been raised concerning upgrading older (pre-UL 300) R-102 systems and/or equipment to "UL 300." The procedure for upgrading depends on the generation of the R-102 system to be modified. Before addressing the various generations of R-102 equipment still in operation and their possible modifications, it is first important to understand the term commonly referred to as "UL 300."

When a fire suppression system (or the equipment used) is said to be "UL 300" or in compliance with "UL 300," it is understood that the system and/or equipment meets the requirements as written in the current "Standard for Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas, UL 300".

"UL 300" was originally titled "Tentative Test Guide for Restaurant Hood and Duct Extinguishing System Units, Subject 300." A tentative test guide is generally written as a draft for a future UL standard. In this case, Subject 300 remained a tentative test guide for approximately 24 years. In 1994, UL revised Subject 300 and published it as a test standard, UL 300, with an effective compliance date of November 21, 1994. In order to continue supplying UL-approved product, manufacturers of restaurant fire suppression systems were required to retest their existing systems to verify compliance with the revised test guidelines.

According to Underwriter's Laboratories (UL), a "UL 300" system must utilize equipment and design limitations that were tested and listed in accordance with Standard UL 300. Technically, to upgrade equipment manufactured before November 21, 1994, to UL 300; Ansul would have to implement a program which would allow pre-UL 300 equipment to be returned to Ansul for factory rework. Ansul does not have such a program. However, "pre-UL 300" equipment and system limitations can be modified to meet the qualifications of "UL 300" under certain circumstances. When acceptable to the authority having jurisdiction, the following upgrade modifications can be made to various generations of R-102 equipment:

Notes:

1. All UL 300 R-102 surface protection requires regulated pressure from a piston-style regulator. This regulator nominally supplies 110 psi (7.58 bar) to the agent storage tanks.
2. Earlier pre-UL 300 R-102 systems utilized a diaphragm-style regulator that was factory set at a nominal 100 psi (6.90 bar).
3. Hood and duct protection did not require retesting in 1994. Consequently, hood and duct protection can be supplied from agent storage tanks that are connected to either the diaphragm-style or the piston-style regulator.

1. **R-102 Equipment (1982 – 1985):** R-102 equipment manufactured from 1982 to February of 1985 included a stainless steel tank and a remote ANSUL AUTOMAN® Regulated Release Assembly with a diaphragm-style regulator.
   a. UL 300 surface protection upgrades can only be made by adding a UL 300 Regulated Actuator Assembly(s) with or without an additional UL 300 add-on tank(s). UL 300 surface protection cannot be connected to an agent tank that is pressurized through a diaphragm-style regulator.
   b. The remaining portion of the pre-UL 300 system can be retained and used for hood and duct protection (hood and duct protection did not require retesting). Existing detection, pull station, and auxiliary connections (i.e., mechanical gas valves, electrical shutdown, alarms, etc.) can also be retained and used.
2. **R-102 Equipment (February 1985 – November 1989):** R-102 equipment manufactured from February of 1985 to November of 1989 included a painted steel tank mounted in a redesigned chrome-plated ANSUL AUTOMAN Regulated Release Assembly enclosure (stainless steel enclosure - 1987) with a diaphragm-style regulator.
   a. UL 300 surface protection upgrades can only be made by adding a UL 300 Regulated Actuator Assembly(s) with or without an additional UL 300 add-on tank(s). **UL 300 surface protection cannot be connected to an agent tank that is pressurized through a diaphragm-style regulator.**

      NOTE: Existing R-102 systems that have already been upgraded - utilizing UL 300 surface protection connected to a tank pressurized from a diaphragm-style regulator - can be corrected by changing out the regulator to a piston-style regulator. **This change will not be allowed for pre-UL 300 systems or equipment that is NOT currently in operation.**
   b. The remaining portion of the pre-UL 300 system can be retained and used for hood and duct protection. Existing detection, pull station, and auxiliary connections (i.e., mechanical gas valves, electrical shutdown, alarms, etc.) may also be retained and used.
3. **R-102 Equipment (November 1989 – November 1994):** R-102 equipment manufactured from November of 1989 to November 1994 included a painted steel tank mounted in a stainless steel ANSUL AUTOMAN Regulated Release Assembly enclosure with a piston-style regulator.
   a. UL 300 surface protection upgrades can be made without adding or changing equipment other than UL 300 nozzles. Additional protection will require a UL 300 Regulated Actuator Assembly(s) and/or an add-on tank assembly(s).
4. **R-102 Equipment (November 1994 - Present):** Only UL 300 R-102 equipment has been manufactured since November 21, 1994.

All existing and retained equipment, as well as all modifications made to pre-UL 300 systems and/or equipment, must completely operational and in compliance with the latest revision of the R-102 Design, Installation, and Maintenance Manual (Part No. 418087) and the authority having jurisdiction. After all appropriate modifications are made, attach properly filled out, dated, and signed Upgrade Certification Labels (Part No. 418523) to the tanks and enclosure covers (Reference General Bulletin No. 2912, dated April 5, 1995).

If you have any questions, please feel free to contact your Ansul District Sales Manager or the Ansul Technical Services Department.

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Tyco Suppression Systems

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BULLETIN

PRODUCT SERVICES BULLETIN NO. 4240a

DATE: March 28, 2002

FROM: Bill Klingenmaier

TO: All Ansul Authorized Restaurant System Distributors and OEM's

SUBJECT: Upgrade Modifications Addendum to General Bulletin No. 4240

On March 14, 2000, Ansul issued Product Bulletin No. 4240, which addressed upgrades to various generations of pre-UL 300 R-102 systems. Apparently, there is still some confusion concerning this issue.

The main issue is whether or not the older diaphragm-style regulator can be changed out to a new piston-style regulator for means of upgrade. The answer is **NO**. The only circumstance where Ansul will allow a diaphragm-style regulator to be changed out to a piston-style regulator (for means of upgrade) is when an R-102 system was previously upgraded incorrectly, prior to the date of General Bulletin No. 4240, dated March 14, 2000. All systems upgraded after that date **CANNOT** be upgraded by changing out the regulator. (Refer to Product Services Bulletin No. 4240 for proper upgrade instructions concerning the various generations of R-102 equipment.)

If you have any questions, please feel free to contact your U.S. District Manager or International Area Manager; or call Ansul Technical Services at 1-800-862-6785 or 1-715-735-7415.

BKwh

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Bulletin

GENERAL BULLETIN NO. 4933

DATE: March 7, 2005

TO: All ANSUL® Restaurant System Distributors

FROM: Mark Neumann – Marketing Manager, Commercial Suppression

SUBJECT: UL 300 Upgrades

We often receive questions regarding the adequacy of older restaurant fire suppression systems. However, we cannot give advice on a specific situation as an on-site inspection is necessary to determine whether any suppression system will provide protection against the particular hazards at hand. If you have any doubt as to the adequacy of a restaurant fire suppression system, you should seek the assistance of fire protection professionals who can evaluate your system and explain any changes that should be made. Any time you change features in your cooking operation that could affect the nature of the hazards (i.e., new appliances, changing appliance locations, changing cooking media, etc.), you should have the adequacy of your fire suppression system professionally re-evaluated. The following information about the evolution of ANSUL® restaurant fire suppression systems may be helpful to you.

The Beginning – Dry Chemical to Subject 300

ANSUL restaurant fire suppression systems have been in the marketplace since the nineteen sixties when the first dry chemical restaurant fire suppression system (ANSUL Model R-101) was developed. In 1982, we introduced our first **wet chemical** restaurant fire suppression system, the ANSUL Model R-102. Once the systems were fully developed, they were fire tested and listed by Underwriter's Laboratories (UL) using a test guide developed by UL at the time entitled "Subject 300." This test guide was utilized by all restaurant fire suppression system manufacturers to obtain UL Listings for their fire systems.

Pre UL-300 Systems to UL-300 Systems

In 1992, UL revised Subject 300, with a manufacturer's effective date of November 21, 1994. This document ultimately was approved as an American National Standard (ANSI), ANSI/UL 300-1998. To maintain UL listings, all manufacturers were required to have their systems re-evaluated in accordance with the new UL test standard (UL 300). ANSUL R-102 systems manufactured between 1982 and November 21, 1994 are considered to be "Pre-UL 300," and not complying with the current UL test requirements. All systems manufactured after the November 21, 1994 date were required to meet the requirements of UL 300 in order to be sold with a UL Listing label attached to the ANSUL tanks and releasing mechanisms.

Since November of 1994, there have been many recommendations made by fire system manufactures, local authorities having jurisdiction, and insurance companies regarding restaurant system upgrades. ANSUL General Bulletin No. 2943, dated August 2, 1995 (attached), stated: "UL 300 changes affect only product manufactured after November 20, 1994. All existing installed systems are "grandfathered" and remain listed using the UL guidelines in effect at the time of manufacture. However, this does not imply either by UL or ANSUL that it is not necessary to evaluate your current restaurant fire protection system."

Since the release of this ANSUL General Bulletin, UL has identified that, "When the appropriate service parts or agent for recharging are no longer available for a specific model UL Listed extinguishing system unit, the Listing for that system unit cannot be maintained in accordance with the manufacturer's manual, NFPA17/17A and NFPA 96, and therefore, would not be considered UL Listed."

ANSUL R-101 Systems Discontinued

The Ansul R-101 Dry Chemical system was obsolete in 1994 because dry chemical systems were not able to meet the test requirements of UL 300. In a General Bulletin dated March 16, 1996, it was announced that as of January 1, 1999, service parts unique to R-101 Dry Chemical Fire Suppression Systems would be no longer available. Consequently, the ANSUL R-101 dry chemical systems technically ceased to be UL Listed.

Pre UL-300 System Status

Regarding Pre-UL 300 R-102 wet chemical systems, acceptable replacement parts are still available, technically allowing listings to be maintained. Mandates for wet chemical upgrades to UL 300 have been made at the local or state jurisdiction levels, or have been required by insurance companies in order to maintain insurability. Local jurisdiction upgrade requirements range from full upgrades within a given time period to upgrading under certain conditions, such as a system discharge, a hydrostatic test requirement for the tanks and cartridges, a cooking line change, or the use of vegetable oil for frying, etc. Referring again to ANSUL General Bulletin No. 2943, the following guidelines for upgrade considerations were offered:

1) Older cooking appliances have been replaced with new high efficiency cooking appliances.
2) Rendered animal fat cooking grease has been changed to vegetable cooking oils.
3) A dry chemical fire suppression system is being used for fryer protection.
4) Protected appliances include a deep fat fryer without (functioning) dual limit switches (thermostats).

ANSUL and FEMA UL 300 Position

The Fire Equipment Manufactures' Association, Inc. (FEMA) has also outlined consideration guidelines (attached) for UL 300 upgrade. In their memo, FEMA has addressed restaurant and commercial kitchen owners/operators by stating, ". . . in the interest of promoting the use of the most current fire protection technology -- to protect lives, property, and the environment from harm by fire – FEMA strongly urges that pre-UL 300 restaurant fire protection systems be upgraded to a system that meets the UL 300 safety standard."

Upgrading is particularly critical when:

1) The manufacturer of the existing dry chemical system no longer supports the system; or
2) Any changes are made to the original installation of cooking appliances and the hoods/ducts within the protected area, or the addition of cooking appliances requiring protection, or a change to vegetable-based cooking oils; or
3) The manufacturer of the restaurant cooking area fire protection system or another fire protection expert recommends upgrading the system; or
4) The local enforcement authorities, insurance company, or other authority requires or recommends upgrading the system."

In ANSUL General Bulletin Nos. 4240 and 4240a, procedures were outlined, dependent upon the generation of the system, for upgrading older R-102 systems in order to meet the qualifying intent of UL 300. These procedures were created to offer a higher level of protection, while minimizing the economic impact to the end user or owner of the fire suppression system.

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GENERAL BULLETIN NO. 5158

DATE: October 25, 2006

TO: All ANSUL® Authorized Pre-Engineered System Distributors

FROM: Product Management – Pre-Engineered Systems

SUBJECT: Fusible Link Date Control

Since the 1995 editions, NFPA 17 "Standard for Dry Chemical Extinguishing Systems" and NFPA 17A "Standard for Wet Chemical Extinguishing Systems" have redefined the life of fusible links to **begin on the date of installation.**

The 2002 Editions of NFPA 17 (11.3.2.2) and NFPA 17A (7.3.3.1) state:

> *"The year of manufacture and the date of installation of the fixed temperature-sensing element shall be marked on the system inspection tag. The tag shall be signed or initialed by the installer."*

Annex A.11.3.2 of NFPA 17 and A.7.3.3 of NFPA 17A also states:

> "*The date of manufacture marked on fusible metal alloy sensing elements **does not limit when they can be used. These devices have unlimited shelf life."***

NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations (2004 Edition) paragraph 11.2.4 states:

> *"Fusible links (including fusible links on fire damper assemblies) and automatic sprinkler heads shall be replaced at least semi-annually or more frequently if necessary where required."*

ANSUL requires all fusible links utilized in cooking operations be replaced every six months or more frequently as the hazard may dictate. Due to the six-month change-out requirements, it is critical to mark the date of installation along with the date of the fusible link on an inspection tag to ensure proper maintenance is being performed.

The code requirements spelled out in this bulletin eliminate any need to replace any dated fusible links in your inventory. Effective immediately ANSUL will not accept any returns for fusible links because of date codes.

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Bulletin

Bulletin No. 5441

Date: November 25, 2008

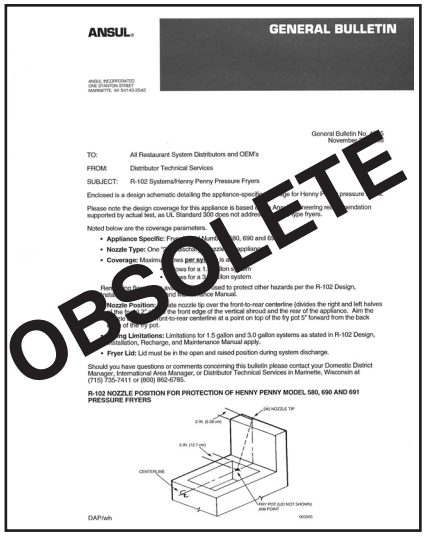
To: All Authorized ANSUL® Restaurant System Distributors and OEM's

From: Product Management, Restaurant Systems

Subject: Henny Penny Fryer Protection

ANSUL General Bulletin 5165a was released September 30, 2008 announcing the ANSUL R-102 UL300 listed fire protection for Henny Penny mono rail center-lift and dual-lift fryers. This protection is UL300 listed in both fully open and intermediate positions.

IMPORTANT – Previous Protection Options Are No Longer Supported: With the availability of UL300 tested and listed protection, ANSUL will no longer support the previously non-UL300 fire protection coverage as listed in ANSUL Bulletin 4085 dated November 1998 and Bulletin 4485 dated February 2002 for new installations. In addition to not being UL300 listed, these previous options were tested with the fryer cover in the fully opened position only.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GENERAL BULLETIN

ANSUL INCORPORATED
ONE STANTON STREET
MARINETTE, WI 54143-2542

General Bulletin No. [illegible]
November [illegible]

TO: All Restaurant System Distributors and OEM's

FROM: Distributor Technical Services

SUBJECT: R-102 Systems/Henny Penny Pressure Fryers

Enclosed is a design schematic detailing the appliance-specific [illegible] for Henny Penny pressure fryers.

Please note the design coverage for this appliance is based on [illegible] Ansul engineering recommendation supported by actual test, as UL Standard 300 does not address pressure fryers.

Noted below are the coverage parameters:

- **Appliance Specific:** Fryers [illegible] 580, 690 and 691
- **Nozzle Type:** One [illegible] nozzle per appliance
- **Coverage:** Maximum [illegible] per system
- [illegible] for a [illegible] system
- [illegible] for a [illegible] system

Refer to [illegible] used to protect other hazards per the R-102 Design, [illegible] Service Manual.

- **Nozzle Position:** [illegible] nozzle tip over the front-to-rear centerline (divides the right and left halves of the [illegible]) the front edge of the vertical shroud and the rear of the appliance. Aim the [illegible] front-to-rear centerline at a point on top of the fry pot 5" forward from the back [illegible] of the fry pot.

Limitations: Limitations for 1.5 gallon and 3.0 gallon systems as stated in R-102 Design, Installation, Recharge, and Maintenance Manual apply.

- **Fryer Lid:** Lid must be in the open and raised position during system discharge.

Should you have questions or comments concerning this bulletin please contact your Domestic District Manager, International Area Manager, or Distributor Technical Services in Marinette, Wisconsin at (715) 735-7411 or (800) 862-6785.

R-102 NOZZLE POSITION FOR PROTECTION OF HENNY PENNY MODEL 580, 690 AND 691 PRESSURE FRYERS

DAP/wh

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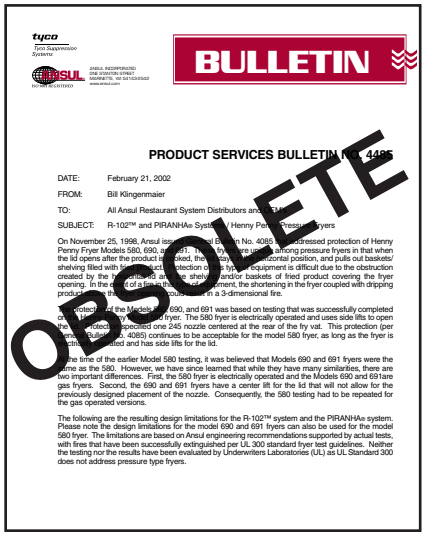
OBSOLETE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BULLETIN

PRODUCT SERVICES BULLETIN [illegible] 4485

DATE: February 21, 2002

FROM: Bill Klingenmaier

TO: All Ansul Restaurant System Distributors and [illegible]

SUBJECT: R-102™ and PIRANHA® Systems / Henny Penny Pressure Fryers

On November 25, 1998, Ansul issued [illegible] Bulletin No. 4085 which addressed protection of Henny Penny Fryer Models 580, 690, and 691. The [illegible] there is a [illegible] among pressure fryers in that when the lid opens after the product is cooked, the [illegible] to the horizontal position, and pulls out baskets/ shelving filled with [illegible] product. Protection of this type of equipment is difficult due to the obstruction created by the [illegible] and the shelving and/or baskets of fried product covering the fryer opening. In the event of a fire [illegible] environment, the shortening in the fryer coupled with dripping product [illegible] in a 3-dimensional fire.

Protection of the Models 580, 690, and 691 was based on testing that was successfully completed on the [illegible] fryer. The 580 fryer is electrically operated and uses side lifts to open the lid. Protection (as specified one 245 nozzle centered at the rear of the fry vat. This protection (per [illegible] Bulletin 4085) continues to be acceptable for the model 580 fryer, as long as the fryer is [illegible] operated and has side lifts for the lid.

At the time of the earlier Model 580 testing, it was believed that Models 690 and 691 fryers were the same as the 580. However, we have since learned that while they have many similarities, there are two important differences. First, the 580 fryer is electrically operated and the Models 690 and 691are gas fryers. Second, the 690 and 691 fryers have a center lift for the lid that will not allow for the previously designed placement of the nozzle. Consequently, the 580 testing had to be repeated for the gas operated versions.

The following are the resulting design limitations for the R-102™ system and the PIRANHA® system. Please note the design limitations for the model 690 and 691 fryers can also be used for the model 580 fryer. The limitations are based on Ansul engineering recommendations supported by actual tests, with fires that have been successfully extinguished per UL 300 standard fryer test guidelines. Neither the testing nor the results have been evaluated by Underwriters Laboratories (UL) as UL Standard 300 does not address pressure type fryers.

OBSOLETE

If you have any questions pertaining to this or previous bulletins on this subject, please contact your U.S. District Manager or International Area Manager, or call Technical Services at 1-800-862-6785/ 1-715-735-7415.

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Bulletin

Bulletin No. 5522

DATE: April 24, 2009

TO: All Authorized ANSUL® Restaurant System Distributors and OEM's

FROM: Product Management, Restaurant Systems

SUBJECT: Alarm Initiating Switch

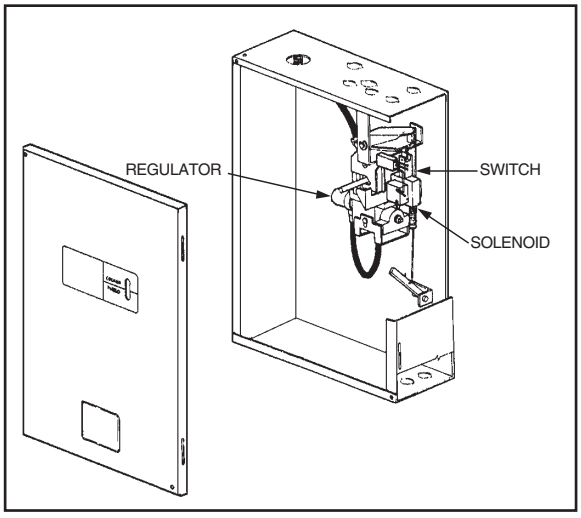
This is a reminder to all ANSUL Restaurant System Distributors regarding the availability and benefits of the Alarm Initiating Switch.

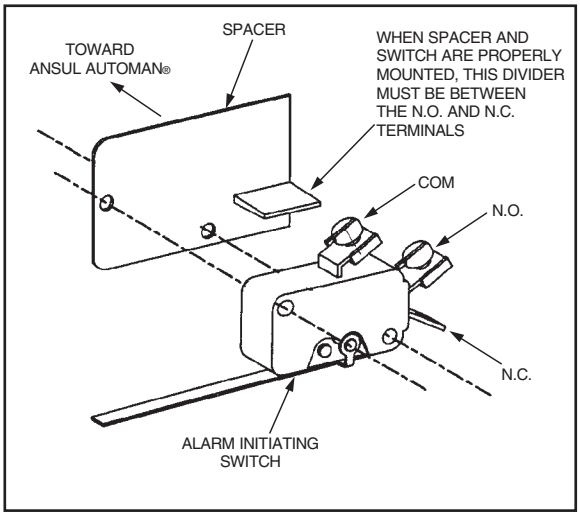
The Alarm Initiating Switch Kit, Part No. 428311, can be field mounted within the ANSUL AUTOMAN® Regulated Release Assembly. This switch must be used when connection to the building main fire alarm control panel is required. When the ANSUL AUTOMAN Regulated Release is operated, the switch will activate, signaling the fire alarm control panel that there was a fire system operation in the kitchen cooking area.

The Alarm Initiating Switch contains screw terminations that allow for proper supervision of the alarm circuit in compliance with the requirements of NFPA 72. The switch kit includes all the necessary mounting components along with a mounting instruction sheet.

The Alarm Initiating Switch contacts have a low current rating (50mA, 28VDC) which makes them suitable for use with fire alarm systems. They can be used in conjunction with up to three other electrical switches (total of four) for both the R-102™ and the PIRANHA® Restaurant Fire Suppression Systems.

The diagram below shows the placement of the Alarm Initiating Switch within the ANSUL AUTOMAN Regulated Release Assembly.





The Alarm Initiating Switch is readily available with a Suggested List Price of $26.40 each.

If you have questions pertaining to this bulletin, please contact your U.S. District Manager or International Area Manager; or call Technical Services at 1-800-862-6785 / 1-715-735-7415.

by Tyco Fire Suppression & Building Products

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www.ansul.com

Bulletin

Bulletin No. 5643

DATE: March 24, 2010

TO: All Authorized ANSUL® Distributors

FROM: General Management, Special Hazard Products

SUBJECT: Use of Manufacturers Authorized Parts

We wish to reiterate Tyco Fire Suppression & Building Products' ('TFS&BP') position relative to the use of non-TFS&BP factory authorized parts when installing or performing services on ANSUL brand equipment and fire suppression systems.

TFS&BP will only warrant fire suppression systems and portable products equipment using genuine TFS&BP-supplied components. TFS&BP will not be held responsible when alternate suppliers listed or unlisted components are installed as part of an ANSUL suppression system or portable product. This is because TFS&BP does not control the inspection or quality control practices of other manufacturers' products.

ANSUL brand genuine parts are available to all TFS&BP authorized and factory trained distributors. The use of non-factory authorized parts during installation, service work, maintenance or repairs places the integrity of the system or portable product in jeopardy, and any TFS&BP warranties will be rendered void.

Additionally, TFS&BP would like to remind you of Article 3, Paragraph C, of your distribution agreement. This section states that the sale of ANSUL brand products or parts to non-ANSUL distributors is specifically prohibited by the distribution agreement, and that the breach of this provision by the distributor can constitute cause for termination of the Authorized TFS&BP Distribution Sales Agreement.

Thank you for your continued cooperation and support in building the strongest distribution network in the fire suppression industry.

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by Tyco Fire Suppression & Building Products

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Bulletin

Bulletin No. 5653

DATE: April 29, 2010

TO: All Authorized ANSUL R-102 System Distributors and OEMS's

FROM: Product Management – Restaurant Systems

SUBJECT: Non-UL-Listed Fire Protection for Conveyor Pizza Ovens

The UL300 Standard: *Fire Testing of Fire Extinguishing System for Protection of Commercial Cooking Equipment* does not currently address a test protocol for conveyor pizza oven protection. However, in many jurisdictions, the Authority Having Jurisdiction has required fire protection for conveyor pizza ovens. In the past, appliances not addressed in the UL300 test standard have been protected by following listed protection options for other appliances with similar operating characteristics. Generally, these appliances presented a more severe hazard than the appliance in question. In the case of conveyor pizza ovens, chain broiler protection was utilized.

To confirm recommended protection, we recently conducted a conveyor pizza oven fire test following the chain broiler test protocol outlined in UL 300, substituting fatty hamburgers with a grease coated pizza crust, to emulate the cooking process used by conveyor pizza ovens.

Prior recommendations for conveyor pizza ovens larger than the two 1N horizontal nozzle limitations for a chain broiler, suggested using four 1N nozzles, each positioned at the end corners and aimed diagonally across the chain within the oven. Based on the actual fire testing, we now recommend two 245 nozzles per conveyor: one nozzle is positioned at the inlet and one nozzle is positioned at the outlet of the conveyor pizza oven on the same side of the oven and aimed at the opposite corners. Utilizing two 245 nozzles as recommended is suitable protection for conveyors larger than the limitations for a chain broiler but not exceeding 38 in.(96.5 cm) wide x 70 in (177.8 cm) long.

If you should have questions pertaining to this bulletin, please contact your U.S. District Manager or International Area Manager; or call Technical Services as noted below.

ANSUL

by Tyco Fire Suppression & Building Products

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Bulletin

Bulletin No. 5654

DATE: May 18, 2010

TO: All Authorized ANSUL R-102 System Distributors

FROM: Product Management – Restaurant Systems

SUBJECT: Broaster Company Information

Since 2004, the Broaster Company has been installing Stored Pressure Wet Agent Tank Assembly (Part No. 430008) in the Broaster Model VF-2 and VF-3 Ventless Fryer which carries a UL710B approval. We have since replaced the original Stored Pressure Wet Agent Tank Assembly with Stainless Steel Shell Assembly (Part No. 436147) which is a UL-recognized component. With the completion of the UL testing, we have agreed to upgrade the original installations with the new version.

The Broaster Company has released the attached bulletin to their operators regarding the change out to the new stainless steel tank assemblies on their broaster units. This bulletin is being released to make all authorized ANSUL Restaurant System Distributors aware of this program.

Broaster Model VF-2

The Broaster Company's end-user customers have been instructed to contact an Authorized ANSUL Distributor to make this change out at the next scheduled six-month maintenance examination. Should you be hired to provide this service and a change out is needed, please refer to the attached Broaster Bulletin for details. You may also log on to the below link for the supporting Broaster Service and Parts Manual.

VF-2/3i Service and Parts

http://www.broaster.com/pdfs/manuals/vfryers-new/16501-0%20VF2_VF3i%20Serv%20&%20Prts%20Manual.pdf

Your assistance with this service for Broaster Company customers will help assure all parties involved that the job will be done correctly Your support is greatly appreciated.

If you should have questions regarding this bulletin, please contact your U.S. Standard Products Manager or International Area Manager or call Technical Services as noted below.

The Broaster Company, LLC

Service Bulletin

June 22, 2009
09-046D

To: All Broaster Ventless Countertop Fryer Operators

From: Ron Kollasch, Service Manager

Subject: Free Fire Suppression Canister Exchange

The red fire suppression canister used in all Broaster Ventless Countertop Fryers is manufactured by Ansul, Incorporated. Ansul has recently informed us that, due to improvements made in their line of fire suppression canisters, they have an upgraded, stainless steel canister that they will provide to all of the Broaster Company customers who have purchased VF-2 and VF-3 Ventless Fryers. There will be no charge for the new stainless steel canister when it is exchanged for the original red canister.

As instructed by your Operation Manual, and required by NFPA (National Fire Protection Association) Standard 17-A, it is very important that you have your unit inspected semi-annually by a certified fire suppression system technician. Your next scheduled inspection would be an ideal time to exchange your suppression canister. If you don't have your next inspection already arranged, please contact your local Ansul Distributor to arrange it. If you have the date set for your next inspection, please contact the Ansul Distributor at least one week in advance and inform him that you need your Ansul canister replaced with **Part Number 436147 under warranty**, so the Ansul distributor has time to make sure to have the correct stainless steel replacement canister in stock. Although the standard fees will apply for the inspection, there will be no extra charge for the new stainless steel suppression canister installation.

Because The Broaster Company warrants all parts for one year from installation, it is also important that you fill out the enclosed Postage-Paid Warranty Registration Card, have the installer sign it, and return it to The Broaster Company. This ensures that your new suppression canister is registered for its one-year warranty.

If you have any questions, or if you need help finding your nearest Ansul Distributor, please call The Broaster Company Service Department at 800-367-0645. You can also find Ansul Distributors at www.ansul.com under the FIND A DISTRIBUTOR tab. There you will enter your State, County, and type of product (Detection and Control / Pre-engineered).

Address: 2855 Cranston Road, Beloit, WI 53511-3991 • *Phone:* 608.365.0193 • *Fax:* 608.363.7957
Toll-Free: 800.365.8278 • *E-mail:* broaster@broaster.com • *Web Site:* www.broaster.com

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Bulletin

Bulletin No. 5709a

DATE: March 17, 2011

TO: Authorized ANSUL Restaurant System Distributors and OEMs

FROM: Product Management, Restaurant Systems

SUBJECT: Follow-Up to Bulletin 5709: Pollution Control Unit Protection

Tyco Fire Protection Products (TFPP) previously released ANSUL General Bulletin No. 5709 (12/3/2010) regarding Pollution Control Unit (PCU) protection. The bulletin was written as a result of some very limited fire testing performed by TFPP at the request of a single PCU manufacturer. This testing attempted to simulate extreme conditions of one model of PCU that was not being maintained according to the manufacturer's requirements. TFPP continues to stand behind the ANSUL R-102 system as a solution for PCU fire protection when the following criteria are met:

1) The R-102 fire suppression system is designed and installed in the PCU in accordance with published ANSUL recommendations;
2) When a PCU is installed within a ventilation system for grease-laden vapor removal, and the PCU and ventilation system is considered a single hazard, the R-102 system protecting the PCU must be designed and installed so that a fire detected in a ventilation hood being serviced by the PCU results in simultaneous operation of both the system protecting the ventilation hood and the system protecting the PCU.
3) The R-102 system is serviced in accordance with the R-102 installation and maintenance manual;
4) The R-102 system is installed in accordance with local codes and standards; and
5) The PCU is properly inspected, cleaned and maintained in accordance with the listing and local jurisdiction requirements.

PCUs have been successfully protected with the ANSUL R-102 Fire Suppression systems for many years. Protection schemes have been created by TFPP for various PCU manufacturers and models based on concepts previously UL-300 tested and listed for filters in exhaust hoods, and conservatively applying these performance tested concepts with factory designed nozzle layout recommendations.

Recent PCU Fire Testing: The recent PCU fire testing completed by TFPP was limited to a single manufacturer's PCU model and only a few fire tests. It was not based on any listing or approval agency's testing requirements and was not intended for PCU fire protection certification, listing, or approval. The testing process was designed in an attempt to meet or exceed worse case conditions we would expect in a PCU fire with filters that could result in Class A fires. The conditions created were intended to meet or exceed what we would expect in a PCU that was not being maintained according to the manufacturer's requirements regarding cleaning and/or filter replacement.

Manufacturers of listed PCUs have requirements for periodic inspection and filter cleaning and/or replacement. Some include grease load monitoring that will visually indicate/notify kitchen personnel that filters are in need of care. In addition, local jurisdictions may have additional requirements regarding inspection and maintenance that will need to be followed.

As an added recommendation and due to the potential remoteness of the PCU, TFPP would recommend that any Authorized ANSUL Restaurant System Distributor request a copy of any cleaning documentation for the PCU to ensure the system is being properly maintained. As with any restaurant fire suppression system, the R-102 system is designed to work with properly maintained equipment. Requesting and documenting the cleaning cycle is good risk avoidance practice for not only the maintaining fire suppression contractor but also serves to better support the customer.

Typical PCU Inspection and Cleaning Requirements: We understand that industry standards for PCU and PCU filtration generally include the following typical inspection and cleaning procedures, as a minimum:

- Two weeks after startup, the entire (PCU) unit and duct shall be inspected for grease leaks.
  - 1st Stage filters shall be thoroughly cleaned using warm soapy water.
  - All filter media shall be monitored for fuel loading to determine frequency of cleaning.
  - All fasteners and hardware shall be checked for tightness each time maintenance checks are performed prior to restarting the unit.
- At least monthly, 1st Stage filters shall be thoroughly cleaned with warm soapy water, and 2nd Stage filters, HEPA filters, and carbon filters shall be inspected and replaced if clogged.
- Filters, with the exception of odor filtration, shall be listed in accordance with UL 1046 and meet the requirements of NFPA 96, 6.2.3 (2011 edition), or shall be UL Classified CLASS I and listed in accordance with UL 900.
- The entire PCU and all of its integral components shall be inspected and cleaned by qualified employees of the restaurant owner or by a cleaning agency. Replacement of integral components shall be performed, if necessary, by trained personnel in accordance with PCU manufacturer's instructions. A record of such inspection and cleaning shall be kept on the premises for inspection.
- At least every three (3) months (monthly if PCU is serving solid fuel cooking equipment), the entire exhaust system shall be inspected. Upon inspection, grease laden deposits shall be cleaned by a properly trained, qualified, and certified person(s) acceptable to the authority having jurisdiction.
- PCU filters shall be inspected, cleaned and replaced by qualified employees of the restaurant owner or by a cleaning agency. A record of such inspection and cleaning shall be kept on the premises for inspection.
- Installation, maintenance, and cleaning procedures shall be performed in accordance with PCU manufacturer's recommendations, and meet all local codes and requirements.

ANSUL Restaurant Fire Suppression System Requirements: The ANSUL Restaurant Fire Suppression System protecting the PCU must be serviced at least semi-annually by a trained and authorized ANSUL Restaurant System Distributor in accordance with the appropriate fire suppression system manual, and all local codes and requirements.

General Bulletin No. 5709 was written with limited testing and was only intended to advise that, in certain adverse conditions, you may need to consider other fire suppression system options. As an example, standard fixed wet chemical systems alone, such as the ANSUL R-102, may not be adequate in cases where the PCU manufacturer does not have required provisions for monitoring, cleaning and/or replacing heavily grease laden filtration media that if ignited could result in a Class A fire, especially when the exhaust is required to remain in operation. In these cases, General Bulletin 5709 recommended "to consider more robust fire systems". The dual agent (wet chemical and water) ANSUL PIRANHA Restaurant Fire Suppression System is an option that can be considered.

TFPP realizes that a dual agent (wet chemical and water) PIRANHA system may be impractical for certain applications or PCU configurations, or may not be allowed or accepted in certain localities or jurisdictions. Any protection chosen must be in compliance with local jurisdiction requirements.

Consult with the authority having jurisdiction before deciding on a given fire suppression concept or system. Questions regarding this bulletin can be directed to Tyco Fire Protection Products, Technical Services as listed below.

ANSUL

A Tyco International Company

One Stanton Street
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Bulletin

Bulletin No. 5737

DATE: April 15, 2011

TO: To All Authorized ANSUL R-102 System Distributors

FROM: Quality Assurance Department

SUBJECT: Warranty Claims for Mild Steel R-102 Tanks

We continue to receive requests for large quantities of replacement R-102 tanks at no charge through Quality Assurance. In monitoring recent returns of red-painted mild steel tanks, we have found that less than 3% showed signs of corrosion. Based on this information and the fact that we have been sending out no-charge replacements for many years, there should be minimal warranty activity through Quality Assurance concerning mild steel tanks exhibiting signs of corrosion.

There was also a recent R-102 Technical Manual (Rev. 11) change to the 12-year maintenance examination section that states: "DO NOT hydrostatically test a red-painted mild steel agent storage tank. The tanks are to be replaced with a new stainless steel tank assembly." **This is not a warranty claim situation. The tank is a saleable replacement part.**

In the near future, our business system will no longer provide a means to offer R-102 tanks at no charge from the Quality Assurance department. **Therefore, effective immediately, please place all tank orders through Customer Services using the normal ordering process. Quality Assurance will process any warranty claims as account credit only.** If you find an R-102 mild steel tank that shows signs of corrosion, you must submit an affidavit for warranty to Quality Assurance who will issue a credit to your account rather than supplying a replacement tank.

You can obtain affidavit forms by calling Quality Assurance: 1-800-862-6785 or 1-715-735-7415, then Press 6. You must fill out the form completely before Quality Assurance can issue your account credit.

Thank you for your support with this procedural change. If you have any questions, please contact your U.S. Standard Products Manager or International Area Manager; or call Quality Assurance.

Bulletin No. 5942

DATE: July 12, 2013

TO: Authorized ANSUL® Restaurant System Distributors

FROM: Product Management, Restaurant Systems

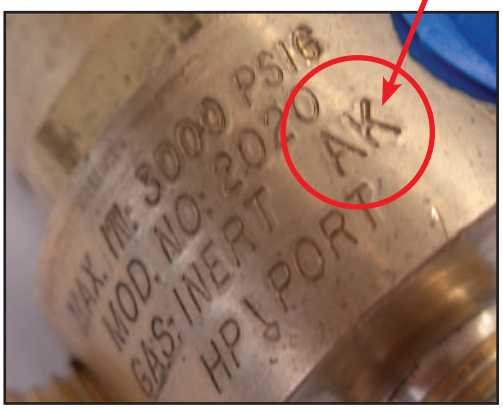
SUBJECT: AUTOMAN Pressure Regulator Date Codes

The AUTOMAN Pressure Regulator must be flow tested at 12-year intervals as a minimum. To identify when this periodic service is to be completed, a reference date code is stamped on the regulator body.

There are two different UL Listed piston-style pressure regulators used in AUTOMAN releases. They can be identified by the "UL Listed" number stamped on the regulator.

007973

DATE CODE LOCATION



007974

UL LISTED **541L**
OR
UL LISTED **74FF**

007975

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S-2010156-02

Bulletin No. 5942
July 12, 2013
Page 2

The R-102 Pressure Regulator (Part No. 79138) and the PIRANHA Presssure Regulator (Part No. 423279) date codes can be identified by using the tables below.

UL 541L

Month*	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	J
Oct	K
Nov	L
Dec	M

Year*	
1981	K
1982	L
1983	M
1984	N
1985	P
1986	R
1987	S
1988	T
1989	U
1990	V
1991	W
1992	Y
1993	Z
1994	A
1995	B
1996	C
1997	D
1998	E
1999	F
2000	G
2001	H
2002	J
2003	K
2004	L
2005	M

*STAMPED MONTH 1ST, YEAR 2ND

UL 74FF

Year*	
2005	E
2006	F
2007	G
2008	H
2009	I
2010	J
2011	K

Month**	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	I
Oct	J
Nov	K
Dec	L

*STAMPED YEAR 1ST, MONTH 2ND
**STAMPED "I" FOR SEPTEMBER

UL 74FF

Month*	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	J
Oct	K
Nov	L
Dec	M

Year*	
2011	T
2012	U1
2013	U2
2014	U3
2015	U4
2016	U5
2017	U6
2018	U7
2019	U8
2020	U9
2021	V1
2022	V2
2023	V3
2024	V4
2025	V5

*STAMPED MONTH 1ST, YEAR 2ND

The date code tables will be updated in the R-102 and PIRANHA system manuals at the next reprint.

Questions pertaining to this bulletin should be directed to your U.S. District Manager or International Area Manager or contact Technical Services as noted below.

Bulletin No. 5980

DATE: March 14, 2014

TO: Authorized ANSUL® Restaurant System Distributors and OEMs

FROM: Product Management, Restaurant Systems

SUBJECT: Agent Distribution Hose – Proper Usage/Installation Practices

Tyco Fire Protection Products continues to offer the latest in specialized restaurant system fire protection options and installation enhancements. The offering of the Agent Distribution Hose, listed with ANSUL R-102 and PIRANHA Restaurant Fire Suppression Systems, has allowed access for cleaning and servicing of mobile cooking equipment requiring affixed fire suppression nozzles without compromising the agent distribution network.

The agent distribution hose is currently found in applications that commonly protect cooking equipment such as specialized pressure fryers, mobile chain pizza ovens, certain rotisseries, and range/salamander combinations. Utilizing the agent distribution hose is an effective way to offer restaurants the flexibility needed to meet various code and servicing requirements.

When installing the agent distribution hose, the following requirements must be met:

1. The Agent Distribution Hose shall not be concealed within or run through any wall, floor, or partition, and shall not have any direct exposure to excessive heat or radiant flame from the cooking appliances.
2. The hose connections must be positioned below an elevation where the hose could be exposed to radiant or convected heat generated by normal cooking operations (such as the horizontal plane of the appliance cooking surface), heat from gas operated-equipment exhaust flues, or the exhausted flue gas itself.
3. The Restraining Cable must be connected from the appliance to the wall or some other structurally sound object capable of restraining the castered appliance from being pulled or pushed out to a point that will result in strain or stress on the Agent Distribution Hose.

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S-2010156-03

Correct Installation

Incorrect Installation

For questions pertaining to proper installation procedures, please reference applicable guidelines found in the ANSUL R-102 or PIRANHA restaurant system manual(s). You may also contact your Territory Sales Manager or Technical Services as noted below.

Thank you for your continued support of ANSUL restaurant systems.

Bulletin No. 5985

DATE: February 14, 2014

TO: Authorized ANSUL® Restaurant System Distributors

FROM: Product Management, Restaurant Systems

SUBJECT: NFPA 96 UL 300 Upgrades (2014 Edition)

In the new 2014 edition of NFPA 96, *Standards for Ventilation Control and Fire Protection of Commercial Cooking Operations*, changes have been made to *Chapter 10, Fire-Extinguishing Equipment* regarding compliance requirements to UL 300 (or equivalent) Listed fire suppression systems which may impact the customers your company is currently servicing.

In regards to compliance with UL 300, NFPA 96 states in 10.2.3, "Automatic fire-extinguishing systems shall comply with ANSI/UL 300 or other equivalent standards and shall be installed in accordance with the requirements of the listing."

In addition, NFPA 96 (2014 edition) has revised the requirements in 10.2.3.1 and has added 10.2.3.2, which both read as follows:

10.2.3.1 In existing dry or wet chemical systems not in compliance with ANSI/UL 300, the fire-extinguishing system shall be made to comply with 10.2.3 when any of the following occurs:

(1) The cooking medium is changed from animal oils and fats to vegetable oils.
(2) The positioning of the cooking equipment is changed.
(3) Cooking equipment is replaced.
(4) The equipment is no longer supported by the manufacturer.

10.2.3.2 Effective January 1, 2014, all existing fire-extinguishing systems shall meet the requirements of 10.2.3.

When a restaurant fire suppression system, including the equipment used, is mandated to "meet the requirements of" (UL 300) or is to be "made to comply with" (UL 300), it is understood that the system, its limitations, and the associated equipment used have been satisfactorily tested and listed in accordance with UL 300, *Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment*.

However, ***when accepted by the local authority having jurisdiction (AHJ)***, some pre-UL 300 equipment and system modifications have previously been allowed to meet the equivalency of UL 300 under certain circumstances.

In March of 2000, two ANSUL General Bulletins, *No. 4240* and *No. 4240a*, outlined criteria for upgrading various generations of R-102 equipment. While the upgrade instructions in these bulletins were intended to meet equivalency to UL 300, by definition, it did not result in a complete UL 300 Listed system.

In jurisdictions where the 2014 edition of NFPA 96 is adopted, UL 300 upgrades to restaurant systems currently being serviced may require a total change-out of the current non-UL 300 system, regardless of whether it is a dry or wet chemical system.

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S-2010156-03

If an equivalency upgrade in accordance with the instructions outlined in Bulletin No. 4240 and No. 4240a is allowed by the local AHJ, some of the existing R-102 equipment may be used. As a minimum, all appliance surface protection MUST utilize fire suppression equipment (including the actuation device) that has been tested and listed in accordance with UL 300, and is in compliance with the limitations outlined in the current ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual (Part No. 418087). Reference ANSUL General Bulletins No. 4240 and No. 4240a for upgrade equivalency instructions.

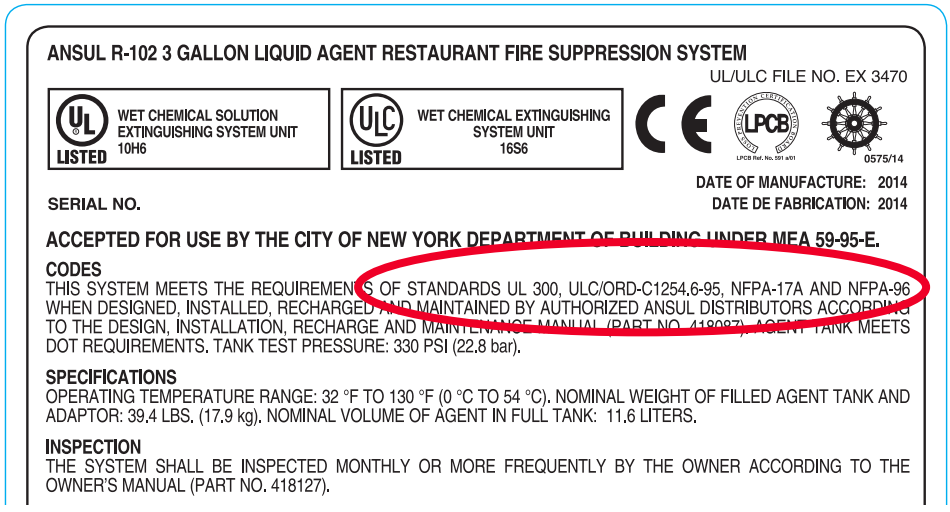
In addition, over the years the NFPA 96 Standard has revised detection requirements which currently mandate one detector per appliance up to 48 inches (1219 mm) in length.

How to identify systems that require upgrading to UL 300

1. All dry chemical systems are pre-UL 300, currently unlisted, and will require a UL 300 upgrade.
2. UL Listed equipment manufactured after November 21, 1994 is UL 300 Listed. If the release assembly and/or regulated actuator cover nameplate does not reference UL 300, or the tank assembly(s) label does not reference UL 300, the system will require updating.

AUTOMAN NAMEPLATE

TANK NAMEPLATE



If you have any doubt as to the adequacy of a restaurant fire suppression system, contact Technical Services for assistance.

All modifications made to pre-UL 300 systems and/or equipment must be made in accordance with the latest revision of the R-102 system manual and with local AHJ requirements. In addition, equivalency upgrades allowed by local jurisdiction must be made in accordance with the criteria outlined in ANSUL General Bulletin No. 4240 and No. 4240a.

Should you have questions pertaining to this bulletin, please contact your Territory Sales Manager or Technical Services as noted below.

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S-2012088

Bulletin No. 5989

DATE: March 4, 2014

TO: Authorized ANSUL® Restaurant Distributors and OEMs

FROM: Product Management, Restaurant Systems

SUBJECT: Appliance Specific Listings not addressed in UL 300

UL 300: *Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment* addresses performance testing of pre-engineered fire suppression systems intended for the protection of commercial cooking equipment, such as deep fat fryers, griddles, ranges, chain broilers, various char-broilers, woks, tilt skillets, and similar cooking appliances, as well as cooking ventilation equipment. Only fire suppression that has been successfully performance tested in accordance with UL 300 is subsequently listed in the manufacturer's restaurant system manual.

Some cooking or ventilation equipment used in restaurant kitchens may not require fire protection unless the cooking appliance is considered to be a source of ignition to the hood and ductwork, or is mandated by the authority having jurisdiction (AHJ). If the appliance can be a source of ignition to the hood and/or duct, and it does not have UL 300 listed fire suppression guidelines, it may not be an appliance type that has test procedures outlined in UL 300. In these types of applications, a manufacturer may choose to recommend protection guidelines listed for other equipment that is very similar in operation, or if the application is considered less than or equal to the same fire risk. However, this option is generally not considered to be UL 300 listed.

In other cases, appliance types that have been evaluated by a third party testing agency using UL 300 may include additional processes, optional equipment add-ons or features, or may be installed with resulting kitchen obstructions that may hinder the performance-tested fire protection originally listed. In these cases, the UL 300 listing may not be applicable.

Generally, when an appliance is considered a fire risk, it requires protection. In jurisdictions that require UL 300 listed protection for all equipment, or when the fire risk exceeds previously listed fire protection, it may become necessary to obtain "Appliance Specific Protection" when the appliance or its function differs from what was originally tested and listed.

Tyco Fire Protection Products (TFPP) has endeavored to provide optimum fire suppression for commercial cooking operations for over 50 years by developing solutions to the complex fire risks of a continuously growing restaurant market with ever-increasing cooking process challenges. Cooking and ventilation equipment technologies are continually changing the kitchen environment with more energy efficient, faster, and safer cooking processes. When applications present difficult solutions, TFPP invests time and resources into fire testing for optimum recommendations. And when the application requires a UL 300 listed solution that is not covered by standard appliance listings, we work with Underwriters Laboratories (UL) to outline specific testing for the equipment in question.

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S-2010156-03

The following is a list of some of the equipment for which Tyco Fire Protection Products has received “Appliance Specific Listings” in accordance with UL 300.

- Henny Penny Eight-Head Fryers
- Nieco Broilers with or without Catalytic Converters, Jet Flow Model
- Duke Chain Broilers with or without Catalytic Converters
- Dunkin Donut Fryers
- Belshaw Brother Fryers
- Krispy Kreme Fryers
- FryMaster Energy Efficient Electric Fryer Model RE 14
- Baker’s Pride Gas Radiant Char-Broiler with Smoker Box
- Magikitch’n Gas Radiant Char-Broiler with Smoker Box
- SPINFRESH Fryer

Should you have questions pertaining to this bulletin, please contact Technical Services as noted below.

Thank you for your continued support of ANSUL restaurant fire suppression systems.

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S-2012088

Bulletin No. 2015197
R-102: UL EX3470

DATE: October 5, 2015

TO: Authorized ANSUL® R-102 Restaurant System Distributors and OEM's

FROM: Product Management, Restaurant Systems

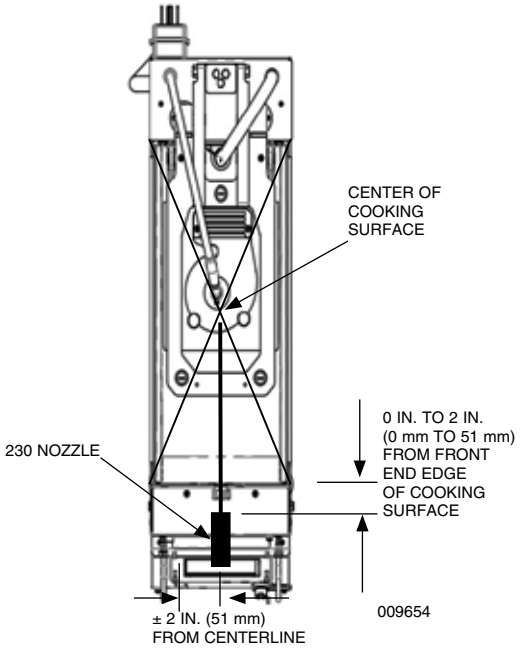
SUBJECT: Garland CXBE12 Broiler

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

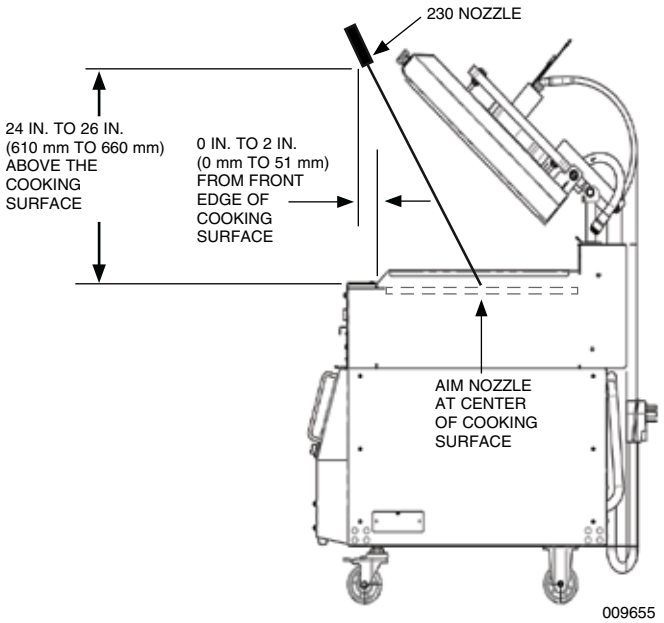
Tyco Fire Protection Products is pleased to announce an additional appliance-specific R-102 restaurant fire protection option for the Garland Electric Dual-Side Clamshell Broiler Model CXBE12. This is an additional option to the coverage shown in the ANSUL R-102 Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12).

The following nozzle positioning and coverage limitations must be followed.

Single 230 Nozzle Protection for Garland CXBE12 Broiler



Broiler Top View



Broiler Side View

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R102: UL EX3470

Specifications

Top Cooking Surface:	10.2 in. x 22.4 in. (259 mm x 568 mm)
Bottom Cooking Surface:	10.8 in. x 22.2 in (274 mm x 564 mm)
Total Load:	16 kW

This bulletin is a supplement to the ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual (Part No. 418087-12), dated 2014-SEP-01.

This bulletin is NOT intended to replace the requirements and limitations outlined within the ANSUL R-102 System Manual listed in this bulletin. The information contained in this bulletin will be ADDED to the manual at the next update. However, we are providing this document immediately for appliance protection.

Should you have questions regarding this bulletin, please contact Technical Services as noted below.

Thank you for your continued support of ANSUL brand fire suppression products.

ANSUL®
ANSUL INCORPORATED
MARINETTE, WI 54143-2542

R-102 PRESSURE VENT INSTALLATION PROCEDURES

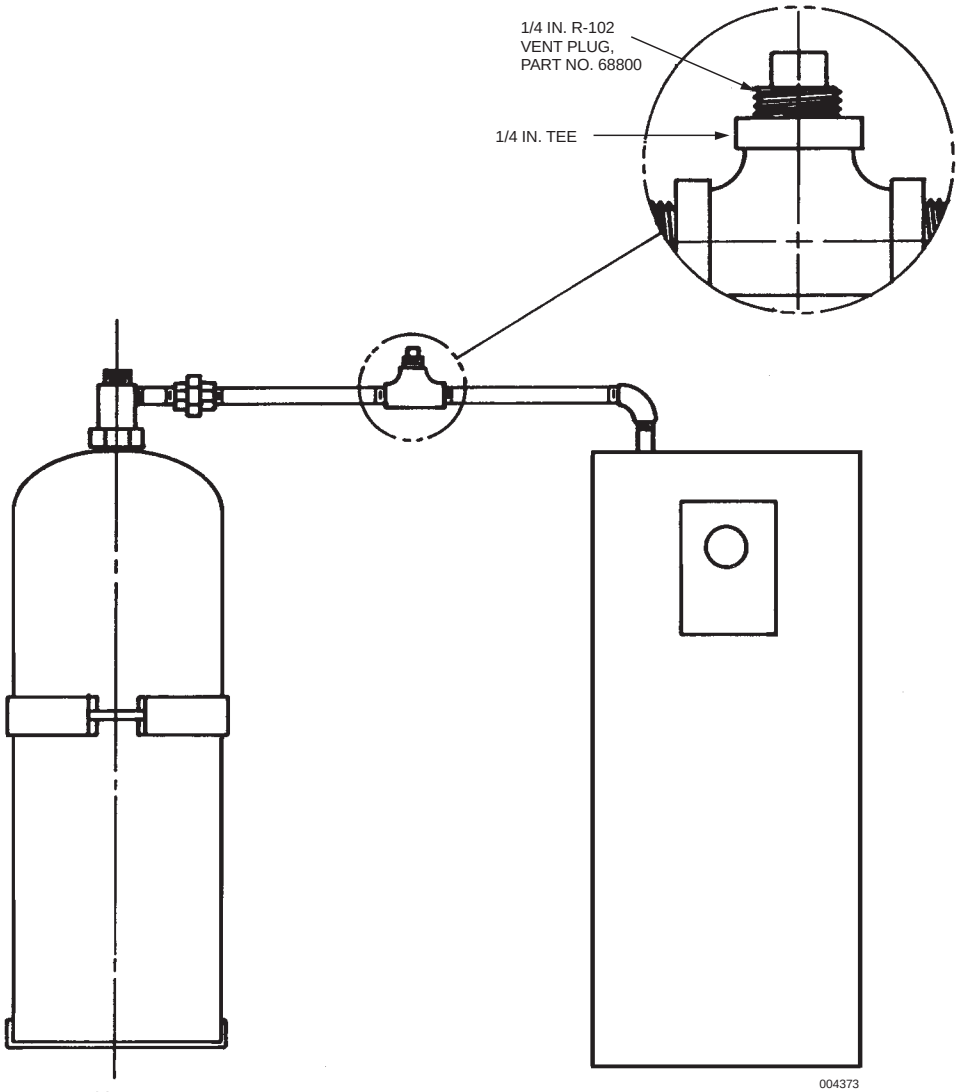
The purpose of the vent check is to open the system to atmosphere. This will eliminate a potential build-up of pressure which might force the agent up the pick-up tube and into the distribution piping. This plug should be installed with every R-102 system.

INSTALLATION

1. Install a 1/4 in. x 1/4 in. x 1/4 in. tee in the actuation line between the ANSUL AUTOMAN regulated release mechanism and the agent tank.
2. Install the pressure vent plug, Part No. 68800, into the center inlet or “bull” of the tee.
3. The plug must always be installed in either the “up” or the “horizontal” position. **NEVER INSTALL THE VENT IN THE DOWN POSITION!**
4. SPARINGLY APPLY PIPE SEALANT OR TAPE ON MALE THREADS ONLY.

RECHARGE/SEMI-ANNUAL MAINTENANCE

1. Remove pressure vent plug from tee.
2. Visually inspect ball seating surface and vent hole for contamination. Clean if necessary.
3. Ensure that ball moves freely.
4. Reinstall vent plug into tee. SPARINGLY APPLY PIPE SEALANT OR TAPE ON MALE THREADS ONLY.



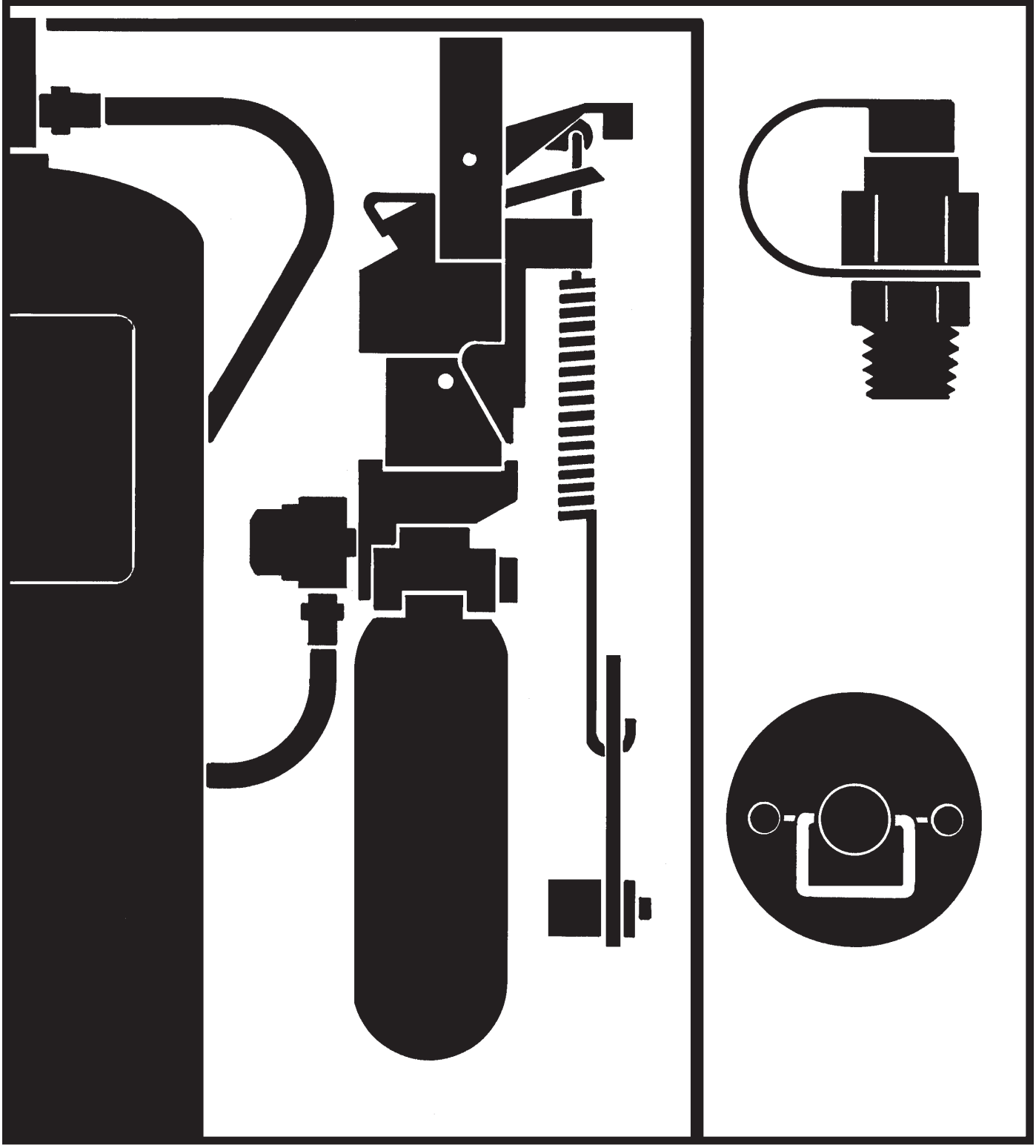
R-102 TANK

R-102 REGULATED RELEASE MECHANISM

R-102 RESTAURANT FIRE SUPPRESSION SYSTEM

ANSUL®

DESIGN, INSTALLATION, RECHARGE, AND MAINTENANCE MANUAL



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Bulletin

Bulletin No. 2016066

UL EX3470; UL EX5174 - May 5, 2016

DATE: August 24, 2016

TO: Authorized ANSUL® R-102 and PIRANHA System Distributors and OEMs

FROM: Product Management - Restaurant Systems

SUBJECT: Restaurant Nozzle 10-Pack Offering

Tyco Fire Protection Products is pleased to announce that we are offering all restaurant nozzles with metal blow-off caps in 10-packs for all ANSUL Restaurant Fire Suppression Systems. This will add consistency to the ordering process and inventory control of the restaurant nozzles.

The current Restaurant Nozzle 9-packs, 25-packs, and 50-packs will be offered until inventories are depleted.

Please make note of the new part numbers and price changes when ordering restaurant nozzles as follows:

New Part No.	R-102 Nozzle (10-Packs)	Suggested List Price (USD)
443319	Nozzle, 1F	$388.00
443321	Nozzle, 1/2 N	$394.00
443317	Nozzle, 1N	$338.00
443323	Nozzle, 1W	$324.00
443325	Nozzle, 2W	$324.00
443327	Nozzle, 3N	$402.00
443329	Nozzle, 230	$327.00
443331	Nozzle, 245	$327.00
443333	Nozzle, 260	$336.00
443335	Nozzle, 290	$336.00
443337	Nozzle, 2120	$336.00

New Part No.	PIRANHA Nozzle (10-Packs)	Suggested List Price (USD)
443339	Nozzle, AP	$402.00
443341	Nozzle, DL	$425.00
442088	P34, 10-Pack	$490.00
442153	P41, 10-Pack	$490.00

Note: Prices are subject to change without notice. Always refer to the latest price files on the ANSUL Distributor Portal prior to ordering.

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UL EX3470; UL EX5174 - May 5, 2016

This bulletin is a supplement to the ANSUL R-102 Restaurant System Design, Installation, Recharge and Maintenance Manual (418087-12) and the ANSUL PIRANHA Restaurant System Design, Installation, Recharge and Maintenance Manual (423385-08).

For questions concerning the information in this bulletin, please contact Technical Services as noted below.

ANSUL®

Bulletin

Bulletin No. 2016045
UL EX3470

DATE: May 3, 2016

TO: All Authorized ANSUL Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: R-102 Coverage of the Imperial Model IABR-36, IABR-48, and IABR-60 Gas-Radiant Char-Broiler with Wood Smoker Box and Chip Holders

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce an appliance-specific coverage for R-102 Restaurant Fire Suppression Systems when protecting the following Imperial Gas Radiant Char-broilers: IABR-36, IABR-48, and IABR-60 with Wood Smoker Box and Chip Holders.

The information in this bulletin will serve as a manual supplement for the R-102 Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1st 2014 and will be added to the manual at the next reprint.

See Pages 2 and 3 for details.

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Bulletin No. 2016045
May 3, 2016

UL EX3470

Model IABR-36 with Wood Smoker Box and Chip Holders is to be protected within the parameters indicated below.

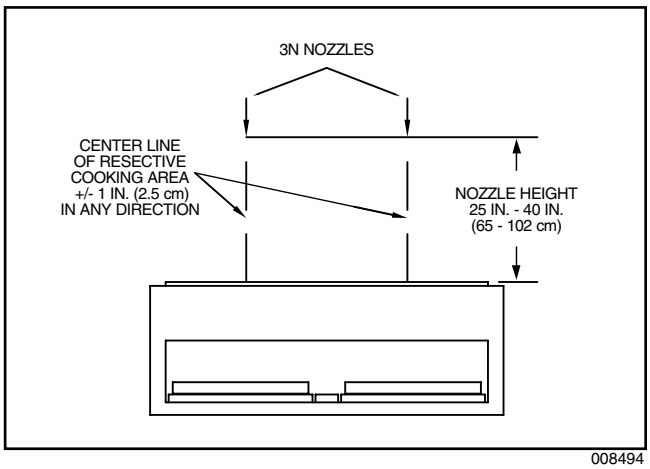
The following nozzle position and coverage limitations must be followed:

Nozzle Quantity: 2

Nozzle Type: 3N

Nozzle Height: 25 in. (635 mm) to 40 in. (1016 mm) above the hazard surface

Nozzle Location: Each nozzle protects half of the cooking area. The nozzles are located within 1 in. (25 mm) of the center of the respective cooking area, aimed at the center of that hazard area.



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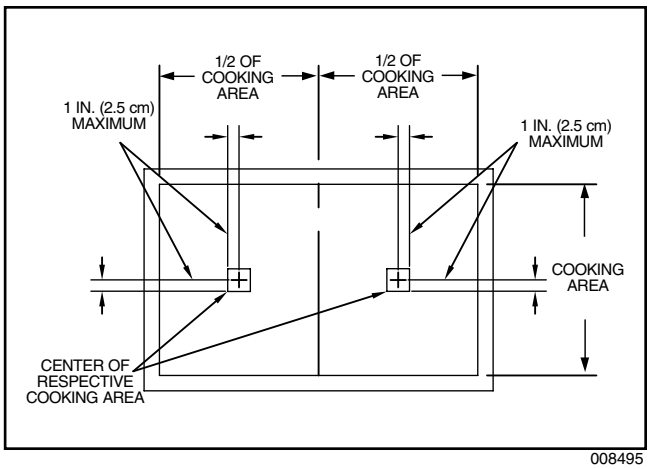


008495

Model	Grate Dimension	Gas Output
IABR-36	32.5 in. (825 mm) x 21 in. (533 mm)	90,000 BTU

UL EX3470

Model IABR-48 and IABR-60 with Wood Smoker Box and Chip Holder is to be protected within the parameters indicated below.

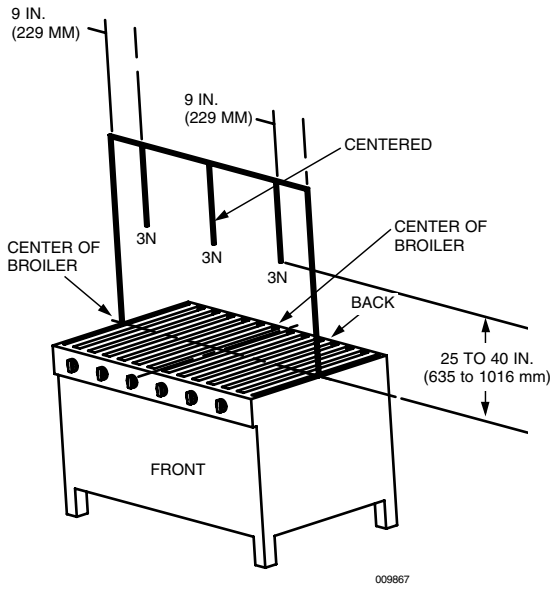
The following nozzle position and coverage limitations must be followed:

Nozzle Quantity: Three

Nozzle Type: 3N

Nozzle Height: 25 to 40 in. (635 to 1,016 mm) above the broiler surface

Nozzle Location: All three nozzles are to be centered front to back above the broiling surface. The middle nozzle is to be centered left to right above the broiling surface. The remaining two nozzles are to be located 9 in. (229 mm) inside the broiler sides.



Model	Grate Dimensions	Gas Output
IABR-48	44.5 in. (1,130 mm) x 21 in. (533 mm)	120,000 BTU
IABR-60	56.5 in. (1,435 mm) x 21 in. (533 mm)	150,000 BTU

For all models, the Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Should you have questions regarding this bulletin, please contact your US Standard Product Manager or International Area Manager, or contact Technical Services as listed below.

ANSUL®

Bulletin

Bulletin No. 2015259
UL EX3470; UL EX5174

DATE: December 14, 2015

TO: All Authorized ANSUL® R-102 and PIRANHA System Distributors and OEMs

FROM: Product Management, Restaurant Systems

SUBJECT: New Nitrogen Cartridge Options for Remote Mechanical Release Assemblies

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

Tyco Fire Protection Products is pleased to announce additional cartridge options for use in the Remote Mechanical Release Assemblies (Part No. 433485 and 439946).

The current remote mechanical release assembly uses the 101-10 Carbon Dioxide Cartridge as the only option for the actuation pressure to operate the regulated actuators. The 101-10 Carbon Dioxide Cartridge can still be used for this application, however, in addition to the 101-10 Carbon Dioxide Cartridge, the following LT-20-R Nitrogen Cartridges can be used for this application.

The following LT-20-R Nitrogen Cartridge options are now approved for use in the remote mechanical release assembly:

- TC/DOT 423429
- European Part No. 428440
- Australian Part No. 428948
- Chinese Part No. 441086

This bulletin is a supplement to the ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual (418087-12) and the ANSUL PIRANHA Restaurant System Design, Installation, Recharge, and Maintenance Manual (423385-08).

This bulletin is not intended to replace the requirements and limitations outlined within the ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual and the ANSUL PIRANHA Restaurant System Design, Installation, Recharge, and Maintenance Manual listed in this bulletin. The information contained in this bulletin will be added to the manual at the next update. However, we are providing this document immediately for product protection.

If you have questions regarding the LT-20-R Nitrogen Cartridge options, feel free to contact Technical Services as noted below.

Thank you for your continued support of ANSUL brand fire suppression products.

tyco Fire Protection Products

One Stanton Street
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www.ansul.com

Main Telephone Numbers: +1-800-862-6785 or +1-715-735-7415
Customer Services..... Press 2
Technical Services ..... Press 4
Training Services ..... Press 6
Quality Assurance ..... Press 8

Bulletin No. 2015197
R-102: UL EX3470

DATE: October 5, 2015

TO: Authorized ANSUL® R-102 Restaurant System Distributors and OEM's

FROM: Product Management, Restaurant Systems

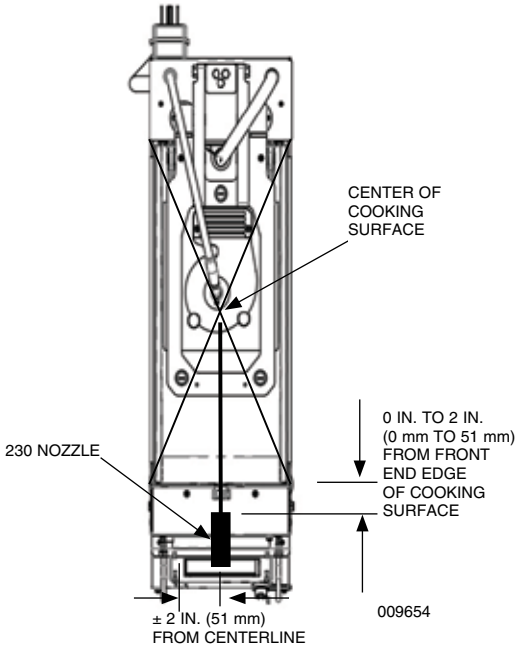
SUBJECT: Garland CXBE12 Broiler

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

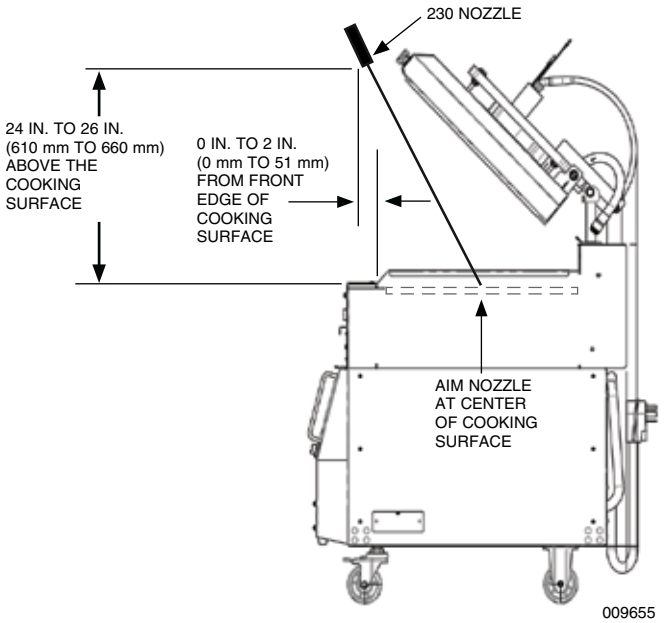
Tyco Fire Protection Products is pleased to announce an additional appliance-specific R-102 restaurant fire protection option for the Garland Electric Dual-Side Clamshell Broiler Model CXBE12. This is an additional option to the coverage shown in the ANSUL R-102 Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12).

The following nozzle positioning and coverage limitations must be followed.

Single 230 Nozzle Protection for Garland CXBE12 Broiler



Broiler Top View



Broiler Side View

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R102: UL EX3470

Specifications

Top Cooking Surface:	10.2 in. x 22.4 in. (259 mm x 568 mm)
Bottom Cooking Surface:	10.8 in. x 22.2 in (274 mm x 564 mm)
Total Load:	16 kW

This bulletin is a supplement to the ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual (Part No. 418087-12), dated 2014-SEP-01.

This bulletin is NOT intended to replace the requirements and limitations outlined within the ANSUL R-102 System Manual listed in this bulletin. The information contained in this bulletin will be ADDED to the manual at the next update. However, we are providing this document immediately for appliance protection.

Should you have questions regarding this bulletin, please contact Technical Services as noted below.

Thank you for your continued support of ANSUL brand fire suppression products.

This manual is intended for use with ANSUL® R-102 Restaurant Fire Suppression Systems.

Those who install, operate, recharge, or maintain these fire suppression systems should read this entire manual. Specific sections will be of particular interest depending upon one's responsibilities.

Design, installation, recharge, and maintenance of the system must conform to the limitations detailed in this manual and performed by an individual who attended an ANSUL training program and became trained to install, recharge, design, and maintain the ANSUL system.

Fire suppression systems are mechanical devices. They need periodic care. Maintenance is a vital step in the performance of your fire suppression system. As such it must be performed in accordance with NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment) and NFPA 17A (Standard on Wet Chemical Extinguishing Systems) by an authorized ANSUL distributor. To provide maximum assurance that the fire suppression system will operate effectively and safely, maintenance must be conducted at six-month intervals, or earlier if the situation dictates. Twelve-year maintenance must include agent tank hydrostatic testing.

ANSUL PART NO. 418087-12

⚠ DANGER

Indicates a hazardous situation in which a person will experience serious personal injury or death if the situation is not avoided.

⚠ WARNING

Indicates a hazardous situation in which a person could experience serious personal injury or death if the situation is not avoided.

⚠ CAUTION

Indicates a hazardous situation in which a person could experience minor or moderate personal injury if the situation is not avoided.

CAUTION

Addresses practices not related to personal injury, such as a system part malfunctioning, property damage, or system failure.

NOTICE

Addresses general practices or observations related to system function that are not related to personal injury.

DATE	PAGE	REV. NO.		DATE	PAGE	REV. NO.
2014-SEP-01	Complete manual has been reformatted along with several revised pages that contain updated technical information. For clarity, all pages have been changed to Revision 11, regardless of previous revision number. Technical information changes have been noted with a revision indicator (▶).					

▸ Indicates revised information.

■ Indicates change in page sequence.

DATE	PAGE	REV. NO.	DATE	PAGE	REV. NO.

▸ Indicates revised information.
■ Indicates change in page sequence.

DESIGN AND APPLICATION

The ANSUL R-102 Restaurant Fire Suppression System is ▸ developed and tested to provide fire protection for restaurant cooking appliances, hoods, and ducts. It is a pre-engineered group of mechanical and electrical components for installation by an authorized ANSUL distributor. The basic system consists of an AUTOMAN regulated release assembly which includes a regulated release mechanism and a liquid agent storage tank housed within a single enclosure. Nozzles, detectors, cartridges, liquid agent, fusible links, pulley tees, and pulley elbows are supplied in separate packages in the quantities needed for each fire suppression system arrangement.

The system provides automatic actuation; or it can be actuated manually through a remote manual pull station. The system is also capable of shutting down appliances at system actuation. For appliance shutdown requirements, refer to the current version of NFPA 17A, "Standard For Wet Chemical Extinguishing Systems," and NFPA 96, "Standard For Ventilation Control and Fire Protection of Commercial Cooking Operations."

Additional equipment includes: remote manual pull station, mechanical and electrical gas valves, and electrical switches for automatic equipment and gas line shut-off. Accessories can be added, such as alarms, warning lights, etc., to installations where required.

The R-102 system suppresses fire by spraying the plenum area, the filters, cooking surfaces, and the exhaust duct system with a predetermined flow rate of ANSULEX Low pH Liquid Fire Suppressant. When the liquid agent is discharged onto a cooking appliance fire, it cools the grease surface, and reacts with the hot grease (saponification) forming a layer of soap-like foam on the surface of the fat. This layer acts as insulation between the hot grease and the atmosphere, thus helping to prevent the escape of combustible vapors.

Exhaust fans in the ventilating system should be left on. The forced draft of these fans assists the movement of the liquid agent through the ventilating system, thus aiding in the fire suppression process. These fans also provide a cooling effect in the plenum and duct after the fire suppression system has been discharged. The system is UL listed with or without fan operation.

▸ Make up or supply air fans, internal to the exhaust hood(s) being protected, shall be shut down upon system actuation.

Along with the fire suppression system, the total system design must include hand portable fire extinguisher(s) located within the cooking/restaurant area that can be used to manually suppress a fire that may be burning in an unprotected area. Class K extinguisher(s) must be provided for hazards where there is a potential for fires involving combustible cooking media (vegetable or animal oils and fats). Refer to NFPA 10, "Standard For Portable Fire Extinguisher," for additional information.

UL LISTING

The R-102 Restaurant Fire Suppression System has been tested and is listed by Underwriters Laboratories, Inc. as a pre-engineered system. The system is in compliance with UL Test Standard 300. These tests require extinguishment of fires which are initiated in deep fat fryers, ranges, griddles, char-broilers, woks, upright broilers, chain-broilers, filters, plenum chambers, hoods, and ducts after pre-loading each appliance with a prescribed amount of cooking grease. Each fire is allowed to progress to maximum intensity before the fire suppression system is actuated.

SYSTEM APPROVALS

- UL EX3470
- ULC EX3470
- ▸ COA #5663 (NYC)

DEFINITION OF TERMS

Actuation Gas Line: Piping and/or stainless steel braided hose assemblies from the AUTOMAN Regulated Release Assembly which supplies high pressure nitrogen or carbon dioxide to the Regulated Actuator Assembly for multiple-tank system actuation.

Agent Tank: A pressure vessel containing the liquid agent.

AUTOMAN Regulated Release Assembly (Electrical): An assembly which contains the regulated release mechanism, agent tank (ordered separately), expellant gas hose, solenoid, and electric switch within a metal enclosure. The enclosure contains knockouts to facilitate component hookups.

AUTOMAN Regulated Release Assembly (Mechanical): An assembly which contains the regulated release mechanism, agent tank (ordered separately), and expellant gas hose within a metal enclosure. The enclosure contains knockouts to facilitate component hookups.

Authority Having Jurisdiction: The ''authority having jurisdiction'' is the organization, office, or individual responsible for ''approving'' equipment, an installation, or a procedure. The phrase ''Authority Having Jurisdiction'' is used in a broad manner since jurisdictions and ''approval'' agencies vary as do their responsibilities. Where public safety is primary, the ''authority having jurisdiction'' may be a federal, state, local, or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance company representative may be the ''authority having jurisdiction.'' In many circumstances the property owner or his designated agent assumes the role of the ''authority having jurisdiction;'' at government installations, the commanding officer or departmental official may be the ''authority having jurisdiction.''

Blow-Off Cap: A siliconized rubber or metal cap which covers the end of the nozzle to protect the nozzle tip and minimize cooking grease migration into the nozzle orifice.

Branch Line: The agent distribution piping which extends from the supply line to the nozzle(s).

DEFINITION OF TERMS (Continued)

Bursting Disc: A disc installed in the tank adaptor which minimizes the remote chance of siphoning of the agent into the discharge piping during extreme temperature variations.

Cartridge: A hermetically sealed, steel pressure vessel containing nitrogen or carbon dioxide gas used to pressurize the agent tank.

▸ **Cooking Appliance:** Includes, but is not limited to, fryers, griddles, ranges, upright broilers, chain broilers, natural charcoal broilers, or char-broilers (electric, lava rock, gas-radiant, or mesquite).

Cooking Area: Cooking area is defined as the maximum surface that requires protection. Each type of appliance has a defined cooking area with parameters that vary for each appliance. For example, the cooking area for a griddle is the entire flat cooking surface, while a fryer may have two areas that need consideration, depending on whether the fryer has a dripboard or not.

Conduit Offset Assembly: A pre-formed piece of conduit which can be installed between the ANSUL regulated release and the conduit to allow the wire rope for the detection, gas valve and remote manual pull station to be installed in a more convenient manner.

Depth: When referring to depth as a linear dimension, it is the horizontal dimension measured from front to back of the appliance or plenum.

Detector: A device which includes the detector bracket, detector linkage, and fusible link used for automatic operation of the fire suppression system.

Detector Linkage: A device used to support the fusible link.

Discharge Hose Assembly: An agent distribution hose to be used with castered cooking appliances with castered supports to allow the movement of the appliance for service or cleaning purposes.

Distribution Piping: Piping which delivers the extinguishing agent from the tank to each discharge nozzle. See also Supply or Branch lines.

Ducts (or Duct System): A continuous passageway for the transmission of air and vapors which, in addition to the containment components themselves, may include duct fittings, dampers, duct filters, duct transitions, in-line or end-duct pollution control units (PCUs), and/or other items or air handling equipment.

Electrostatic Precipitator: A device used to aid in the cleaning of the exhaust air. This device is normally installed at or near the base of the ventilation duct or may be included as an integral part of a pollution control unit (PCU).

Expellant Gas Line: Piping and/or hose which supplies the nitrogen or carbon dioxide gas from the regulated release assembly/regulated actuator assembly to each agent tank.

Flexible Conduit: A flexible means to route stainless steel cable from the AUTOMAN Regulated Release to a manual pull station or mechanical gas valve.

Flow Number: Term used in system design to describe the flow capacity of each nozzle used to determine the quantity of tanks needed to cover a certain group of hazards.

Fusible Links: A fixed temperature heat detecting device employed to restrain the operation of a mechanical control until its designed temperature is reached, allowing separation of the link and system operation.

Gas Valve: An electrically or mechanically operated device used to shut off the gas supply to the cooking equipment when the system is actuated.

Gas Valve Air Cylinder: An air cylinder, located in the release mechanism, which operates pneumatically to mechanically unlatch a mechanical gas valve actuator, causing the gas valve to close upon system actuation.

High Proximity: Indicates a distance (vertically) between the nozzle tip and the surface of the appliance being protected.

Hood: A device provided for cooking appliances to direct and capture grease-laden vapors and exhaust gases from cooking appliances. It shall be constructed in a manner which meets the requirements of NFPA 96.

Liquid Agent: A potassium-based solution used for the knockdown and suppression of fire.

Low Proximity: Indicates a distance (vertically) between the nozzle tip and the surface of the appliance being protected.

Maximum Length of Cooking Appliance: The maximum dimension, on any side, which may be protected by one nozzle.

Maximum Piping: Specified length of piping and number of fittings which must not be exceeded for each system.

Medium Proximity: Indicates a distance (vertically) between the nozzle tip and the surface of the appliance being protected.

Minimum Piping: Minimum length of distribution piping required between the agent tank outlet and any nozzle protecting a ▸ range, fryer, or wok.

Nozzle: A device designed to deliver the liquid agent with a specific flow rate and stream pattern.

Overlapping Protection: When discharge nozzles are spaced equally apart over one or more appliances requiring protection. Nozzles used in this manner provide area protection of eligible appliances within the protected area. Two types of overlapping protection is available: full hood continuous protection and group protection. Overlapping protection is in addition to appliance specific coverages.

Plenum: The space enclosed by the filters and the portion of the hood above the filters.

Pre-engineered System: NFPA 17A defines a pre-engineered system as one which has "…predetermined flow rates, nozzle pressures, and quantities of liquid agent." The R-102 system, as prescribed by UL (Underwriter's Laboratories), has specific pipe sizes, maximum and minimum pipe lengths and numbers of fittings, and number and types of nozzles. The hazards protected by this system are also specifically limited as to type and size by UL based upon actual fire tests. All limitations on hazards that can be protected and piping and nozzle configurations are contained in the R-102 installation and maintenance manual which is part of the UL listing.

DEFINITION OF TERMS (Continued)

Pulley Elbow: A device used to change the direction of the wire rope which runs between: the regulated release mechanism and the detectors, the regulated release mechanism and the mechanical gas valve, and/or the regulated release mechanism and the remote manual pull station.

Pulley Tee: A device used to change the direction of two wire ropes which run from a regulated release or a regulated actuator to two remote manual pull stations, or from two regulated releases or regulated actuators to a single mechanical gas valve or from one regulated release or regulated actuator to two gas valves.

Regulated Actuator Assembly: An assembly which contains the regulator, pneumatic actuator, agent tank, and expellant gas hose within a metal enclosure. This assembly is used to pressurize additional agent tanks in a multiple tank system.

Regulated Release Mechanism: An enclosed device within the AUTOMAN regulated release assembly which releases the expellant gas, activates alarms, and/or shuts off other devices when signaled automatically by a detector or manually with a remote pull station.

Regulator: A device used to regulate the pressure from the nitrogen cartridge into the agent tank(s) when the system is actuated.

Remote Manual Pull Station: A device which provides manual actuation of the system from a remote location.

Remote Mechanical Release: A device that provides actuation gas, activates alarms, and/or shuts off other devices when signaled automatically by a detector, or manually with a remote pull station.

Salamander Broiler: A broiler very similar in design to the upright broiler. A salamander broiler is used for general broiling of meats and fish, toasting, and holding/warming foods. Most contain a removable grease drip tray.

Series Detector: Any detector located in-line between the regulated release assembly and the terminal detector.

Silicone Lubricant: A heat-resistant organic compound used to lubricate O-rings, rubber and mechanical components.

Supply Line: The agent distribution piping which extends from the agent tank outlet and serves as a manifold for the branch lines.

Terminal Detector: The last in a series of detectors, or the only detector used in a single-detector system. This detector is thus named because it is at the point at which the wire rope ends, or ‘‘terminates.’’ There is only one terminal detector per detection system.

Transition: An extension of the hood or canopy which allows for the smooth transmission of gases, air, and vapors between the hood opening and the base of the ventilation duct.

Vent Plug: A device used to prevent pressure build-up within the agent tank or agent distribution lines due to temperature fluctuations.

NOTES:

TOTAL SYSTEM

There are four types of R-102 Restaurant Fire Suppression Systems:

1. Single-tank System
2. Double-tank System
3. Three-tank System (1 Cartridge)
4. Multiple Tank System (Three Tanks or More – Multiple Cartridges)

The type of system required for the particular installation will be determined through the guidelines covered in “System Design.” Additional equipment which may be required to complete the system design is explained in the “System Components” section. Additional devices covered are: remote manual pull stations, mechanical and electrical gas shut-off valves, electrical switches, and pressure switches.

Single-Tank System

The R-102 single-tank system is available with a stainless steel enclosure and consists of:

1. AUTOMAN Regulated Release Assembly (Electrical or Mechanical)
2. Nitrogen Cartridge and/or Carbon Dioxide Cartridge
3. ANSULEX Low pH Liquid Fire Suppressant
4. Discharge Nozzles
5. Detection Components
6. Additional Devices (As Required)

The regulated release assembly contains the regulated release mechanism, agent tank, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing detection system and additional equipment. Refer to “System Components” section for individual component descriptions.

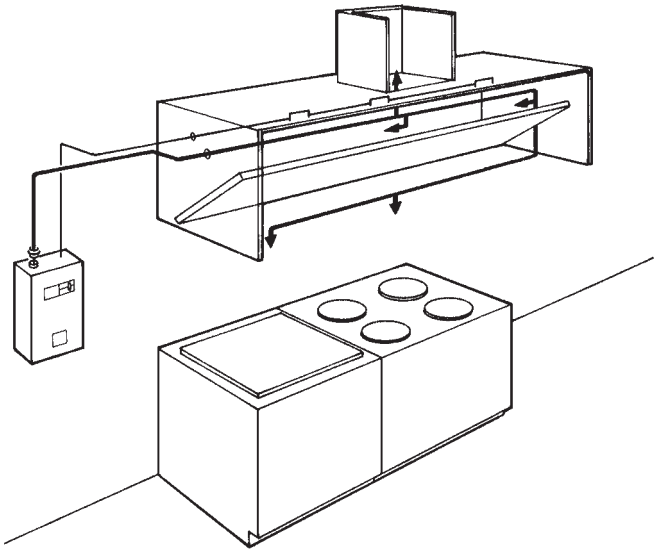


FIGURE 2-1
000133

Double-Tank System

The R-102 double-tank system is available with stainless steel enclosures and consists of:

1. AUTOMAN Regulated Release Assembly (Electrical or Mechanical)
2. Nitrogen Cartridge and/or Carbon Dioxide Cartridge
3. ANSULEX Low pH Liquid Fire Suppressant
4. Enclosure or Bracket Assembly
5. Discharge Nozzles
6. Detection Components
7. Additional Devices (As Required)

The regulated release assembly contains the regulated release mechanism, agent tank, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing expellant piping, detection system, and additional equipment.

The enclosure or bracket assembly is mounted separately but within the guidelines of the regulated release assembly expellant gas piping requirements to ensure simultaneous actuation of the system. Refer to “System Components” section for individual component descriptions.

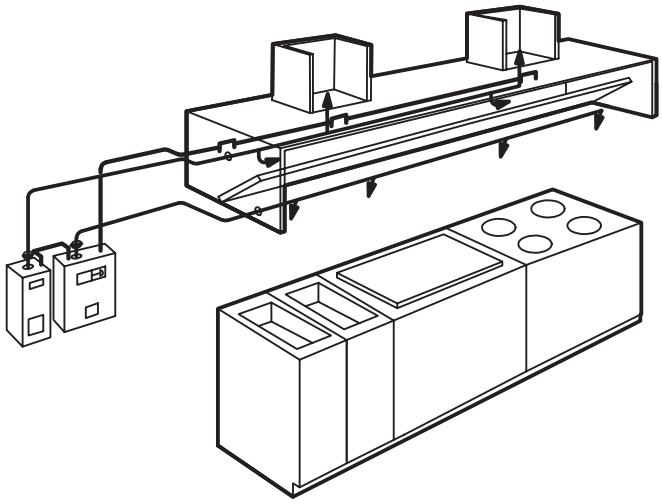


FIGURE 2-2
008321

TOTAL SYSTEM (Continued)

Three-Tank System (1 Cartridge with Three 3.0 Gal Tanks ONLY)

The R-102 three-tank system is available with stainless steel enclosures and consists of:

1. AUTOMAN Regulated Release Assembly (Electrical or Mechanical)
2. Double Tank Enclosure Assembly
3. Nitrogen Cartridge
4. ANSULEX Low pH Liquid Fire Suppressant
5. Discharge Nozzles
6. Detection Components
7. Additional Devices (As Required)

The regulated release assembly contains the regulated release mechanism, agent tank, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing expellant piping, detection system, and additional equipment.

The double tank enclosure assembly is mounted separately but within the guidelines of the regulated release assembly expellant gas piping requirements to ensure simultaneous actuation of the system. Refer to “System Components” section for individual component descriptions.

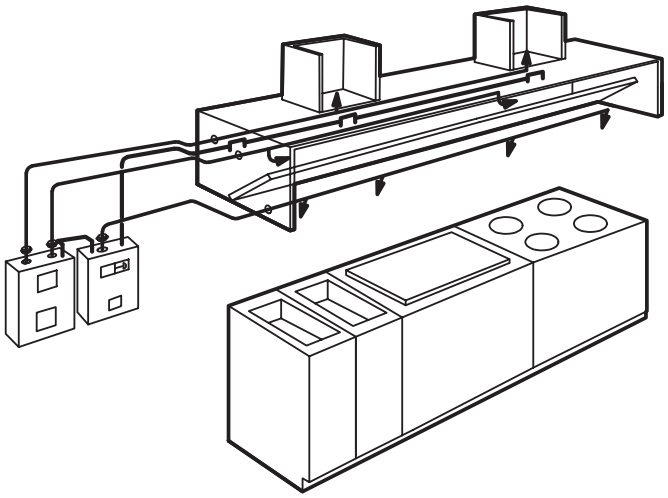


FIGURE 2-3
008322

Multiple Tank System (Three Tanks or More – Multiple Cartridges)

The R-102 multiple-tank system is available with stainless steel enclosures and consists of:

1. AUTOMAN Regulated Release Assembly (Electrical or Mechanical) or AUTOMAN Remote Release Assembly(ies)
2. Nitrogen Cartridge(s) and/or Carbon Dioxide Cartridge(s)
3. Regulated Actuator Assembly(ies)
4. ANSULEX Low pH Liquid Fire Suppressant
5. Enclosure or Bracket Assembly(ies)
6. Discharge Nozzles
7. Detection Components
8. Additional Devices (As Required)

The regulated release assembly contains the regulated release mechanism, agent tank, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing actuation piping, expellant piping, detection system, and additional equipment.

The remote release assembly(ies) is used in large systems or multi-hood systems to actuate regulated actuator assembly(ies) ONLY. The remote release assembly contains a release mechanism (unregulated), with enclosure knockouts to facilitate installing the actuation piping, expellant piping, detection system, and additional equipment.

Each regulated actuator assembly is mounted separately but within the guidelines of the regulated release assembly actuation/expellant gas piping requirements to ensure simultaneous actuation of the system. The assembly contains the pneumatic actuator, regulator, agent tank, expellant gas hose for agent tank hookup, and enclosure plugs to facilitate installing expellant piping.

Each enclosure or bracket assembly is mounted separately but within the guidelines of the regulated release assembly or regulated actuator assembly expellant gas piping requirements to ensure simultaneous actuation of the system. Refer to “System Components” section for individual component descriptions.

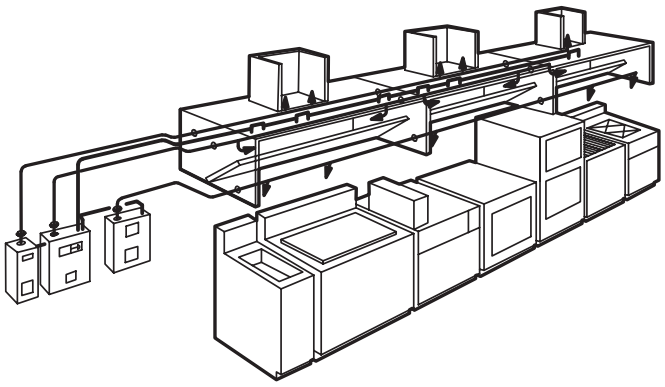


FIGURE 2-4
008323

EXTINGUISHING AGENT

ANSULEX Low pH Liquid Fire Suppressant (1.5 gallon – Part No. 79694 or 3.0 gallon – Part No. 79372) is a potassium-based solution designed for fast knock-down and suppression of grease-related fires. The agent is shipped in plastic containers which provide one complete tank charge. (Refer to Section V, Page 5-2.1, for maximum agent fill capacity.) Agent storage life expectancy is twelve years and can be stored at a temperature of –40 °F to 130 °F (–40 °C to 54 °C). **Note: When installing agent in R-102 system, temperature range is 32 °F (0 °C) to 130 °F (54 °C).** The distributor must record the batch numbers and date of shipment receipt to be filed with each installation record.

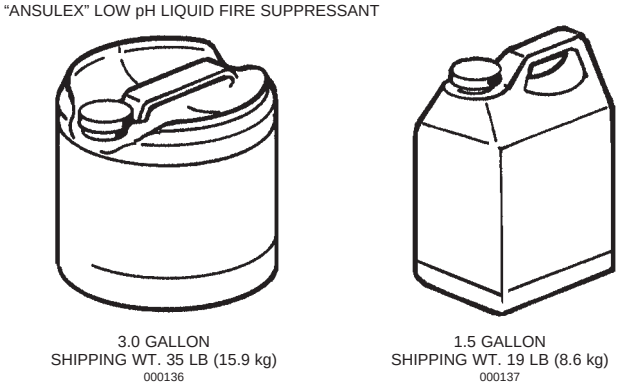


FIGURE 3-1

REGULATED RELEASE ASSEMBLY (MECHANICAL)

The AUTOMAN Regulated Mechanical Release Assembly (Part No. 429853) contains the regulated release mechanism, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing actuation piping; expellant piping; detection system; and additional equipment. This regulated release assembly is used in single, double, and multiple-tank systems and must be mounted to a rigid surface. The release mechanism can be used to interconnect both the actuation and expellant gas lines as required per system design. The regulator is designed to allow a constant flow of gas into the tank at 110 psi (7.6 bar) when the system is actuated. The agent tank must be ordered separately.

In single, double, and multiple-tank systems, the provided expellant gas hose connects the agent tank to the bottom outlet of the regulator. In double and multiple-tank system configurations, the back outlet of the regulator is used as an expellant gas feed for one additional tank-enclosure or tank-bracket hookup. The enclosure contains the required knockouts to facilitate this connection. If a pressure switch is to be attached to the regulator, additional fittings are required.

The tank is mounted within the enclosure. The tank contains an adaptor/tube assembly with a burst disc union. The burst disc helps prevent siphoning of the agent up the pipe due to significant temperature fluctuations in the area where the tank is located. The tank is stainless steel and, under normal conditions, requires hydrostatic testing every twelve years.

The detection and additional equipment required per system design are connected to the release mechanism. The enclosure contains knockouts to facilitate detection and additional hookups.

The system can be actuated automatically or manually. Automatic actuation occurs when a fusible link within the detection system separates in a fire condition. Manual actuation of the system occurs when personnel pull on the remote manual pull station pull ring.

AUTOMAN REGULATED RELEASE ASSEMBLY (MECHANICAL)

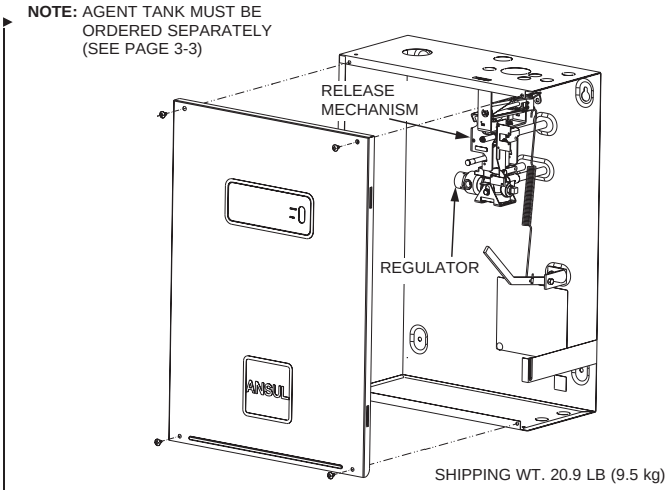


FIGURE 3-2
009454

REGULATED RELEASE ASSEMBLY (ELECTRICAL)

The AUTOMAN Regulated Electrical Release Assembly (Part No. 429856) is identical to the mechanical version except it also contains a factory installed 120 VAC solenoid and electrical switch.

The solenoid is used to provide electrical actuation of the release mechanism. The electric switch is used to protect the solenoid by opening the circuit to the solenoid once the system is fired. Additional electrical switches can be added as required for automatic equipment and gas shut-off accessories, as well as initiating audible and visual alarms.

AUTOMAN REGULATED RELEASE ASSEMBLY (ELECTRICAL)*

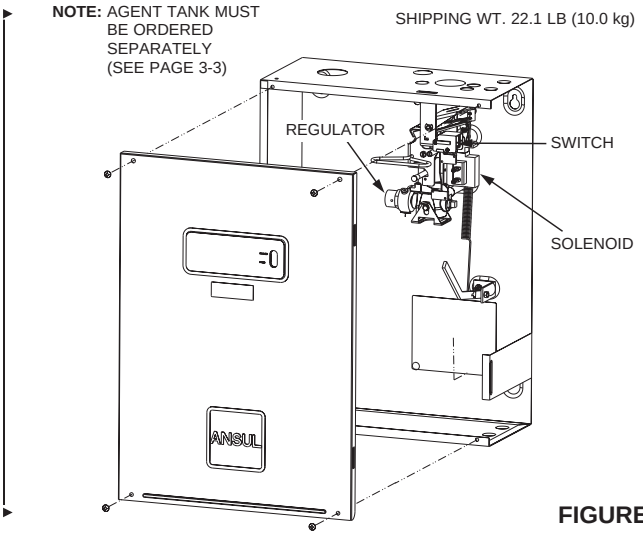


FIGURE 3-3
009455

* **Note:** AUTOMAN Regulated Electrical Release (Part No. 429856) is not intended to be used with electric detection.

REMOTE MECHANICAL RELEASE

The Remote Mechanical Release (Part No. 433485) is used to actuate up to five R-102 regulated actuators. The remote mechanical release utilizes a 101-10 carbon dioxide cartridge as the actuation pressure to operate the regulated actuators. The release is housed in a stainless steel enclosure.

Also available is an OEM Remote Release/Bracket Assembly (Part No. 439946). The OEM Remote Release/Bracket contains the same release mechanism as the standard Remote Release, and must be installed in a suitable equipment enclosure either horizontally or vertically. The remote release contains all the necessary mounting and conduit holes needed to fully install the assembly. **Note:** OEM Release/Bracket Assembly must be installed high enough in cabinet so that there is sufficient room to install and remove cartridge.

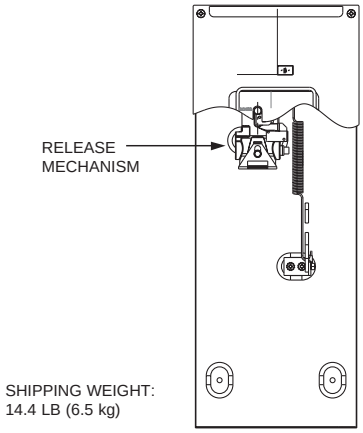


FIGURE 3-4
009456

SINGLE TANK ENCLOSURE ASSEMBLY

The Single Tank Enclosure Assembly (Part No. 429870) is used in double and multiple-tank systems and must be mounted to a rigid surface near the regulated release or regulated actuator assembly its expellent gas line will be connected to.

The enclosure is designed for mounting either a 1.5 gallon (Part No. 429864) or a 3.0 gallon tank (Part No. 429862) in a minimum amount of space.

ENCLOSURE ASSEMBLY

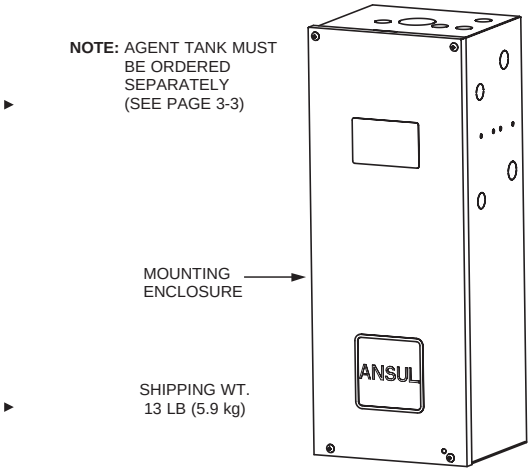


FIGURE 3-5
000142

RED PAINTED BRACKET ASSEMBLY

The Bracket Assembly (Part No. 429878) is used in double and multiple-tank systems and must be mounted to a rigid surface near the regulated release assembly or regulated actuator assembly that its expellant gas line will be connected to.

The tank bracket is constructed of mild steel and painted red. It is designed for mounting the tank in a minimum amount of space. The Bracket Assembly can only be utilized with 3.0 gallon tanks (Part No. 429862).

BRACKET ASSEMBLY

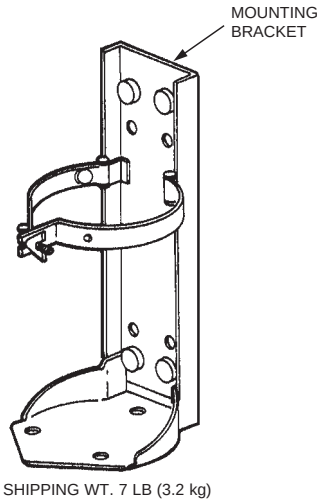


FIGURE 3-6
000141

REGULATED ACTUATOR ASSEMBLY

The Regulated Actuator Assembly (Part No. 429850) contains the regulator, pneumatic actuator, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing expellant piping. This assembly is used in multiple-tank systems and must be mounted to a rigid surface.

The regulator contains two outlets 135° apart. One outlet is used to interconnect the expellant gas hose to the enclosed agent tank. The other outlet connects an expellant gas line to an additional enclosure or bracket assembly. The regulator is designed to allow a constant flow of expellant gas into each agent tank at 110 psi (7.6 bar).

The pneumatic actuator is designed to puncture the expellant gas cartridge seal upon receiving pressure from the regulated release assembly actuation piping. The enclosure contains a knockout to facilitate distribution piping hookup.

REGULATED ACTUATOR ASSEMBLY

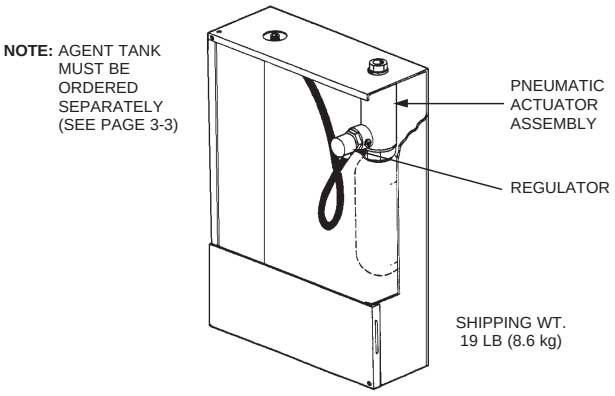


FIGURE 3-7
000143

AGENT TANK ASSEMBLY

The agent tank shipping assembly (3 Gallon (Part No. 429862) and 1.5 Gallon (Part No. 429864)) consists of a stainless steel tank and an adaptor/tube assembly. The adaptor/tube assembly contains a burst disc. The burst disc prevents agent leakage due to significant temperature fluctuations in the area where the tank is located. Under normal conditions, the tank requires hydrostatic testing every twelve years. The date of manufacture is stamped on the tank nameplate.

The tank is shipped uncharged and must be filled with only ANSULEX Low pH Liquid Fire Suppressant during installation.

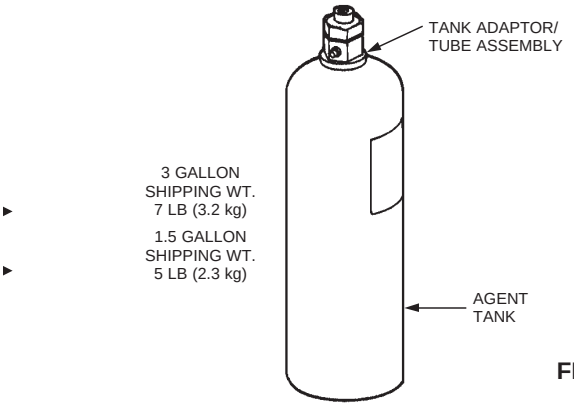


FIGURE 3-8
000140

OEM RELEASE/BRACKET ASSEMBLY (FOR OEM IN-CABINET USE ONLY)

The OEM Regulated Mechanical Release/Bracket Assembly (Part No. 79493) contains the same regulated release mechanism as the standard AUTOMAN Regulated Release Assembly. The OEM Regulated Electrical Release/Bracket Assembly (Part No. 437324*), is identical to the mechanical version except that it contains a factory installed 120 VAC solenoid and electrical switch. These release/bracket assemblies must be installed in a suitable equipment enclosure either horizontally or vertically. They contain all the necessary mounting and conduit holes needed to fully install the assembly. The agent tank is installed separately and need not be bracketed once it is piped and filled. **Note:** OEM Release/Bracket Assembly must be installed high enough in cabinet so that there is sufficient room to install and remove cartridge.

***Note:** OEM Regulated Electrical Release/Bracket Assembly (Part No. 437324) is not intended to be used with electric detection.

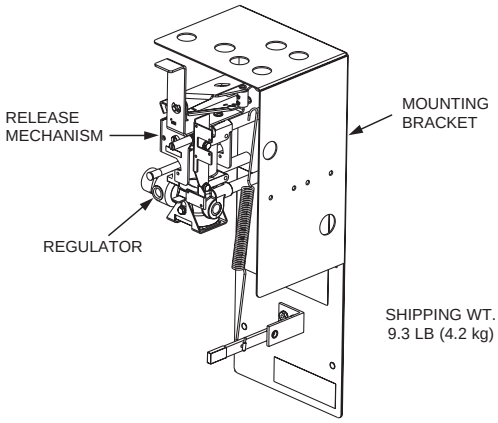
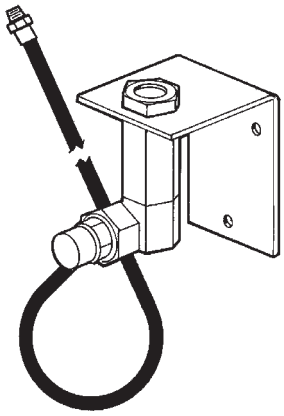


FIGURE 3-9
009457

OEM REGULATED ACTUATOR ASSEMBLY

The OEM Regulated Actuator Assembly (Part No. 418691) includes the regulator, pneumatic actuator, expellant gas hose and OEM bracket. Also available is an OEM Regulated Actuator Assembly with all the above mentioned components except for the bracket. This assembly is Part No. 418522.



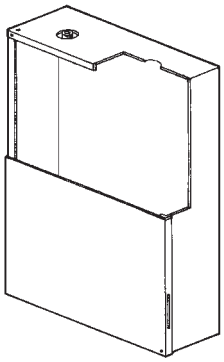
SHIPPING WT. 4 LB (1.8 kg)

FIGURE 3-10
002225

TWO TANK ENCLOSURE ASSEMBLY

The Two Tank Enclosure Assembly (Part No. 429872) consists of two expellant gas hoses, two grommets, and the mounting enclosure. The assembly is used in 9-gallon systems. It can be coupled with a 3-gallon regulated release assembly or a 3-gallon regulated actuator assembly to give a total of 9 gal (34.1 L) of agent. Agent tanks must be ordered separately.

The tank enclosure is designed to mount in a minimum amount of space.



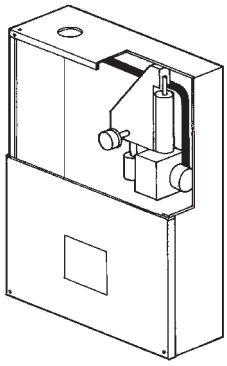
SHIPPING WT.
26 LB (11.8 kg)

FIGURE 3-11
002277

24VDC REGULATED RELEASE ASSEMBLY

The 24VDC Regulated Release Assembly (Part No. 429859) is used where electric, thermostat detection is required via the use of a releasing control unit. This assembly consists of a 24VDC AUTOMAN II-C regulated release mechanism, expellant gas hose, and enclosure knockouts to facilitate installing actuation piping, expellant piping, detection system, and additional equipment. Agent tank must be ordered separately.

The system can be actuated automatically or manually. Automatic actuation occurs when the control panel receives a signal from the detection circuit. The panel then sends an electrical signal to the 24VDC regulated release, causing it to actuate. When actuation occurs, the gas cartridge is punctured, pressurizing the agent tank and discharging the agent through the distribution piping. Manual actuation of the system occurs when personnel pull on the remote manual pull station pull ring.



NOTE: AGENT TANK MUST BE ORDERED SEPARATELY (SEE PAGE 3-3)

SHIPPING WT.
34 LB (15.4 kg)

FIGURE 3-12
002279

ADDITIONAL SHIPPING ASSEMBLIES

Several complete shipping assemblies are available containing both the release or actuator mechanism and the agent tank. When ordering a complete shipping assembly, order the following part numbers:

Part No.	Description	Shipping Wt. lb	(kg)
430299	3.0 Gallon Mechanical Release Shipping Assembly including: 429853 Mechanical Regulated Release Assembly 429862 3.0 Gallon Tank Assembly	33	(15)
430300	1.5 Gallon Mechanical Release Shipping Assembly including: 429853 Mechanical Regulated Release Assembly 429864 1.5 Gallon Tank Assembly	30	(14)
430309	3.0 Gallon Regulated Actuator Shipping Assembly including: 429850 Regulated Actuator Assembly 429862 3.0 Gallon Tank Assembly	36	(16)
430316	1.5 Gallon Stainless Steel Enclosure Shipping Assembly including: 429870 Single Tank Mounting Box Assembly 429864 1.5 Gallon Tank Assembly 418511 Hose Assembly	18	(8)
430317	3.0 Gallon Stainless Steel Enclosure Shipping Assembly including: 429870 Single Tank Mounting Box Assembly 429862 3.0 Gallon Tank Assembly 418511 Hose Assembly	20	(9)
430324	6.0 Gallon Stainless Steel Enclosure Shipping Assembly including: 429872 Two Tank Mounting Box Assembly 429862 3.0 Gallon Tank Assembly (2)	40	(18)
430332	3.0 Gallon Mounting Bracket Shipping Assembly including: 429878 3.0 Gallon Mounting Bracket Assembly 429862 3.0 Gallon Tank Assembly	20	(9)

GAS CARTRIDGES

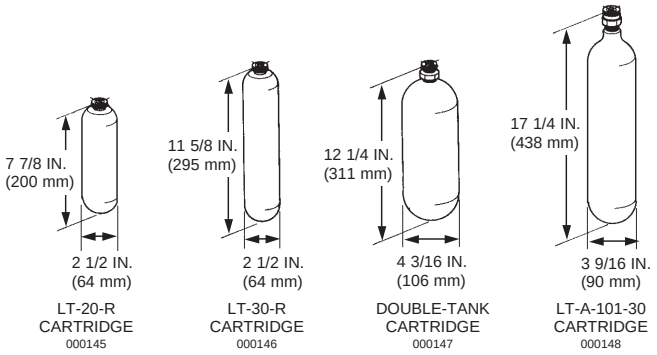
The R-102 system uses gas cartridges to store nitrogen or carbon dioxide expellant gases under pressure until the system is actuated, at which time the cartridge seal is punctured and the released gas expels liquid agent from one or more tanks through the discharge piping and out the discharge nozzles.

Four nitrogen gas cartridges and three carbon dioxide gas cartridges are available as shown in Figure 13.

Cartridges noted as TC/DOT are both Transport Canada (TC) and Department of Transportation (DOT) approved. Cartridges noted as DOT are Department of Transportation approved only.

Cartridge selection options are provided in Section 4 under Tank and Cartridge Requirements.

NITROGEN GAS CARTRIDGES



CARBON DIOXIDE CARTRIDGES

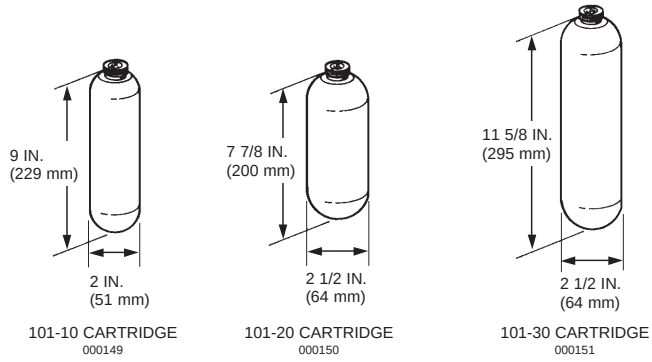


FIGURE 3-13

Additional cartridge shipping assemblies are available for European and Australian requirements.

Cartridge Description	European Part No.	Australian Part No.	TC/DOT Part No.
LT-20-R	428440	428948	423429
LT-30-R	428441	426553	423435
Double Tank	428446	426563	423493
LT-A-101-30	428442	426555	423491
101-10 – CO2	428443	N/A	423439
101-20 – CO2	428445	N/A	423441
101-30 – CO2	428444	N/A	423443

Note: For 101-10 cartridge, Part No. 15850 is DOT only.

NOZZLES

There are 11 types of discharge nozzles each designed to distribute the liquid agent in a uniform pattern throughout the hazard area:

1. 1/2N Nozzle
2. 1F Nozzle
3. 1W Nozzle
4. 1N Nozzle
5. 2W Nozzle
6. 230 Nozzle
7. 245 Nozzle
8. 260 Nozzle
9. 290 Nozzle
10. 2120 Nozzle
11. 3N Nozzle

Although these nozzles are similar in appearance and have certain common parts, the tip of each nozzle is designed for a specific application and must only be used in those areas. See Nozzle Application Chart in Section 4 – System Design, for individual nozzle usage. Nozzles are shipped with metal blow-off caps included.

A 25 pack of Nozzle O-rings (Part No. 439848) is also available.

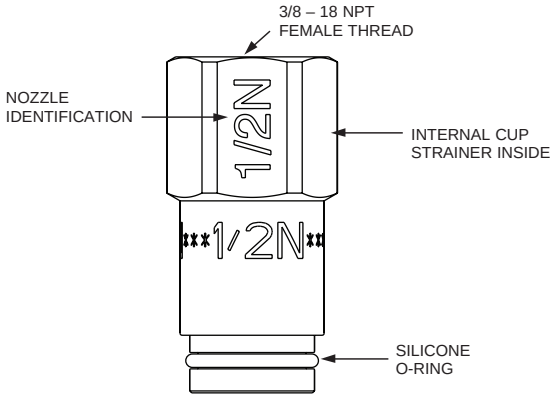


FIGURE 3-14
009474

Nozzle Identification Chart

Nozzle Type	Nozzle Part No.	Package Quantity	Nozzle Flow No.	Nozzle Material
1/2N Nozzle	439837	9	1/2	Chrome-Plated Body
1F Nozzle	439836	9	1	Chrome-Plated Body
1W Nozzle*	439839	25	1	Chrome-Plated Body
1N Nozzle*	439838	25	1	Chrome-Plated Body
2W Nozzle	439840	25	2	Chrome-Plated Body
230 Nozzle	439842	25	2	Chrome-Plated Body
245 Nozzle	439843	25	2	Chrome-Plated Body
260 Nozzle	439844	9	2	Chrome-Plated Body
290 Nozzle	439845	9	2	Chrome-Plated Body
2120 Nozzle	439846	9	2	Chrome-Plated Body
3N Nozzle	439841	9	3	Chrome-Plated Body

*Stainless steel versions are available in the 1W nozzle (Part No. 439864) and the 1N nozzle (Part No. 439865).

SILICONE LUBRICANT

Dow Corning Compound 111 (Part No. 78112) is available in a 5.3-ounce tube. Compound has excellent qualities for sealing and lubricating system components.

SWIVEL ADAPTOR

The Swivel Adaptor Assembly consists of a swivel nut, swivel body and swivel ball. All are chrome-plated. The swivel adaptor allows any nozzle to be rotated approximately 30° in all directions. Swivel Adaptors must be ordered as a Swivel Adaptor Shipping Assembly (Part No. 423572) which contains 25 Swivel Adaptors or Part No. 419385, which contains 9 Swivel Adaptors.

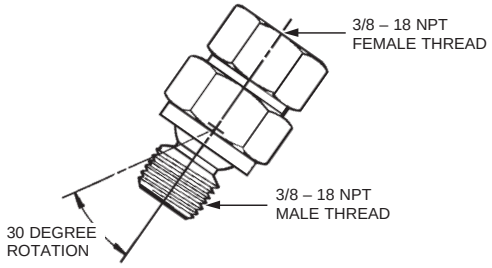


FIGURE 3-15
000003

METAL BLOW-OFF CAP

The Metal Blow-Off Cap helps keep the orifice of the nozzle free of grease or other substances that could interfere with agent distribution.

The Metal Blow-Off Cap Package (Part No. 439861) contains 10 blow-off caps.

Also available is a 10 pack of Stainless Steel Blow-Off Caps (Part No. 439866).

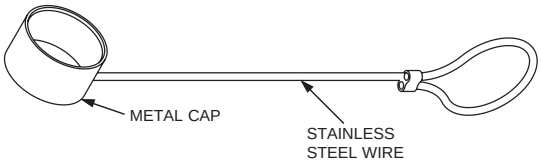


FIGURE 3-16
009475

REDUCING COUPLING

The reducing coupling (Part No. 436228) is made of stainless steel material with 3/8 in. x 1/2 in. NPT inlet threads. If necessary, the reducing coupling can be utilized when installing the Agent Distribution Hose Line Kit (Part No. 435982). Two couplings are required per Agent Distribution Hose.

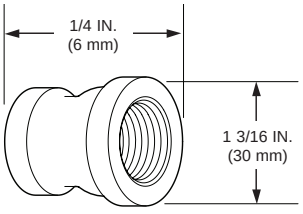


FIGURE 3-17

CONDUIT OFFSET ASSEMBLY

The conduit offset assembly (Part No. 435961) is used to change direction of the wire rope on detection, mechanical gas valve, and remote pull station lines. The conduit offset assembly can only be used in the area where the conduit attaches to the regulated release assembly. When using the conduit offset assembly, the maximum number of pulley elbows allowed is 16. The Conduit Offset Shipping Assembly (Part No. 436063) consists of 6 conduit offsets.

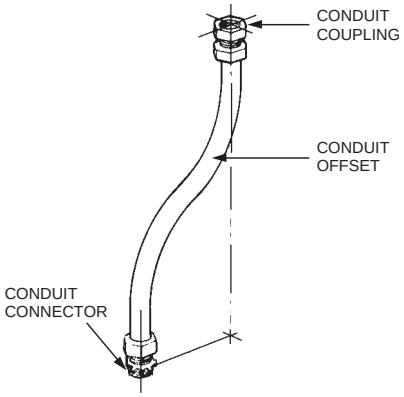


FIGURE 3-18
000153

"QUIK-SEAL" ADAPTOR

The "Quik-Seal" adaptor is a listed mechanical bulkhead fitting that produces a liquid-tight seal around both distribution piping and detection conduit which runs through restaurant hoods and ducts. The "Quik-Seal" adaptor accepts threaded pipe or conduit. The adaptor is available for 1/4 in. (Part No. 78196), 3/8 in. (Part No. 77285), 1/2 in. (Part No. 77287), or 3/4 in. (Part No. 77289) pipe or conduit sizes. When using with EMT conduit, a conduit connector must be installed in each end of the adaptor. The "Quik-Seal" Adaptor Shipping Assembly must be ordered as stated below:

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/4 in.	78196	24	3/4 in.
3/8 in.	77285	24	1 1/8 in.
1/2 in.	77287	24	1 1/8 in.
3/4 in.	77289	24	1 3/8 in.

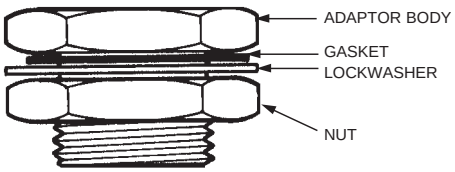


FIGURE 3-19
000154

"COMPRESSION-SEAL" ADAPTOR

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around pipe and conduit when installing distribution piping and detection conduit through restaurant hoods and ducts. The "Compression-Seal" adaptor is a straight-through design requiring no cutting or threading of conduit or pipe. The adaptor is available for pipe sizes of 1/4 in. (Part No. 79149), 3/8 in. (Part No. 79151), 1/2 in. (Part No. 79147), and EMT conduit size of 1/2 in. (Part No. 79153). Each "Compression-Seal" Adaptor Shipping Assembly must be ordered as stated below:

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/4 in. Pipe / 1/2 in. tube	79149	24	3/4 in.
3/8 in. Pipe / 5/8 in. tube	79151	24	1 1/8 in.
1/2 in. Pipe	79147	24	1 1/8 in.
1/2 in. EMT Conduit	79153	24	1 1/8 in.

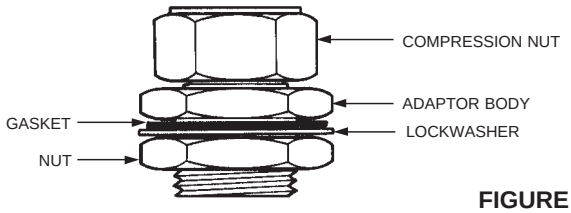


FIGURE 3-20
000155

"HOOD SEAL" ADAPTOR ASSEMBLY

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around 1/2 in. EMT conduit when installing the detection line through restaurant hoods and duct. The adaptor accepts a high temperature pulley elbow and, when used, correctly positions the elbow or conduit in line with the conduit adaptor hole in the detector bracket. The "Hood Seal" eliminates the need for multiple elbows when penetrating the top of a hood when installing the detection line. "Hood Seal" Adaptors are available in quantities of six as Shipping Assembly Part No. 423253.

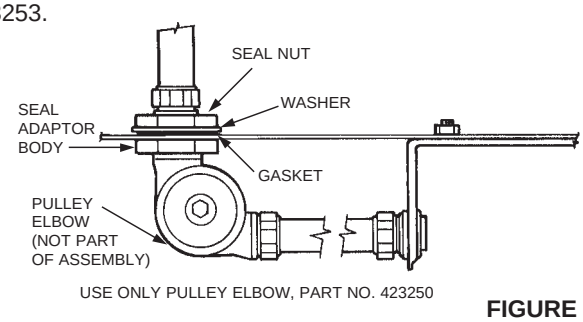


FIGURE 3-21
000156

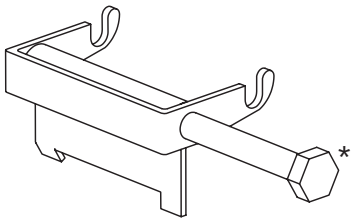
▸COCKING LEVER/LOCK PIN

The cocking lever is a component required to cock (arm) both the mechanical/electrical AUTOMAN release and the mechanical gas valve. After the AUTOMAN is cocked (armed), the lock pin must be inserted to eliminate the accidental firing of the release mechanism. These components are available as either an individual shipping assembly or a shipping assembly containing both. Listed below are the various shipping assembly part numbers.

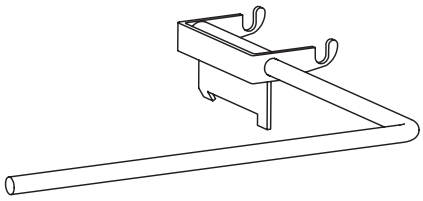
Part No.	Description
441042	Short Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
441041	Long Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
26310	Cocking Lever only (AUTOMAN II-C)
416018	Cocking Lever only (Mechanical Gas Valve)
438031	Lock Pin

Short Handle Cocking Lever

*Requires a crescent wrench or open end/box wrench



Long Handle Cocking Lever



Lock Pin

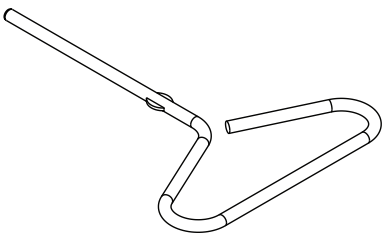


FIGURE 3-22
008325

DETECTORS

The detector consists of three basic components: the bracket, linkage, and fusible link. (Fusible links are not included and must be ordered separately.) The bracket holds the entire assembly to the mounting surface. The linkage is used to support the fusible link. The fusible link is designed to separate at a specific temperature and release the wire rope, thereby actuating the regulated release mechanism.

The scissor style detector allows the wire rope to be strung completely through the detection system conduit and brackets first and the detector linkage assemblies are then clipped on later.

The detector consists of two types of assemblies:

The Terminal Detector (Part No. 435546) includes a test link and is placed last in a series of detectors. This detector is sometimes referred to as the end-of-line detector and is thus named because it is at the point at which the wire rope "terminates," or is anchored at the detector bracket. Only one terminal detector is required per detection system.

The Series Detector (Part No. 435547) is any detector located in-line between the regulated release assembly and the terminal detector.

When using Part No. 435546 and 435547 detectors, a total of 15 detectors can be in one detection system: 14 series detectors (Part No. 435547) and 1 terminal detector (Part No. 435546).

Note 1: Series Detector (Part No. 435547) is also available as Part No. 435548, 25/Pkg.

▸ **Note 2**: Scissor-style linkage is also available in a 10-Pack (Part ▸ No. 439515).

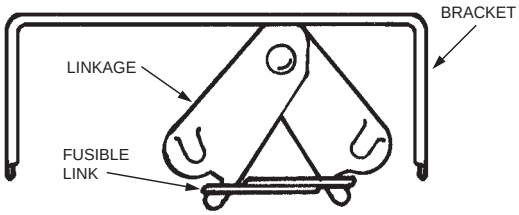
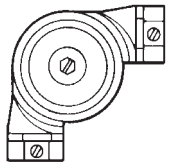


FIGURE 3-23
000159

PULLEY ELBOWS

There are two types of pulley elbows used to change the direction of the wire rope by 90°. ANSUL recommends for temperatures not in excess of 700 °F (371 °C). Part No. 415670 has socket ends with set screws for 1/2 in. conduit, and Part No. 423250 has compression ring ends also for 1/2 in. conduit. Pulley elbows must be ordered in quantities of 50 as Shipping Assembly Part No. 415671 (socket end type) and Part No. 423251 (compression end type).

PART NO. 415670



PART NO. 423250

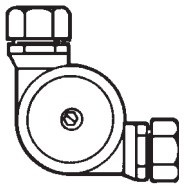


FIGURE 3-24
000160/000161

PULLEY TEE

The Pulley Tee (Part No. 427929) is used to change the direction of two wire ropes by 90°. It must be used in areas where the temperatures are within the range of 32 °F to 130 °F (0 °C to 54 °C). Pulley tees can be used in mechanical gas valve actuation lines and remote manual pull station lines. Pulley tees cannot be used within a detection line.

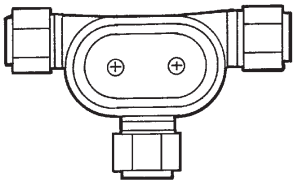


FIGURE 3-25
000447

▸ANSUL STAINLESS STEEL CABLE

The 1/16 in. stainless steel cable is run from the terminal detector, through conduit, all series detectors and pulley elbows, and into the regulated release mechanism trip lever. When any fusible link separates, the tension on the cable is relaxed, and the trip lever actuates the regulated release mechanism. The cable can also be used for mechanical gas valves and remote ▸manual pull stations. The cable is available in 50 ft (15.2 m) (Part No. 15821) and 500 ft (152.4 m) (Part No. 79653) lengths. ▸The ANSUL stainless steel cable contains a blue tracer cable.

REMOTE MANUAL PULL STATION

The remote manual pull station (Part No. 434618 or 435960) is made out of a molded red composite material. The red color makes the pull station more readily identifiable as the manual means for fire suppression system operation. The pull station is compatible with the ANSUL Flexible Conduit. The molded manual pull station should be mounted at a point of egress and positioned at a height determined by the authority having jurisdiction. Trim Rings (Part No. 427074) (pack of 10), are available.

Part No. 434618 (Without Wire Rope)
Part No. 435960 (With 50 ft (15.2 m) of Wire Rope)

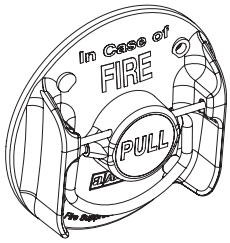


FIGURE 3-26
008326

FLEXIBLE CONDUIT

Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit. Flexible conduit can be used only with the Molded Manual Pull Station (Part No. 434618) and mechanical gas valve installations. The Flexible Conduit comes in a 500 ft (152.4 m) length (Part No. 434525) or together with 500 ft (152.4 m) of wire rope (Part No. 435959).

- A 50 ft (15.2 m) Flexible Conduit pre-fed with wire rope (Part No. 439104) is available.

  Also available is a Flexible Conduit Strain Relief (50-pack) (Part No. 435979).

- A 50-pack of Flexible Conduit Inserts (Part No. 434347) and a 50-pack of P-Clips (Part No. 436150) are also available.

- **Note 1: Flexible conduit is intended for indoor use ONLY.**

- **Note 2: Flexible conduit cannot be used in detection systems.**

MECHANICAL GAS VALVES

The mechanical gas valves are designed to shut off the flow of gas to the appliances upon actuation of the regulated release assembly. The valves are available in sizes of 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., and 2 in. ANSUL style; and 2 1/2 in. and 3 in. ASCO style. The valves are rated for natural and LP gas. Both styles are UL Listed and includes the air cylinder, tubing, and fittings (Part No. 15733) for connection to the release mechanism.

Part No.	Description	Maximum Operating Pressure
55598	3/4 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55601	1 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55604	1 1/4 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55607	1 1/2 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55610	2 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
25937	2 1/2 in. Gas Valve (ASCO)	5 psi (0.35 bar)
25938	3 in. Gas Valve (ASCO)	5 psi (0.35 bar)

Pipe Size (inches)	Flow Capacity (CFH) P.D. 1 in. WC 0.64 SP GR	BTU/HR, at 1 in. P.D. 0.64 SP GR 1000 BTU/ft^3 Natural Gas
3/4	751	751,000
1	1288	1,288,000
1 1/4	1718	1,718,000
1 1/2	2630	2,630,000
2	4616	4,616,000
2 1/2	5700	5,800,000
3	7100	7,300,000

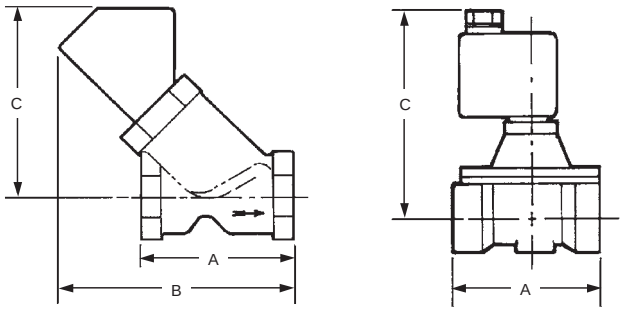
To calculate gas flow for other than 1 inch p.d.:

New cfh = (cfh at 1 inch) x $\sqrt{\text{new p.d.}}$

To calculate gas flow for other than 0.64 SP GR:

New cfh = (cfh at 0.64) x $\sqrt{\dfrac{0.64}{\text{New SP GR}}}$

Valve Size	A in.	A (mm)	B in.	B (mm)	C in.	C (mm)
3/4 in.	3 3/4	(95.3)	6 3/8	(161.9)	5 1/2	(139.7)
1 in.	3 3/4	(95.3)	6 3/8	(161.9)	5 1/2	(139.7)
1 1/4 in.	4 7/8	(123.8)	7 3/8	(187.3)	6 3/8	(161.9)
1 1/2 in.	4 7/8	(123.8)	7 3/8	(187.3)	6 3/8	(161.9)
2 in.	5 7/8	(149.2)	7 7/8	(200.0)	6 11/16	(169.9)
2 1/2 in.	7 13/16	(198.4)	-----		9 1/16	(230.2)
3 in.	7 25/32	(197.6)	-----		9 1/16	(230.2)



3/4 IN. THRU 2 IN.
004208

2 1/2 IN. THRU 3 IN.
004209

FIGURE 3-27

ELECTRICAL GAS VALVES

The electrical gas valves are designed to shut off the flow of either natural or LP gas to the appliances upon actuation of the regulated release assembly. The valves are available in sizes of 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., 2 in., 2 1/2 in., and 3 in. The valve is held open by an energized solenoid and upon system actuation, the switch contacts in the regulated release assembly open, thus de-energizing the circuit to the gas valve solenoid, causing the valve to close. Valves are available in 120 VAC and are UL Listed.

Part No.	Description	Max. Operating Pressure
13707	3/4 in. Solenoid Gas Valve (ASCO)	25 psi (1.7 bar)
13708	1 in. Solenoid Gas Valve (ASCO)	25 psi (1.7 bar)
550360	1 1/4 in. Solenoid Gas Valve (ASCO)	25 psi (1.7 bar)
13709	1 1/2 in. Solenoid Gas Valve (ASCO)	25 psi (1.7 bar)
13710	2 in. Solenoid Gas Valve (ASCO)	25 psi (1.7 bar)
▸550363	2 1/2 in. Solenoid Gas Valve (ASCO)	5 psi (0.3 bar)
▸17643	3 in. Solenoid Gas Valve (ASCO)	5 psi (0.3 bar)

Pipe Size (inches)	Flow Capacity (CFH) P.D. 1 in. WC 0.64 SP GR	BTU/HR, at 1 in. P.D. 0.64 SP GR 1000 BTU/ft^3 Natural Gas
3/4	264.96	247,500
1	1091.01	1,119,000
1 1/4	1662.49	1,730,000
1 1/2	1818.35	1,900,000
2	3117.18	3,251,000
2 1/2	6078.49	5,821,000
3	7169.51	7,430,000

To calculate gas flow for other than 1 inch p.d.:

New cfh = (cfh at 1 inch) x $\sqrt{\text{new p.d.}}$

To calculate gas flow for other than 0.64 SP GR:

New cfh = (cfh at 0.64) x $\sqrt{\frac{0.64}{\text{New SP GR}}}$

Valve Size	A in.	A (mm)	B in.	B (mm)
▸3/4 in.	3 5/16	(81)	3 5/8	(92)
1 in.	5	(127)	6 27/32	(174)
1 1/4 in.	7 13/16	(198)	7 29/32	(201)
1 1/2 in.	5	(127)	5 19/32	(142)
2 in.	6 3/32	(155)	5 15/16	(151)
2 1/2 in.	7 13/16	(198)	7 29/32	(201)
▸3 in.	7 13/16	(198)	7 29/32	(201)

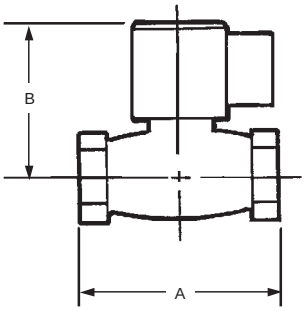


FIGURE 3-28
004210

MANUAL RESET RELAY

The Manual Reset Relay (Part No. 426151) is required when using an electrical gas valve shut-off system. After the electric gas valve has closed, either due to system actuation or power failure, the valve cannot be re-opened, allowing gas to flow, until the reset relay button is manually pressed, re-energizing the circuit. The reset relay is available 120 VAC. The manual reset relay is also recommended for electrical shut down.

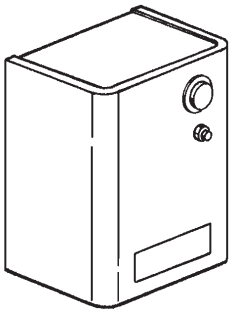


FIGURE 3-29
000087

ELECTRICAL SWITCHES

The electrical switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices and other electrical devices that are designed to shut off or turn on when the system is actuated.

Switches are available in kits: One Switch Kit (Part No. 423878), Two Switch Kit (Part No. 423879), Three Switch Kit (Part No. 423880), and Four Switch Kit (Part No. 423881). Mounting ▸ hardware and 24 in. (610 mm) long wire leads are provided with each kit. A Two-Switch Assembly without wire leads (Part No. ▸ 436770) is also available. Each switch has a set of single-pole, double-throw contacts rated at:

UL/cUL/CSA Rating	**ENEC Rating**
250 VAC, 21A Resistive	IE4T105µ Approved
250 VAC, 2 HP	250V, 21A Resistive
125 VAC, 1 HP	8A Motor Load

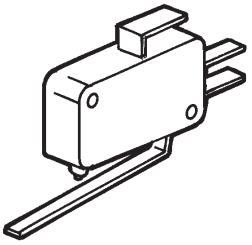


FIGURE 3-30
001612

ALARM INITIATING SWITCH

The Alarm Initiating Switch Kit (Part No. 428311) can be field mounted within the AUTOMAN release. This switch must be used to close a supervised alarm circuit to the building main fire alarm panel when the AUTOMAN release actuates. This action will signal the fire alarm panel that there was a system actuation in the kitchen area. The switch kit contains all necessary mounting components along with a mounting instruction sheet. The switch is rated 50 mA, 28 VDC.

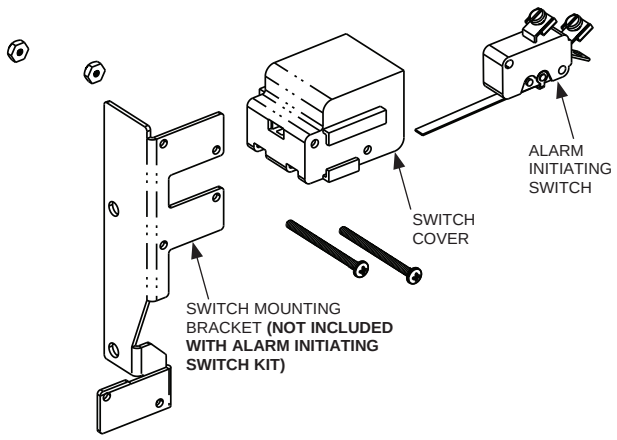


FIGURE 3-31
004890

REGULATOR TEST KIT

The Test Kit Assembly (Shipping Part No. 56972) is required to test the regulator setting and nitrogen flow during 12-year maintenance examinations. This will ensure that the regulator is functioning properly.

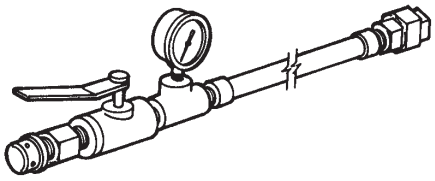


FIGURE 3-32
000169

VENT PLUG ASSEMBLY

The Vent Plug Assembly (Part No. 74274) is installed on the agent tank adaptor to prevent pressure buildup within the agent tank or distribution lines due to temperature fluctuations.

CARTRIDGE RECEIVER GASKET

The Cartridge Receiver Gasket (Part No. 181) is installed in the release and actuator assembly cartridge receiver to create a seal between the cartridge receiver assembly and the cartridge.

FUSIBLE LINK

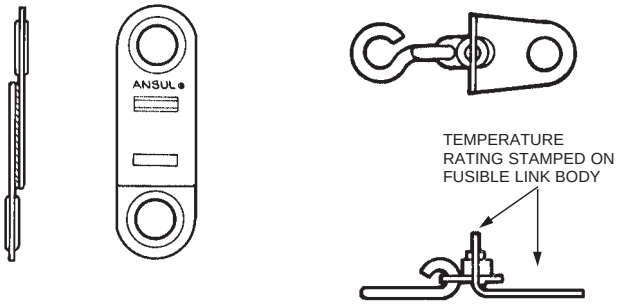
Select correct UL Listed fusible link(s) for installation in detector(s) according to the temperature condition chart below:

SL STYLE

Fusible Link Shipping Assembly Part No.	Temperature Rating	To Be Used Where Temperature Does Not Exceed	Color of Link
439085 (25)	165 °F	100 °F (74 °C)	Black (38 °C)
439086 (25)	212 °F	150 °F (100 °C)	White (66 °C)
439087 (25)	280 °F	225 °F (138 °C)	Blue (107 °C)
439088 (25)	360 °F	290 °F (182 °C)	Red (143 °C)
439089 (25)	450 °F	360 °F (232 °C)	Green (182 °C)

A-PC STYLE

Fusible Link Shipping Assembly Part No.	Temperature Rating	To Be Used Where Temperature Does Not Exceed
439227 (10)	165 °F (74 °C)	100 °F (38 °C)
439228 (10)	212 °F (100 °C)	150 °F (66 °C)
439229 (10)	280 °F (138 °C)	225 °F (107 °C)
439230 (10)	360 °F (182 °C)	290 °F (143 °C)
439231 (10)	450 °F (232 °C)	360 °F (182 °C)
439232 (25)	500 °F (260 °C)	400 °F (204 °C)



SL STYLE
000170

A-PC STYLE
000171

FIGURE 3-33

MAXIMUM REGISTERING THERMOMETER

The Maximum Registering Thermometer (Part No. 15240) may be used to indicate the highest normal temperature for the protected area. Once this is established, the correct rated fusible link can be chosen. Other methods for determining maximum temperatures may be used.

HOSE/GROMMET PACKAGE

The Hose/Grommet Package (Part No. 418511) consists of a 24 in. rubber hose and two grommets. This package is required when expellant gas hose is routed outside the AUTOMAN Regulated Release, Regulated Actuator, and/or tank enclosure assemblies.

IN-LINE BURST DISC ASSEMBLY (MANIFOLDED SYSTEMS ONLY)

The in-line burst disc assembly is required to eliminate the siphoning of the agent up the pipe during extreme temperature variations. In addition to eliminating the siphoning effect, the common in-line burst disc assembly eliminates the possibility of one or more individual discs located in the tank adaptor from failing to burst. The assembly consists of a stainless steel body which houses the burst disc. When utilizing this assembly in a manifolded system, it is necessary to modify (remove) the burst disc located in all of the R-102 tank adaptors in the system. The in-line burst disc assembly is to be mounted as close to the tank outlet as possible. After system discharge, the assembly must be disassembled and a new burst disc installed.

Part No.	Description
416970	In-Line Burst Disc Assembly
417911	Burst Disc (Pack of 10)

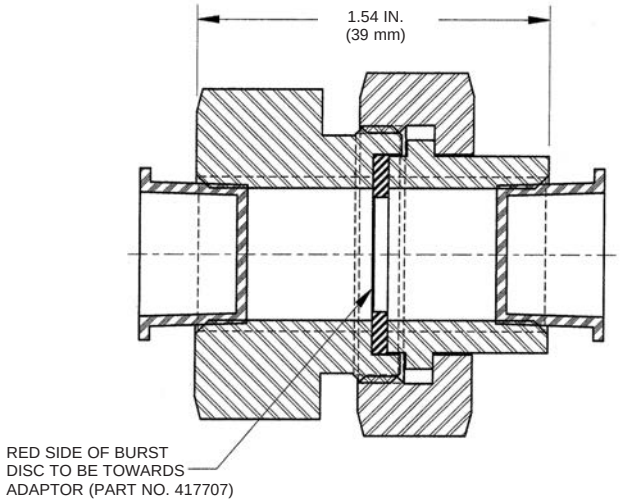


FIGURE 3-34
008383

1/4 IN. CHECK VALVE

The 1/4 in. check valve (Part No. 25627) blocks the flow of actuation gas from the actuator that was actuated to the actuator(s) that was not actuated. This prevents actuation gas from escaping from an open actuator which may have had the cartridge removed.

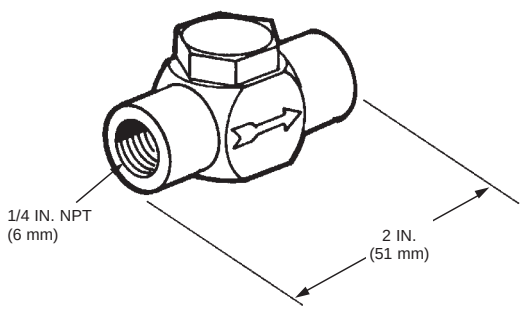


FIGURE 3-35
000899

NOZZLE AIMING DEVICE

The Nozzle Aiming Device (Part No. 439877) is available to properly aim each nozzle to the correct aiming point. The device clamps to the nozzle and emits a small laser light that reflects on the surface that it is aiming at. The nozzle can then be rotated to point at a predetermined aiming point and then tightened to hold that angle. The aiming device adaptor attaches to the nozzle. The shipping assembly consists of the aiming device and the adaptor.

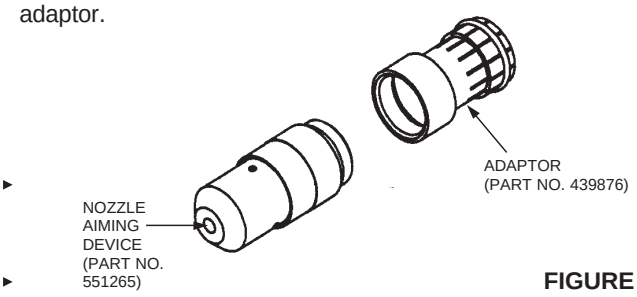


FIGURE 3-36
006520

STAINLESS STEEL BRAIDED ACTUATION HOSE

The Stainless Steel Actuation Hose is used to connect the actuation line compression tees between each pneumatic actuator. The hose has the same thread, 7/16-20, as the fittings. The actuation hose allows flexibility between the AUTOMAN and each regulated actuator.

Hose

Part No.	Length	Couplings
31809	16 in. (406 mm)	7/16-20 x 7/16-20 Females
32335	20 in. (508 mm)	7/16-20 x 7/16-20 Females
32336	24 in. (610 mm)	7/16-20 x 7/16-20 Females
430815	42 in. (1067 mm)	7/16-20 Female x 1/4 in. NPT Male

Fitting

Part No.	Description
31810	Male Elbow (7/16-20 x 1/4 in. NPT)
31811	Male Tee (7/16-20 x 7/16-20 x 1/4 in. NPT)
415371	Tee (7/16-20 x 1/8 in. Male NPT x 1/8 in. Female NPT)
32338	Male Straight Connector (7/16-20 x 1/4 in. NPT)
25627	1/4 in. Check Valve

FIGURE 3-37
000433

AGENT DISTRIBUTION HOSE AND RESTRAINING CABLE KIT

The Agent Distribution Hose and Restraining Cable Kit (Part No. 435982) consists of a 5 ft (1.5 m) long Agent Distribution Hose, a 3 ft (0.9 m) long Restraining Cable, and a Restraining Cable Hardware Package. The Agent Distribution Hose can be utilized with castered cooking appliances with castered supports found in commercial kitchens. The hose allows for movement of the appliance for cleaning without having to disconnect any fire suppression system discharge piping.

Note: The Agent Distribution Hose is authorized for use with only UL Listed ANSUL Wet Chemical Restaurant Fire Suppression Systems.

SYSTEM DESIGN

The ANSUL R-102 Restaurant Fire Suppression System may be used on a number of different types of restaurant cooking appliances and hood and duct configurations. The design information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the design of the R-102 system must be trained and hold a current ANSUL certificate in an R-102 training program.

The R-102 and the PIRANHA systems use compatible agents and components, therefore, they may be used together for cooking appliance, hood, and duct protection. The primary AUTOMAN Release can be either an R-102 or a PIRANHA AUTOMAN Release and can actuate up to two additional R-102 or PIRANHA Regulated Actuators. In systems utilizing a 101 remote release, any combination of the maximum number of regulated actuators can be used.

- Both systems must actuate simultaneously.
- Each system must be designed and installed per its appropriate manual.
- Adjacent appliances requiring protection must be protected with the same type of system, either R-102 or PIRANHA, unless the center-to-center spacing between the adjacent R-102 and PIRANHA nozzles is no less than 36 in. (914 mm).
- When appliances are protected with R-102 nozzles, the hood and connecting duct above those appliances cannot be protected with PIRANHA nozzles.
- Mixing systems in a common plenum is not allowed.

One of the key elements for restaurant fire protection is a correct system design. This section is divided into 10 sub-sections: Nozzle Placement Requirements, Tank Quantity Requirements, Actuation and Expellant Gas Line Requirements, Distribution Piping Requirements, Detection System Requirements, Manual Pull Station Requirements, Mechanical Gas Valve Requirements, Electrical Gas Valve Requirements, Electrical Switch Requirements, and Pressure Switch Requirements. Each of these sections must be completed before attempting any installation. System design sketches should be made of all aspects of design for reference during installation.

NOZZLE PLACEMENT REQUIREMENTS

This section gives guidelines for nozzle type, positioning, and quantity for duct, plenum, and individual appliance protection. This section must be completed before determining tank quantity and piping requirements.

Duct Protection – Single Nozzle

All duct protection is UL listed without limitation of maximum duct length (unlimited length). This includes all varieties of ductworks both horizontal and vertical including ducts that run at angles to the horizontal and ducts with directional bends.

Note: Ducts from multiple hoods connected to a common ductwork must be protected in compliance with NFPA 96 and all local codes.

The R-102 system uses different duct nozzles depending on the size of duct being protected.

GENERAL INFORMATION

1. Nozzles must be located 2-8 in. (51-203 mm) into the center of the duct opening, discharging up. See Figure 4-1.

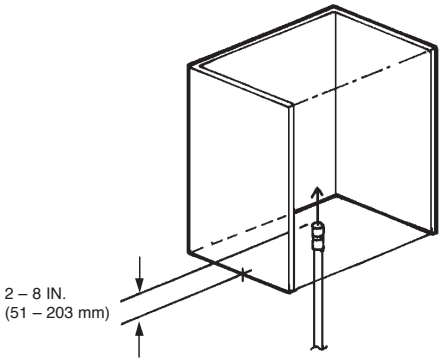


FIGURE 4-1
000173

2. In installations where a UL listed damper assembly is employed, the duct nozzle can be installed beyond the 8 in. (203 mm) maximum, to a point just beyond the damper assembly that will not interfere with the damper. Exceeding the maximum of 8 in. (203 mm) in this way will not void the UL listing of the system.
3. Previously listed three flow number and five flow number duct protection detailed in earlier published manual (Part No. 418087-06) can also still be utilized.

DUCT SIZES UP TO 50 IN. (1270 mm)
PERIMETER/ 16 IN. (406 mm) DIAMETER

- One 1W nozzle = one flow number
- 50 in. (1270 mm) perimeter maximum
- 16 in. (406 mm) diameter maximum

DUCT SIZES UP TO 100 IN. (2540 mm)
PERIMETER/ 32 IN. (812 mm) DIAMETER

- One 2W nozzle = two flow numbers
- 100 in. (2540 mm) perimeter maximum
- 32 in. (812 mm) diameter maximum

The chart below shows the maximum protection available from each duct nozzle.

Description	3.0 Gallon System	1.5 Gallon System
2W Nozzle	Maximum 100 in. (2540 mm) Perimeter	Maximum 100 in. (2540 mm) Perimeter
1W Nozzle	Maximum 50 in. (1270 mm) Perimeter	Maximum 50 in. (1270 mm) Perimeter

Duct Protection – Multiple Nozzle

DUCT SIZES UP TO 135 IN. (3429 mm) PERIMETER – THREE FLOW OPTION

- One 1W nozzle and one 2W nozzle = three flow numbers
- 135 in. (3429 mm) perimeter maximum
- No round duct option available
- Follow design table in Figure 4-2 to determine maximum module size for each nozzle

Side A Maximum		Side B Maximum		1W Module Side B Maximum		2W Module Side B Maximum	
in.	(mm)	in.	(mm)	in.	(mm)	w.	(mm)
4	(101)	60.0	(1524)	23.0	(584)	37.0	(939)
5	(127)	60.0	(1524)	23.0	(584)	37.0	(939)
6	(151)	59.5	(1511)	22.5	(571)	37.0	(939)
7	(177)	59.0	(1498)	22.0	(558)	37.0	(939)
8	(203)	58.5	(1485)	22.0	(558)	36.5	(927)
9	(228)	58.0	(1473)	21.5	(546)	36.5	(927)
10	(254)	57.0	(1447)	21.0	(533)	36.0	(914)
11	(279)	56.0	(1422)	20.5	(520)	35.5	(901)
12	(304)	55.5	(1409)	20.0	(508)	35.5	(901)
13	(330)	54.5	(1384)	19.5	(495)	35.0	(889)
14	(355)	53.5	(1358)	18.5	(469)	35.0	(889)
15	(381)	52.0	(1320)	18.0	(457)	34.0	(863)
16	(406)	51.0	(1295)	17.0	(431)	34.0	(863)
17	(431)	49.5	(1257)	16.0	(406)	33.5	(850)
18	(457)	47.5	(1206)	14.5	(368)	33.0	(838)
19	(482)	46.0	(1168)	13.5	(342)	32.5	(825)
20	(508)	43.5	(1104)	12.0	(304)	31.7	(805)
21	(533)	41.0	(1041)	10.0	(254)	31.0	(787)
22	(558)	38.0	(965)	7.5	(190)	30.5	(774)
23	(584)	33.5	(850)	4.0	(101)	29.5	(749)

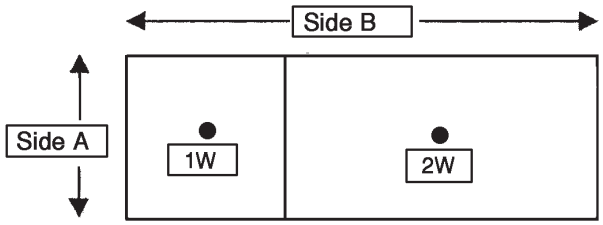


FIGURE 4-2
006521

Example: Protection is required for a duct that has an "A" dimension of 8 in. (203 mm) wide and a "B" dimension of 55 in. (1397 mm) long.

Referring to the table in Figure 2, if the "A" dimension is 8 in. (203 mm), the "B" dimension must not exceed 58.5 in. (1485 mm). In this example, the "B" dimension is 55 in. (1397 mm), therefore, this duct can be protected with a three flow application.

Read over from the 8.0 in. (203 mm) line on the table to the 1W Module column. At that point, the chart shows that the "B" module length for the 1W nozzle can be 22.0 in. (558 mm). Center the 1W nozzle in that module. The 2W module can now be centered within the remaining module.

Duct Protection – Multiple Nozzle (Continued)

DUCT SIZES GREATER THAN 100 IN. (2540 mm) PERIMETER

- Ducts over 100 in. (2540 mm) perimeter may be modularized using 2W nozzles
- No round duct option available
- Follow the design chart to determine maximum module size for each 2W nozzle
- When determining number of nozzles required, it is sometimes an advantage to check the chart using the shortest side as Side “A” and then recheck it using the longest side as Side “A.” This comparison may reveal a need for a lesser quantity of nozzles one way versus the other way.

When working with Chart 4-1, the quantity of nozzles determined must be equally divided within the duct area.

When working with Chart 4-2, one half of the quantity of nozzles determined must be equally positioned in the top half of the area of the duct and the remaining half of the nozzles must be positioned in the bottom half of the duct area.

Example: The duct to be protected has a Side “A” of 40 in. (1016 mm) and a Side “B” of 60 in. (1524 mm). Referring to the design chart, this duct requires four nozzles. One half of 4 = 2. Therefore, two nozzles must be equally positioned in each of the two duct areas. See Figure 4-3.

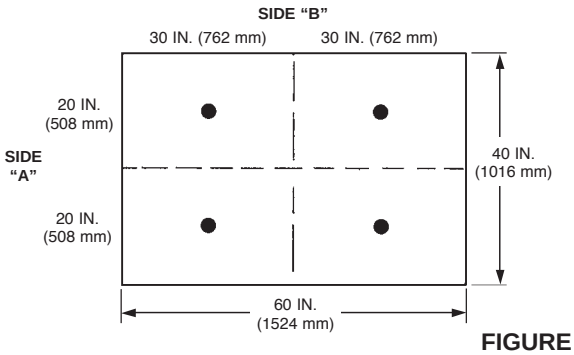


FIGURE 4-3
006523

CHART 4-1

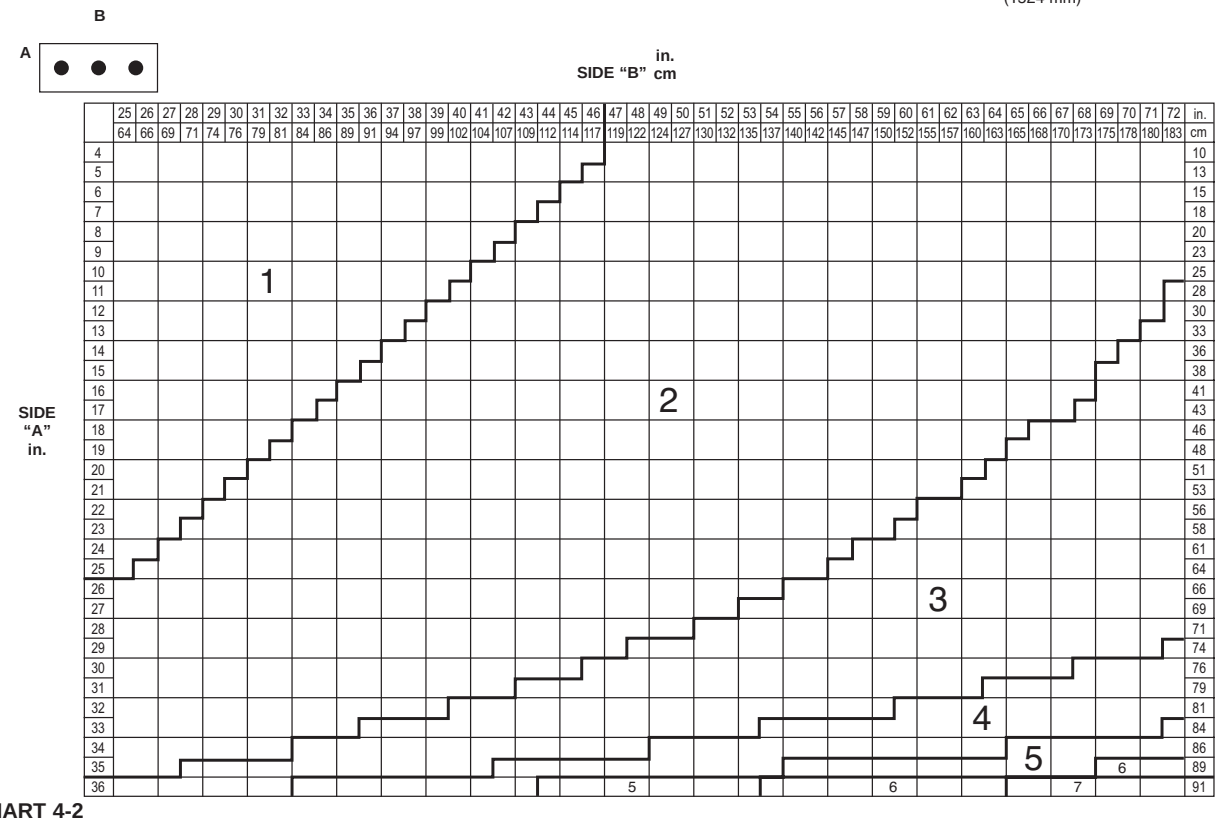
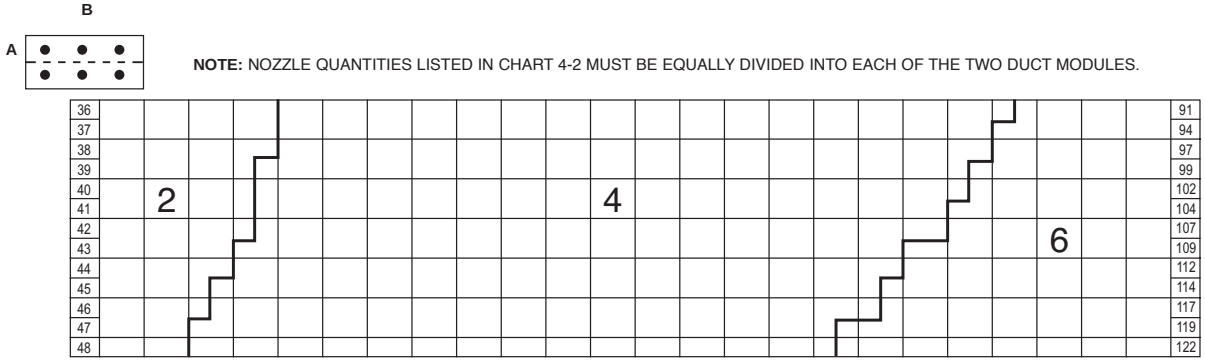


CHART 4-2



NOTE: NOZZLE QUANTITIES LISTED IN CHART 4-2 MUST BE EQUALLY DIVIDED INTO EACH OF THE TWO DUCT MODULES.

006522

Transition Protection

Transitions are protected at a point in the transition where the perimeter or the diameter is equal to or less than the maximum size duct that can be protected. The nozzle(s) must be located in the center of the area at that point, or center of the module protected when more than one duct nozzle is required. **Note: Nozzles to protect ducts with a transition that is more than 4 ft (1.2 m) in height, will be required to be positioned in the opening of the transition from the hood 2 to 8 in. (50 to 203 mm) into the opening using standard duct nozzle design parameters.** See Figure 4-4.

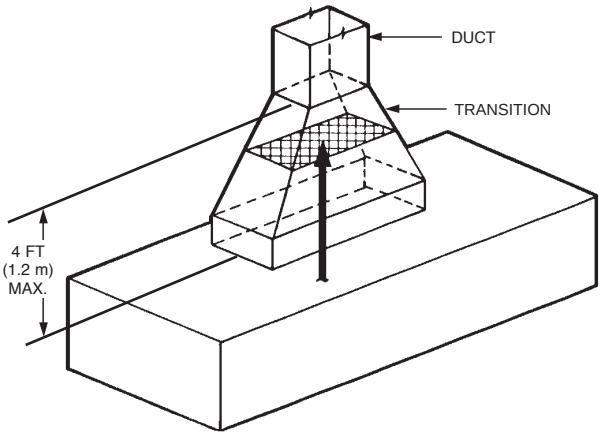


FIGURE 4-4
000174

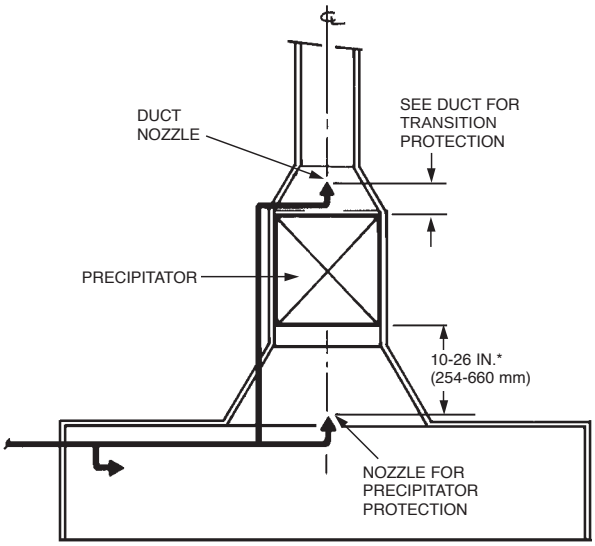
Electrostatic Precipitator Protection

Some restaurant ventilating ducts have an electrostatic precipitator installed at or near the base. These precipitators are generally small and are used to aid in the cleaning of exhaust air.

Ducts with precipitators located at or near the base can be protected using duct nozzle(s) above the precipitator and 1/2N nozzle(s) for the precipitator. One 1/2N nozzle must be used ► for each cell being protected. This nozzle is stamped with 1/2N, indicating that it is a 1/2-flow nozzle and must be counted as 1/2 flow number.

When protecting ducts equipped with precipitators, the duct nozzle(s) must be installed above the precipitator and aimed to discharge downstream. If the area above the precipitator is a duct, the nozzle(s) must be positioned according to duct protection guidelines. If the area above the precipitator is a transition, the transition guidelines must be followed.

The 1/2N nozzle must be centered 10 to 26 in. (254 to 660 mm) below the precipitator and aimed to discharge at the center of each precipitator cell. However, if it is physically impossible to mount the nozzle at 10 to 26 in. (254 to 660 mm) due to precipitator placement, the nozzle may be mounted closer than 10 in. (254 mm). See Figure 4-5.



* IF PHYSICALLY IMPOSSIBLE AT 10 TO 26 IN. (254 TO 660 mm), NOZZLE MAY BE MOUNTED CLOSER THAN 10 IN. (254 mm).

FIGURE 4-5
000196

Note: For protection of Pollution Control Units (PCUs) or air scrubbers with or without ESPs, contact Technical Services for non-UL listed recommended application.

Plenum Protection

The R-102 system uses the 1W nozzle or the 1N nozzle for plenum protection. The 1W nozzle is stamped with 1W and the 1N nozzle is stamped with 1N, indicating they are one-flow nozzles and must be counted as one flow number each. When protecting a plenum chamber, the entire chamber must be protected regardless of filter length.

VERTICAL PROTECTION – GENERAL

1W NOZZLE – SINGLE AND "V" BANK PROTECTION

One 1W nozzle will protect 4 linear feet (1.2 m) of plenum. The maximum distance from the end of the hood to the first and last nozzle must be no more than 2 ft (0.6 m). After the first nozzle, any additional nozzles must be positioned at a maximum of 4 ft (1.2 m) apart down the entire length of the plenum. The plenum width must not exceed 4 ft (1.2 m). (The 1W nozzle can be used on single or V-bank filter arrangements.) See Figure 4-6.

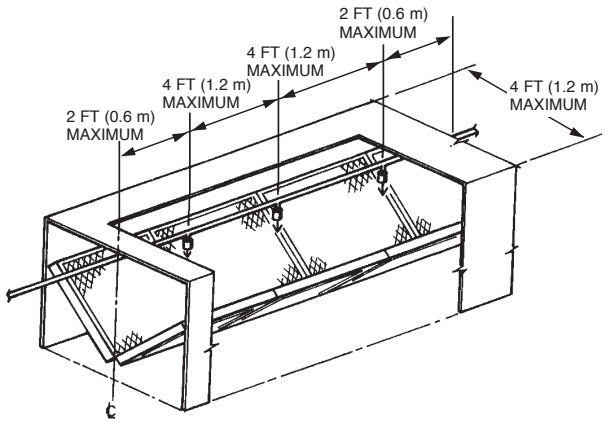


FIGURE 4-6
000197

When protecting plenums with the 1W nozzle, two options of coverage are available:

Option 1: The 1W nozzle must be on the center line of the single or "V" bank filter and positioned within 1-20 in. (26-508 mm) above the top edge of the filter. See Figure 4-7.

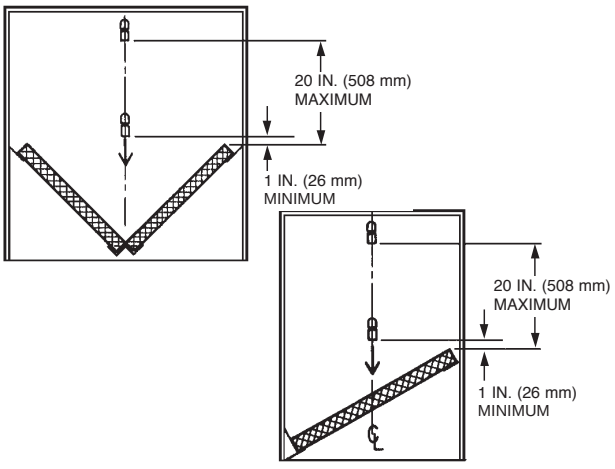


FIGURE 4-7
000199

Option 2: The 1W nozzle must be placed perpendicular, 8-12 in. (203-304 mm) from the face of the filter and angled to the center of the filter. The nozzle tip must be within 2 in. (50 mm) from the perpendicular center line of the filter. See Figure 4-8.

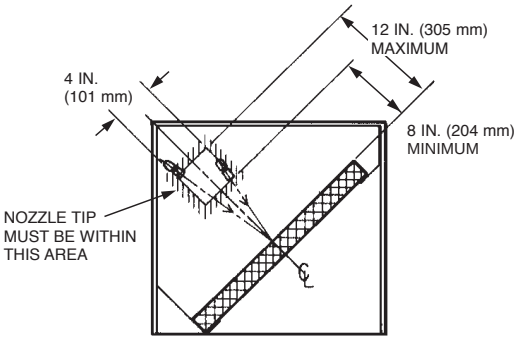


FIGURE 4-8
000200

HORIZONTAL PROTECTION – OPTION 1

1N NOZZLE SINGLE BANK PROTECTION

One 1N nozzle will protect 10 linear feet (3.0 m) of single filter bank plenum. The nozzle(s) must be mounted in the plenum, 2 to 4 in. (50 to 102 mm) from the face of the filter, centered between the filter height dimension, and aimed down the length. The nozzle must be positioned 0-6 in. (0-152 mm) from the end of the hood to the tip of the nozzle. See Figure 4-9.

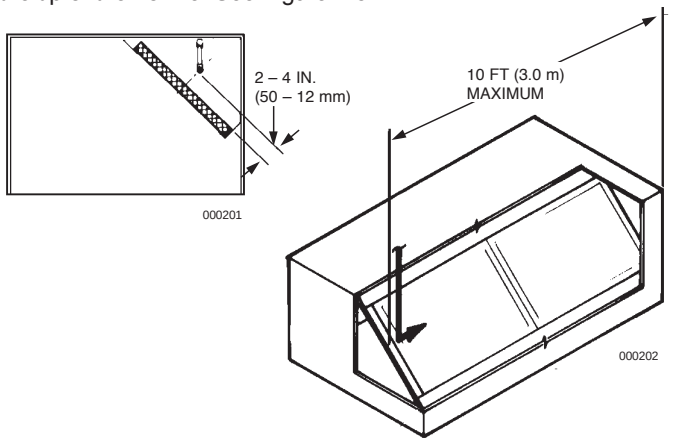


FIGURE 4-9

Plenum Protection (Continued)

HORIZONTAL PROTECTION – OPTION 2

1W NOZZLE – "V" BANK PROTECTION

One 1W nozzle will protect 6 linear feet (1.8 m) of "V" bank plenum. The nozzle must be mounted horizontally, positioned 1/3 the filter height down from the top of the filter. Nozzles can be located at 6 ft (1.8 m) spacings on longer plenums. The nozzle must be positioned 0-6 in. (0-152 mm) from the end of the hood to the tip of the nozzle. See Figure 4-10.

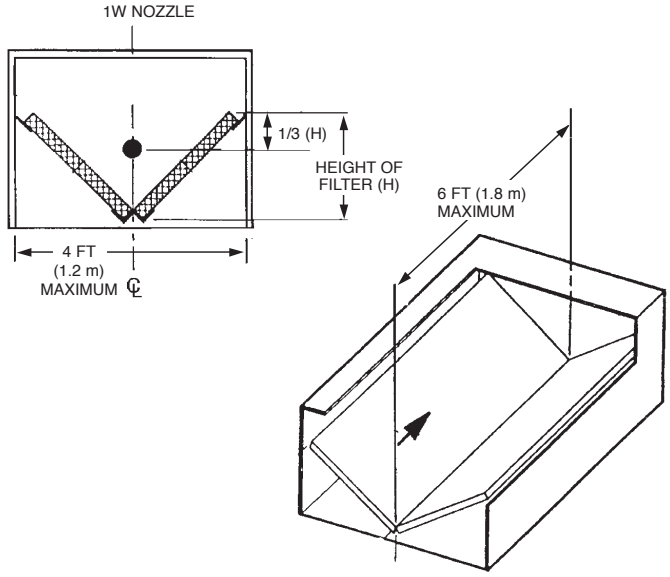


FIGURE 4-10
006524

TWO 1N NOZZLES – "V" BANK PROTECTION

Two 1N nozzles will protect 10 linear feet (3.0 m) by 4 ft (1.2 m) wide of "V" bank plenum. The nozzles must be mounted in the plenum, 2 to 4 in. (50 to 101 mm) from the face of the filter, centered between the filter height dimension, and aimed down the length. The nozzle must be positioned 0-6 in. (0-381 mm) from the end of the hood to the tip of the nozzle. See Figure 4-11.

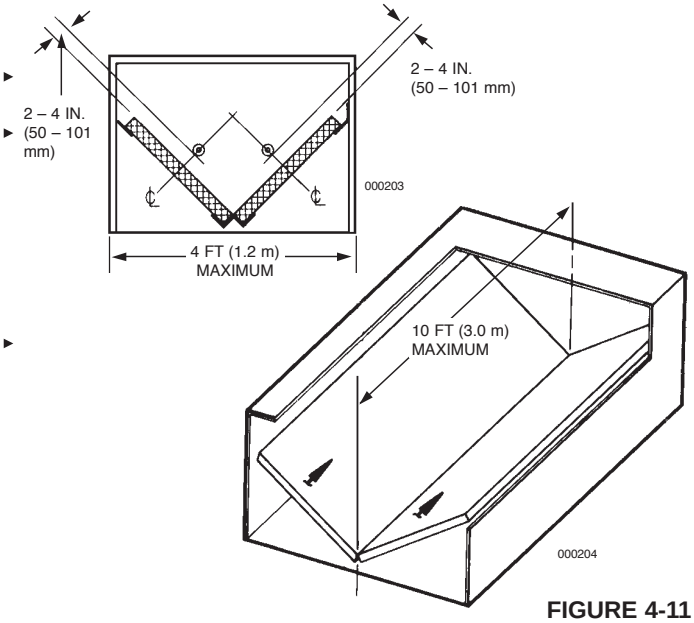


FIGURE 4-11

For a plenum, either single or "V" bank, with a linear extension longer than 10 ft (3.0 m), each bank may be protected using one 1N nozzle every 10 ft (3.0 m) or less depending on the overall length of the plenum. See Figure 4-12. The nozzles may point in the opposite directions as long as the entire plenum area is protected, and the 10 ft (3.0 m) limitation is not exceeded. See Figure 4-13. The nozzle positioning shown in Figure 4-14 is not an acceptable method of protection because the plenum area directly under the tee is not within the discharge pattern of either nozzle.

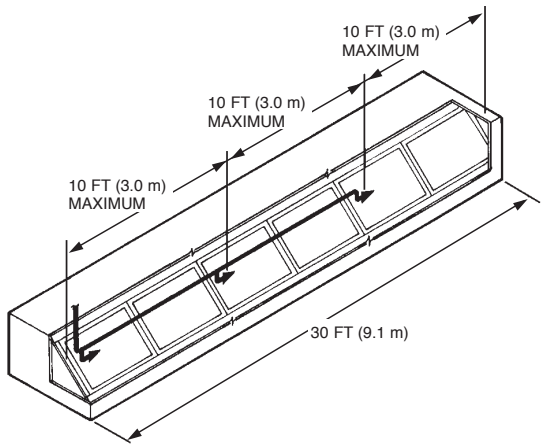


FIGURE 4-12
000206

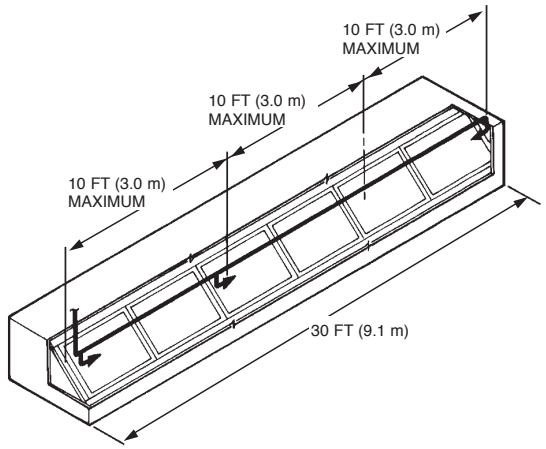


FIGURE 4-13
000207

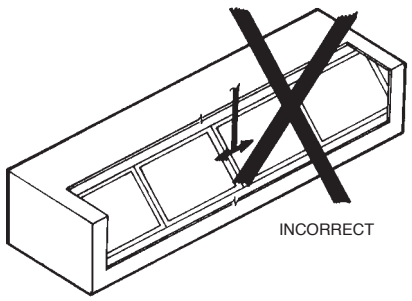


FIGURE 4-14
000208

Appliance Protection

The following pages detail types of appliance protection. Each design requires several factors: correct nozzle choice, correct nozzle height above hazard, correct nozzle location and correct aiming point.

Fryer – Single Nozzle Protection

1. Design requirements for fryers are broken down into two types.
   A. FRYERS WITHOUT DRIPBOARDS

      If the fryer does not include a dripboard, measure the internal depth (horizontal dimension from front to back) and length of the frypot.

   B. FRYERS WITH DRIPBOARDS

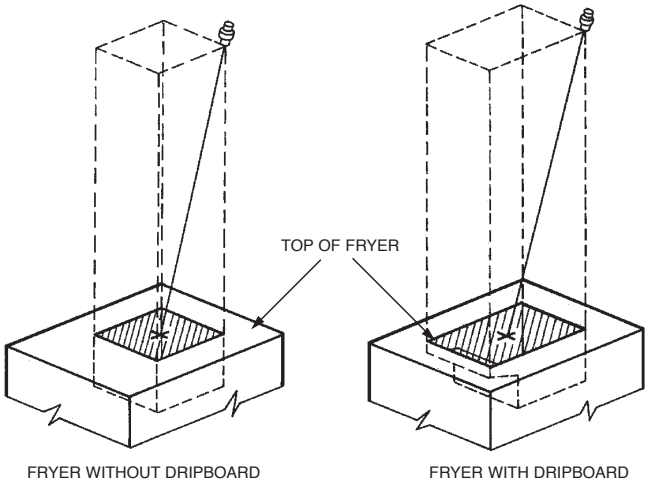
      If the fryer includes any dripboard areas, measure both the internal depth (horizontal dimension from front to back) and length of the frypot portion, and then measure the internal depth and length of the overall hazard area including any dripboard areas.
2. Using Table, "Maximum Cooking Area Dimension – Single Nozzle Fryer Protection," determine which nozzle is needed to protect the fryer based on the maximum dimensions listed.
   A. If the fryer does not include a dripboard, use the maximum dimensions listed in the first column of the table to select the correct nozzle.
   B. If the fryer includes any dripboard areas, use both the maximum frypot dimensions in the first column of the table, **and** the maximum overall dimensions in the second column of the table to select the correct nozzle. None of the maximum dimensions in either column may be exceeded.
3. If either the maximum frypot or the overall sizes are exceeded, an additional nozzle(s) will be required. Refer to the multiple nozzle requirements.

Example: A fryer with a dripboard. The inside of the frypot without the dripboard measures 18 in. in depth x 18 in. in length (457 mm x 457 mm) and the inside of the overall area including the dripboard measures 18 in. in depth x 24 in. in length (457 mm x 610 mm). From the Table "Maximum Cooking Area Dimension – Single Nozzle Fryer Protection," either the 3N or the 290 nozzle should be selected to protect the fryer, depending on the maximum nozzle height above the fryer and the positioning requirements allowed. Refer to appropriate Figures.

Fryer – Single Nozzle Protection (Continued)

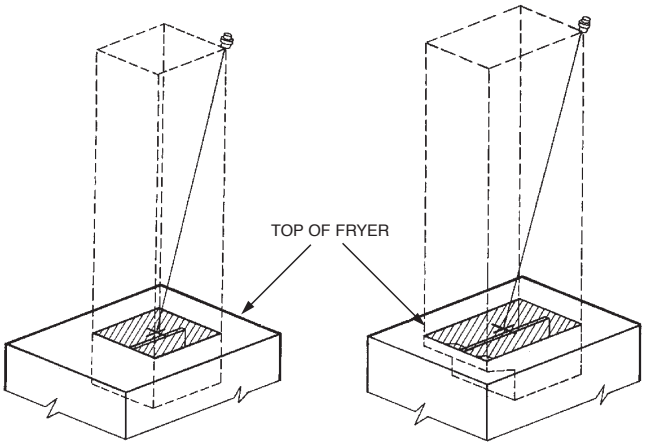
Maximum Area Dimensions – Single Nozzle Fryer Protection

Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
Full or Split Vat 14 in. x 15 in. ▸ (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	230	27 in. to 47 in. (686 mm to 1193 mm)	See Figure 4-15 and 4-16
Full or Split Vat 14 in. x 15 in. ▸ (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	245	20 in. to 27 in. (508 mm to 685 mm)	See Figure 4-15 and 4-16
Full or Split Vat 14 in. x 15 in. ▸ (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	290	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-17
Full or Split Vat 14 1/2 in. x 14 in. ▸ (368 mm x 355 mm)	Full or Split Vat 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm)	290	16 in. to 27 in. (406 mm to 685 mm)	See Figure 4-17



NOZZLE TIP POSITIONED ANYWHERE ALONG OR WITHIN PERIMETER OF COOKING SURFACE AND AIMED TO THE CENTER OF THE COOKING AREA.

FIGURE 4-15
002280



SPLIT VAT

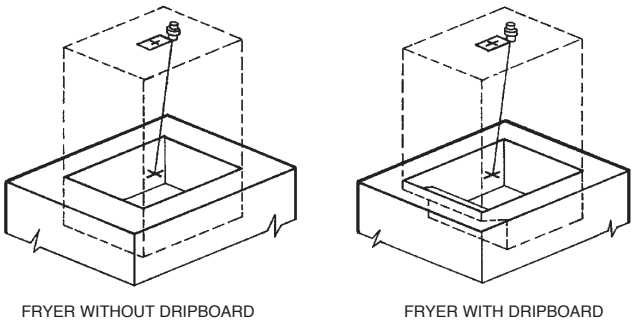
NOZZLE TIP POSITIONED ANYWHERE ALONG OR WITHIN PERIMETER OF COOKING SURFACE AND AIMED TO THE CENTER OF THE COOKING AREA.

FIGURE 4-16
002283

Fryer – Single Nozzle Protection (Continued)

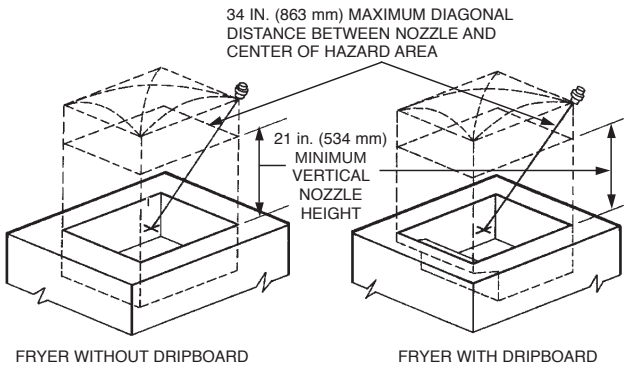
Maximum Area Dimensions – Single Nozzle Fryer Protection (Continued)

Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
▸ 14.5 in. x 16.5 in. ▸ (368 mm x 419 mm)	14.5 in. x 26.5 in. (368 mm x 673 mm)	290	16 in. to 21 in. (406 to 533 mm)	See Figure 4-17
19.5 in. x 19 in. ▸ (495 mm x 482 mm)	19.5 in. x 25 3/8 in. (495 mm x 644 mm)	290	13 in. to 16 in. (330 to 406 mm)	See Figure 4-17
19.5 in. x 19 in. ▸ (495 mm x 482 mm)	19.5 in. x 25 3/8 in. (495 mm x 644 mm)	3N	See Figure 4-18	See Figure 4-18
18 in. x 18 in. ▸ (457 mm x 457 mm)	18 in. x 27 3/4 in. (457 mm x 704 mm)	3N	25 in. to 35 in. (635 mm to 889 mm)	See Figure 4-19



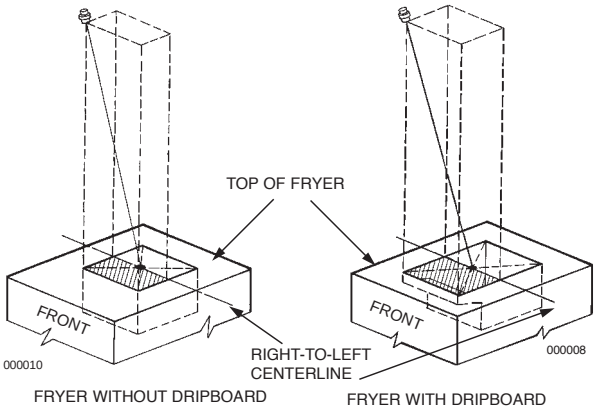
290 NOZZLE TIP POSITIONED OVER THE MIDPOINT OF THE HAZARD AREA ± 3 IN. (76 mm) FROM THE MIDPOINT ALONG THE LONGEST SIDE OF THE HAZARD AND ± 1 IN. (25 mm) FROM THE MIDPOINT ALONG THE SHORTEST SIDE OF THE HAZARD AND AIMED AT THE MIDPOINT OF THE COOKING AREA.

FIGURE 4-17
002286



3N NOZZLE TIP POSITIONED ANYWHERE ALONG OR WITHIN PERIMETER OF COOKING SURFACE AND AIMED TO THE CENTER OF THE COOKING AREA.

FIGURE 4-18
002287



NOTE: 3N NOZZLE TIP MUST BE LOCATED WITHIN THE PERIMETER OF THE SURFACE AREA WITHIN THE FRONT HALF OF THE FRY POT AND AIMED AT THE CENTER.

FIGURE 4-19

Fryer – Multiple Nozzle Protection

Design Requirements:

Fryers exceeding the coverage of a single nozzle can be divided into modules. Each module must not exceed the maximum area allowed for a single nozzle. However, when utilizing multiple nozzle protection, the longest side allowed for a fryer with dripboard can be used, regardless of whether the fryer has a dripboard or not.

The maximum size fryer that can be modularized is 864 in.^{2} ▸ (55742 mm^2).

1. Design requirements for multiple nozzle fryers are broken down into two types:
   A. FRYERS WITHOUT DRIPBOARD(S)
      If the fryer does not include a dripboard, measure the internal depth (horizontal dimension from front to back) and length of the frypot. Then, multiply the depth and length to obtain the area of the frypot in square inches.
   B. FRYERS WITH DRIPBOARD(S)
      If the fryer includes any dripboard areas, measure both the internal depth and length of the frypot portion, and then measure the internal depth and length of the overall hazard area including any dripboard areas.
      Determine the area of both the frypot and the area of the overall vat by multiplying corresponding depth and length dimensions.
2. Divide the frypot or overall vat into modules, each of which can be protected by a single nozzle, based on the maximum dimension and area coverage of the nozzle as specified in Table, "Maximum Cooking Area Dimension – Multiple Nozzle Protection."
   A. If the module considered does not include any portion of the dripboard, use only the maximum frypot area and maximum dimension listed in the first column of the table to select the correct nozzle.
   B. If the module considered includes any dripboard areas, use both the maximum frypot area and dimension listed in the first column of the table, and the maximum overall area and dimensions listed in the second column of the table to select the correct nozzle.
3. None of the maximum dimensions in either column may be exceeded. If either the maximum frypot or the overall sizes are exceeded, the area divided into modules will need to be redefined with the possibility of an additional nozzle.

Options For Modularizing Fryers

The following Figure 4-20 shows approved methods of dividing (modularizing) fryers so that each section can be properly protected.*Example: A fryer with a dripboard. The inside vat without the dripboard measures 18 in. in depth x 30 in. in length (457 mm x 762 mm) and the inside of the overall vat including the dripboard measures 24 in. in depth x 30 in. in length (610 mm x 762 mm). Because the fryer is 30 in. (762 mm) in length, it exceeds the coverage of a single nozzle.*

Dividing the length in half, each module now has an overall vat dimension of 24 in. in depth x 15 in. in length (610 mm x 381 mm). From the Table, "Maximum Cooking Area Dimension – Multiple Nozzle Fryer Protection," either the 3N or the 290 nozzle should be selected to protect each fryer module, depending on the maximum nozzle height above the fryer and the positioning requirements allowed. Refer to appropriate Figures, 4-15 through 4-19.

See additional examples in Appendix Section.

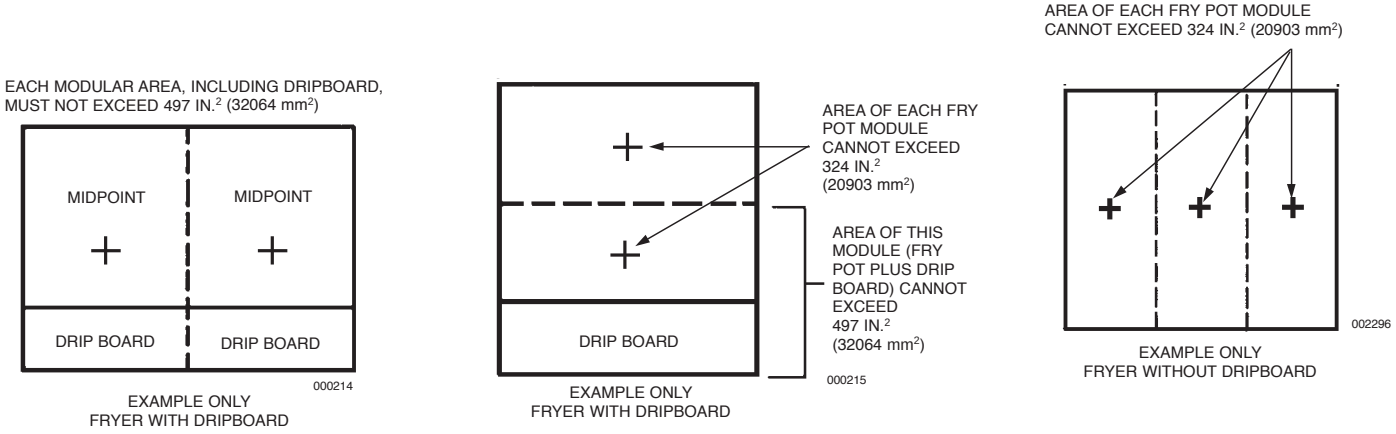
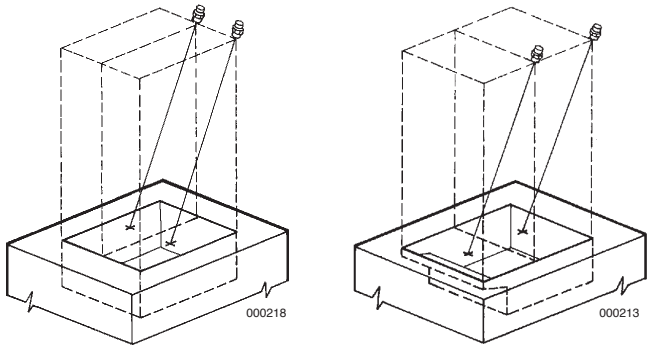


FIGURE 4-20

Fryer – Multiple Nozzle Protection (Continued)

Maximum Area Dimension – Multiple Nozzle Fryer Protection

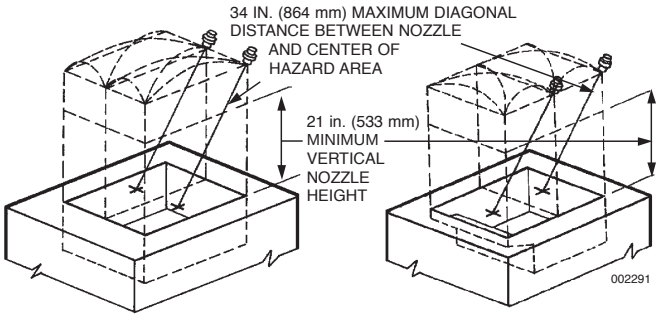
Max. Size Module Frypot Only	Max. Size Module Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
Full or Split Vat 21 in. x 210 in.^{2} (533 mm x 0.14 m^2)	Full or Split Vat 21 in. x 294 in.^{2} (533 mm x 0.19 m^2)	230	27 in. to 47 in. (686 mm to 1194 mm)	See Figure 4-21
Full or Split Vat 21 in. x 210 in.^{2} (533 mm x 0.14 m^2)	Full or Split Vat 21 in. x 294 in.^{2} (533 mm x 0.19 m^2)	245	20 in. to 27 in. (508 mm to 686 mm)	See Figure 4-21
Full or Split Vat 21 in. x 210 in.^{2} (533 mm x 0.14 m^2)	Full or Split Vat 21 in. x 294 in.^{2} (533 mm x 0.19 m^2)	290	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-22
25 3/8 x 370.5 in^2 (644 mm x 0.24 m^2)	25 3/8 x 495 in^2 (644 mm x 0.32 m^2)	290	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-22
Full or Split Vat 26 1/2 in. x 203 in.^{2} (673 mm x 0.13 m^2)	Full or Split Vat 26 1/2 in. x 384 1/4 in.^{2} (673 mm x 0.25 m^2)	290	16 in. to 27 in. (406 mm to 686 mm)	See Figure 4-22
25 3/8 x 370.5 in^2 (644 mm x 0.24 m^2)	25 3/8 x 495 in^2 (644 mm x 0.32 m^2)	3N	See Figure 4-23	See Figure 4-23
27 3/4 x 324 in.^{2} (704 mm x 0.21 m^2)	27 3/4 x 497 in^2 (704 mm x 0.32 m^2)	3N	25 in. to 35 in. (635 mm to 889 mm)	See Figure 4-24



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

POSITION NOZZLE TIP ANYWHERE ALONG OR WITHIN THE PERIMETER OF THE MODULE IT IS PROTECTING AND AIM AT THE MIDPOINT OF THAT MODULAR AREA.

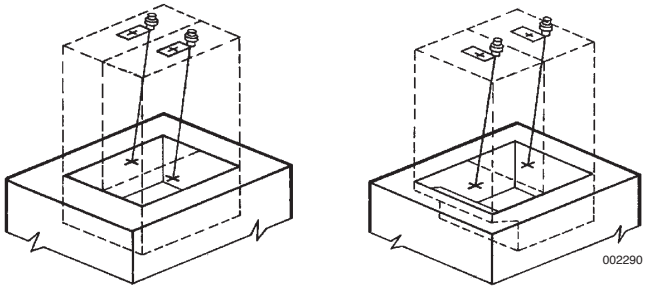
FIGURE 4-21



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

3N NOZZLE TIP MUST BE POSITIONED ANYWHERE ALONG OR WITHIN THE PERIMETER OF THE MODULAR IT IS PROTECTING AND AIMED AT THE MIDPOINT OF THAT RESPECTIVE MODULE AREA.

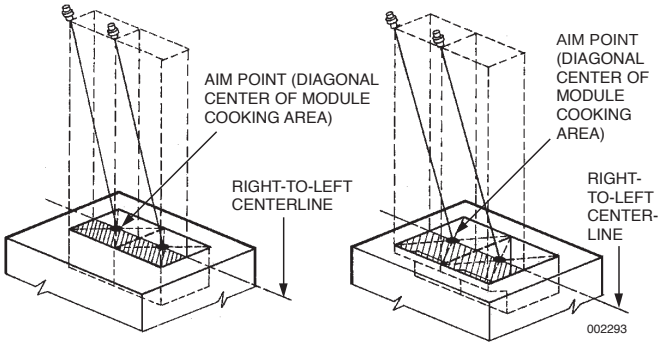
FIGURE 4-23



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

290 NOZZLE TIP POSITIONED OVER THE MIDPOINT OF THE RESPECTIVE MODULAR AREA ± 3 IN. (76 mm) FROM THE MIDPOINT ALONG THE LONGEST SIDE OF THE MODULE AND ± 1 IN. (25 mm) FROM THE MIDPOINT ALONG THE SHORTEST SIDE OF THE MODULE AND AIMED AT THE MIDPOINT OF THE MODULE.

FIGURE 4-22



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

THE 3N NOZZLE TIP MUST BE POSITIONED ANYWHERE ALONG OR WITHIN THE PERIMETER AND FORWARD OF THE RIGHT-TO-LEFT CENTERLINE OF THE COOKING AREA. THE AIMING POINT OF THE NOZZLE MUST BE AT THE DIAGONAL CENTER OF THE MODULAR COOKING AREA.

FIGURE 4-24

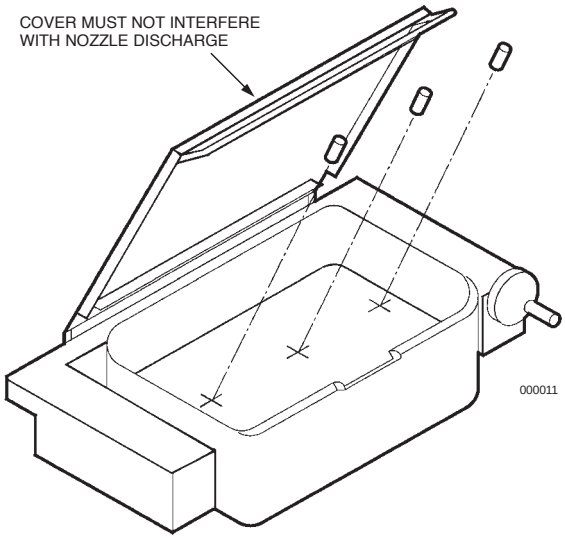
Multiple Nozzle Fryer Protection – Tilt Skillet / Braising Pan

Protection for tilt skillets or braising pans is to be based upon the coverage limitations provided for deep fat fryer protection. Refer to Section IV, DESIGN, starting on Page 4-10, for maximum fryer nozzle coverages and maximum fryer nozzle height limitations.

- Although the maximum 864 in.^{2} (55741 mm^2) total surface cooking area requirement applies to fryer protection, it does not apply to tilt skillets or braising pans.

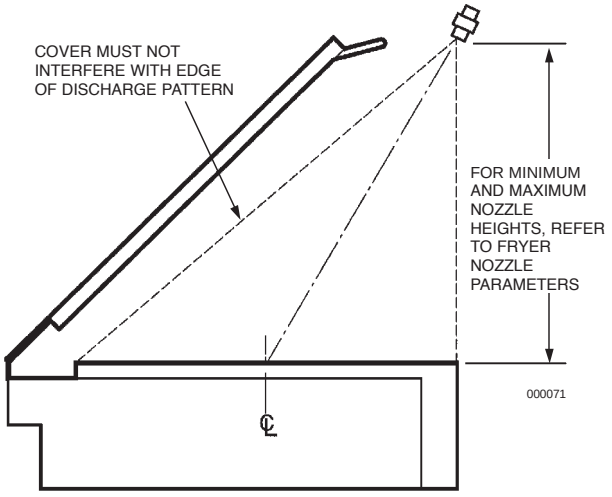
Each tilt skillet/braising pan protected module must not exceed the fryer limitations for "MAXIMUM SIZE MODULE OVERALL WITH DRIPBOARD" coverage per nozzle as described in Table on Page 4-11.

Tilt skillets and braising pans generally utilize a hinged cover. Fryer protection nozzles are to be placed toward the front of the appliance to minimize the potential for the tilt skillet or braising pan cover to interfere with the nozzle discharge. See Figures 4-25 and 4-26.



THE NOZZLE IS TO BE PLACED TOWARD THE FRONT OF THE APPLIANCE TO MINIMIZE THE POTENTIAL FOR THE SKILLET OR BRAISING PAN COVER TO INTERFERE WITH THE NOZZLE DISCHARGE.

FIGURE 4-25



FRYER NOZZLE USED FOR TILT SKILLET OR BRAISING PAN PROTECTION MUST BE POSITIONED NEAR THE FRONT EDGE OF THE PAN AND AIMED AT THE FRONT TO BACK CENTERLINE OF THE PAN. THE DISCHARGE FROM THE NOZZLE(S) MUST COMPLETELY CLEAR THE PAN COVER WITH AN UNOBSTRUCTED VIEW TO THE BACK OF THE PAN.

FIGURE 4-26

Range Protection

The R-102 system uses five different nozzles for the protection of ranges. Two of the design options require a one-flow nozzle and three of the design options require two-flow nozzles.

NOTICE

A 13 in. (330 mm) diameter wok pan is the largest wok size that can be protected on ranges.

When protecting hot top ranges, the entire cooking surface must be protected.

Range Protection 1N (1-Flow) Nozzle – High Proximity Application

No Obstructions

Single and multiple burner ranges can be protected using a 1N ▸ nozzle. The nozzle is stamped with 1N, indicating that this is a one-flow nozzle and must be counted as one flow number.

When using this nozzle for range protection, the maximum length of the burner grates being protected with a single nozzle must not exceed 32 in. (812 mm) and the maximum area of the burner grates must not exceed 384 in.^{2} (24774 mm^2) per nozzle.

When protecting a range, the 1N nozzle must be located a maximum of 10 in. (254 mm) from each burner grate centerline and must be aimed at the center of the cooking surface. See Figures 4-27 and 4-28.

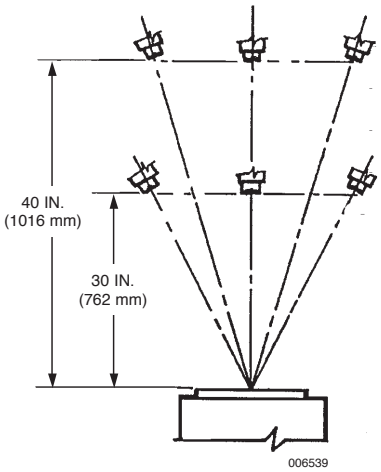


FIGURE 4-27

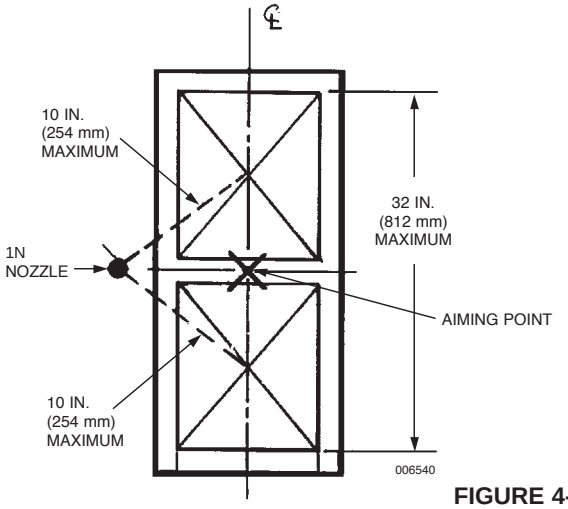


FIGURE 4-28

Range Protection 245 (2-Flow) Nozzle – High Proximity Application

No Obstructions

40 in. to 50 in. (1016 mm to 1270 mm) above the cooking surface.

This high proximity application uses the 245 nozzle.

- The nozzle is stamped with 245 indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 245 nozzle will protect a maximum cooking area of 672 in.^{2} (43354 mm^2) with a maximum longest dimension of 28 in. (711 mm).

When using this nozzle for range protection, the nozzle must be pointed vertically down and positioned as shown in Figures 4-29 and 4-30.

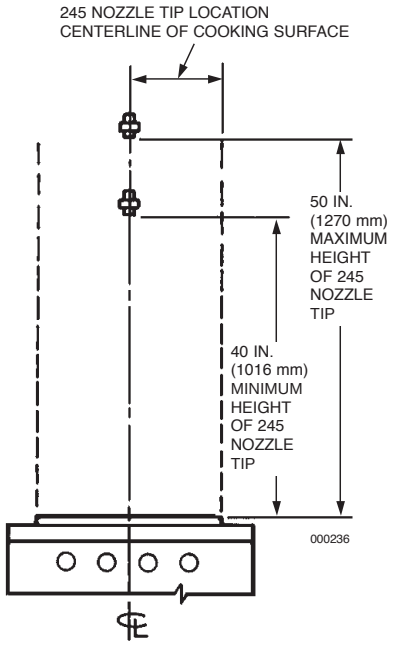


FIGURE 4-29

NOTICE

Four burner grates shown in Figure 4-30. For single or double burner grates, locate nozzle at center of cooking surface or 11 3/8 in. (288 mm) maximum from nozzle centerline to center of any burner grate.

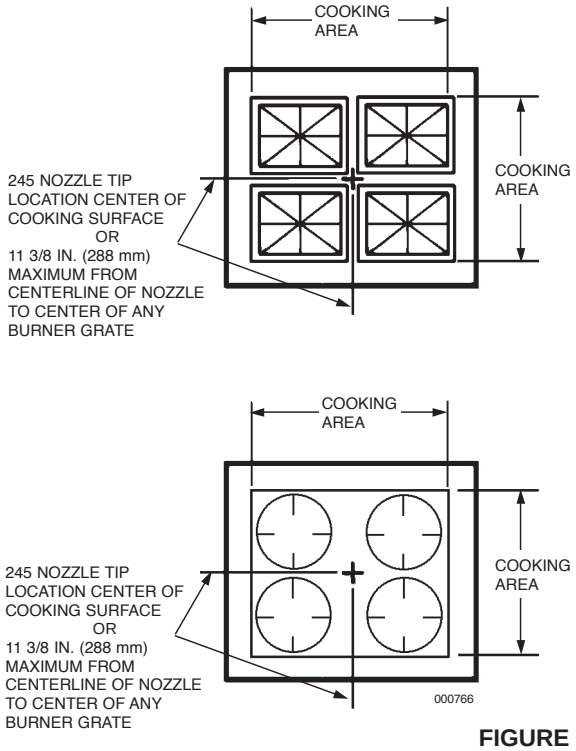


FIGURE 4-30

Range Protection 260 (2-Flow) Nozzle – Medium Proximity Application

No Obstructions

30 in. to 40 in. (762 mm to 1016 mm) above the cooking surface.

The medium proximity application uses the 260 nozzle.

- The nozzle is stamped with 260 indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 260 nozzle will protect a cooking area of 768 in.^{2} (49548 mm^2) with a maximum dimension of 32 in. (812 mm).

When using this nozzle for range protection, the nozzle must be pointed vertically down and positioned as shown in Figures 4-31 and 4-32.

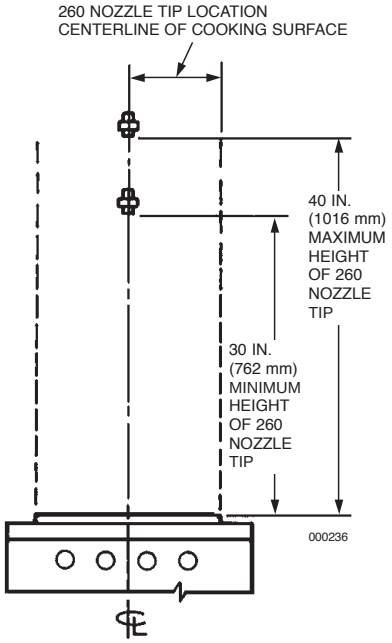


FIGURE 4-31

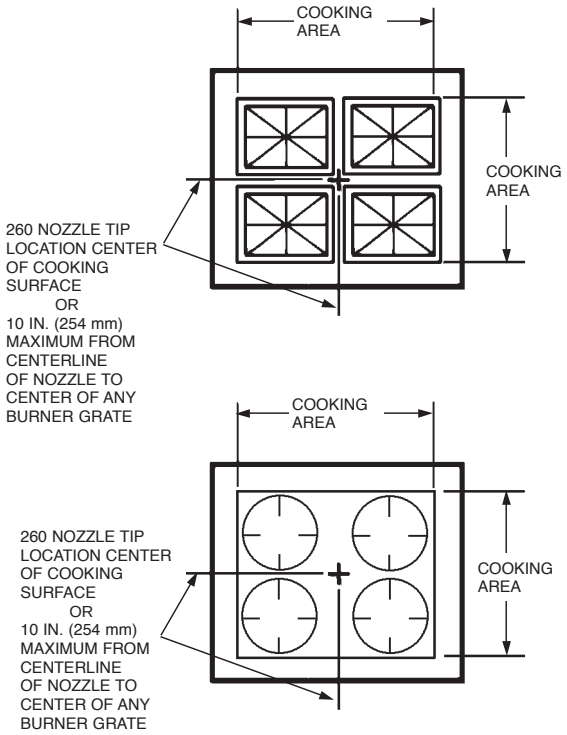


FIGURE 4-32
000766

NOTICE

Four burner grates shown in Figure 4-32. For single or double burner grates, locate nozzle at center of cooking surface.

Range Protection 1N (1-Flow) Nozzle – Low Proximity Application

15 in. to 20 in. (381 mm to 508 m) above the cooking surface.

The low proximity 1-flow nozzle application for the protection of ranges requires the 1N nozzle.

- The nozzle is stamped with 1N indicating that it is a one-flow nozzle and must be counted as one flow number,

When using the 1N nozzle for low proximity range protection with or without obstruction, the maximum length of the burner grates being protected must not be exceed 24 in. (609 mm) length, aimed along a centerline to a point 20 in. (508 mm) from the end of the length, protecting a maximum width of 18 in. (457 mm).

When protecting a range, the 1N nozzle must be located a maximum of 9 in. (228 mm) from each burner grate centerline and must be positioned above the edge of the hazard area to be protected.

The 1N nozzle tip must be positioned at or below the obstruction, if present. The protected area begins at the point straight down from the nozzle tip. The nozzle can be placed at the side of the range aimed either left or right, or can be placed in the front or back of the range. See Figures 4-33 and 4-34 for nozzle location details.

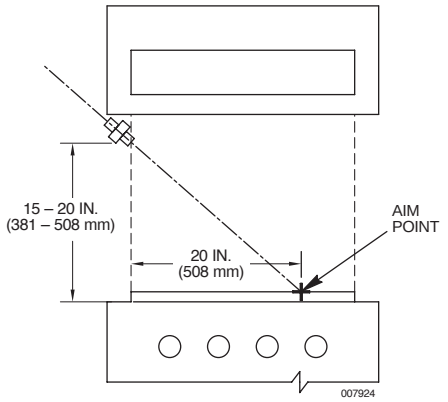


FIGURE 4-33

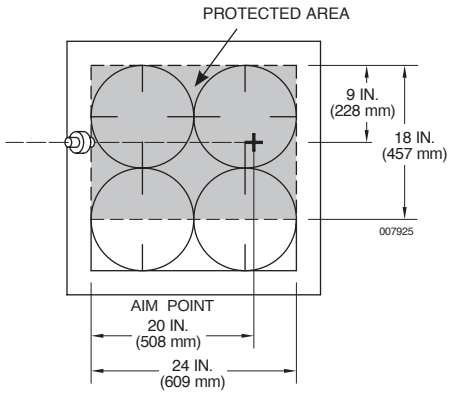


FIGURE 4-34

Range Protection Two 290 (2-Flow) Nozzles – Low Proximity Application

15 in. to 20 in. (381 mm to 508 mm) above the cooking surface.

The low proximity 2-flow application requires the use of two 290 nozzles.

- Both nozzles are stamped with 290 indicating they are two flow nozzles and must be counted together for a total of four flow numbers.

Two 290 nozzles will protect a cooking area of 1008 in.^{2} (65032 mm^2) with a maximum dimension of 36 in. (914 mm).

When using two of these nozzles for low proximity range protection, the nozzles must be positioned along the cooking surface perimeter to 1.5 in. (38 mm) inside the perimeter, and aimed at a 45° angle along the longitudinal centerline of the range. See Figures 4-35 and 4-36.

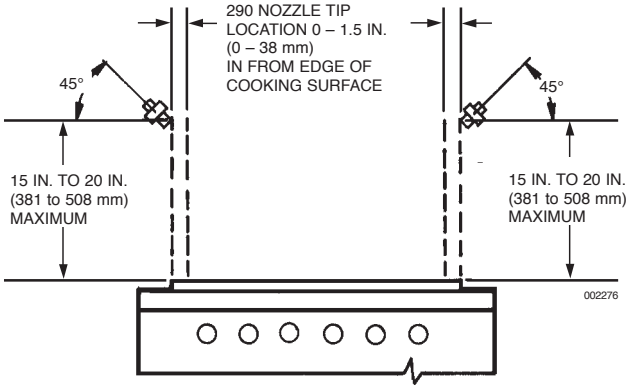
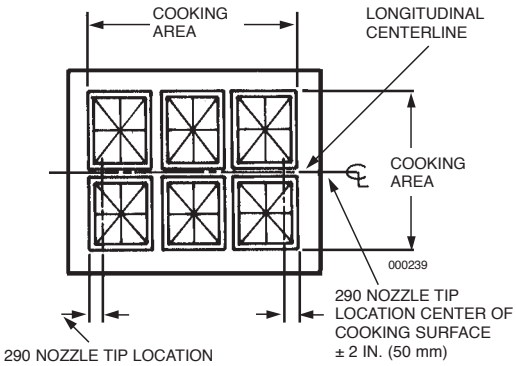


FIGURE 4-35



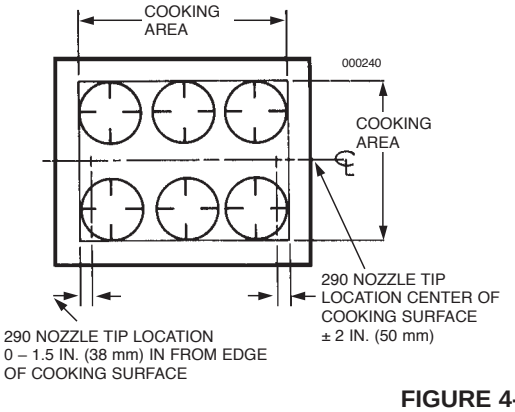


FIGURE 4-36

Range Protection (With or Without Back Shelf/Obstruction)

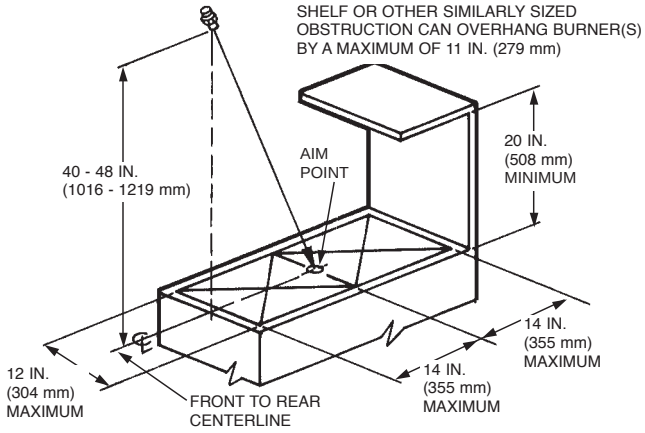
When this type of hazard is equipped with a back shelf or other similarly sized obstruction located above the range top, two protection options are available: One requires a 1F nozzle and the other option requires a 260 nozzle.

Range Protection 1F (1-Flow) Nozzle (With or Without Back Shelf/Obstruction)

Single and multiple burner ranges can be protected using a ▸ 1F nozzle. The nozzle is stamped with 1F indicating that it is a one-flow nozzle and must be counted as one flow number.

When using the 1F nozzle for range protection with or without back shelf or other similarly sized obstruction, the maximum length of the burner grates being protected must not exceed 28 in. (711 mm) and the maximum area of the burner grates must not exceed 336 in.^{2} (21677 mm^2). See Figure 4-37 for nozzle location details.

1F NOZZLE



1F NOZZLE LOCATED OVER FRONT EDGE OF BURNER GRATE AND ORIENTED SO NOZZLE TIP FLATS ARE PARALLEL WITH BURNER GRATE FRONT TO REAR CENTERLINE AND SHALL BE AIMED AT THE CENTER OF THE COOKING SURFACE.

FIGURE 4-37
000238

Range Protection 260 (2-Flow) Nozzle (With or Without Back Shelf/Obstruction)

Single and multiple burner ranges can be protected using a 260 ▸ nozzle. The nozzle is stamped with 260 indicating that it is a two-flow nozzle and must be counted as two flow numbers.

When using the 260 nozzle for range protection with or without back shelf or other similarly sized obstruction, the maximum length of burner grates being protected must not exceed 32 in. (812 mm) and the maximum area of the burner grates must not exceed 384 in.^{2} (24774 mm^2). Nozzle must be located on the front edge of the burner grates and aimed at a point 10 in. (254 mm) from the back edge of the burner grates. Nozzle must be mounted 30 to 40 in. (762 to 1016 mm) above the hazard surface. See Figure 4-38.

260 NOZZLE

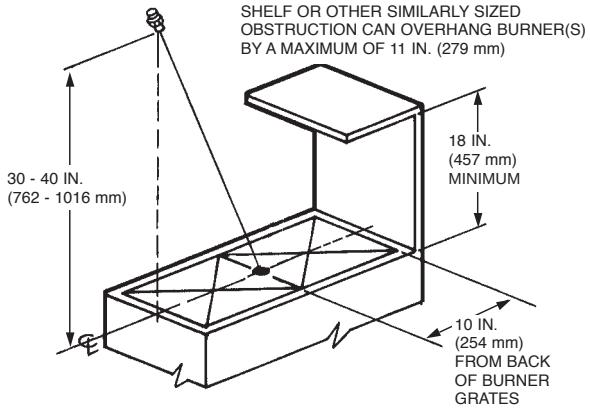


FIGURE 4-38
000238a

Griddle Protection 1N (1-Flow) Nozzle – High Proximity Application

The R-102 system uses four different nozzles for the protection of griddles. One of the applications requires a 1-flow nozzle and three of the applications require a 2-flow nozzle.

High Proximity Application: 35 in. to 40 in. (889 to 1016 mm) above the cooking surface.

This high proximity application uses the 1N nozzle.

▸ The nozzle is stamped with 1N indicating this is a one-flow nozzle and must be counted as one flow number.

One 1N nozzle will protect a maximum cooking area of 1080 in.^{2} (69677 mm^2) with the maximum longest side of 36 in. (914 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the cooking surface perimeter to a maximum of 2 in. (50 mm) inside the perimeter, and aimed to the midpoint of the cooking surface. See Figure 4-39 and 4-40.

NOTICE

When using this type of griddle protection, only five flow numbers are allowed on a 1.5 gal (5.7 L) system and only 11 flow numbers are allowed on a 3 gal (11.4 L) system.

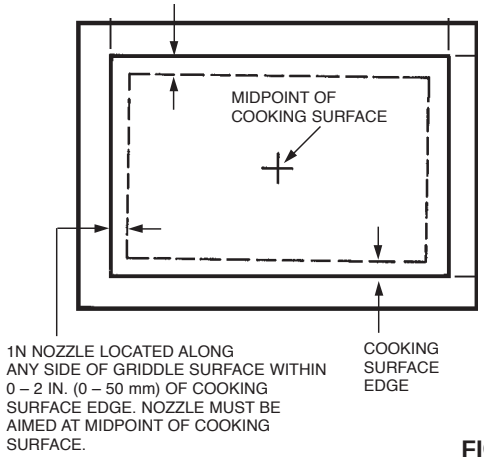


FIGURE 4-39
000241

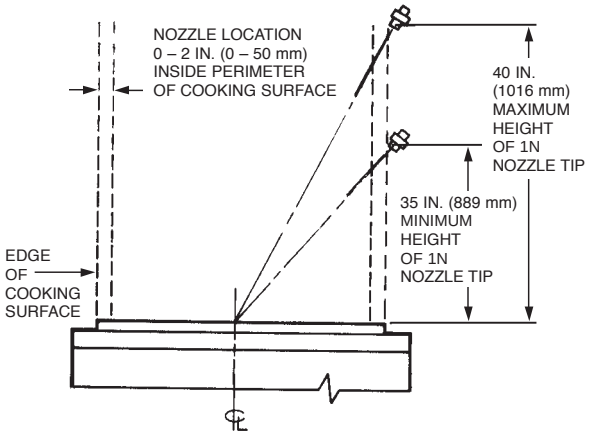


FIGURE 4-40
000243

Griddle Protection 290 (2-Flow) Nozzle – High Proximity Application

Option 1 – Nozzle Center Located

30 in. to 50 in. (762 mm to 1270 mm) above the cooking surface.

This high proximity application uses the 290 nozzle.

▸ The nozzle is stamped with 290 indicating this is a 2-flow nozzle and must be counted as two flow numbers.

One 290 nozzle will protect a maximum cooking area of 720 in.^{2} (46451 mm^2) with a maximum dimension of 30 in. (762 mm).

When using this nozzle for high proximity applications, the nozzle must be positioned within 1 in. (25 mm) of the center of the cooking surface and pointed vertically down. See Figure 4-41 and 4-42.

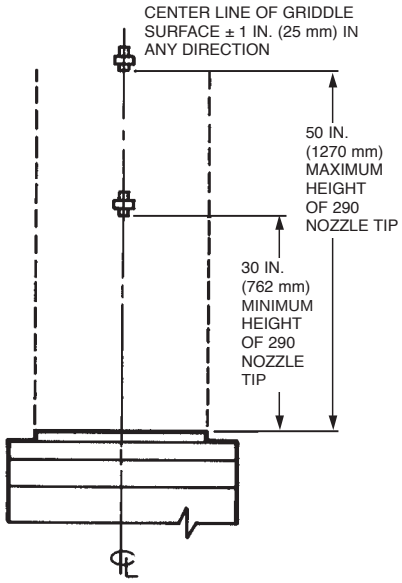


FIGURE 4-41
000244

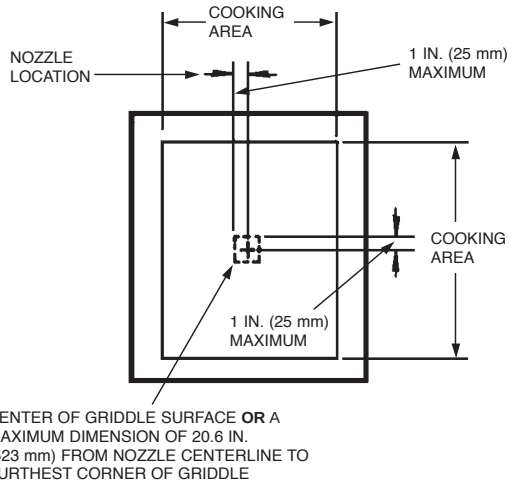


FIGURE 4-42
000773

Griddle Protection 260 (2-Flow) Nozzle – High Proximity Application

Option 2 – Nozzle Perimeter Located

30 in. to 50 in. (762 mm to 1270 mm) above the cooking surface.

This high proximity application uses the 260 nozzle.

- The nozzle is stamped with 260 indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 260 nozzle will protect a maximum cooking area of 1440 in.^{2} (92903 mm^2) with a maximum dimension of 48 in. (1219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the cooking surface perimeter to 2 in. (50 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-43 and 4-44.

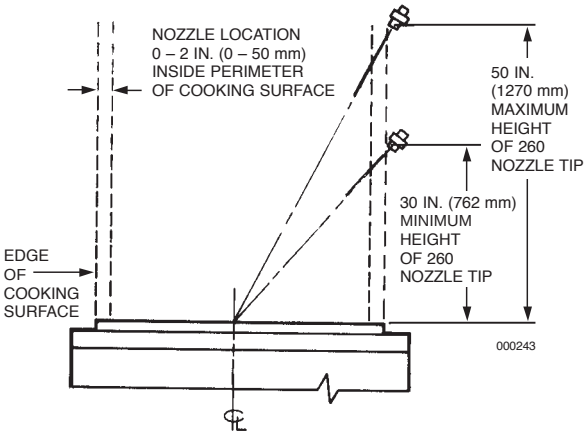


FIGURE 4-43
000243

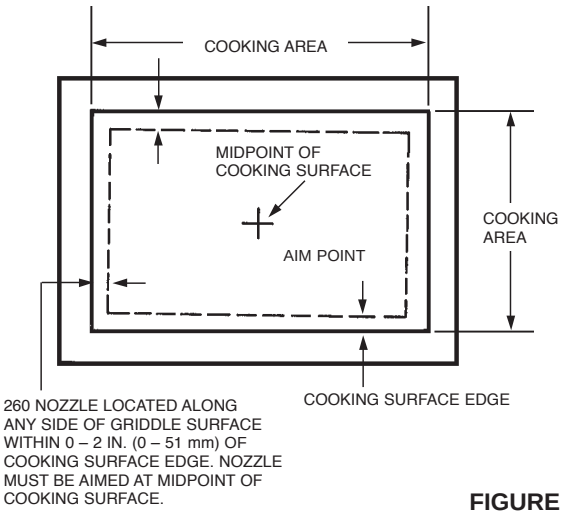


FIGURE 4-44
000241

Griddle Protection 290 (2-Flow) Nozzle – Medium Proximity Application

Option 2a – Nozzle Perimeter Located (Continued)

20 in. to 30 in. (508 mm to 762 mm) above the cooking surface.

The medium proximity application uses the 290 nozzle.

- The nozzle is stamped with 290 indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 290 nozzle will protect a maximum cooking area of 1440 in.^{2} (92903 mm^2) with a maximum dimension of 48 in. (1219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the perimeter to 2 in. (50 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-45 and 4-46.

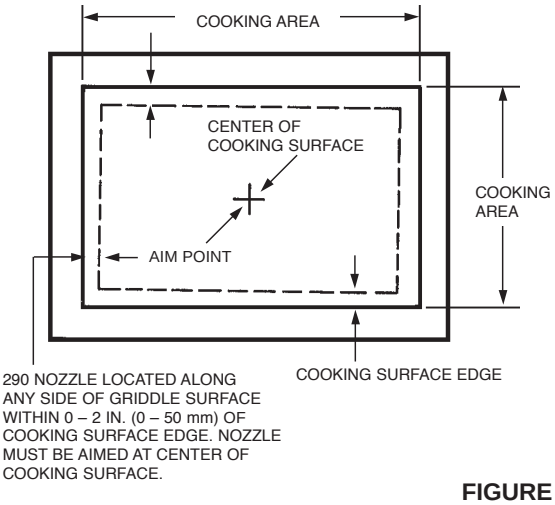


FIGURE 4-45
000241

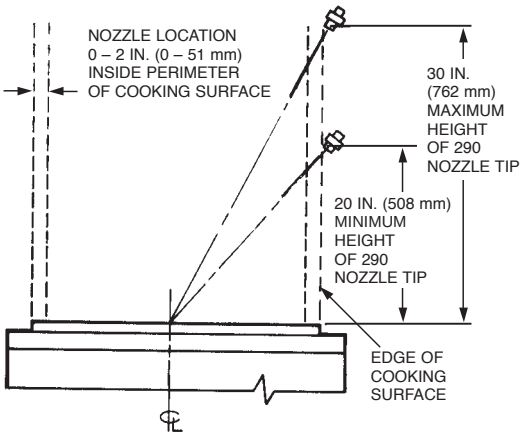


FIGURE 4-46
000243

Griddle Protection 2120 (2-Flow) Nozzle – Low Proximity Application

Option 2b – Nozzle Perimeter Located (Continued)

10 in. to 20 in. (254 mm to 508 mm) above the cooking surface.

The low proximity application uses the 2120 nozzle.

- The nozzle is stamped with 2120 indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 2120 nozzle will protect a maximum cooking area of 1440 in.^{2} (92903 mm^2) with a maximum dimension of 48 in. (1219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the perimeter to 2 in. (50 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-47 and 4-48.

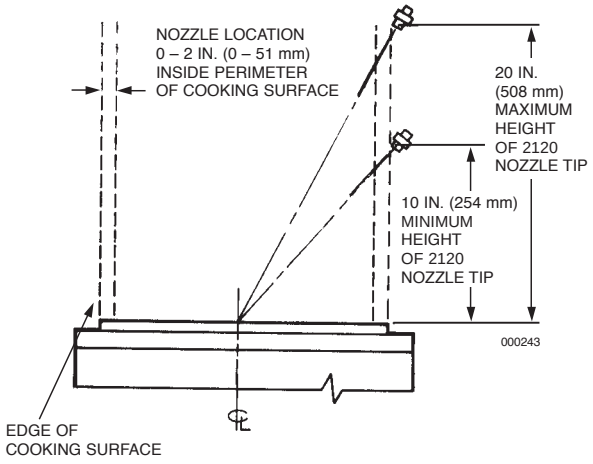


FIGURE 4-47
000243

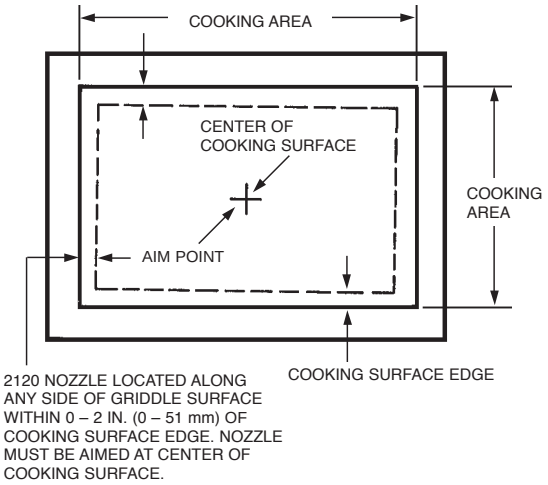


FIGURE 4-48
000241

Griddle Protection 2W (2-Flow) Nozzle – Low Proximity Application

Option 2c – Nozzle Perimeter Located (Continued)

10 in. to 20 in. (254 mm to 508 mm) above the cooking surface.

The low proximity application uses the 2W nozzle.

- The nozzle is stamped with 2W indicating this is a two-flow nozzle and must be counted as two flow numbers.

One 2W nozzle will protect a maximum cooking area of 1080 in.^{2} (69677 mm^2) with a maximum dimension of 36 in. (914 mm).

When using this nozzle for griddle protection, the nozzle must be positioned 0-10 in. (0-254 mm) forward or behind the right to left centerline of the hazard area. See the diagram below for nozzle location and aiming.

OVERHEAD VIEW

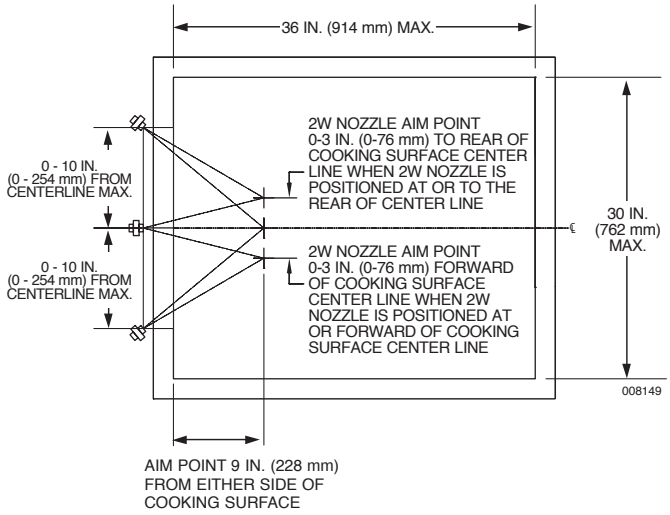


FIGURE 4-49

FRONT VIEW

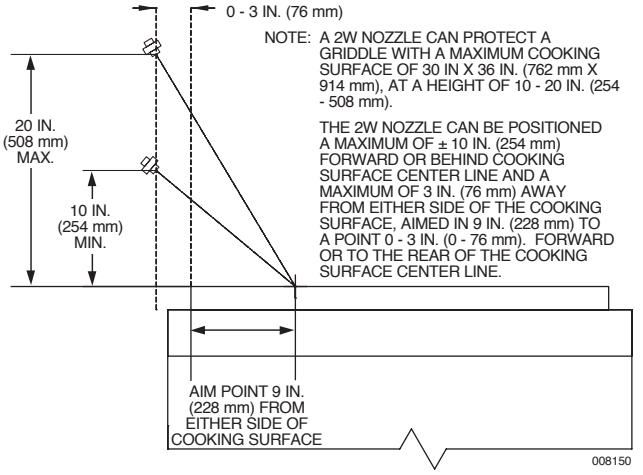


FIGURE 4-50

Griddle Protection 1W (1-Flow) Nozzle – Low Proximity Application

15 in. to 20 in. (381 mm to 508 mm) above the cooking surface.

The low proximity 1-flow nozzle application for the protection of griddles requires the 1W nozzle.

▸ The nozzle is stamped with 1W indicating that this is a one-flow nozzle and must be counted as one flow number.

When using the 1W nozzle for low proximity griddle protection with our without obstruction, the maximum length of the cooking surface to be protected must not exceed 26 in. (660 mm). The nozzle must be centered at one end of the maximum 26 in. (660 mm) length, aimed along a centerline to a point 20 in. (508 mm) from the end of the length, protecting a maximum width of 20.5 in. (520 mm).

The 1W nozzle tip must be positioned at or below the obstruction, if present. The protected area begins at the point straight down from the nozzle tip. The nozzle can be positioned above the edge of the hazard area to be protected. See Figure 4-51 and 4-52.

Note: If the hazard area exceeds the single nozzle coverage listed above, additional nozzles will be required. The additional nozzle can be positioned in front at high proximity or at the side at low proximity.

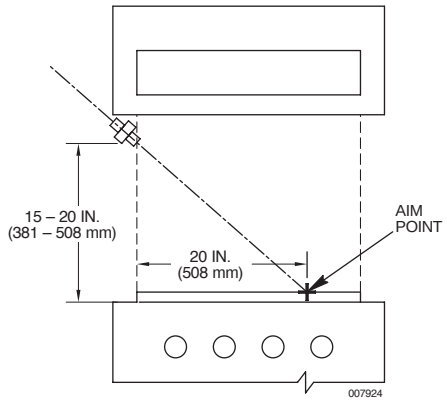


FIGURE 4-51

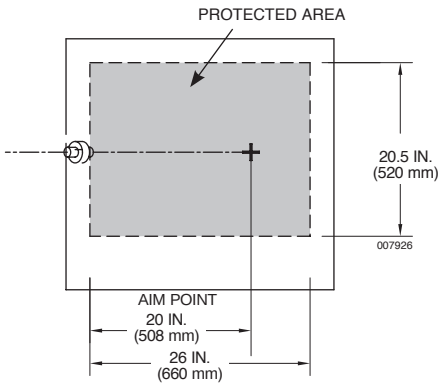


FIGURE 4-52

Chain Broiler Protection

The following listed protection guidelines can be applied to any manufacturer's chain broilers, if the chain broiler meets the specified parameters. Chain broilers utilizing catalytic converters can be protected from overhead using model specific protection identified in the "Specific Application by Model" section in System Design. Or, they can be protected with standard 1N nozzle horizontal chain broiler protection with the nozzles positioned at either end of the chain broiler openings. Refer to the "Horizontal Chain Broiler Protection" section for specific design information.

Horizontal Chain Broiler Protection

The R-102 system can use two 1N nozzles for horizontal chain ▸ broiler protection. The nozzle is stamped 1N, indicating that this is a one-flow nozzle and must be counted as one flow number (total of two flow numbers for each chain broiler being protected).

Two 1N nozzles are always needed for chain broiler protection when the hazard area to be protected does not meet the "Overhead Broiler Protection" requirements. The maximum internal size of the broiler is 43 x 31 in. (1092 mm x 787 mm). The nozzles must be positioned at each end of the enclosed cooking chamber 1 to 3 in. (25 mm to 76 mm) above the surface of the chain and a maximum distance of 4 in. (101 mm) away from the broiler opening. The nozzles may be mounted at either corner as long as they are at opposite ends of the chain broiler and positioned to discharge diagonally across the top of the chain. See Figure 4-53 and 4-54.

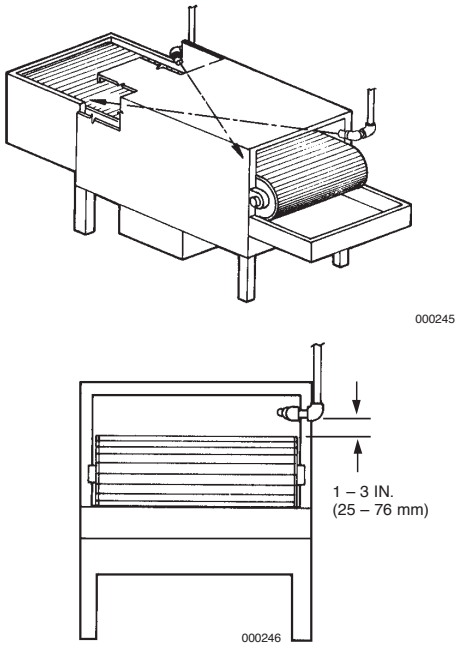


FIGURE 4-53

Horizontal Chain Broiler Protection (Continued)

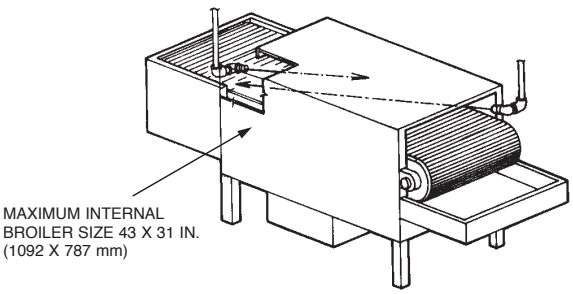


FIGURE 4-54
000247

Overhead Chain Broiler Protection

The R-102 system can use two 1W nozzles for overhead chain ▸ broiler protection. The nozzle is stamped with 1W, indicating that this is a one-flow nozzle and must be counted as one flow number.

Overhead protection is **only** available for chain broilers with exhaust opening dimensions that are not less than 60% of the internal broiler length and not less than 60% of the internal broiler width, to a minimum size of 12 in. x 12 in. (305 mm x 305 mm). Internal broiler size can not be larger than 32 in. x 34 in. (812 mm x 863 mm).

When overhead protection is used, the nozzles must be centered above the exhaust opening within 4 to 8 in. (101 to 203 mm) of each other and they must be located 10 to 26 in. (254 to 660 mm) above the top of the broiler surface. See Figure 4-55.

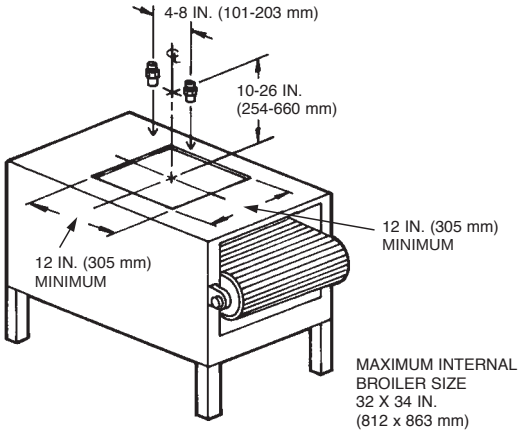


FIGURE 4-55
000248

The nozzles may vary in position as long as they are evenly spaced from the exhaust center and are always 180° opposite of each other. If the opening is not square, the nozzles must be positioned along the centerline, parallel to the longest side of the opening. See Figure 4-56.

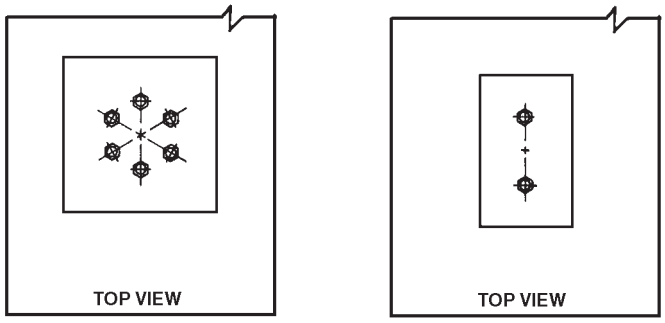


FIGURE 4-56
000249

▸ **Note:** The Metal Blow-off Cap must be used when utilizing chain broiler protection.

Example No. 1 – Internal broiler size is 24 in. long x 20 in. wide (609 mm x 508 mm), with an opening of 16 in. x 16 in. (406 mm x 406 mm).

To determine minimum opening size, multiply the internal length and the internal width by 0.6:

Length of opening – 24 in. x 0.6 = 14.4 in.
(609 mm x 0.6 = 366 mm)

Width of opening – 20 in. x 0.6 = 12.0 in.
(508 mm x 0.6 = 304 mm)

The minimum allowable opening for overhead protection would be 14.4 in. x 12.0 in. (365 mm x 304 mm).

This example would be acceptable for overhead protection.

Example No. 2 – Internal broiler size is 30 in. long x 24 in. wide (762 x 609 mm) with an opening of 22 in. x 12 in. (558 x 304 mm).

To determine minimum opening size, multiply internal length and internal width by 0.6:

Length of opening – 30 in. x 0.6 = 18.0 in.
(762 mm x 0.6 = 457 mm)

Width of opening – 24 in. x 0.6 = 14.4 in.
(609 mm x 0.6 = 365 mm)

Minimum allowable opening for overhead protection would be 18 in. x 14.4 in. (457 mm x 365 mm).

Because this broiler has an opening of 22 in. x 12 in. (558 mm x 304 mm), the 12 in. (304 mm) width is below the minimum allowable calculated dimension of 14.4 in. (365 mm) and therefore would not be acceptable for overhead protection.

Salamander Broiler Protection

The R-102 system uses three different nozzle locations for salamander broiler protection. All of the design options require a one-flow nozzle.

Salamander Broiler Protection – 1N (1-Flow) Nozzle Overhead

A salamander broiler with a maximum hazard area (internal broiler chamber) of 16 in. (406 mm) deep x 29 in. (736 mm) wide can be protected using a 1N nozzle. The nozzle is stamped with 1N, indicating that this is a one-flow nozzle.

The single 1N nozzle must be located directly in line with either vertical edge of the broiler opening, 6 in. (152 mm) to 12 in. (304 mm) in front of the broiler, and 0 in. to 12 in. (304 mm) above the top of the broiler. The nozzle must be aimed at the center of the broiler opening. See Figure 4-57a.

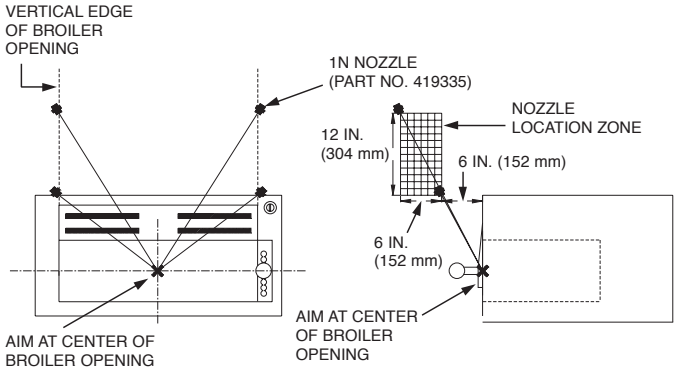


FIGURE 4-57a
008426

Salamander Broiler Protection – 1F (1-Flow) Nozzle Overhead

A salamander broiler with a maximum hazard area (internal broiler chamber) of 15.5 in. (393 mm) deep x 31 in. (787 mm) wide can be protected using a 1F nozzle. The nozzle is stamped with 1F, indicating that this is a one-flow nozzle.

The single 1F nozzle must be located directly in line with the center of the broiler opening, 8 in. (203 mm) to 12 in. (304 mm) in front of the broiler and 12 in. (304 mm) to 18 in. (457 mm) above the top of the broiler. The nozzle must be aimed at the center of the top broiler opening when the grate is located in the middle position. The nozzle must be orientated so the nozzle tip flats are parallel with the grate left to right centerline. See Figure 4-57b.

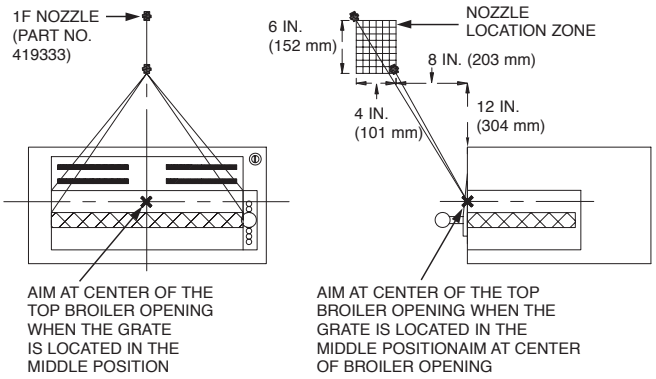


FIGURE 4-57b
008426

Salamander Broiler Protection – 1N (1-Flow) Nozzle Local

Note: The use of the Agent Distribution Hose should be considered when protecting a salamander broiler/range combination appliance that employs casters.

A salamander broiler with a maximum hazard area (internal broiler chamber) of 15 in. (381 mm) deep x 31 in. (787 mm) wide can be protected using a 1N nozzle. The nozzle is stamped with 1N, indicating that this is a one-flow nozzle.

The single 1N nozzle must be affixed to the side of the cooking chamber, above the grate on either vertical edge of the broiler opening. The nozzle must be aimed at the center of the grates. See Figure 4-57c.

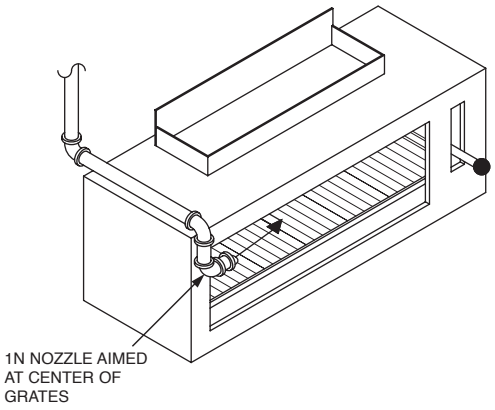


FIGURE 4-57c
008428

Upright Broiler/Salamander Protection

The R-102 system uses two 1/2N Nozzles for all upright broiler protection. The nozzle is stamped 1/2N, indicating that this is a half-flow nozzle. A pair of these nozzles will equal one flow number.

Two 1/2N nozzles will protect a maximum hazard area (internal broiler chamber) of 30 in. x 32.5 in. (761 mm x 825 mm). These nozzles must always be used in pairs on an upright broiler. One nozzle must be positioned above the grate and pointed at the back opposite corner of the broiler chamber. The second nozzle must be pointed down into the center of the drip pan through the open slot. See Figure 4-58.

Upright Broiler/Salamander Protection (Continued)

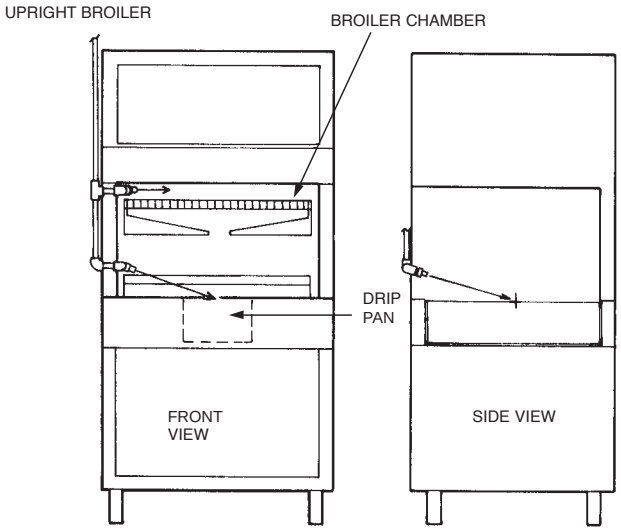


FIGURE 4-58
000252

Gas-Radiant/Electric Char-Broiler Protection

The R-102 system uses the 1N nozzle for gas-radiant/electric char-broiler protection.

The nozzle is stamped with a 1N, indicating that this is a one-flow nozzle and must be counted as one flow number.

One 1N nozzle will protect a hazard with a maximum length of 36 in. (914 mm) and a total cooking area which does not exceed 864 in.^{2} (55741 mm^2). The nozzle tip must be located 15 in. to 40 in. (381 mm to 1016 mm) above the hazard surface. When using this nozzle for gas-radiant/electric char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and shall be aimed at the center of the cooking surface. See Figure 4-59a.

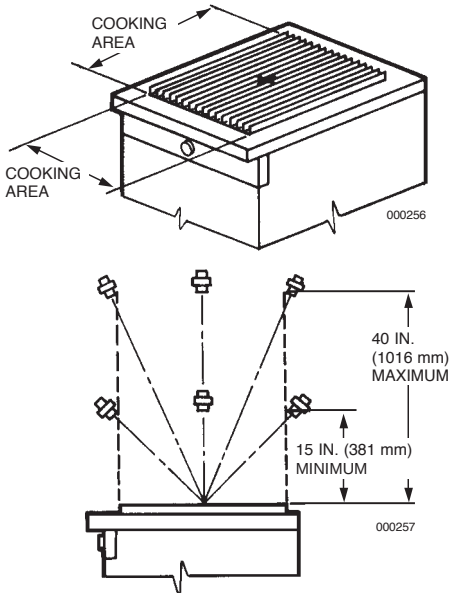


FIGURE 4-59a

Electric Char-Broiler Protection (Optional)

The R-102 system uses the 1N nozzle for electric char-broiler protection.

The nozzle is stamped with a 1N, indicating that this is a one-flow nozzle and must be counted as one flow number.

One 1N nozzle will protect a hazard with a maximum length of 34 in. (863 mm) and a total cooking area which does not exceed 680 in.^{2} (43870 mm^2). The nozzle tip must be located 20 in. to 50 in. (508 mm to 1270 mm) above the hazard surface. When using this nozzle for electric char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and shall be aimed at the center of the cooking surface. See Figure 4-59b.

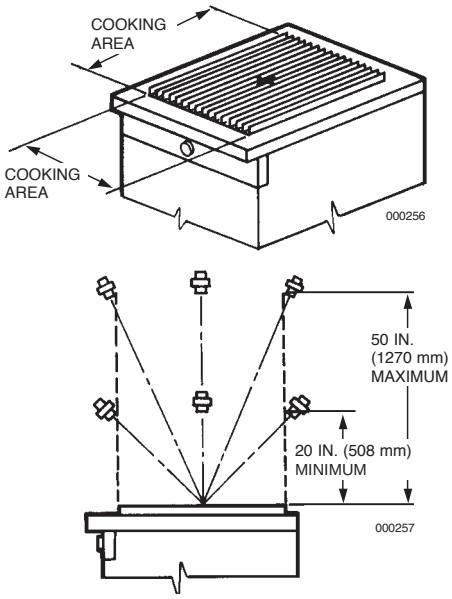


FIGURE 4-59b

Lava Rock (Ceramic) Char-Broiler Protection

The R-102 system uses the 1N nozzle for all lava rock char-broiler protection. The nozzle is stamped with 1N, indicating that this is a one-flow nozzle and must be counted as one flow number.

One 1N nozzle will protect a hazard which has a maximum length of 24 in. (609 mm) and a total cooking area which does not exceed 312 in.^{2} (20128 mm^2). The nozzle tip must be located 18 in. to 35 in. (457 mm to 889 mm) above the hazard surface. When using this nozzle for lava rock (ceramic) char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and angled to the center. See Figure 4-60.

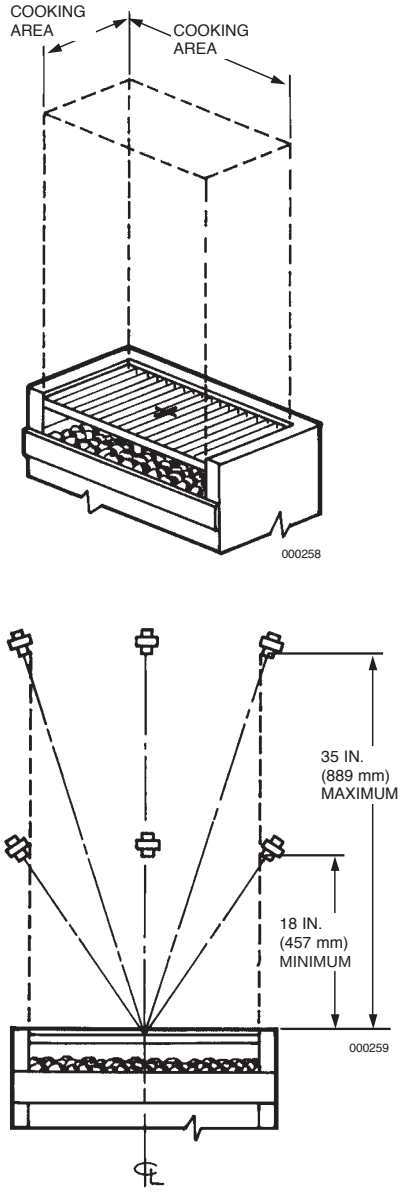


FIGURE 4-60

Natural Charcoal Broiler Protection

The R-102 system uses the 1N nozzle for all natural charcoal broiler protection. The nozzle is stamped with 1N indicating that this is a one-flow nozzle and must be counted as one flow number.

One 1N nozzle will protect a hazard area which has a maximum length of 24 in. (610 mm) and a total cooking area which does not exceed 288 in.^{2} (18580 mm^2). The nozzle tip must be located 18 in. to 40 in. (457 mm to 1016 mm) above the hazard surface. When using this nozzle for natural charcoal broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and aimed at the center of the cooking surface. See Figure 4-61.

The coverage of such appliances only applies when the depth of the charcoal does not exceed 4 in. (101 mm).

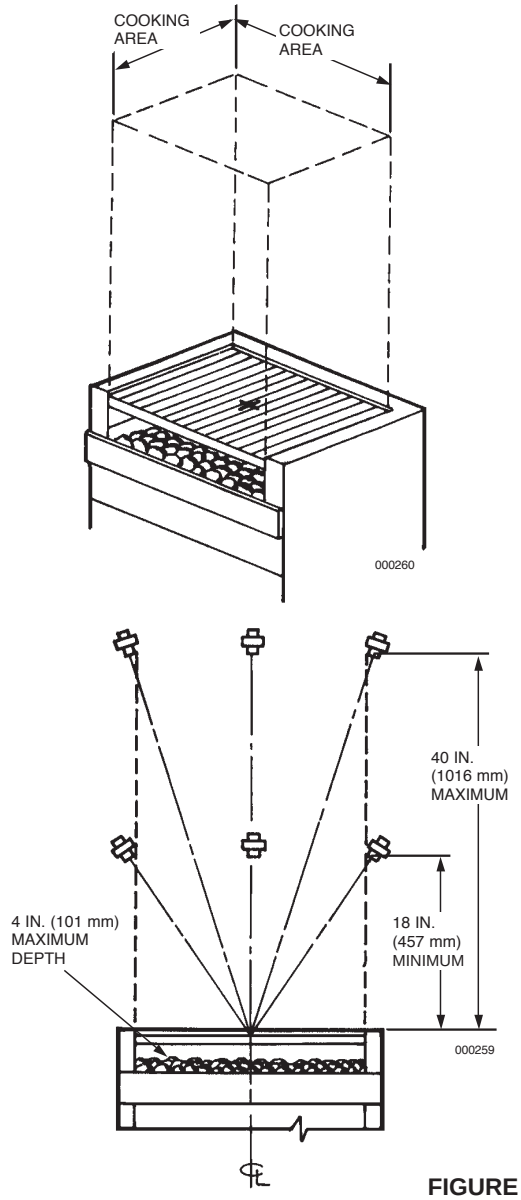


FIGURE 4-61

Alternate Ceramic/Natural Charcoal Char-broiler Protection

The R-102 system may also use the 3N nozzle for all ceramic (lava rock) and natural charcoal char-broiler protection. The ► nozzle is stamped with 3N, indicating that this is a three-flow nozzle and must be counted as three flow numbers.

One 3N nozzle will protect a hazard which has a maximum length of 30 in. (762 mm) and a total cooking area which does not exceed 720 in.^{2} (46451 mm^2). The nozzle tip must be located 14 in. to 40 in. (355 mm to 1016 mm) above the hazard surface. The nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and angled to the center. See Figure 4-62.

For natural charcoal char-boiler protection, this coverage only applies when the depth of the charcoal does not exceed 4 in. (101 mm).

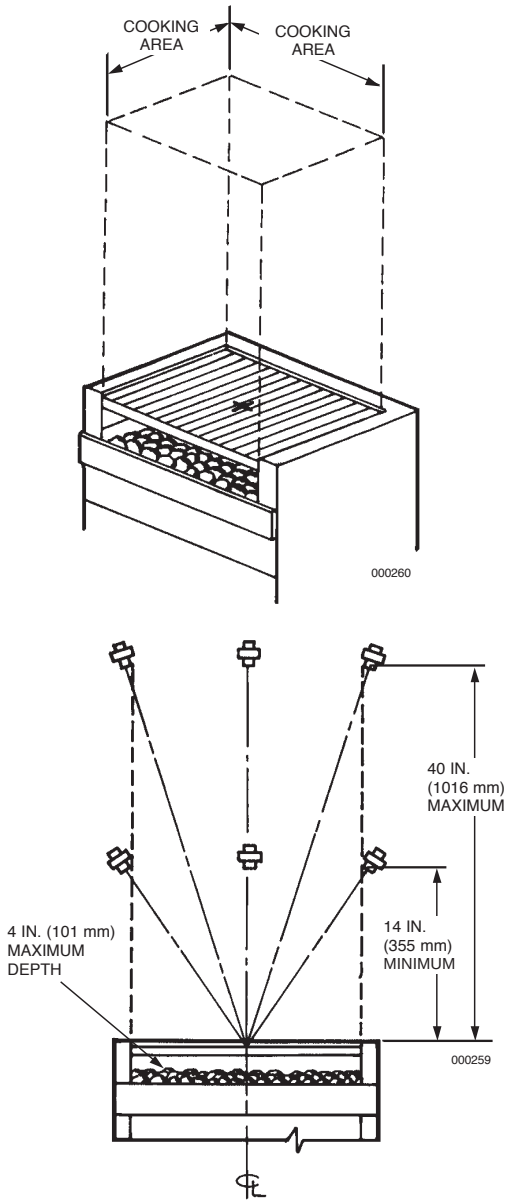


FIGURE 4-62

Wood Fueled Char-Broiler Protection

The R-102 system uses the 3N nozzle for mesquite char-broiler ► protection. The nozzle is stamped with 3N indicating that this is a three-flow nozzle and must be counted as three flow numbers.

One 3N nozzle will protect a hazard which has a maximum length of 30 in. (762 mm) and a total cooking area which does not exceed 720 in.^{2} (46451 mm^2). The nozzle tip must be located 14 in. to 40 in. (355 mm to 1016 mm) above the hazard surface. The nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and aimed at the center of the cooking surface. See Figure 4-63.

Mesquite logs and pieces, no larger than 4 in. (102 mm) in diameter, may be protected with a maximum allowable wood depth of 6 in. (152 mm).

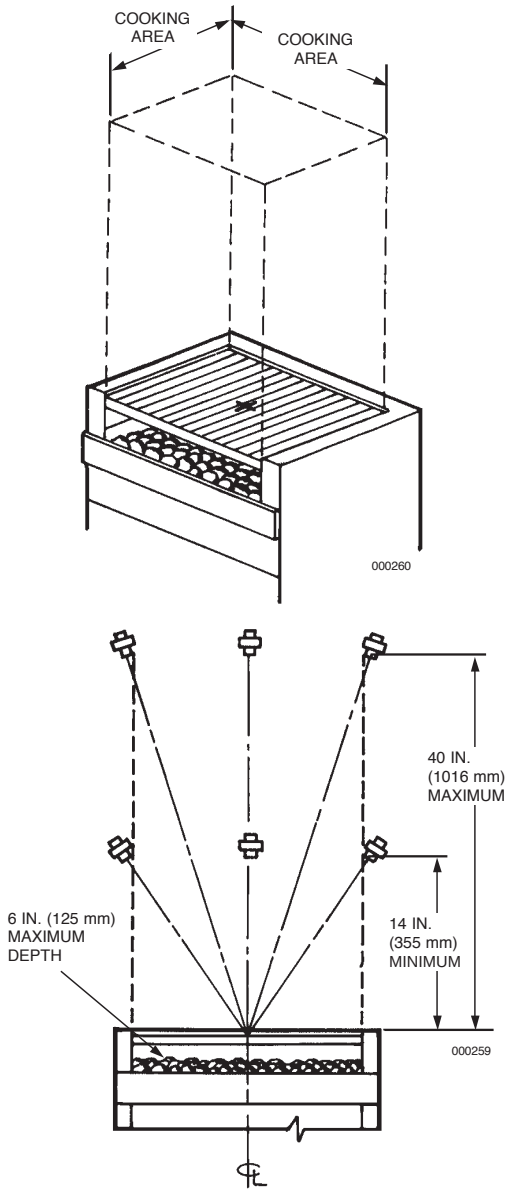


FIGURE 4-63

Wok Protection

The R-102 system uses two different nozzles for the protection of woks.

1. A 260 nozzle will protect a wok 14 in. (355 mm) minimum diameter up to 30 in. (762 mm) maximum diameter. The wok depth must be no less than 3.75 in. (95 mm) and no greater than 8 in. (203 mm).

   ► The nozzle is stamped with 260 indicating that this is a two-flow nozzle and must be counted as two flow numbers.

   When using this nozzle, the nozzle must be positioned as shown in Figure 4-64.

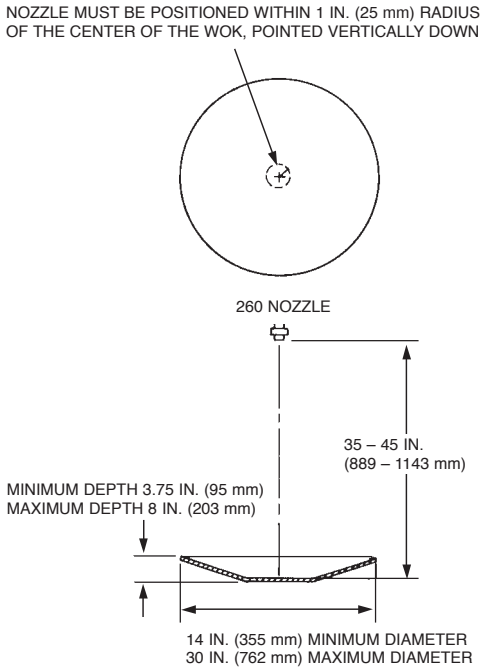


FIGURE 4-64
000261

2. A 1N nozzle will protect a wok 11 in. (279 mm) minimum diameter up to 24 in. (609 mm) maximum diameter. The wok depth must be no less than 3 in. (76 mm) and no greater ► than 6 in. (152 mm). The nozzle is stamped with 1N indicating that this a one-flow nozzle and must be counted as one flow number. When using this nozzle, the nozzle must be positioned anywhere along or within the perimeter of the wok, aimed at the center, 30 in. to 40 in. (762 mm to 1016 mm) above the hazard surface, as shown in Figure 4-65.

NOTICE

When using this type of wok protection, only five flow numbers are allowed on a 1.5 gal (5.7 L) system, and only eleven flow numbers are allowed on a 3 gal (11.4 L) system.

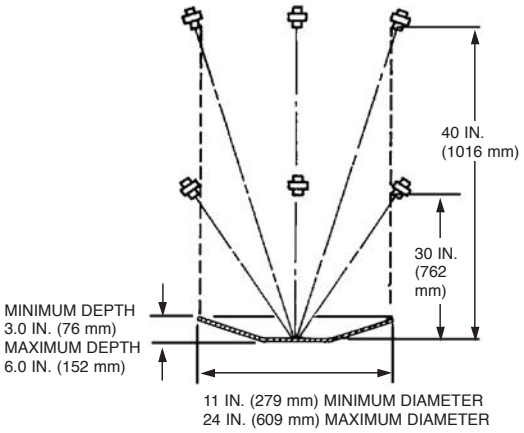


FIGURE 4-65
000261

Nozzle Application Chart

The following chart has been developed to assist in calculating the quantity and type of nozzle required to protect each duct, plenum, or appliance.

NOTICE

This chart is for general reference only. See complete details for each type of hazard.

Hazard	Maximum Hazard Dimensions	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping – Flow No.
Duct or Transition (Single Nozzle)	Length – Unlimited Perimeter – 50 in. (1270 mm) Diameter – 16 in. (406 mm)	1	–	439839	1W
Duct or Transition (Single Nozzle)	Length – Unlimited Perimeter – 100 in. (2540 mm) Diameter – 31 7/8 in. (809 mm)	1	–	439840	2W
Duct or Transition (Dual Nozzle)	Length – Unlimited Perimeter – 150 in. (3810 mm) Diameter – 48 in. (1219 mm)	2	–	439840	2W
Electrostatic Precipitator (At Base of Duct)	Individual Cell	1	–	439837	1/2N
Plenum (Horizontal Protection)	Length – 10 ft (3.0 m)	1	–	439838	1N
Plenum (Horizontal Protection)	Length – 6 ft (1.8 m) Width – 4 ft (1.2 m)	1	–	439839	1W
Plenum (Vertical Protection)	Length – 4 ft (1.2 m) Width – 4 ft (1.2 m)	1	–	439839	1W
Fryer (Split or Non-Split Vat)	Maximum Size (without drip board) 14 in. (355 mm) x 15 in. (381 mm) Low Proximity	1	13 – 16 in. (330 – 406 mm)	439845	290
Fryer (Split or Non-Split Vat)	Maximum Size (without drip board) 14 1/2 in. (368 mm) x 14 in. (355 mm) Medium Proximity	1	16 – 27 in. (406 – 685 mm)	439845	290
Fryer (Split or Non-Split Vat)*	Maximum Size (without drip board) 15 in. (381 mm) x 14 in. (355 mm) High Proximity	1	27 – 47 in.	439842	230
	Medium Proximity	1	20 – 27 in.	439843	245
Fryer (Non-Split Vat Only)	Maximum Size (without drip board) 19 1/2 in. (495 mm) x 19 in. (482 mm) High Proximity	1	21 – 34 in.	439841	3N
	Low Proximity	1	13 – 16 in.	439845	290
	Maximum Size (without drip board) 18 in. (457 mm) x 18 in. (457 mm) High Proximity	1	25 – 35 in. (635 – 889 mm)	439841	3N

* For multiple nozzle protection of single fryers, see detailed information on Pages 4-10 and 4-11.

Nozzle Application Chart (Continued)

Hazard	Maximum Hazard Dimensions	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping – Flow No.
Fryer (Non-Split Vat Only) (Continued)	Maximum Size (without drip board) 14 1/2 in. (368 mm) x 16.5 in. (419 mm)				
	High Proximity	1	16 – 21 in. (406 – 533 mm)	439845	290
Fryer (Non-Split Vat Only)*	Maximum Size (with drip board) 21 in. (533 mm) x 14 in. (355 mm) (Fry Pot must not exceed 15 in. x 14 in. (381 mm x 355 mm))				
	High Proximity	1	27 – 47 in. (685 – 1193 mm)	439842	230
	Medium Proximity	1	20 – 27 in. (508 – 685 mm)	439843	245
	Maximum Size (with drip board) 25 3/8 in. (644 mm) x 19 1/2 in. (495 mm) (Fry pot side must not exceed 19 1/2 in. (495 mm) x 19 in. (483 mm)				
	High Proximity	1	21 – 34 in. (533 – 863 mm)	439841	3N
	Low Proximity	1	13 – 16 in. (330 – 406 mm)	439845	290
	Maximum Size (with drip board) 18 in. (457 mm) x 27 3/4 in. (704 mm)				
	High Proximity	1	25 – 35 in. (635 – 889 mm)	439841	3N
	Maximum Size (with drip board) 14 1/2 in. (368 mm) x 26.5 in. (673 mm)				
	High Proximity	1	16 – 21 in. (406 – 533 mm)	439845	290
Fryer (Split or Non-Split Vat)	Maximum Size (with drip board) 14 in. (355 mm) x 21 in. (533 mm)				
	Low Proximity	1	13 – 16 in. (330 – 406 mm)	439845	290
Fryer (Split or Non-Split Vat)	Maximum Size (with drip board) 14 1/2 in. (368 mm) x 26 1/2 in. (673 mm)				
	Medium Proximity	1	16 – 27 in. (406 – 685 mm)	439845	290

* For multiple nozzle protection of single fryers, see detailed information on Pages 4-10 and 4-11.

Nozzle Application Chart (Continued)

Hazard	Maximum Hazard Dimensions	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping – Flow No.
Range	Longest Side (High Proximity) 32 in. (812 mm) Area – 384 in.^{2} (24774 mm^2)	1	30 – 40 in. (762 – 1016 mm)	439838	1N
	Longest Side (Low Proximity) 24 in. (609 mm) Area – 432 in.^{2} (27870 mm^2)	1	15 – 20 in. (381 – 508 mm)	439838	1N
	Longest Side 28 in. (711 mm) Area – 336 in.^{2} (21677 mm^2)		40 – 48 in. (1016 – 1219 mm) (With Backshelf)	439836	1F
	Longest Side 32 in. (812 mm) Area – 384 in.^{2} (24774 mm^2)		30 – 40 in. (762 – 1016 mm) (With Backshelf)	439844	260
	Longest Side (High Proximity) 28 in. (711 mm) Area – 672 in.^{2} (43354 mm^2)	1	40 – 50 in. (1016 – 1219 mm)	439843	245
	Longest Side (Medium Proximity) 32 in. (812 mm) Area – 768 in.^{2} (49548 mm^2)	1	30 – 40 in. (762 – 1016 mm)	439844	260
	Longest Side (Low Proximity) 36 in. (914 mm) Area – 1008 in.^{2} (65032 mm^2)	2	15 – 20 in. (381 – 508 mm)	439845	290
Griddle	Longest Side (High Proximity) 48 in. (1219 mm) Area – 1440 in.^{2} (92903 mm^2)	1	30 – 50 in. (762 – 1270 mm) (perimeter located)	439844	260
	Longest Side (High Proximity) 30 in. (762 mm) Area – 720 in.^{2} (46451 mm^2)	1	30 – 50 in. (762 – 1270 mm) (center located)	439845	290
	Longest Side (High Proximity) 36 in. (914 mm) Area – 1080 in.^{2} (69677 mm^2)	1	35 — 40 in. (889 – 1016 mm) (perimeter located)	439838/439865	1N/1NSS
	Longest Side (Medium Proximity) 48 in. (1219 mm) Area – 1440 in.^{2} (92903 mm^2)	1	20 – 30 in. (508 – 762 mm) (perimeter located)	439845	290
	Longest Side (Low Proximity) 26 in. (660 mm) Area – 533 in.^{2} (34387 mm^2)	1	15 – 20 in. (381 – 508 mm) (center located)	439839	1W

Nozzle Application Chart (Continued)

Hazard	Maximum Hazard Dimensions	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping – Flow No.
Griddle (Continued)	Longest Side (Low Proximity) 36 in. (914 mm) Area – 1080 in.^{2} (69677 mm^2)	1	10 – 20 in. (254 – 508 mm) (perimeter located)	439840	2W
	Longest Side (Low Proximity) 48 in. (1219 mm) Area – 1440 in.^{2} (92903 mm^2)	1	10 – 20 in. (254 – 508 mm) (perimeter located)	439846	2120
Chain Broiler* (Overhead Protection)	Length – 34 in. (863 mm) Width – 32 in. (812 mm)	2	10 – 26 in. (254 – 660 mm)	439839/439864	1W/1WSS
Chain Broiler (Horizontal Protection)	Length – 43 in. (1092 mm) Width – 31 in. (787 mm)	2	1 – 3 in. (25 – 76 mm)	439838/439865	1N/1NSS
Gas-Radiant/Electric Char-Broiler	Longest Side – 36 in. (914 mm) Area – 864 in.^{2} (55741 mm^2)	1	15 – 40 in. (381 – 1016 mm)	439838/439865	1N/1NSS
Electric Char-Broiler	Longest Side – 34 in. (863 mm) Area – 680 in.^{2} (43870 mm^2)	1	20 – 50 in. (508 – 1270 mm)	439838/439865	1N/1NSS
Lava-Rock Broiler	Longest Side – 24 in. (609 mm) Area – 312 in.^{2} (20128 mm^2)	1	18 – 35 in. (457 – 889 mm)	439838/439865	1N/1NSS
Natural Charcoal Broiler	Longest Side – 24 in. (609 mm) Area – 288 in.^{2} (18580 mm^2)	1	18 – 40 in. (457 – 1016 mm)	439838/439865	1N/1NSS
Lava-Rock or Natural Charcoal Char-Broiler	Longest Side – 30 in. (762 mm) Area – 720 in.^{2} (46451 mm^2)	1	14 – 40 in. (355 – 1016 mm)	439841	3N
Wood Fueled Char-Broiler	Longest Side – 30 in. (762 mm) Area – 720 in.^{2} (46451 mm^2)	1	14 – 40 in. (355 – 1016 mm)	439841	3N
Upright Broiler/ Salamander	Length – 32.5 in. (825 mm) Width – 30 in. (762 mm)	2	–	439837	1/2N
Salamander Broiler	Length – 29 in. (736 mm) Width – 16 in. (406 mm)	1	–	439838	1N
	Length – 31 in. (787 mm) Width – 15 in. (381 mm)	1	–	439836	1F
	Length – 31 in. (787 mm) Width – 15 in. (381 mm)	1	–	439838	1N
Wok	14 in. – 30 in. (355 – 762 mm) Diameter 3.75 – 8.0 in. (95 – 203 mm) Deep	1	35 – 45 in. (889 – 1143 mm)	439844	260
	11 in. – 24 in. (279 – 609 mm) Diameter 3.0 – 6.0 in. (76 – 152 mm) Deep		30 – 40 in. (762 – 1016 mm)	439838/439865	1N/1NSS

* Minimum chain broiler exhaust opening – 12 in. x 12 in. (305 mm x 305 mm), and not less than 60% of internal broiler size.

SPECIFIC APPLICATION BY MODEL

Due to the configuration, application, and/or additional features that pose protection problems using conventional protection, noted in the guidelines previously addressed, the following appliances/applications are considered hazard specific.

The following hazard specific applications have been individually tested and listed by make and model number of the equipment designated.

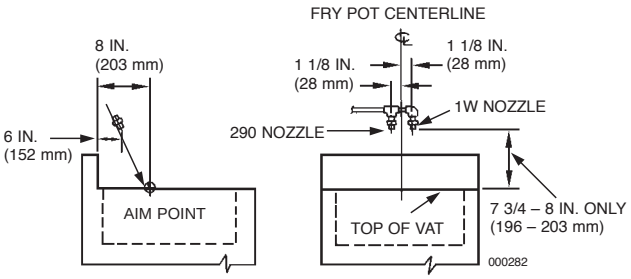
Dean Industries Gas Fryer, Model 2424 GTI, 120,000 BTU/hr. Rating

This specialized gas fryer can be protected with a combination of a 290 nozzle and a 1W nozzle for low proximity (7 3/4 – 8 in. (197 – 203 mm) nozzle height only) and two 230 nozzles (Part No. 419339) for high proximity (45 in. (1143 mm) nozzle height only).

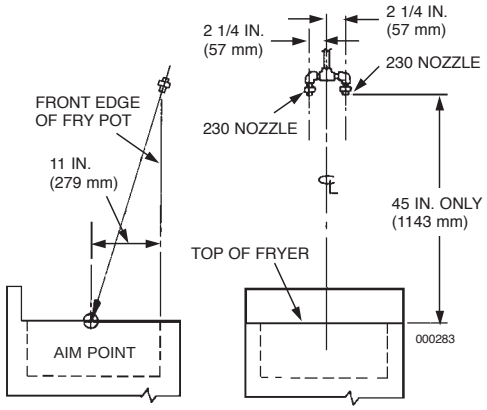
The maximum dimension of the fry pot is 24 in. x 24 in. (610 mm x 610 mm).

Nozzles must be positioned and aimed as shown in Figure 4-66.

Note: For low proximity protection, see Special Piping Layout in Figure 4-67.



LOW PROXIMITY (7 3/4 – 8 IN. (196 – 203 mm) NOZZLE HEIGHT)



HIGH PROXIMITY (45 IN. (1143 mm) NOZZLE HEIGHT ONLY)

FIGURE 4-66

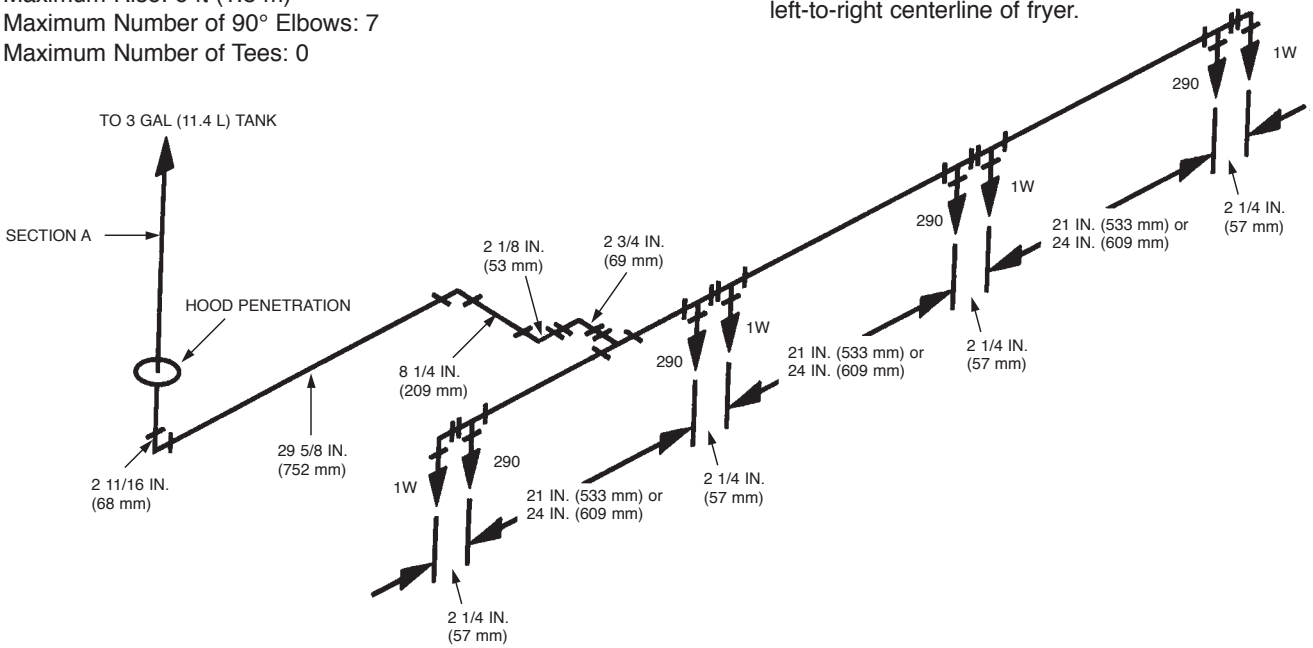
Dean Industries Model GTI Gas Fryer Special Piping Layout

Section A (Tank to Hood Penetration) Piping Limitations

Maximum Length: 30 ft (9.1 m)
Maximum Rise: 6 ft (1.8 m)
Maximum Number of 90° Elbows: 7
Maximum Number of Tees: 0

Section B (Hood Penetration to Nozzles) Piping Limitations

1. Piping configuration shall be as shown with ±1/4 in. (6 mm) tolerance on dimensions.
2. All nozzles shall be at the same elevation.
3. Each pair of appliance nozzles shall be equally spaced from left-to-right centerline of fryer.



SPECIFIC DISCHARGE PIPING FOR LOW PROXIMITY PROTECTION OF FOUR DEAN INDUSTRIES MODEL GTI GAS FRYERS

FIGURE 4-67
000284

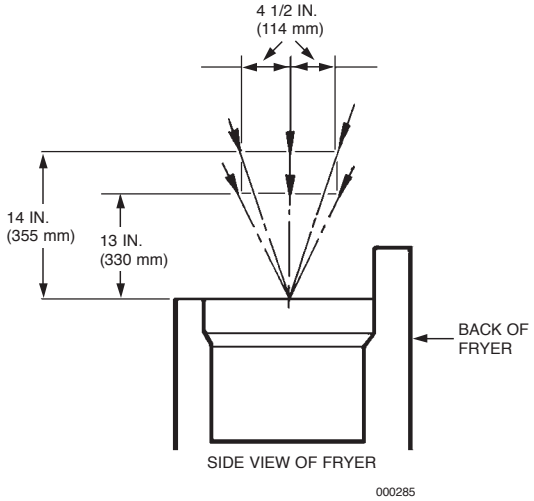
SPECIFIC APPLICATION BY MODEL (Continued)

Far West Hospitality Products Gas Fryer, Model PAR-1-20, 63000 BTU/hr Rating

This specialized gas fryer can be protected with a single, 290 nozzle.

The maximum dimension of the fry pot is 21 in. x 21 in. (533 mm x 533 mm).

The 290 nozzle must be located on the front-to-rear centerline and aimed at the center of the cooking surface. See Figure 4-68.



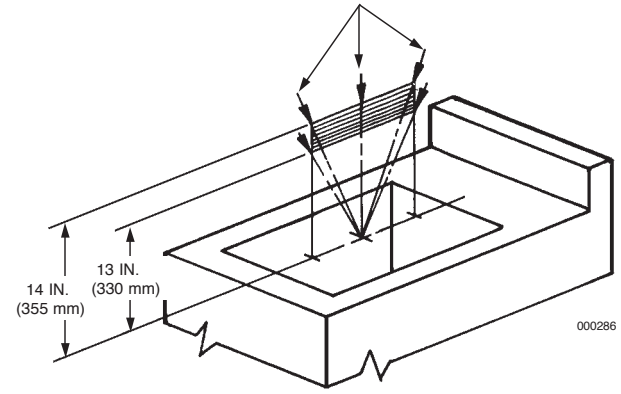


FIGURE 4-68

Frymaster 14 KW – 208V Electric Fryer, Model MACH 14 Series

This specialized single vat electric fryer can be protected either with a single 230 nozzle located 27 in. to 47 in. (685 mm to 1193 mm) above the top surface of the fryer or with a single 245 nozzle located 20 in. to 27 in. (508 mm to 685 mm) above the top surface of the fryer.

Either nozzle must be located anywhere along or within the perimeter of the cooking surface and aimed at the midpoint. See Figure 4-69. The maximum size of the fry pot (without drip board) is 13 3/4 in. x 16 3/4 in. (349 mm x 425 mm) and the maximum size of the cooking surface (with drip board) is 13 3/4 in. x 20 7/8 in. (349 mm x 530 mm). The vat may be divided in half to make two split vats.

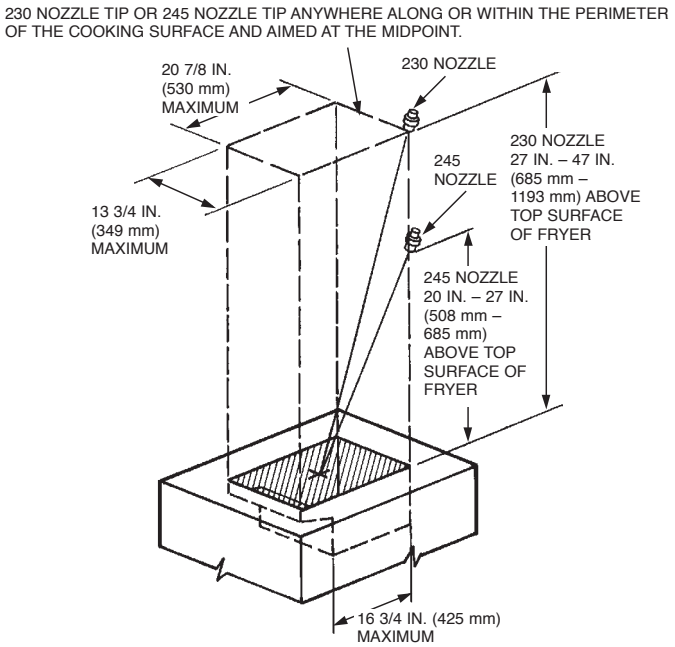


FIGURE 4-69
000209

SPECIFIC APPLICATION BY MODEL (Continued)

Frymaster Energy Efficient RE 14 Fryer

This electric fryer can be protected with either a single 230 nozzle located 27 to 47 in. (685 mm to 1193 mm) above the top surface of the fryer or with a single 245 nozzle located 20 to 27 in. (508 mm to 685 mm) above the top surface of the fryer.

Either nozzle must be located anywhere along or within the perimeter of the cooking surface and aimed at the midpoint. See Figure 4-70. The maximum size of the fry pot (without drip board) is 14 x 15 1/2 in. (355 mm x 393 mm) and the maximum size of the cooking surface (with drip board) is 14 x 20 7/8 in. (355 mm x 530 mm). The vat may be divided in half to make two split vats.

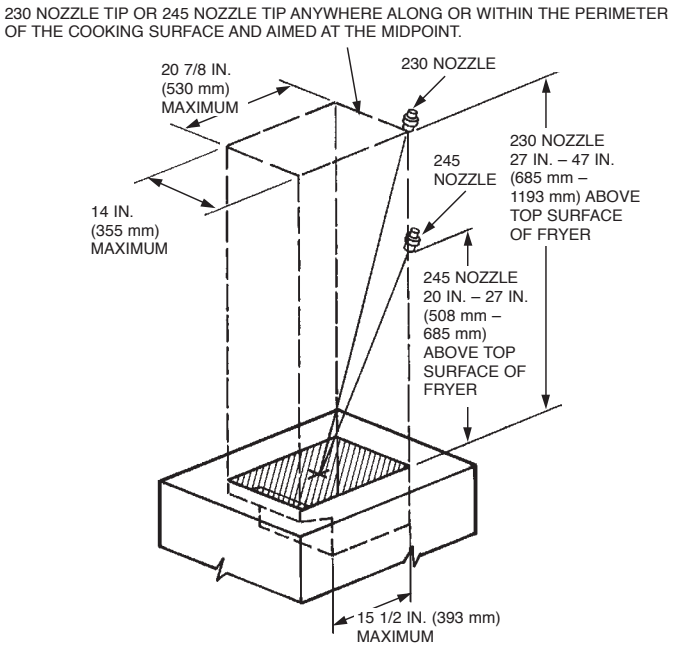


FIGURE 4-70

McDonald Fryer (Nozzle Heights of Less Than 20 in. (508 mm))

When the 245 nozzle is used to protect McDonald's fryers at heights less than 20 in. (508 mm) above the top of the fryer, the following appliance and distribution piping rules shall apply:

1. Each McDonald's gas or electric fryer shall be protected by one 245 nozzle. The fryer vat dimensions for one full vat or two split vats shall not exceed 14 in. x 15 in. (355 mm x 381 mm) without the dripboard and 14 in. x 21 in. (355 mm x 533 mm) with the dripboard.

   The heat input rating of the fryer shall not exceed 122,000 BTU/HR.

   The 245 nozzle shall be located 18 in. to 20 in. (457 mm to 508 mm) above the top of the fryer vat, 2 in. to 2 1/4 in. (51 mm to 57 mm) to the right or left of the front-to-rear vat centerline, and 0 to 3 1/4 in. (0 to 82 mm) forward of the right-to-left vat centerline, and aimed at the vat center point. See Figure 4-71.

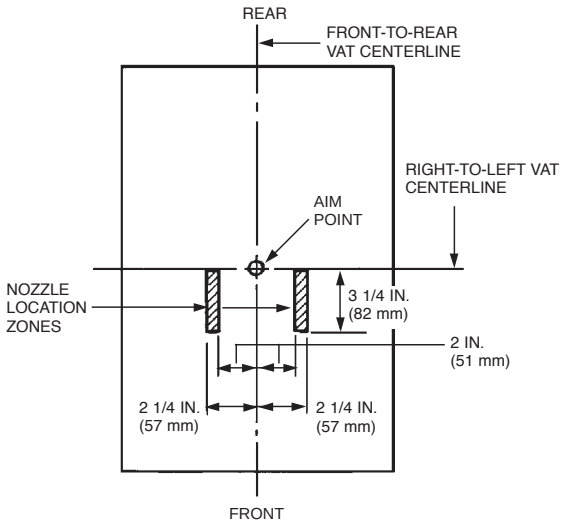


FIGURE 4-71

002297

2. The distance between the start of the first branch line and the start of the last branch line shall not exceed 79 in. (2006 mm).
3. The total length of all branch lines shall not exceed 162 in. (4114 mm).
4. The 3 gallon agent tank shall be elevated above the connections between the supply and branch lines.
5. The requirements of the following table shall not be exceeded:

Requirement	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	140 in. (3556 mm)	67 in. (1701 mm)	6 in. (152 mm)	42 in. (1066 mm)
Minimum Length	81 in. (2057 mm)	4 in. (101 mm)	4 in. (101 mm)	17 in. (431 mm)
Maximum 90° Elbows	5	3	1	6
Maximum Tees	0	1	1	1
Maximum Flow Numbers	11	2	1	2
Minimum Flow Numbers	5	0	0	1/2

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Mono Rail Center Lift System – Models 690, 691, 692

Nozzle Type: One 1N nozzle (Upper position)
One 1F nozzle (Lower position)

Nozzle Location:

1N Nozzle (Upper position): From the Tee Block, position nozzle tip 16 in. (406 mm) up from base of fryer surface and 5 in. (127 mm) in from **right** side of appliance back shroud

1F Nozzle (Lower Position): Running down from the Tee Block to the base of the fryer, position the nozzle tip 2 in. (51 mm) from back side of fry vat, and 8 in. (203 mm) in from the **right** side of appliance back shroud

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat

1F Nozzle: The 1F nozzle is a flat spray nozzle and the spray must be horizontal to that of the edge of the back lip of the fry vat

System Coverage: Each fryer requires a minimum of 3 gal (11.4 L) of ANSULEX Low pH agent discharging through the two one-flow nozzles (1N and 1F)

Note: In this application, R-102 agent storage tanks must be pressurized from a dedicated R-102 double-tank nitrogen cartridge. The cartridge utilized for this hazard-specific Henny Penny fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection will require an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

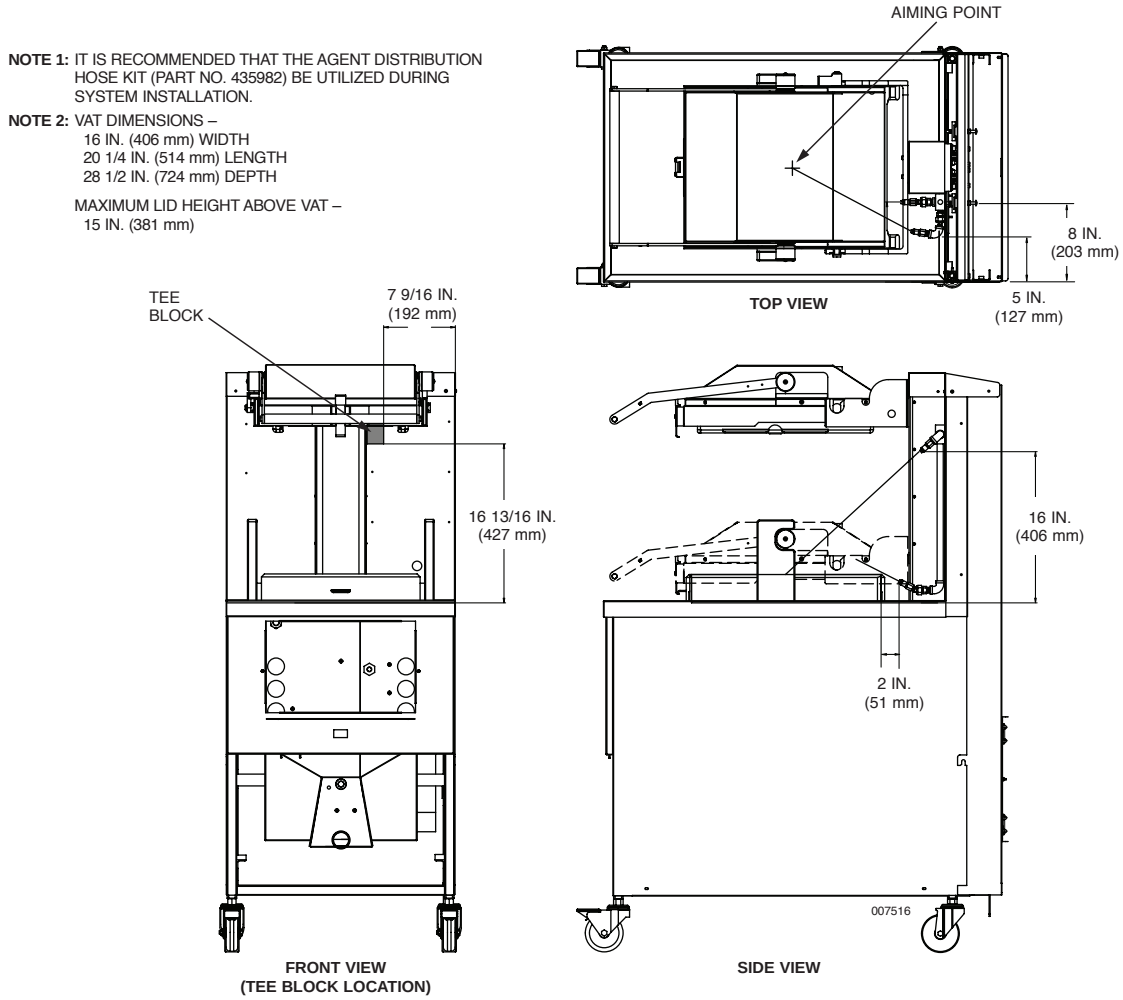


FIGURE 4-72

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Dual Lift System – Models 580, 581, 582, 590, 591, 592, 680, 682, 691

Nozzle Type: One 1N nozzle (Upper position)
One 1F nozzle (Lower position)

Nozzle Location:

1N Nozzle (Upper position): From the Tee Block, position nozzle tip 16 in. (406 mm) up from base of fryer surface and 5 in. (127 mm) in from **left** side of appliance back shroud

1F Nozzle (Lower position): Running down from the Tee Block to the base of the fryer, position the nozzle tip 2 in. (51 mm) from back side of fry vat, and 8 in. (203 mm) in from the **left** side of appliance back shroud.

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat

1F Nozzle: The 1F nozzle is a flat spray nozzle and the spray must be horizontal to that of the edge of the back lip of the fry vat

System Coverage: Each fryer requires a minimum of 3 gal (11.4 L) of ANSULEX Low pH agent discharging through the two one-flow nozzles (1N and 1F)

Note: In this application, R-102 agent storage tanks must be pressurized from a dedicated R-102 double-tank nitrogen cartridge. The cartridge utilized for this hazard-specific Henny Penny fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection will require an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

NOTE 1: IT IS RECOMMENDED THAT THE AGENT DISTRIBUTION HOSE KIT (PART NO. 435982) BE UTILIZED DURING SYSTEM INSTALLATION.

NOTE 2: VAT DIMENSIONS –
16 IN. (406 mm) WIDTH
20 1/4 IN. (514 mm) LENGTH
28 1/2 IN. (724 mm) DEPTH

MAXIMUM LID HEIGHT ABOVE VAT –
15 IN. (381 mm)

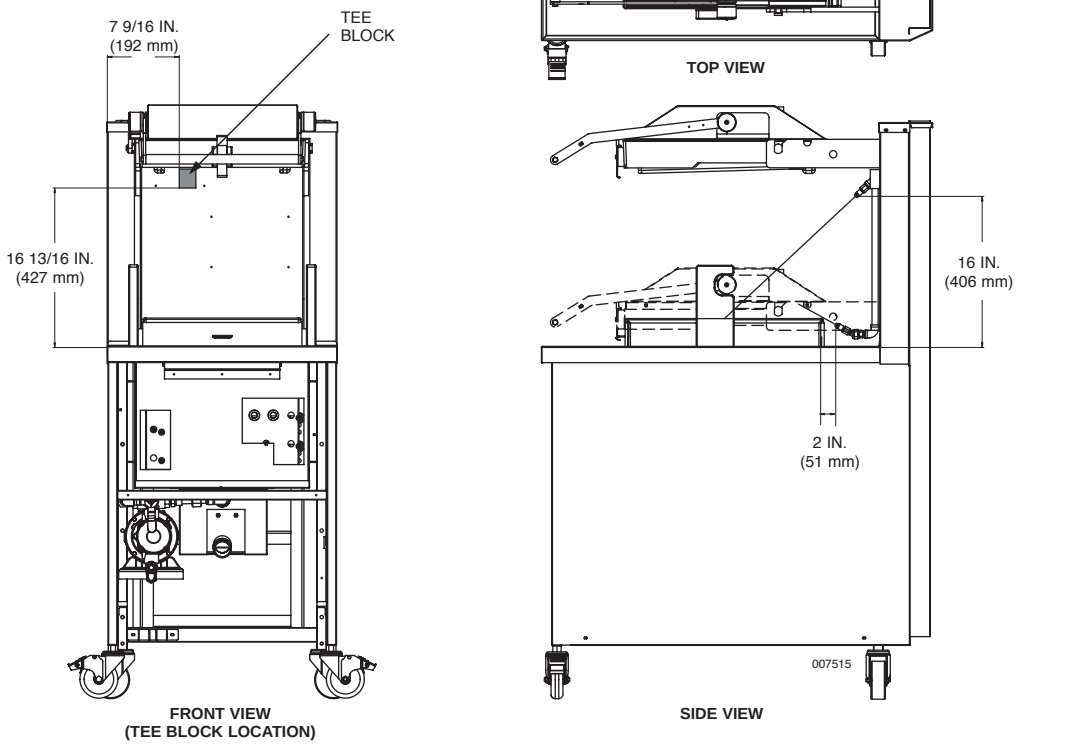


FIGURE 4-73

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Dual Lift System – Model PXE-100

Nozzle Type: One 1N nozzle (Upper position)
One 1F nozzle (Lower position)

Nozzle Location:

1N Nozzle (Upper position): From the Tee Block, position nozzle tip 16.75 in. (425 mm) up from base of fryer surface and 1.75 in. (44 mm) in from **right** side of appliance back shroud

1F Nozzle (Lower position): Running down from the Tee Block to the base of the fryer, position the nozzle tip 2 in. (51 mm) up from the base of the fryer surface, and 2.25 in. (57 mm) in from the **right** side of appliance back shroud

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat

1F Nozzle: The 1F nozzle is a flat spray nozzle and the spray must be horizontal to that of the edge of the back lip of the fry vat

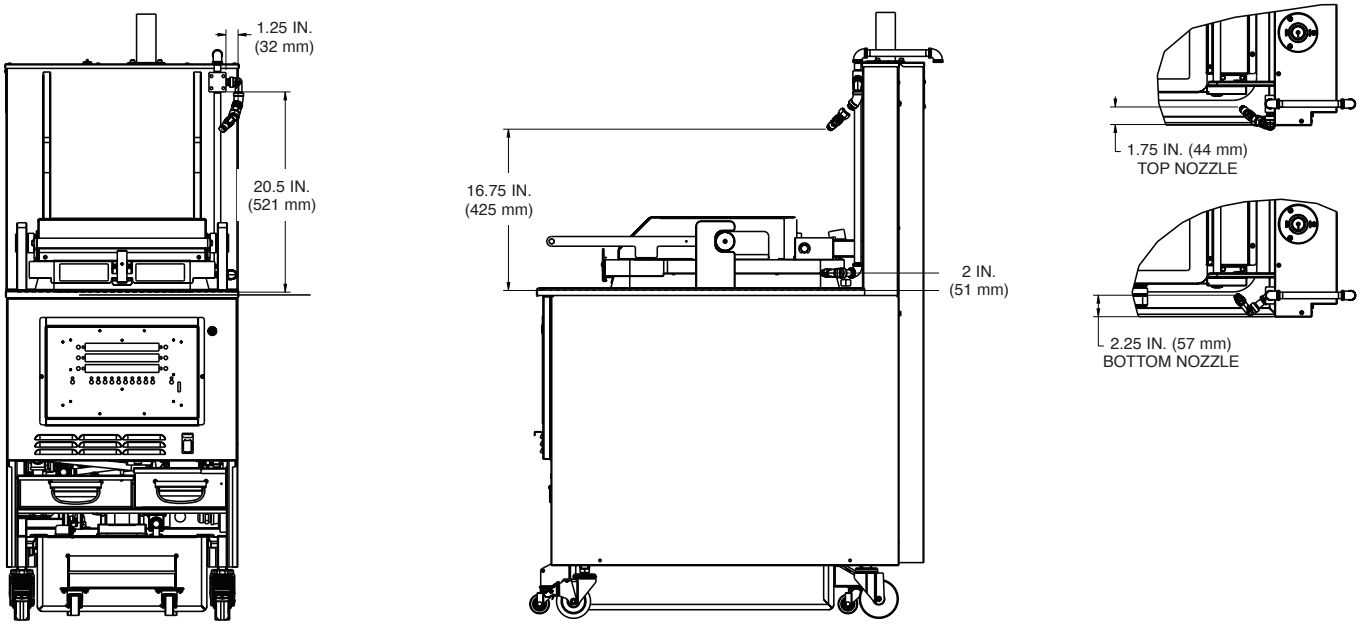
System Coverage: Each fryer requires a minimum of 3 gal (11.4 L) of ANSULEX Low pH agent discharging through the two one-flow nozzles (1N and 1F)

Note: In this application, R-102 agent storage tanks must be pressurized from a dedicated R-102 double-tank nitrogen cartridge. The cartridge utilized for this hazard-specific Henny Penny fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection will require an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

NOTE 1: IT IS RECOMMENDED THAT THE AGENT DISTRIBUTION HOSE KIT (PART NO. 435982) BE UTILIZED DURING SYSTEM INSTALLATION.

NOTE 2: VAT DIMENSIONS –
14.93 IN. (379 mm) WIDTH
20.55 IN. (522 mm) LENGTH
17.42 IN. (442 mm) DEPTH

HEAT OUTPUT – 17kW



FRONT VIEW (TEE BLOCK LOCATION)

SIDE VIEW (NOZZLE LOCATION)

FIGURE 4-74
009481

SPECIFIC APPLICATION BY MODEL (Continued)

Pitco *SPIN*FRESH Fryer – Models MEII, MGII, SE14, SE14R, SE14X, SG144S, SG14RS, SEH50, SEH5017, SGH50, SGH5017, SSH55, SSH55R

Nozzle Quantity/Type: Two 2120 nozzles

- One Agent Distribution Hose and Restraining Cable Kit (Part No. 435982) must be utilized for each fryer (see Figure 4-78)
- The 3/8 in. Quik-Seal mechanical bulkhead fitting (Part No. 77285) must be utilized for the connections through fryer cover.
- Nozzle must be installed with the standard Metal Blow-Off Cap (Part No. 439861) or the Stainless Steel Blow-Off Cap (Part No. 439866).
- Fryer electrical power source must be connected for electrical shutdown upon system actuation through the use of the ANSUL R-102 Snap Action Switch Kit (Part Nos. 423878-423881).

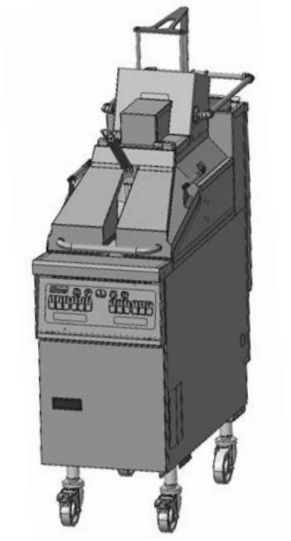


FIGURE 4-75
009476

NOZZLE CROSS SECTION VIEW

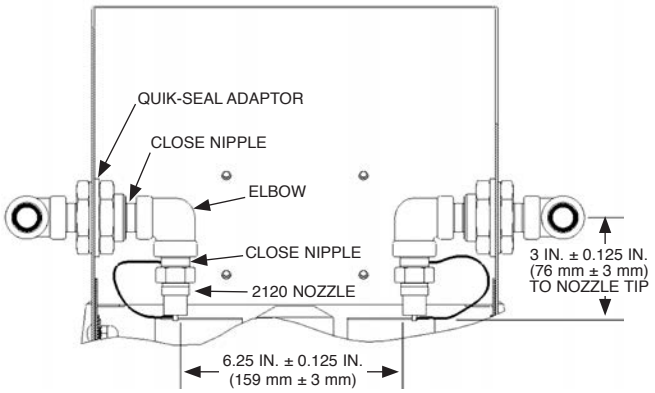


FIGURE 4-76
009459

FRYER FLUE

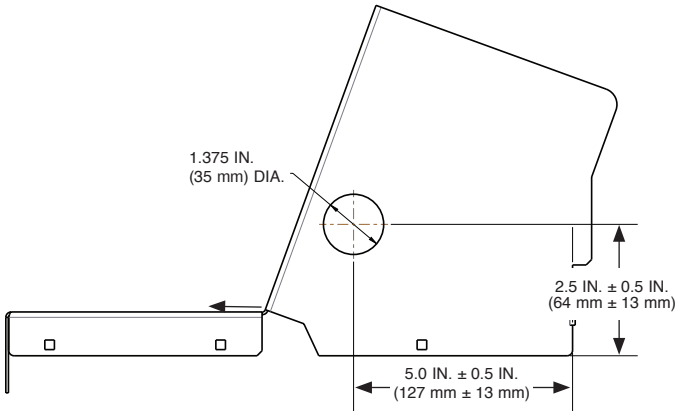
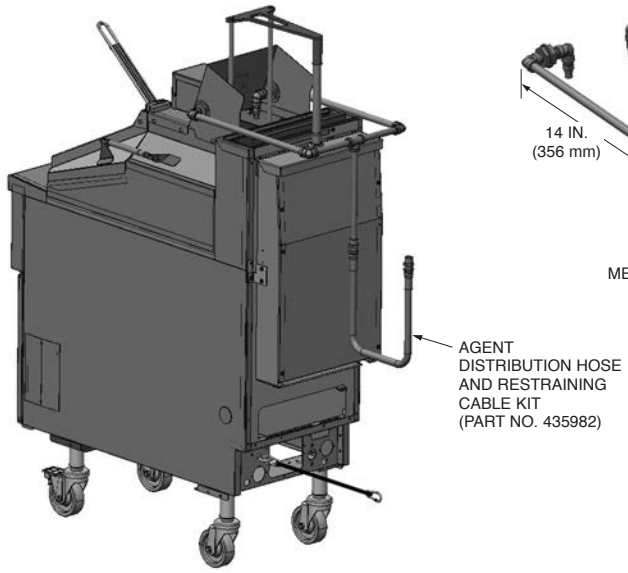
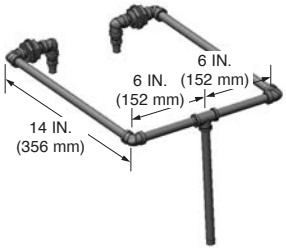


FIGURE 4-77
009460





MEASURE TO THE CENTER
OF FITTINGS

FIGURE 4-78
009477

SPECIFIC APPLICATION BY MODEL (Continued)

BELSHAW Century Fryers – Models C100, C200, C200G, C300G, C400, C400G, C600, C600G

- **Nozzle Type:** 3N nozzle
- **Nozzle Spacing:** 11.5 in. (292 mm) maximum from end of fryer and 25.5 in. (647 mm) maximum on centers
- **Nozzle Height:** 35 in. (889 mm) above top of appliance
- **Nozzle Position:** 2 in. (51 mm) in from inside edge of fry vat
- **Nozzle Aiming Point:** Along the centerline of fry vat

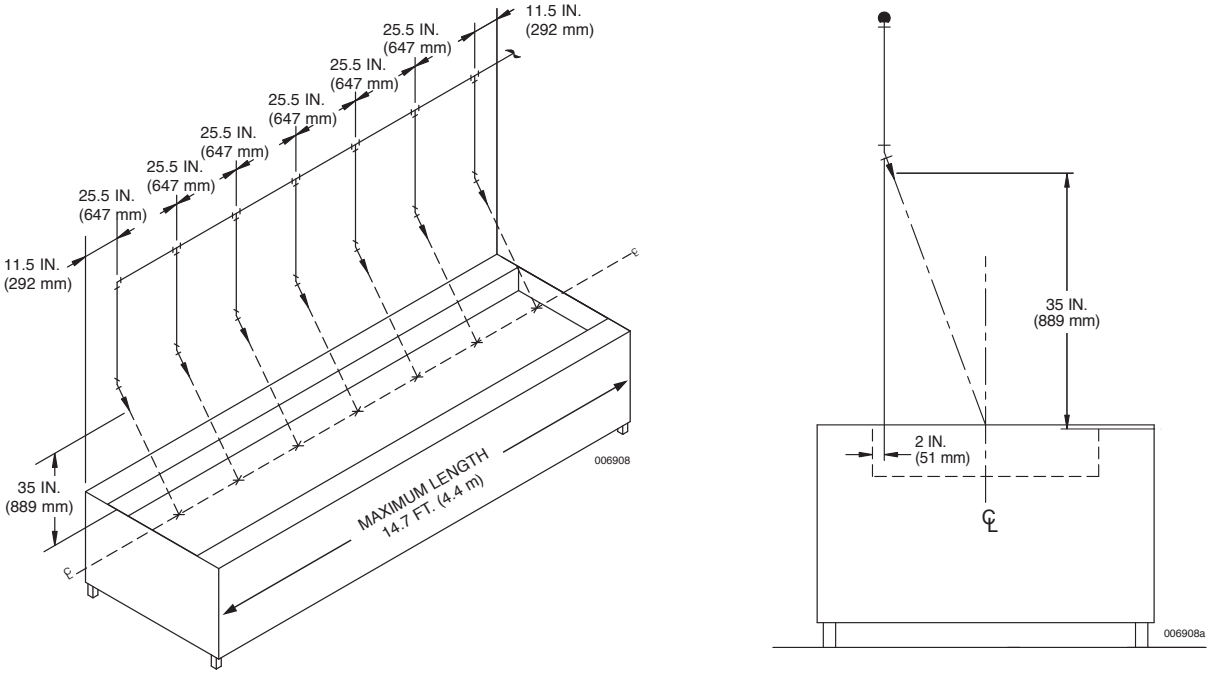


FIGURE 4-79

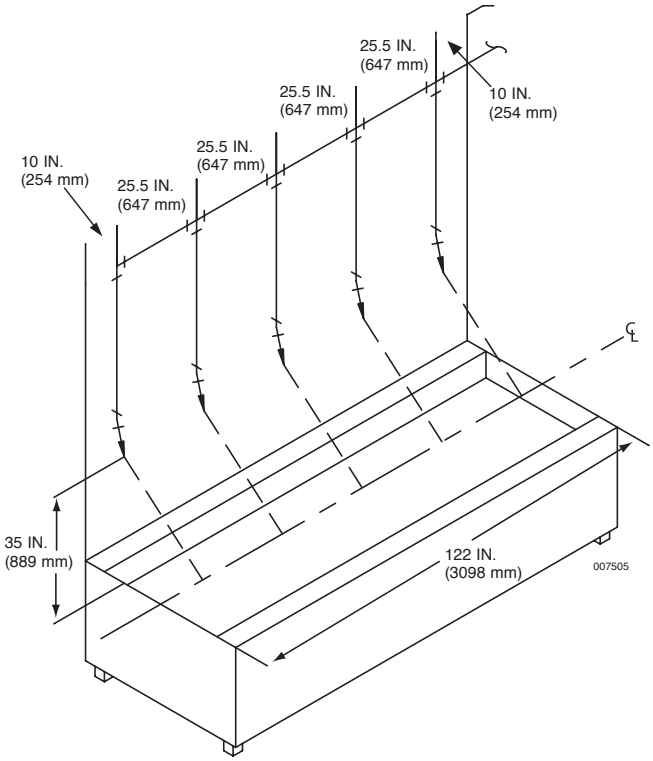
BELSHAW Century Fryers

Specifications		C100	C200	C200G	C300G	C400	C400G	C600	C600G
Fryer Vat Size									
Length:	Inches (mm)	65 (1651)	65 (1651)	65 (1651)	65 (1651)	122.25 (3105)	122 (3099)	122.25 (3105)	122 (3099)
Width:	Inches (mm)	12 (305)	20 (508)	20 (508)	31.25 (794)	20.25 (514)	21.25 (540)	31 (787)	31.25 (794)
Depth:	Inches (mm)	5.25 (133)	5.25 (133)	9.75 (248)	9.75 (248)	6.25 (159)	11.25 (286)	7.12 (181)	11.00 (279)
BTU Rating: K		—	—	188	200	—	350	—	360
Vat Oil Capacity:	Lb (kg)	110 (49.8)	188 (85.2)	346 (156.9)	700 (317.5)	478 (216.8)	600 (272.1)	675 (306.1)	1250 (566.9)

SPECIFIC APPLICATION BY MODEL (Continued)

Dunkin Donuts Fryer Model DD400CGF

- **Nozzle Type:** 3N nozzle
- **Nozzle Spacing:** 11.5 in. (292 mm) maximum from end of fryer and 25.5 in. (647 mm) maximum on centers
- **Nozzle Height:** 35 in. (889 mm) above top of appliance
- **Nozzle Position:** 2 in. (51 mm) in from inside edge of fry vat
- **Nozzle Aiming Point:** Along the centerline of fry vat



Fryer Specifications:

- **Vat Size:**
  Length: 122 in. (3098 mm)
  Width: 31.3 in. (795 mm)
  Depth: 11 in. (279 mm)
- **BTU Rating:** 360k
- **Vat Oil Capacity:**
  1250 lb (566.9 kg)

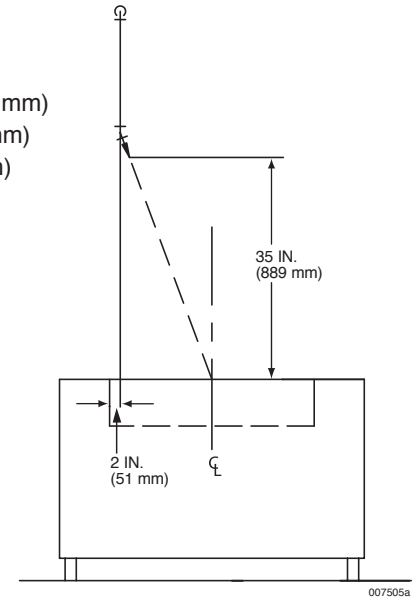
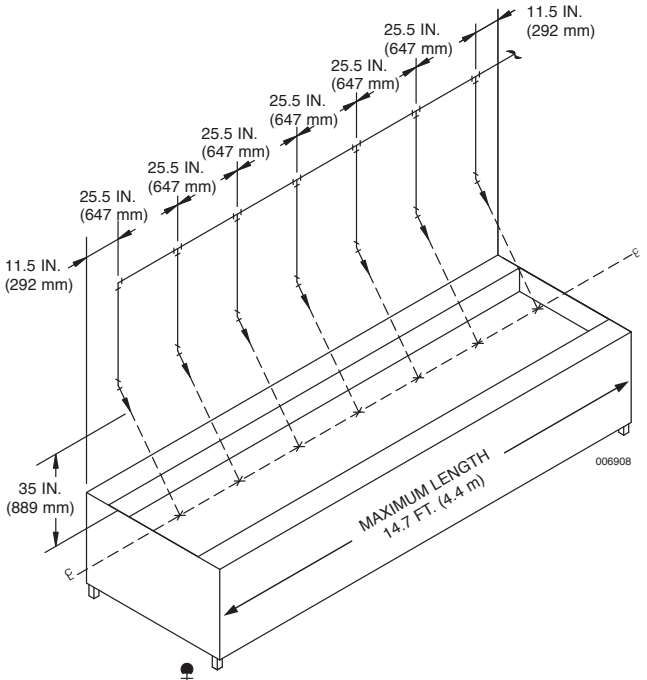


FIGURE 4-80

▸ **Krispy Kreme Fryers – Models 55M, 65 D/H, 110 D/H, 110M,**
▸ **150 D/H, 220M, 270 D/H, 600 D/H, and 1000 D/H**

Nozzle Type: 3N nozzle
Nozzle Spacing: 11.5 in. (292 mm) maximum from end of fryer and on maximum 25.5 in. (647 mm) centers
Nozzle Height: 35 in. (889 mm) above top of appliance
Nozzle Position: 2 in. (51 mm) from inside edge of fry vat
Nozzle Aiming Point: Along centerline of fry vat

Note: Figure 4-81 shows maximum size fryer (Model 1000 D/H). Smaller size fryers (Models 150 D/H, 270 D/H, and 600 D/H) can be protected with less nozzles but nozzle spacings, height requirements, and positions, must be maintained as shown in Figure 4-81.



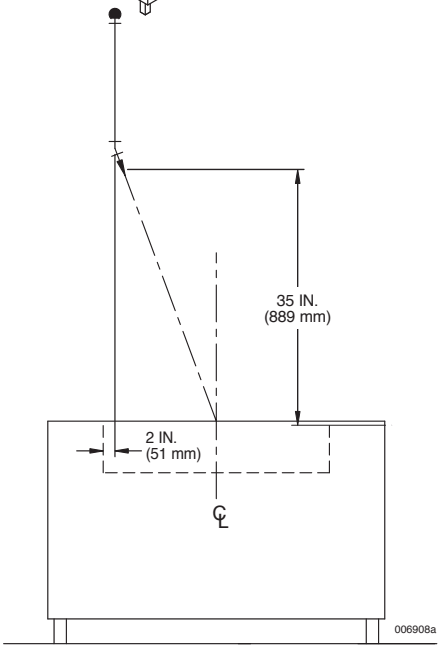


FIGURE 4-81

SPECIFIC APPLICATION BY MODEL (Continued)

Garland Electric Dual-Side Clamshell Broiler – Model CXBE12

Nozzle Quantity/Type: One 1N nozzle

Nozzle Height: 12 in. (304.8 mm) to 15 in. (381 mm) above lower cooking surface

Nozzle Location: 1 in. (26 mm) from side of appliance at 12 in. (304.8 mm) up

1 in. (26 mm) to 3 in. (76 mm) from side of appliance at 15 in. (381 mm) up

See Figure 4-82

Nozzle Aiming Point: Center of lower cooking surface

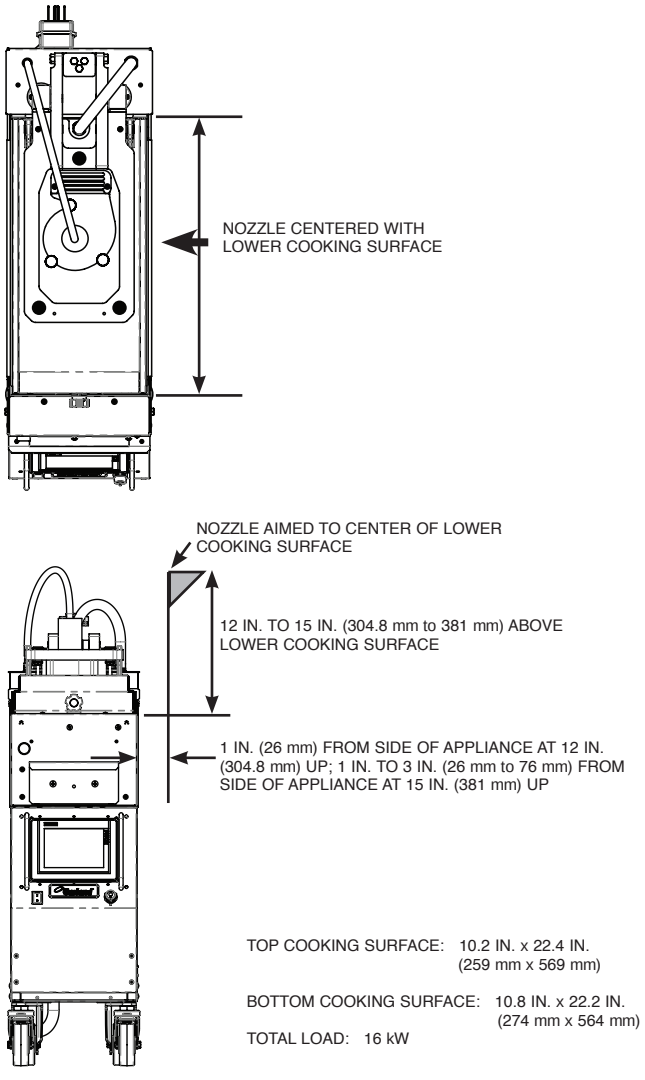


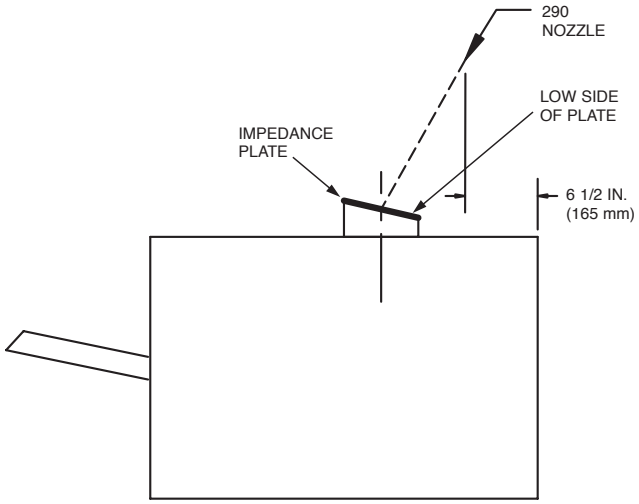
FIGURE 4-82

SPECIFIC APPLICATION BY MODEL (Continued)

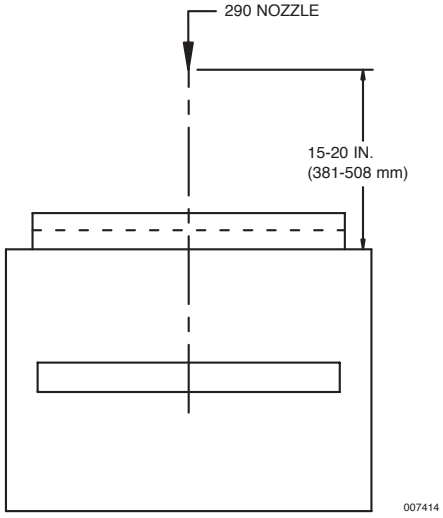
DUKE Chain Broiler – Model FBB-High Proximity

DUKE Chain Broiler With or Without Catalyst View:

- **Nozzle Quantity/Type:** One 290 nozzle
- **Nozzle Height:** 15 to 20 in. (381 to 508 mm) above top of appliance
- **Nozzle Location:** Centered 6 1/2 in. (165 mm) back from **front feed edge** of appliance. Nozzle must be oriented to spray onto impedance plate.
- **Nozzle Aiming Point:** Aimed at center of impedance plate



Side View



Front View (Feed Side)

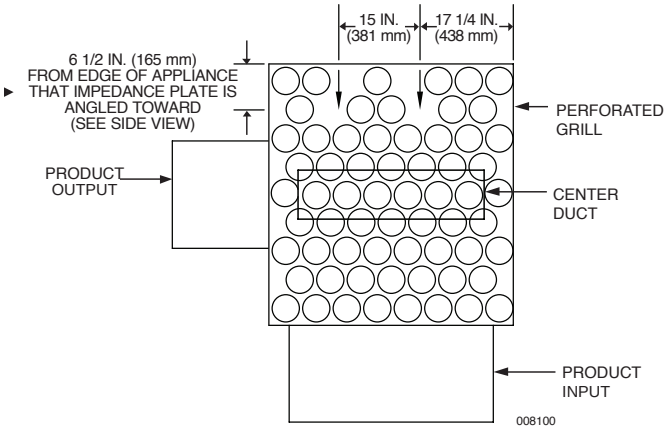
FIGURE 4-83

DUKE Chain Broiler With or Without Catalyst View

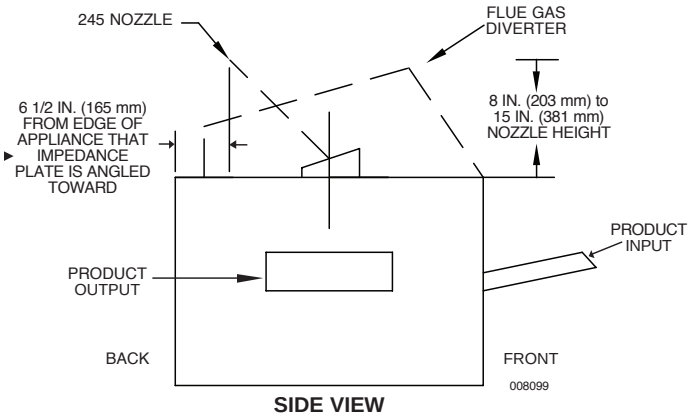
Exhaust Deflector Size – 6.25 in. (159 mm) x 26.75 in. (679 mm):

- **Nozzle Quantity/Type:** Two 245 nozzles
- **Nozzle Height:** 8 in. to 15 in. (203 mm to 381 mm) above top of appliance.
- **Nozzle Location:** 6.5 in. (165 mm) from front or back edge of hazard
  First nozzle positioned 17.25 in. (438 mm) from right side of broiler (facing broiler)
  Second nozzle positioned 15 in. (381 mm) from first nozzle
  Nozzle must be oriented to spray onto impedance plate.
- **Nozzle Aiming Point:** Aimed at at center of impedance plate

Note: If the deflector or flue gas diverter is rotated 180 degrees, the nozzles must also rotate to discharge into the opening.



TOP VIEW



SIDE VIEW

FIGURE 4-84

SPECIFIC APPLICATION BY MODEL (Continued)

DUKE Electric Broiler – Model FBB – High Proximity

DUKE Electric Broiler with or without Catalyst View

Nozzle Quantity/Type: Two 1N nozzles

Nozzle Height: 18 in. (457 mm)

Nozzle Location: 6.5 in. (165 mm) from edge of appliance that impedance plate is angled toward

First nozzle positioned 5 in. (127 mm) to left of opening centerline

Second nozzle positioned 5 in. (127 mm) to right of opening centerline

See Figure 4-85

Nozzle Aiming Point: Aimed at center of opening

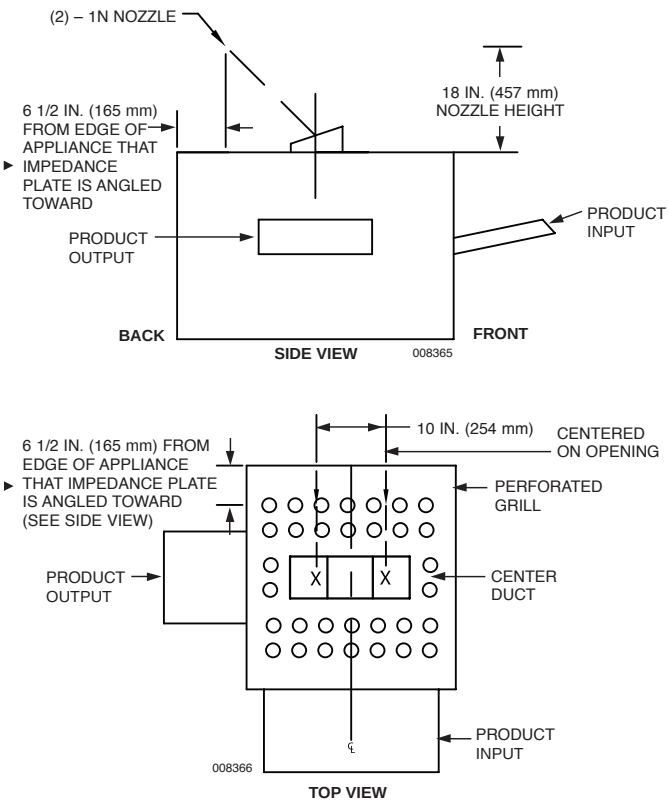


FIGURE 4-85

DUKE Electric Broiler – Model FBB – High Proximity

DUKE Electric Broiler without Catalyst View

Nozzle Quantity/Type: One 290 nozzle

Nozzle Height: 15 to 20 in. (381 to 508 mm)

Nozzle Location: 6.5 in. (165 mm) from edge of appliance that impedance plate is angled toward

See Figure 4-86

Nozzle Aiming Point: Aimed at center of opening

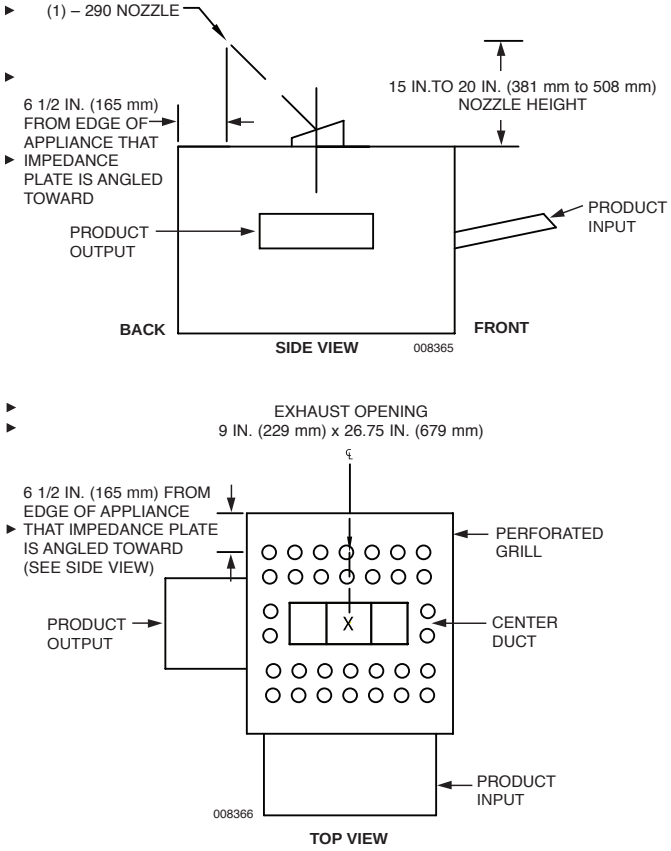


FIGURE 4-86

SPECIFIC APPLICATION BY MODEL (Continued)

DUKE Electric Broiler – Model FBB – Low Proximity

DUKE Electric Broiler with or without Catalyst View

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)

Nozzle Location: 6.5 in. (165 mm) from edge of appliance that impedance plate is angled toward

First nozzle positioned 17.5 in. (444 mm) from right side of broiler (facing broiler)

Second nozzle positioned 15 in. (381 mm) from first nozzle

See Figure 4-87

Nozzle Aiming Point: Aimed at center of opening

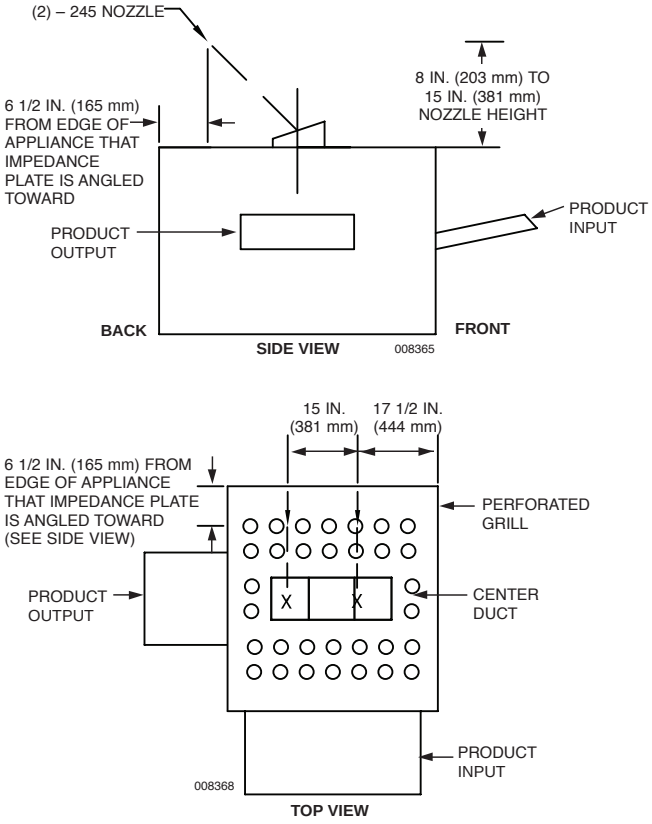


FIGURE 4-87

Nieco Broiler Model 940, 962 or 960 With Catalytic Converter Protection

Note: Nieco broilers without catalytic converters use standard chain broiler protection options.

Certain models of the Nieco broiler (Models 940, 962, and 960) are equipped with a catalytic converter to comply with new clean air laws. Because of the converter, it is necessary to protect these broilers in a special way. The guidelines for protecting these broilers are as follows:

– The maximum internal broiling area is 29 in. x 23.5 in. (737 mm x 596 mm).

– An R-102 3-gallon system with a maximum of six flow numbers, must be used for protection of each broiler, including plenum and duct.

– Each individual broiler must be protected with a minimum of two 1N nozzles. The nozzles must be located as shown in Figure 4-88.

– The broiler must be fitted with two 1 in. (25 mm) high agent barriers on the angled surface of the broiler. If these have not been completed by the equipment supplier, they must be added in the field.

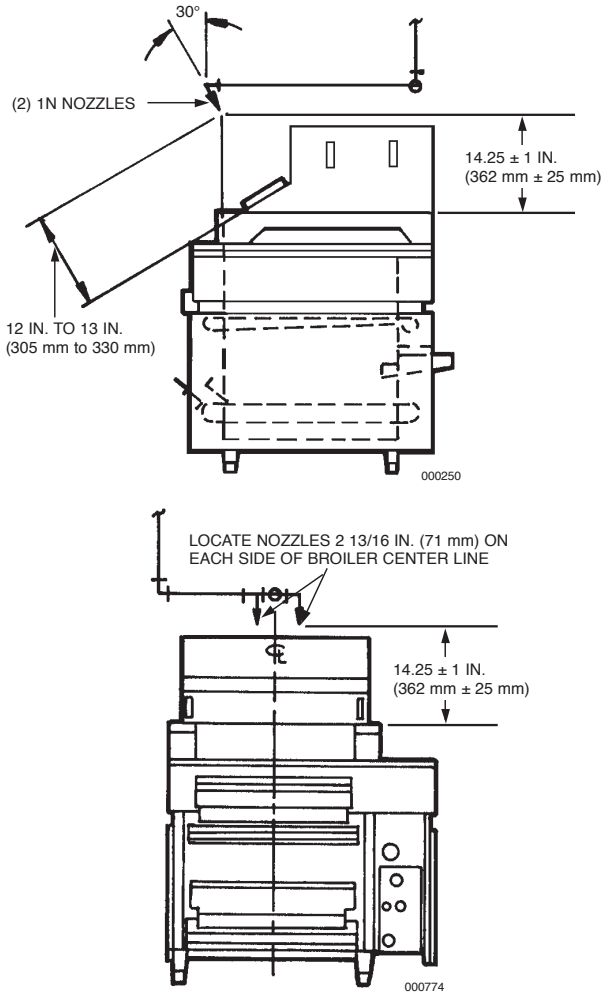


FIGURE 4-88

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model 950, 960, 980, 1424

- **Nozzle Quantity/Type:** One 2W nozzle
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 4-89a.
- **Nozzle Location:** 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-89a.
- **Nozzle Aiming Point:** Aimed at center of opening. See Figure 4-89a.

Nieco Broiler – Model 950, 960, 980, 1424 (with Catalytic Converter)

- **Nozzle Quantity/Type:** Two 2W nozzles
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 4-89b.
- **Nozzle Location:** 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-89b.
- **Nozzle Aiming Point:** Aimed at center of opening. See Figure 4-89b – Side View.
- **Nozzle Aiming Point:** Aimed at point 3 in. (76 mm) each side of center. See Figure 4-89b – Front View.

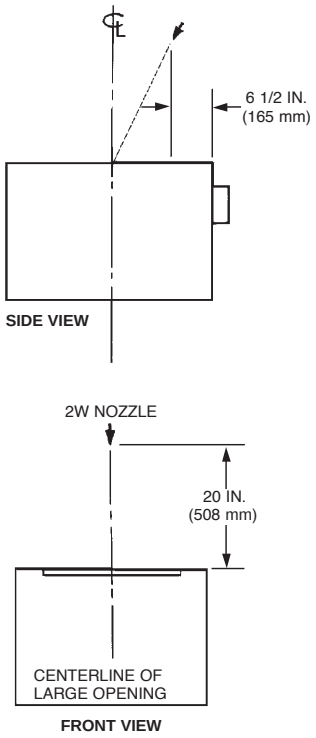


FIGURE 4-89a
006486

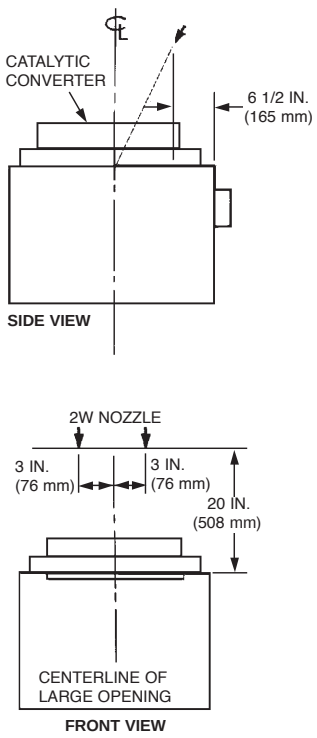


FIGURE 4-89b
007034

Nieco Broiler – Model 9015 (With or Without Catalytic Converter)

- **Nozzle Quantity/Type:** Two 2W nozzles
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 4-90.
- **Nozzle Location for Large Chamber:** 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-90.
- **Nozzle Location for Small Chamber:** Nozzle to be located 6 1/2 in. (165 mm) back from front edge of appliance and 12 in. (305 mm) over from large chamber nozzle.
- **Nozzle Aiming Point for Large Chamber:** Aimed at center of opening. See Figure 4-90.
- **Nozzle Aiming Point for Small Chamber:** Nozzle to be aimed 12 in. (305 mm) over from large chamber nozzle aiming point.

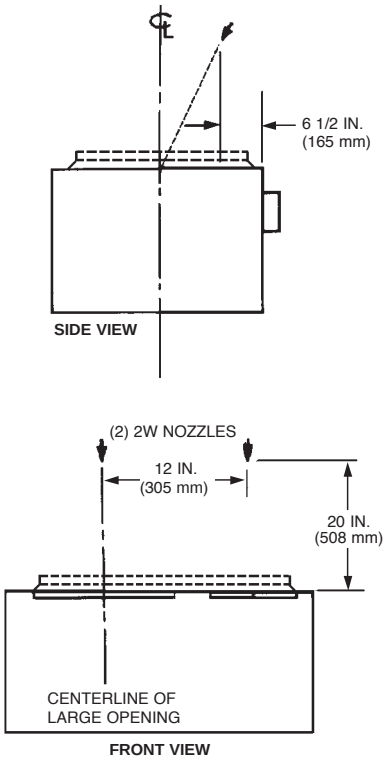


FIGURE 4-90
007010

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model 9025 (With or Without Catalytic Converter)

- **Nozzle Quantity/Type:** Two 2W nozzles
- **Nozzle Height:** 20 1/2 in. (520 mm) above top of appliance. See Figure 4-91.
- **Nozzle Location:** 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-91.
- **Nozzle Aiming Point:** Aimed at center of each opening. See Figure 4-91.

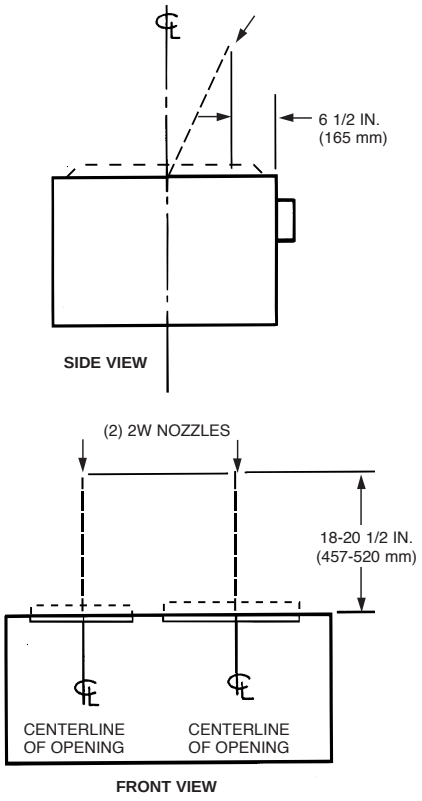


FIGURE 4-91
004355

Nieco Broiler – Model MPB94 and MPB84 – High Proximity (With or Without Catalytic Converters)

- **Nozzle Quantity/Type:** One 2W nozzle
- **Nozzle Height:** 20 in. (508 mm) above top of converter. See Figure 4-92.
- **Nozzle Location:** Centered 6 1/2 in. (165 mm) back from any edge of the appliance. See Figure 4-92.
- **Nozzle Aiming Point:** Aimed at center of opening. See Figure 4-92.

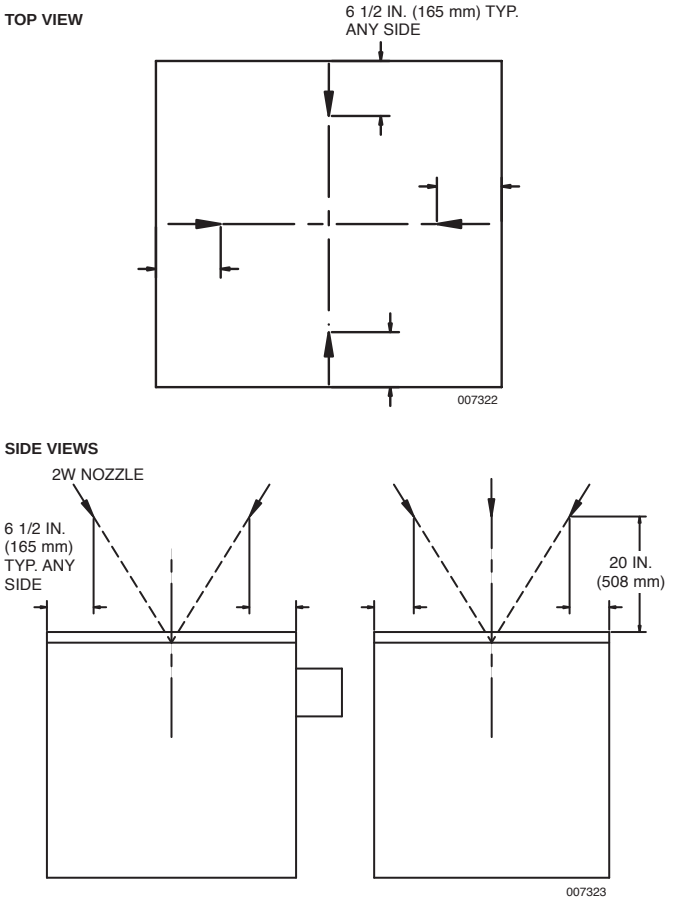


FIGURE 4-92
006487

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model MPB94 – Low Proximity (With or Without Catalytic Converter)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm) measured from top of converter

Nozzle Location: 6.5 in. (165 mm) from front or back edge of hazard.

First nozzle positioned 7.5 in. (190 mm) to the right from center of hazard.

Second nozzle positioned 7.5 in. (190 mm) to the left from center of hazard.

See Figure 4-93.

Nozzle Aiming Point: Aimed at opening on respective center lines

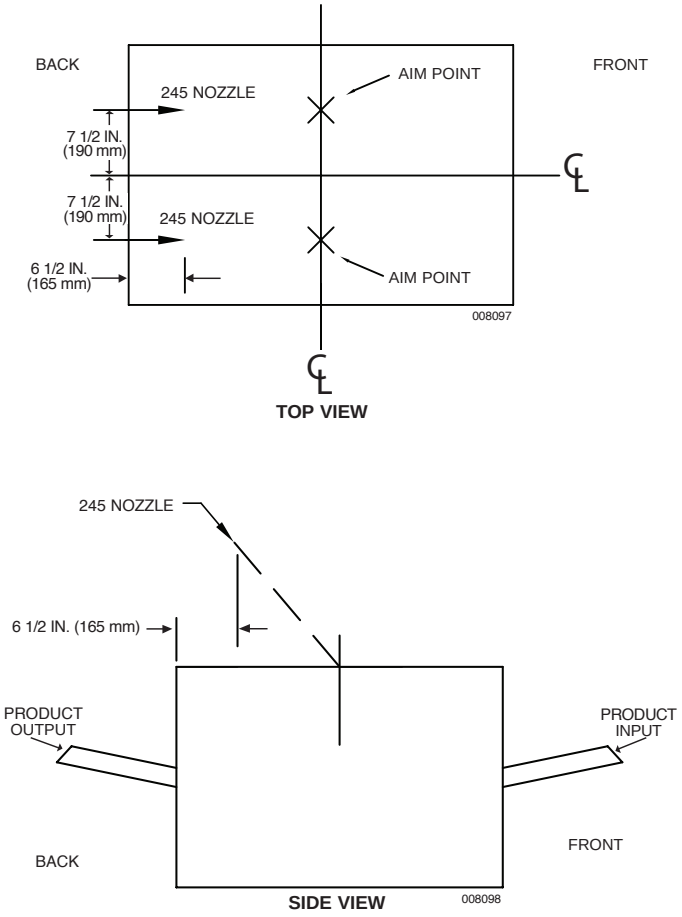


FIGURE 4-93

Nieco Broiler – Model MPB84 – Low Proximity (With Catalytic Converter)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm) measured from top of converter

Nozzle Location: 6.5 in. (165 mm) from front or back edge of hazard.

First nozzle positioned 7.5 in. (190 mm) to the right from center of hazard.

Second nozzle positioned 7.5 in. (190 mm) to the left from center of hazard.

See Figure 4-94.

Nozzle Aiming Point: Aimed at opening on respective center lines

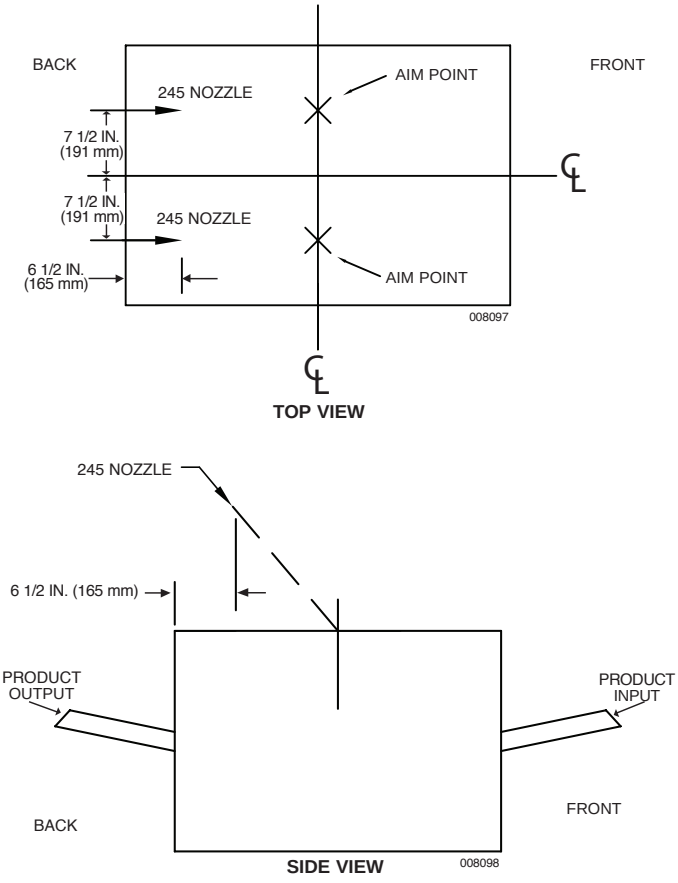


FIGURE 4-94

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model MPB84 and MPB94 – High Proximity (With Perforated Cap OR with Catalytic Converter and Chimney)

Nozzle Quantity/Type: Two 1N nozzles

Nozzle Height: 18 in. (457 mm) to 20 in. (508 mm)

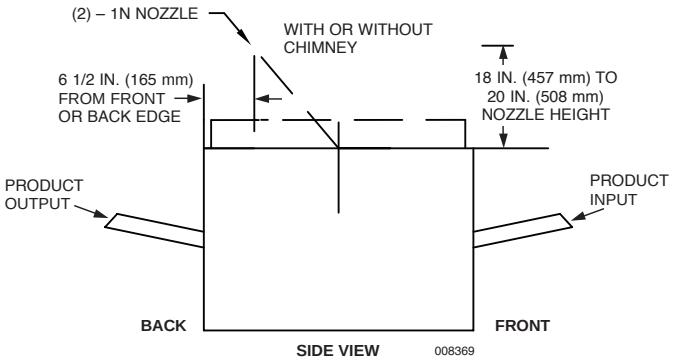
Nozzle Location: 6.5 in. (165 mm) from front or back edge of hazard

First nozzle positioned 5 in. (127 mm) to left of opening centerline

Second nozzle positioned 5 in. (127 mm) to right of opening centerline

See Figure 4-95

Nozzle Aiming Point: Aimed at center of opening



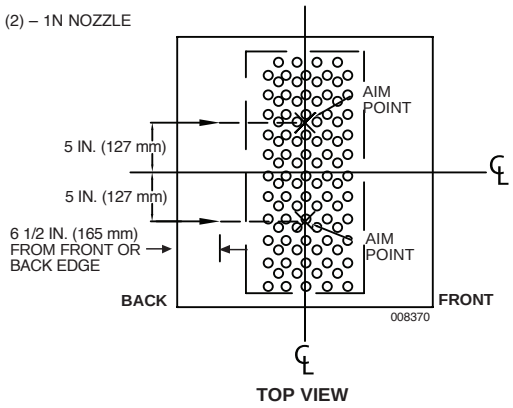


FIGURE 4-95

Nieco Broiler – Model MPB84 and MPB94 – Low Proximity (With Perforated Cap OR with Catalytic Converter and Chimney)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)

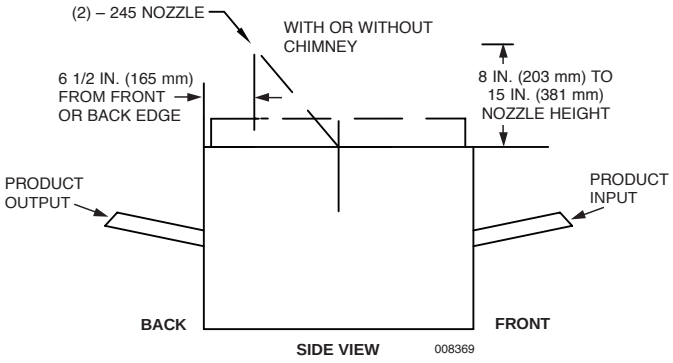
Nozzle Location: 6.5 (165 mm) from front or back edge of hazard

First nozzle positioned 7.5 in. (190 mm) to the right of hazard centerline

Second nozzle positioned 7.5 in. (190 mm) to the left of hazard centerline

See Figure 4-96

Nozzle Aiming Point: Aimed at center of opening



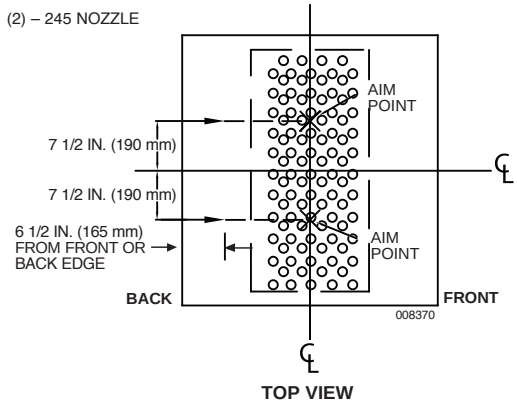


FIGURE 4-96

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model JF94E Electric Broiler – High Proximity (With Catalyst)

Nozzle Quantity/Type: Two 230 nozzles

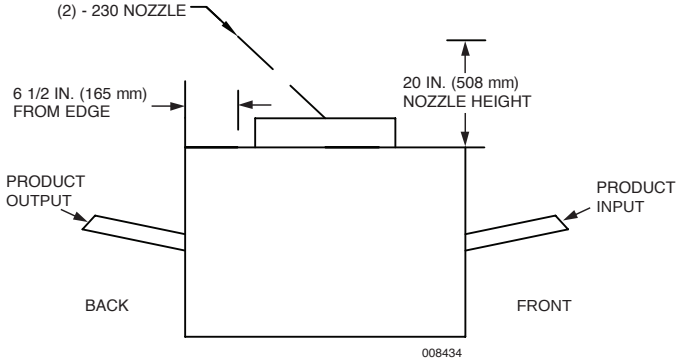
Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

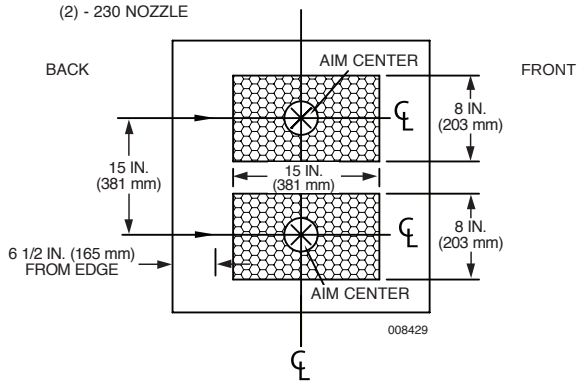
Nozzles positioned 15 in. (381 mm) apart

See Figure 4-97

Nozzle Aiming Point: Center of catalyst



SIDE VIEW



TOP VIEW

FIGURE 4-97

Nieco Broiler – Model JF94E Electric Broiler – Low Proximity (With Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

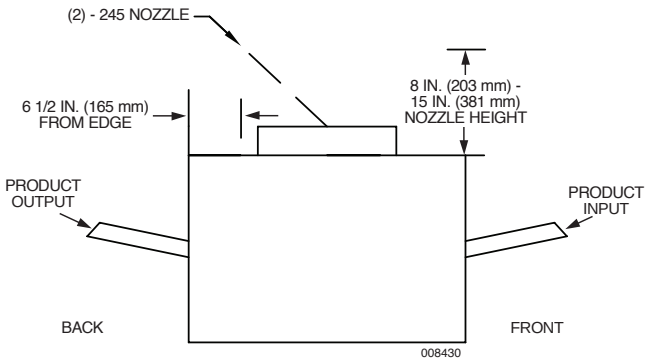
Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

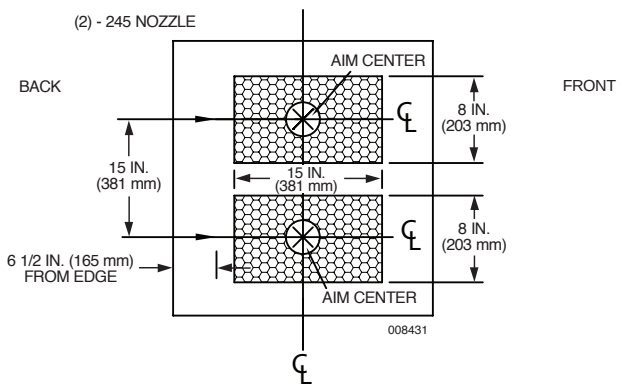
Nozzles positioned 15 in. (381 mm) apart

See Figure 4-98

Nozzle Aiming Point: Center of catalyst



SIDE VIEW



TOP VIEW

FIGURE 4-98

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Jet Flow Automatic Chain Broilers – Models JF62, JF63, JF92, JF93, JF143 (With or Without Catalyst)

Nozzle Quantity/Type: One 245 nozzle

Nozzle Height: 20 in. (508 mm) to 25 in. (635 mm)

Nozzle Location: Centered above the catalyst to 5 in. (127 mm) forward of catalyst front edge

See Figure 4-99a

Nozzle Aiming Point: Center of catalyst

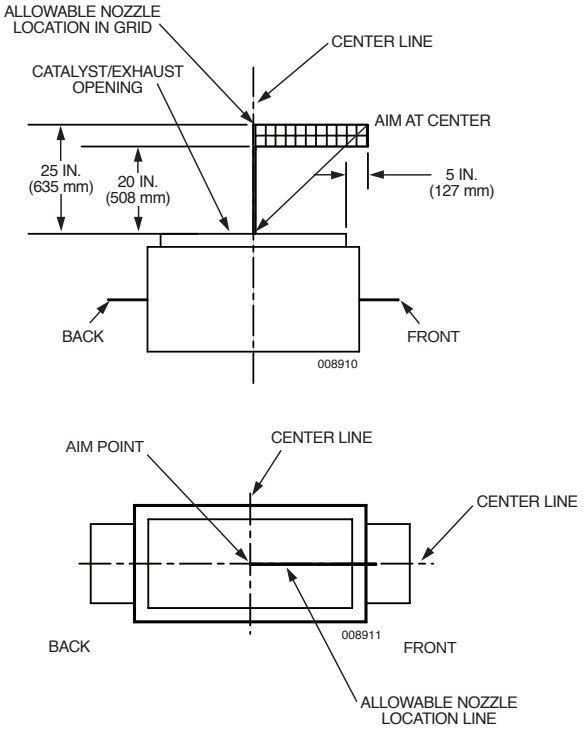


FIGURE 4-99a

Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – High Proximity (With or Without Catalyst)

Nozzle Quantity/Type: Two 230 nozzles

Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6.5 in. (165 mm) from front or back edge of hazard

Nozzles positioned 15 in. (381 mm) apart

See Figure 4-99b

Nozzle Aiming Point: Center of catalyst front to back; 6 in. (152 mm) in from each side of catalyst

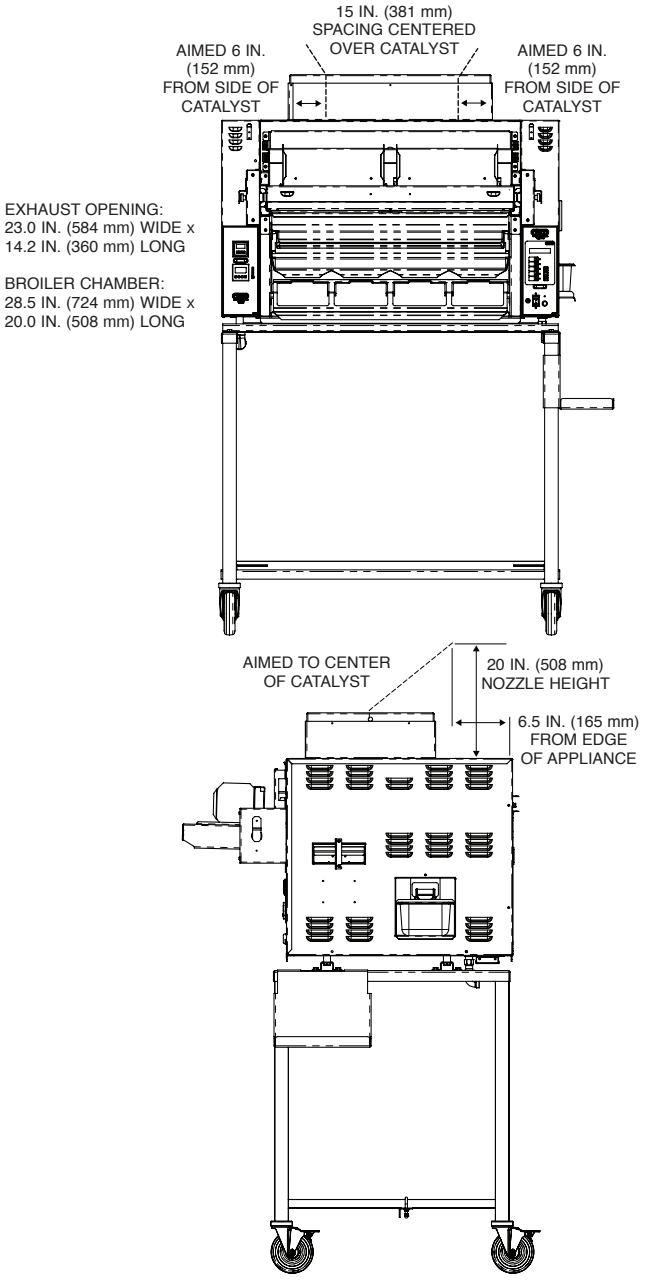


FIGURE 4-99b
009482

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – Low Proximity, Nozzles Rear-Mounted Facing Forward (With or Without Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)

Nozzle Location: 6.5 in. (165 mm) from back edge of hazard
Nozzles positioned 15 in. (381 mm) apart
See Figure 4-99c

Nozzle Aiming Point: 4 in. (102 mm) from back edge of catalyst; 6 in. (152 mm) in from each side of catalyst

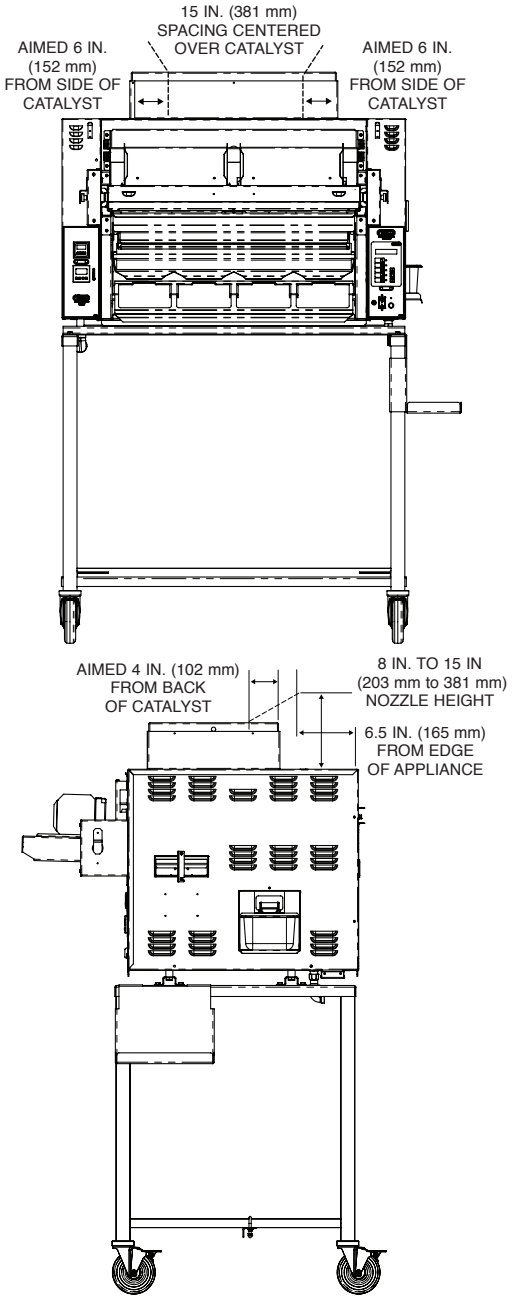


FIGURE 4-99c
009483

Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – Low Proximity, Nozzles Front-Mounted Facing Rearward (With or Without Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)

Nozzle Location: 6.5 in. (165 mm) from front edge of hazard
Nozzles positioned 15 in. (381 mm) apart
See Figure 4-99d

Nozzle Aiming Point: Center of catalyst front to back; 6 in. (152 mm) in from each side of catalyst

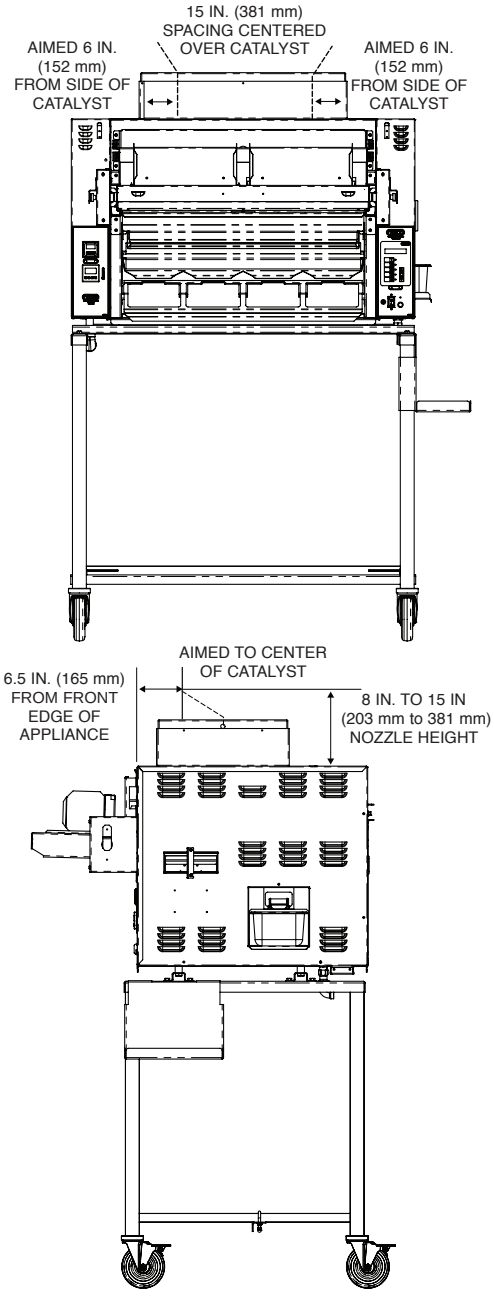


FIGURE 4-99d
009484

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SPECIFIC APPLICATION BY MODEL (Continued)

Bakers Pride Broiler – Models CH6, CH8, CH10, XX6, XX8, XX10 (With Wood Smoker Box and Chip Holders)

Nozzle Quantity/Type: Two 3N nozzles

Nozzle Height: 25 in. (635 mm) to 40 in. (1016 mm) above the hazard surface

Nozzle Location: Each nozzle is to protect half of the cooking area and located within 1 in. (25 mm) of the center of the respective cooking area, aimed at the center of that hazard area

See Figure 4-100

Note: Smoker Box and Chip Holders cannot exceed logs 4 in. (101 mm) in diameter and a maximum allowable wood depth of 4 in. (101 mm).

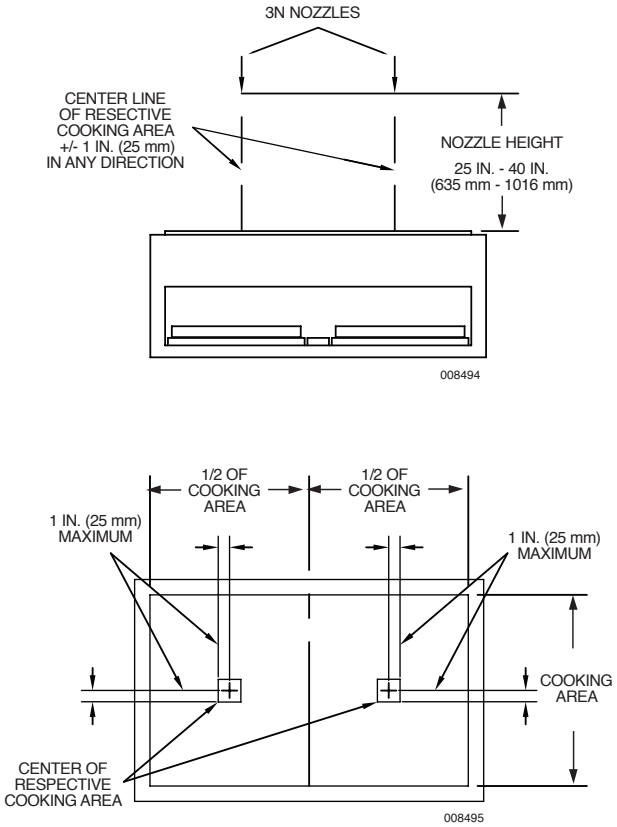


FIGURE 4-100

Magikitch'n Gas Radiant Char-Broiler with Smoker Box – Models FM-RMB-660, FM-RMB-648, FM-RMB-636 (With Wood Smoker Box and Chip Holders)

Nozzle Quantity/Type: Three 3N nozzles

Nozzle Height: 25 in. (635 mm) to 40 in. (1016 mm) above the broiler surface

Nozzle Location: All three nozzles are to be centered front to back above the broiling surface. The middle nozzle is to be centered left to right above the broiling surface. The remaining two nozzles are to be located 9 in. (229 mm) inside the broiler sides.

See Figure 4-101

Note: Smoker Box and Chip Holders cannot exceed logs 4 in. (101 mm) in diameter and a maximum allowable wood depth of 4 in. (101 mm).

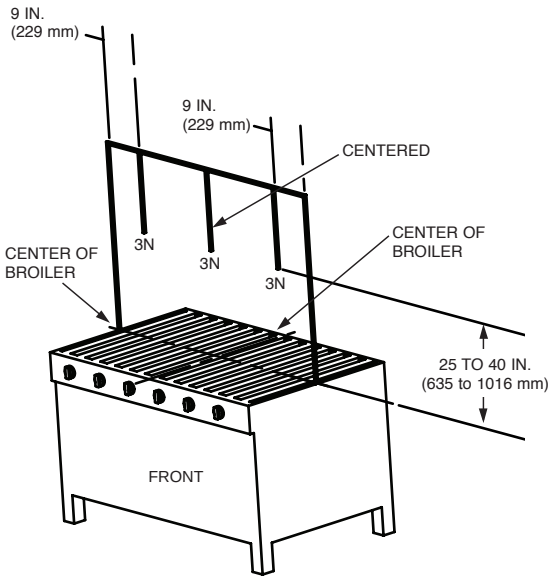


FIGURE 4-101

SPECIFIC APPLICATION BY MODEL (Continued)

Marshall Air – Model 2001BK Multi-Chamber Broiler

- **Nozzle Quantity/Type:** Two 1W nozzles
- **Nozzle Location:** Front nozzle tip must be located 14 in. (355 mm) directly above the appliance, aligned with the front face and centerline of the catalytic converter. The aim point is 4 in. (101 mm) forward of the front edge of the converter on the centerline.

  The rear nozzle tip is a mirror image of the front. The rear nozzle is located 14 in. (355 mm) vertically above the appliance, aligned with the "rear" face and centerline of the catalytic converter. The aim point is 4 in. (101 mm) behind the "rear" edge of the converter on the centerline. See Figure 4-102.
- **System Limitation:** Maximum of five flows for a 3.0 gallon system: Remaining flow points available may be used to protect other hazards.

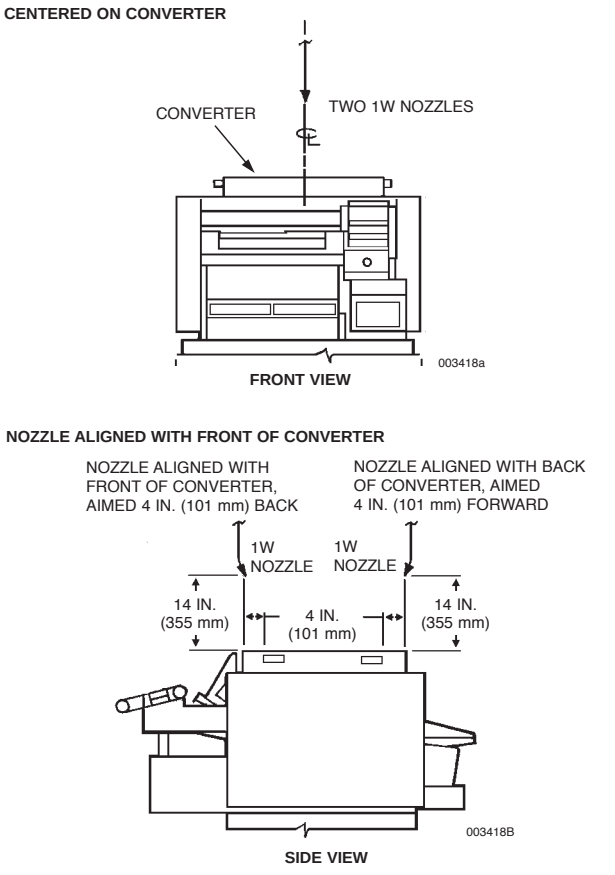


FIGURE 4-102

Marshall Air Electric Broiler – Model FR14B AutoBroil

Nozzle Quantity/Type: One 260 Nozzle

Nozzle Height: 15 – 20 in. (381 – 508 mm) above the top of the broiler

Nozzle Location: The nozzle must be centered above the front edge of the broiler

Nozzle Aiming Point: Aimed at the center of the exhaust opening of the broiler. See Figure 4-103.

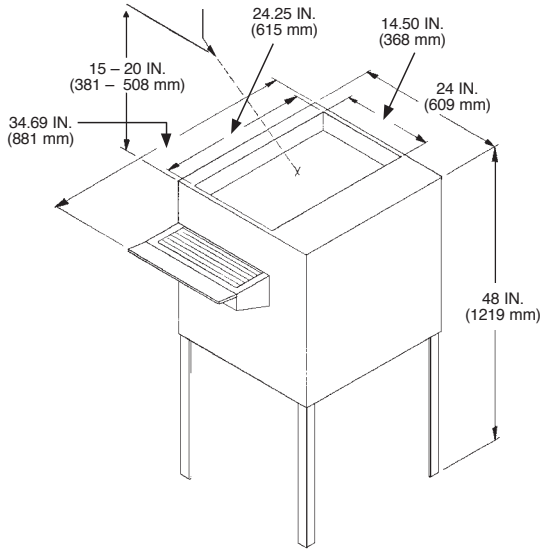
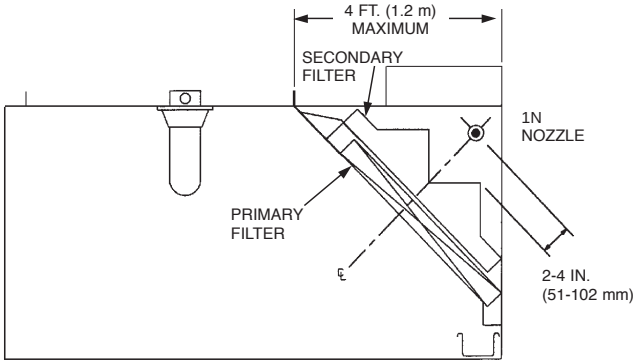


FIGURE 4-103
006737

Grease Grabber-80™ Two Stage Filtration System

The Grease Grabber-80 Two Stage Filtration System consists of two components: The primary filter (The Grease-X Tractor) and the secondary filter (The Grease Grabber-80).

The protection required for this application is the same as the standard plenum/filter protection: One 1N nozzle protecting 10 (3.0 m) linear feet of plenum length by 4 ft (1.2 m) of plenum chamber depth (width), positioned 2 in. to 4 in. (51 mm to 102 mm) from peak of secondary filter. See Figure 4-104.



NOTE: TWO NOZZLES MUST BE UTILIZED FOR V-BANK FILTER ARRANGEMENT.

FIGURE 4-104
006526

OVERLAPPING NOZZLE COVERAGE

Overlapping Coverage – Option 1

For each group of protected appliances under a common hood(s), the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 6 in. (152 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 12 in. (304 mm).

Hazard Zone

The hazard zone is defined as a theoretical, flat and level, rectangular surface, that includes all of the cooking hazards of the protected appliances under a common hood(s). The purpose of the hazard zone is to provide a means of locating the appliances and the overlapping nozzles, as well as aiming the overlapping nozzles. The hazard zone measures 28 in. (711 mm) deep by the length of the cooking hazard(s). The centerline of the hazard zone must bisect the 28 in. (711 mm) depth (from front to back) and run from right-to-left for the full width of the hazard zone.

Overlapping Nozzle Appliance Protection

Overlapping Nozzle Appliance Protection is defined as protection of cooking appliances by nozzles spaced uniformly at uniform elevations under a common hood(s). Overlapping protection of appliances is continuous for the full length of the hood or divided when group(s) of protected appliances are separated by counters or appliances not requiring protection.

Full hood continuous protection is defined as overlapping nozzle appliance protection that covers the appliance line-up located under the total hood length. All appliances requiring protection are the appliances under the hood that can be an ignition source of grease in the hood, grease removal device or the duct.

Group protection is defined as overlapping nozzle appliance protection that protects individual hazard zones located under a common hood. These “groups” of appliances may be separated by appliances not requiring protection, such as steam equipment or work tables, or by dedicated appliance protection, such as salamander broilers.

See Figure 4-108 (full hood continuous protection) and Figure 4-109 (multiple group protection).

Dedicated Nozzle Appliance Protection

Appliance protection using dedicated nozzle coverage is defined as protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

General Design Limitations

- Maximum depth of zone is 28 in. (711 mm).
- The 245 nozzle is the only approved nozzle for overlapping (zone) protection.
- Nozzle must be located 0 in. to 6 in. (0 mm to 152 mm) forward of zone centerline, aimed back at the zone centerline.
- Nozzles must be spaced a maximum of 6 in. (152 mm) from each end of hazard and then a maximum of 12 in. (304 mm) on center for the remaining overlapping nozzles until the complete hazard is covered.
- For appliance hazard surfaces **with listed protection** exceeding the standard hazard zone of 28 in. (711 mm) in depth, the hazard surface(s) must be aligned with the back edge of the hazard zone, with the front edge overhanging the front edge of the zone. See Appliance Chart, Table 4-1.
- For appliance hazard surfaces that **exceed the listed protection** sizes, multiple zones must be utilized. Align entire hazard surface area within the multiple zones.

►• All hood, duct, individual appliance, piping, and flow limitations are as specified in the R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087).

- All appliance protection currently listed in the R-102 Design Manual (Part No. 418087) is also approved protection. Zone protection can be considered optional protection.

TABLE 4-1
Overlapping Nozzle Coverage (Zone Protection)

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (863 mm) Deep x 5.8 ft^2 (0.5 m^2)
Griddle	30 in. (762 mm) Deep x Unlimited Length
Range	28 in. (711 mm) Deep x Unlimited Length
Wok, Maximum	30 in. (762 mm) Diameter x 8 in. (203 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/Tilt Skillet*	34 in. (863 mm) Deep x Unlimited Length
Lava Rock Char-Broiler	32 in. (812 mm) Deep x Unlimited Length
Charcoal Broiler	32 in. (813 mm) Deep x Unlimited Length (4 in. (102 mm) Maximum Fuel Depth)
Mesquite Wood Broiler	32 in. (812 mm) Deep x Unlimited Length (12 in. (304 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	34 in. (863 mm) Deep x 20 in. (508 mm)

* See Figure 4-105 for nozzle location

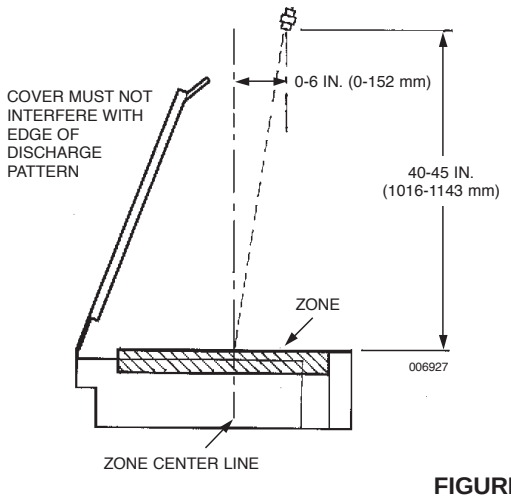


FIGURE 4-105

OVERLAPPING NOZZLE COVERAGE (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations

1. All overlapping appliance nozzles must be the 245 nozzle and must be located under a common hood at the same height above the hazard zone, in a straight line from right to left and aimed at the centerline of the hazard zone. The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
2. The hazard zone must be positioned (located) so that all appliance hazard surfaces are within the zone. For appliance hazard surfaces with listed protection exceeding the standard hazard zone size of 28 in. (711 mm) in depth (see Table 1), the hazard surface(s) must be aligned with the back edge of the hazard zone, with the front edge overhanging the front of the zone.
3. The overlapping appliance nozzles must be located 40 in. to 45 in. (1016 mm to 1143 mm) above the top surface of the protected appliances. See Figure 4-107.

   Exception No. 1: Nozzle dimensions for wok protection are measured to bottom of wok. Exception No. 2: When using overlapping appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 4-106.

   Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone and cannot be less than 20 in. (508 mm) above the hazard zone. See Figure 4-106.

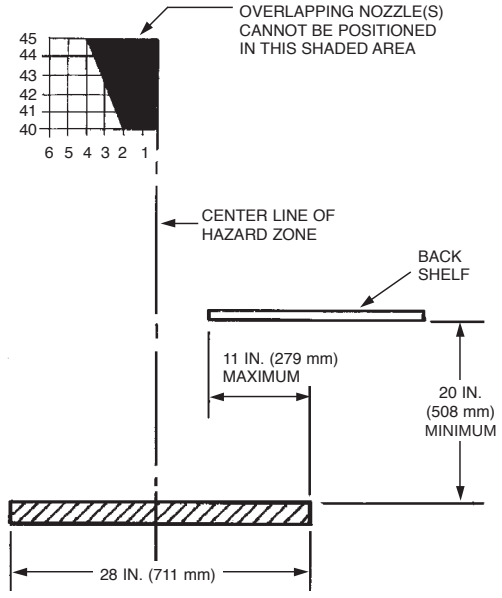


FIGURE 4-106
006914

4. The overlapping appliance nozzles must be located 0 in. to 6 in. (0 mm to 152 mm) forward of the centerline or aimline of the selected hazard zone. See Figure 4-107.

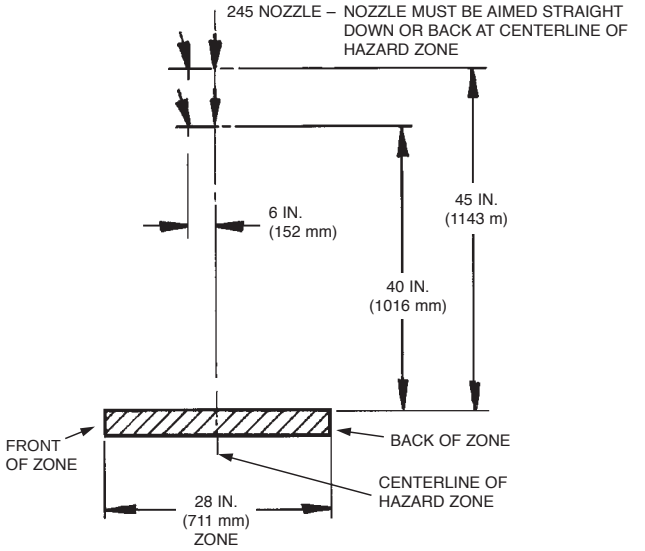


FIGURE 4-107
006915

OVERLAPPING NOZZLE COVERAGE (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection

1. For each group of protected appliances under a common hood(s), the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 6 in. (152 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 12 in. (304 mm). See Figures 4-108 and 4-109.

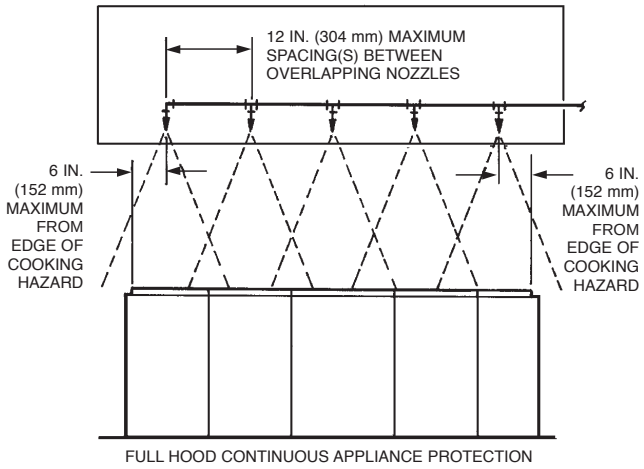


FIGURE 4-108

001710

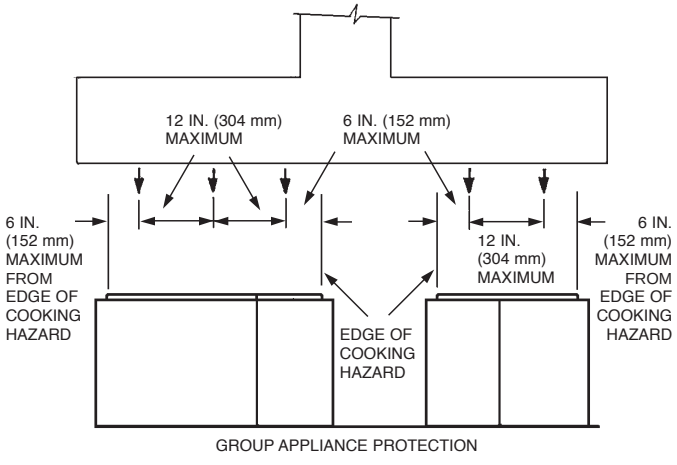


FIGURE 4-109

001720

2. When obstructions are located adjacent to appliance(s) protected by overlapping nozzles, the overlapping appliance nozzle spacing must start with the appliance(s) adjacent to the obstruction. See Figure 4-110.

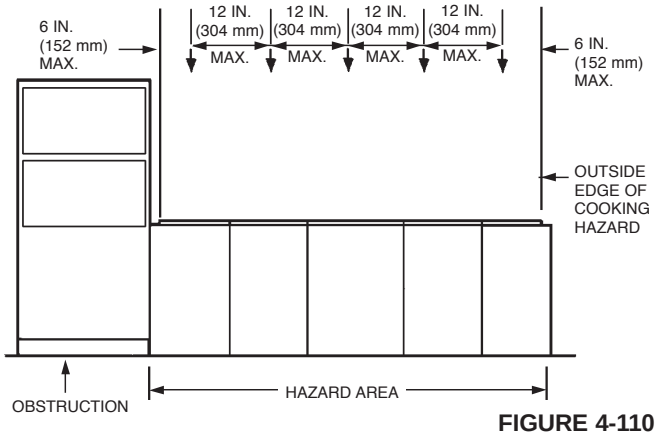


FIGURE 4-110

001713

3. When an appliance requires dedicated protection with a protected area intended for overlapping appliance nozzle protection, the group protection option will be required for appliances on either side of the appliances using dedicated protection. Group protection using overlapping appliance nozzles must begin with the protected appliance(s) adjacent to the dedicated appliance protected. An overlapping appliance nozzle(s) must be positioned within 6 in. (152 mm) of the edge(s) of the appliance hazard surface area(s) adjacent to the dedicated nozzle protection. See Figure 4-111.

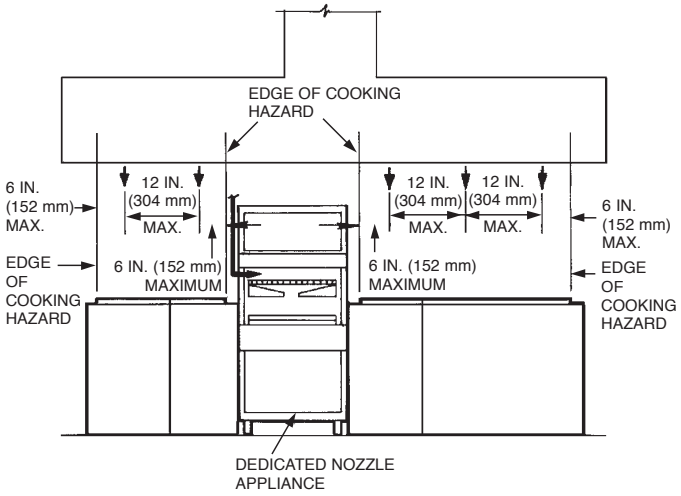


FIGURE 4-111

001756

OVERLAPPING NOZZLE COVERAGE (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection (Continued)

4. On protected appliances, all hazard surfaces located in a group must be within 40-45 in. (1016-1143 mm) from the nozzle(s). Once that dimension is exceeded, a new group must be started. See Figure 4-112.

   Note: The supply pipe feeding nozzle groups is to be at the same elevation. Adjust height for each group only by varying lengths of nozzle drops.

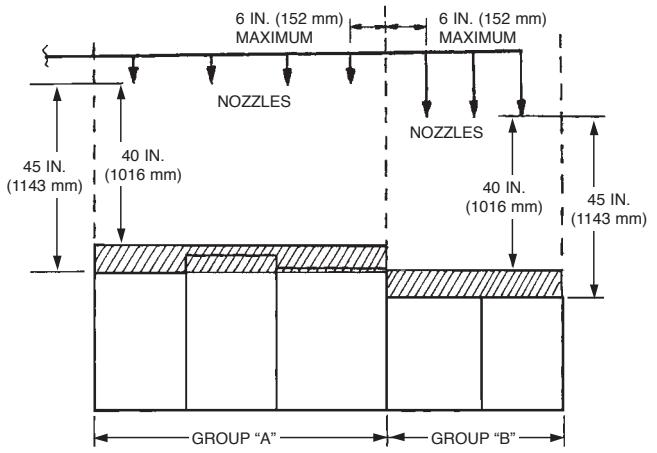


FIGURE 4-112
006917

Detection Requirements For Overlapping Appliance Protection

When utilizing overlapping appliance protection, fusible link detectors must be installed on a maximum of 2 ft (0.6 m) centers, starting with detectors located in (under) the duct opening(s).

Starting from the detector under the duct opening, add detectors on 2 ft (0.6 m) maximum spacing until the complete length of the plenum area is covered, from one end to the other. The location of the last detector on each end of the plenum must not exceed 2 ft (0.6 m) from end of plenum.

Note: Standard detector coverage, as specified in "Design Section," is acceptable when utilizing dedicated nozzle coverages.

OVERLAPPING NOZZLE COVERAGE (Continued)

Overlapping Coverage – Option 2

For each group of protected appliances under a common hood(s), the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 11.5 in. (292 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 25.5 in. (647 mm).

Hazard Zone

The hazard zone is defined as a theoretical, flat and level, rectangular surface, that includes all of the cooking hazards of the protected appliances under a common hood(s). The purpose of the hazard zone is to provide a means of locating the appliances and the overlapping nozzles, as well as aiming the overlapping nozzles. The hazard zone measures 28 in. (711 mm) deep by the length of the cooking hazard(s). The centerline of the hazard zone must bisect the 28 in. (711 mm) depth (from front to back) and run from right-to-left for the full width of the hazard zone.

Overlapping Nozzle Appliance Protection

Overlapping Nozzle Appliance Protection is defined as protection of cooking appliances by nozzles spaced uniformly at uniform elevations under a common hood(s). Overlapping protection of appliances is continuous for the full length of the hood or divided when group(s) of protected appliances are separated by counters or appliances not requiring protection.

Full hood continuous protection is defined as overlapping nozzle appliance protection that covers the appliance line-up located under the total hood length. All appliances requiring protection are the appliances under the hood that can be an ignition source of grease in the hood, grease removal device or the duct.

Group protection is defined as overlapping nozzle appliance protection that protects individual hazard zones located under a common hood. These “groups” of appliances may be separated by appliances not requiring protection, such as steam equipment or work tables, or by dedicated appliance protection, such as salamander broilers.

See Figure 4-116 (full hood continuous protection) and Figure 4-117 (multiple group protection).

Dedicated Nozzle Appliance Protection

Appliance protection using dedicated nozzle coverage is defined as protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

General Design Limitations

- If overlapping appliance protection is mixed with dedicated appliance protection on the same pipe system, THE OVERLAPPING APPLIANCE PROTECTION PIPING REQUIREMENTS MUST BE FOLLOWED.
- Overlapping protection requires the use of 3.0 gal (11.4 L) tank(s) and a maximum of six flows per tank.
- In installations using tanks only intended for overlapping protection, a single Double Tank nitrogen expellant gas cartridge can be utilized with up to three 3.0 gal (11.4 L) tanks.
- In installations using both overlapping protection and conventional non-overlapping protection (ex. hood/duct or dedicated appliance protection), a single Double Tank nitrogen expellant gas cartridge can be utilized with up to three 3.0 gal (11.4 L) tanks, as long as none of the 3.0 gal (11.4 L) tanks exceed a total flow output of more than six flows.
- If more than six flows will be used in a conventional non-overlapping tank, it cannot share the same cartridge as tanks intended for overlapping protection. In this case, an additional Regulated Actuator Assembly with another expellant gas cartridge will be required.
- The 245 nozzle must be used for “end of zone” protection.
- The 260 nozzle must be used for zone protection.
- Maximum depth of zone is 28 in. (711 mm).
- Refer to overlapping system piping requirements listed in Table 4-2.
- Nozzle must be located 0 in. to 12 in. (0 mm to 304 mm) forward of zone centerline, aimed back at the zone centerline.
- Nozzles must be spaced a maximum of 11.5 in. (292 mm) from each end of hazard and then a maximum of 25.5 in. (647 mm) on center for the remaining overlapping nozzles until the complete hazard is covered.
- For appliance hazard surfaces **with listed protection** exceeding the standard hazard zone of 28 in. (711 mm) in depth, the hazard surface(s) must be aligned with the back edge of the hazard zone, with the front edge overhanging the front edge of the zone. See Appliance Chart, Table 4-1.
- For appliance hazard surfaces that **exceed the listed protection** sizes, multiple zones must be utilized. Align entire hazard surface area within the multiple zones.
- All hood, duct, and individual appliance protection are as specified in the R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087).
- All appliance protection currently listed in the R-102 Design Manual (Part No. 418087) is also approved protection. Zone protection can be considered optional protection.

OVERLAPPING NOZZLE COVERAGE (Continued)

TABLE 1
Overlapping Nozzle Coverage (Zone Protection)

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (863 mm) Deep x 5.8 ft^2 (0.5 m^2)
Griddle	30 in. (762 mm) Deep x Unlimited Length
Range	30 in. (762 mm) Deep x Unlimited Length
Wok, Maximum	30 in. (762 mm) Diameter x 8 in. (203 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/Tilt Skillet*	34 in. (863 mm) Deep x Unlimited Length
Lava Rock Char-Broiler (see Note 1)	26 in. (660 mm) Deep x Unlimited Length
Charcoal Broiler	30 in. (762 mm) Deep x Unlimited Length (4 in. (101 mm) Maximum Fuel Depth)
Mesquite Wood Broiler	30 in. (762 mm) Deep x Unlimited Length (6 in. (152 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	34 in. (863 mm) Deep x Unlimited Length

* See Figure 4-113 for nozzle location

Note 1: Always try to place Lava Rock Char-Broiler(s) near the center of the zone. When the Lava Rock Char-Broiler is the first or last appliance in the zone, the outside edge of the broiler must not be more than 6 in. (152 mm) outside the end nozzle.

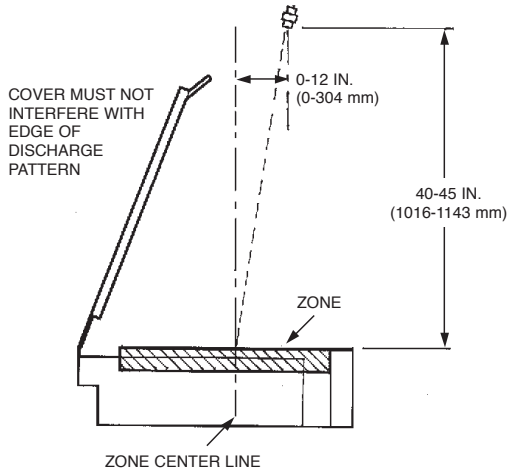


FIGURE 4-113
006927

Overlapping Appliance Nozzle and Hazard Zone Locations

1. All overlapping appliance nozzles must be the 245 nozzle for “end of zone” protection and the 260 nozzle for zone protection, and must be located under a common hood at the same height above the hazard zone, in a straight line from right to left and aimed at the centerline of the hazard zone. The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
2. The hazard zone must be positioned (located) so that all appliance hazard surfaces are within the zone. For appliance hazard surfaces smaller than the standard hazard zone size, the hazard surface can be located anywhere within the standard hazard zone. For appliance hazard surfaces with listed protection exceeding the standard hazard zone size of 28 in. (711 mm) in depth (see Table 4-1), the hazard surface(s) must be aligned with the back edge of the hazard zone, with the front edge overhanging the front of the zone.
3. The overlapping appliance nozzles must be located 40 in. to 45 in. (1016 mm to 1143 mm) above the top surface of the protected appliances. See Figure 4-115.

   Exception No. 1: Nozzle dimensions for wok protection are measured to bottom of wok. Exception No. 2: When using overlapping appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 4-114.

   Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone and cannot be less than 18 in. (458 mm) above the hazard zone. See Figure 4-114.

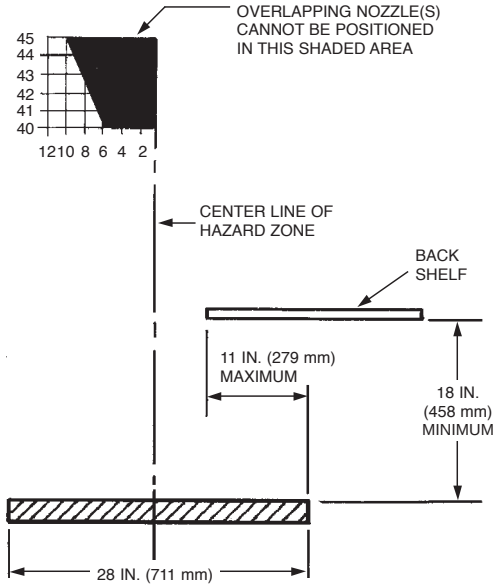


FIGURE 4-114
006914

OVERLAPPING NOZZLE COVERAGE (Continued)

4. The overlapping appliance nozzles must be located 0 in. to 12 in. (0 mm to 304 mm) forward of the centerline or aimline of the selected hazard zone. See Figure 4-115.

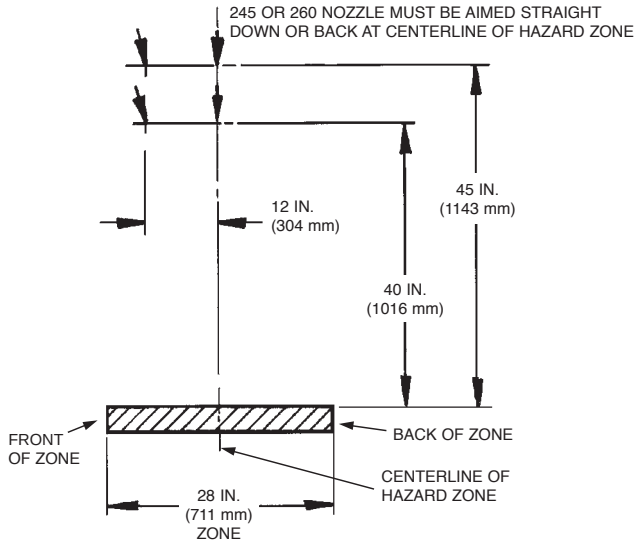


FIGURE 4-115
007537

TABLE 4-2
Overlapping System Piping Limitations

System Size	Total Flow Numbers	Max. 3/8 in. Pipe Length	Max. No. of Elbows	Max. Elevation Rise	Cartridge Size
3 Gallon (11.4 L)	6	75 ft (22.9 m)	25	10 ft (3.0 m)	LT-30-R
6 Gallon (22.7 L) Manifolded	12	75 ft (22.9 m)	25	10 ft (3.0 m)	Double Tank/ LT-A-101-30*
9 Gallon (34.1 L)	18	75 ft (22.9 m)	25	10 ft (3.0 m)	Double Tank/ LT-A-101-30*

50 ft (15.2 m) maximum pipe from first to last nozzle.

50 ft (15.2 m) maximum pipe after the split on a split system.

*Use with regulated actuator only.

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection

1. For each group of protected appliances under a common hood(s), the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 11.5 in. (292 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 25.5 in. (647 mm). See Figures 4-116 and 4-117.

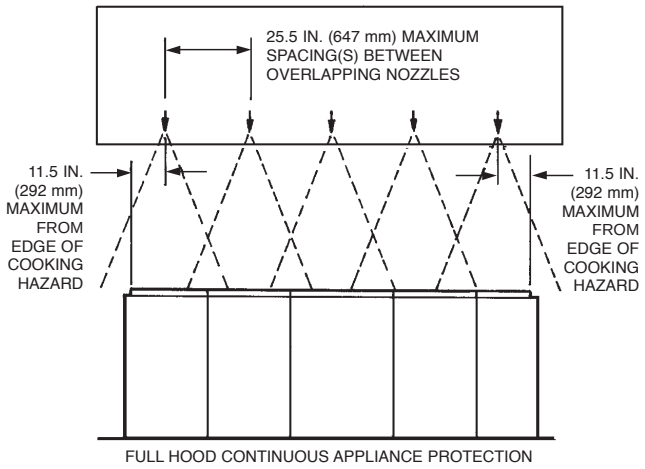
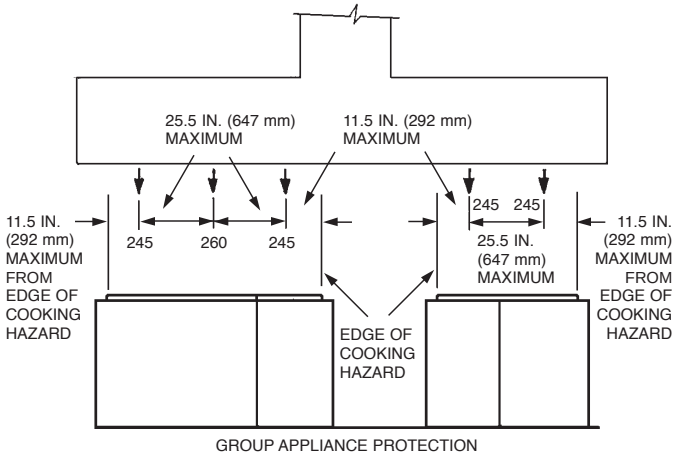


FIGURE 4-116
007538



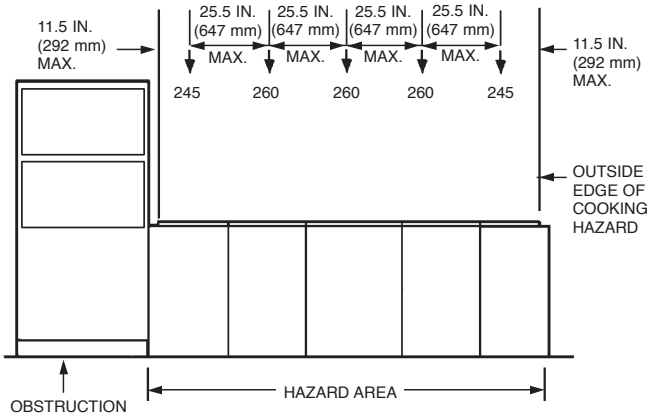
Note: On group appliance protection, start and end of EACH zone group must be protected with a 245 nozzle.

FIGURE 4-117
001720

OVERLAPPING NOZZLE COVERAGE (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection (Continued)

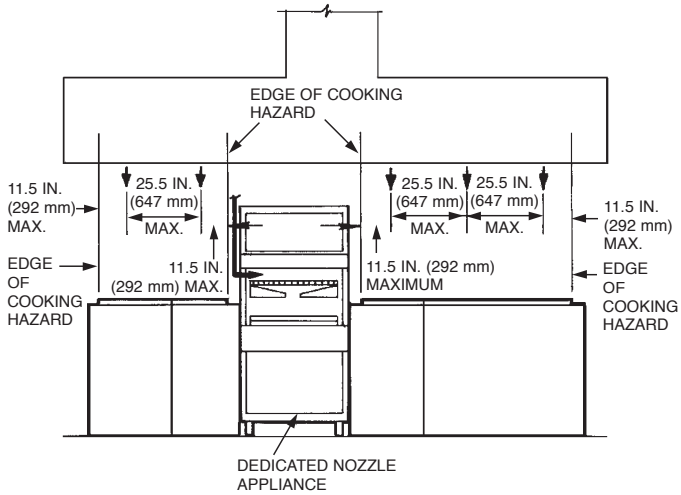
2. When obstructions are located adjacent to appliance(s) protected by overlapping nozzles, the overlapping appliance nozzle spacing must start with the appliance(s) adjacent to the obstruction. See Figure 4-118.



Note: On continuous appliance protection, start and end with 245 nozzles and 260 nozzle(s) in the middle.

FIGURE 4-118
001713

3. When an appliance requires dedicated protection with a protected area intended for overlapping appliance nozzle protection, the group protection option will be required for appliances on either side of the appliances using dedicated protection. Group protection using overlapping appliance nozzles must begin with the protected appliance(s) adjacent to the dedicated appliance protected. An overlapping appliance nozzle(s) must be positioned within 11.5 in. (292 mm) of the edge(s) of the appliance hazard surface area(s) adjacent to the dedicated nozzle protection. See Figure 4-119.

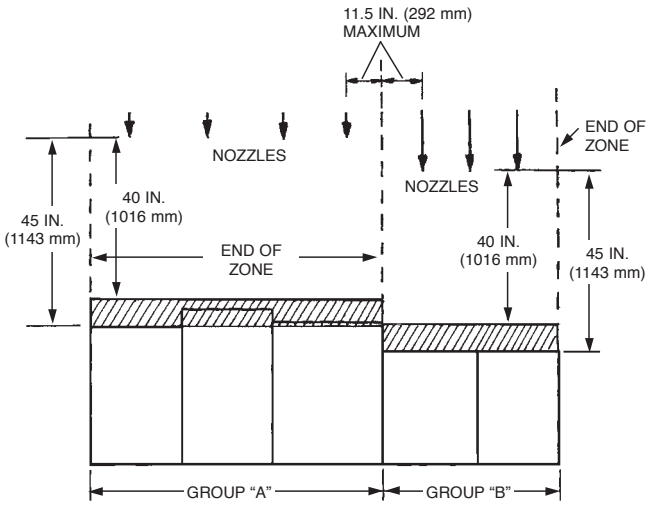


Note: On group appliance protection, start and end of EACH zone group must be protected with a 245 nozzle.

FIGURE 4-119
001756

4. On protected appliances, all hazard surfaces located in a group must be within 40-45 in. (1016-1143 mm) from the nozzle(s). Once that dimension is exceeded, a new group must be started. See Figure 4-120.

   Note: The supply pipe feeding nozzle groups is to be at the same elevation. Adjust height for each group only by varying lengths of nozzle drops.



Note: On group appliance protection, start and end of EACH zone group must be protected with a 245 nozzle.

FIGURE 4-120
007539

Detection Requirements For Overlapping Appliance Protection

When utilizing overlapping appliance protection, fusible link detectors must be installed on a maximum of 2 ft (0.6 m) centers, starting with detectors located in (under) the duct opening(s).

Starting from the detector under the duct opening, add detectors on 2 ft (0.6 m) maximum spacing until the complete length of the plenum area is covered, from one end to the other. The location of the last detector on each end of the plenum must not exceed 2 ft (0.6 m) from end of plenum.

Note: Standard detector placement can also be utilized when using overlapping protection. However, the overlapping detector option cannot be used when utilizing standard R-102 protection.

▸ Refer to Pages 4-71 – 4-73 for detector placement.

TANK AND CARTRIDGE REQUIREMENTS

Once the hazard analysis is completed and the total nozzle flow numbers are established, the quantity and size of agent tanks and cartridges needed to supply the nozzles with the proper volumes of agent at the proper flow rates can be determined. For cartridges used in the regulated release mechanism, flow capacities, tank quantities and sizes, and regulated release cartridge options are given in the table below.

Total Flow Numbers*	Quantity and Size of Tank(s)	Regulated Release Cartridge Options	
		Nitrogen	Carbon Dioxide
1 – 5	(1) 1.5 Gallon	LT-20-R	101-10
6 – 11	(1) 3.0 Gallon	LT-30-R	101-20
11 – 16	(1) 1.5 Gallon (1) 3.0 Gallon	Double	101-30
16 – 22	(2) 3.0 Gallon	Double	101-30**
16 – 22	(2) 3.0 Gallon (Manifold)	Double	–
22 – 33	(3) 3.0 Gallon	Double	–

When one or more regulated actuators are used, the following tank and cartridge combinations apply for each regulated actuator:

Regulated Actuator Tank(s)	Regulated Actuator Cartridge
(1) 1.5 Gallon	LT-20-R or 101-10
(1) 3.0 Gallon	LT-30-R or 101-20
(1) 1.5 Gallon and (1) 3.0 Gallon	LT-A-101-30 or 101-30** or double tank
(2) 3.0 Gallon	LT-A-101-30 or 101-30** or double tank
(2) 3.0 Gallon (Manifold)	LT-A-101-30 or Double
(3) 3.0 Gallon	LT-A-101-30 or Double

* For exceptions to maximum flow numbers, see Distribution Piping Requirements for 1.5 gallon and 3.0 gallon systems in this Section.

** The 101-30 cartridge can not be used when two 3.0 gallon tanks are manifolded together.

For higher total flow numbers (23 to 110), multiple cartridges and regulated actuators are required as shown in the System Selection Guide in “Appendix” Section

ACTUATION AND EXPELLANT GAS LINE REQUIREMENTS

This section contains the guidelines for installing the actuation and expellant gas lines between the regulated release mechanism regulator, each regulated actuator regulator, and each agent tank. These limitations should be considered when selecting the component mounting locations.

The **actuation gas line** is the length of pipe and/or hose that is run from either the AUTOMAN Regulated Release Assembly or the Remote Release Assembly that directs high pressure from the cartridge in the release to actuate one or more additional Regulated Actuator Assemblies. The actuation gas line can consist of 1/4 in. Schedule 40 black iron, chrome-plated, stainless steel, or galvanized steel pipe and fittings, and/or factory supplied stainless steel braided actuation hose.

The **expellant gas line** is the length of pipe that is run from the regulator in either the AUTOMAN Regulated Release Assembly or a Regulated Actuator Assembly that directs regulated pressure to the agent storage tanks to pressurize the tank and discharge the agent. The expellant gas line shall consist of 1/4 in. Schedule 40 black iron, chrome-plated, stainless steel, or galvanized steel pipe and fittings.

Actuation Gas Line – 6 to 8* Tanks Maximum

* 8 Tank maximum reflects the utilization of 3 tank regulated actuators.

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings.
2. The actuation gas line piping is installed from the regulated release mechanism to each regulated actuator connected within the system. The total length of the actuation gas line from the regulated release assembly to the regulated actuator assembly(ies) **must not exceed** 20 ft (6.0 m) when using an LT-20-R, an LT-30-R nitrogen cartridge, or a 101-10 or a 101-20 carbon dioxide cartridge. See Figure 4-121.

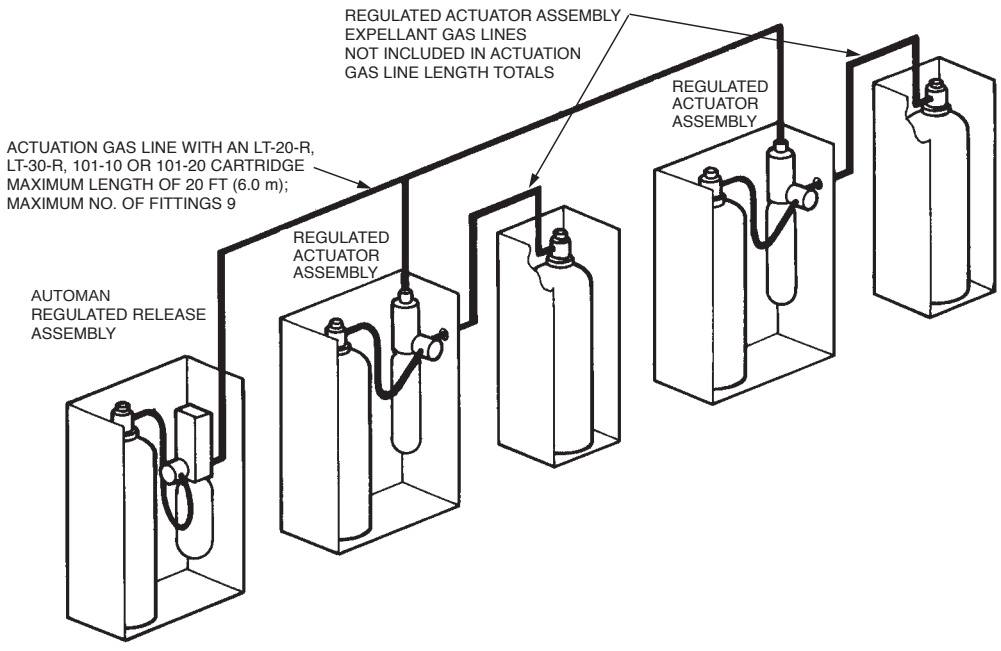


FIGURE 4-121
000775

ACTUATION AND EXPELLENT GAS LINE REQUIREMENTS (Continued)

Actuation Gas Line – 6 to 8* Tanks Maximum (Continued)

3. If an expellant gas line is connected to the regulated release assembly along with an actuation gas line, the total combined length of the actuation and expellant gas line **must not exceed** 30 ft (9.1 m) when using a "double-tank" nitrogen cartridge or a LT-A-101-30 nitrogen cartridge or a 101-30 carbon dioxide cartridge. See Figure 4-122.
4. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

Actuation Gas Line – 10 to 15* Tanks Maximum

* 15 Tank maximum reflects the utilization of 3 tank regulated actuators.

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings. **Note:** Stainless steel hose and fittings can also be used. See Component Section for detailed information.
2. The actuation gas line piping is installed from the 101 remote mechanical release to each R-102 regulated actuator assembly. The total length of the actuation gas line from the remote mechanical release to the regulated actuator assemblies must not exceed 100 ft (30.4 m).
3. A combined total of 20 elbows and 9 tees may be used in these lines. Two 45° elbows equal one 90° elbow. See Figure 4-123.
4. Use only a 101-10 carbon dioxide cartridge in the 101 remote mechanical release.
5. A safety vent relief valve (Part No. 15677) is required in the actuation gas line to relieve residual pressure after actuation.

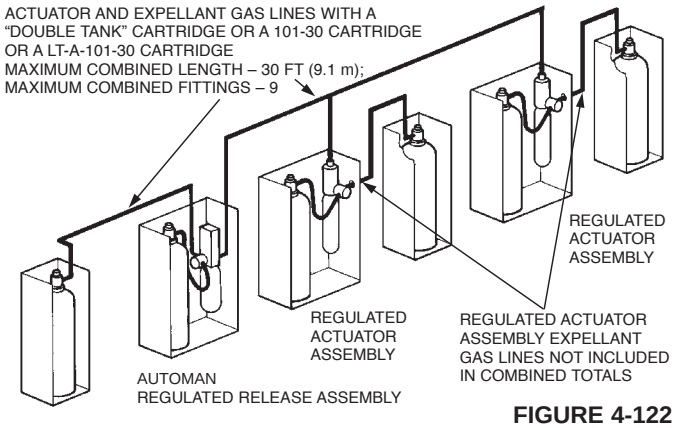


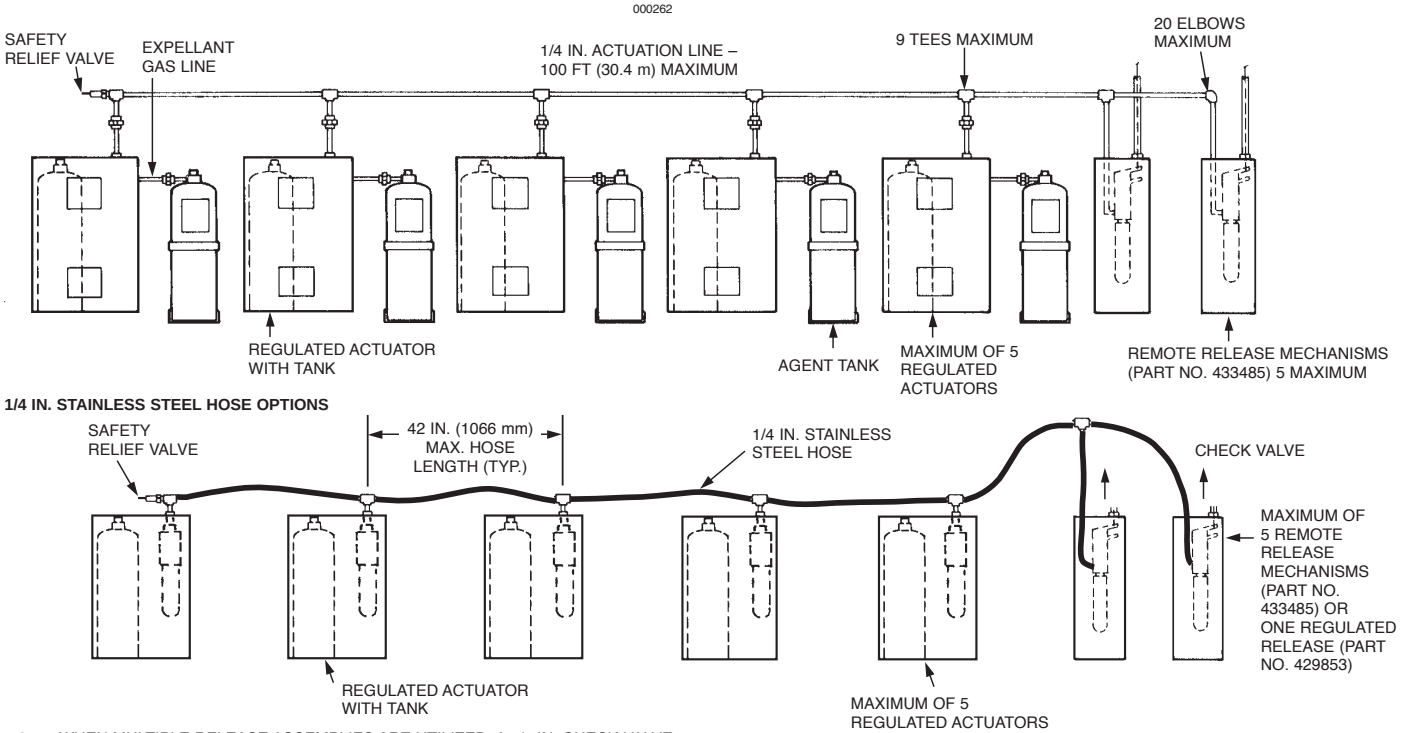
FIGURE 4-122
000262

Actuation Gas Line – Using 1/4 in. Stainless Steel Hose

* 15 Tank maximum reflects the utilization of three tank regulated actuators.

1. Maximum total length of hose cannot exceed 17.5 ft (5.3 m).

   Note: A combination of 1/4 in. stainless steel braided hose and 1/4 in. NPT pipe can be used as long as the total combined actuation gas line length does not exceed 17.5 ft (5.3 m). **Stainless steel braided hose cannot be used for expellant gas lines.** See Figure 4-123 for additional details.
2. Maximum of five regulated actuators allowed
3. Actuated with remote release (Part No. 433485) or Regulated Release Assembly (Part No. 429853)



NOTE: WHEN MULTIPLE RELEASE ASSEMBLIES ARE UTILIZED, A 1/4 IN. CHECK VALVE (PART NO. 25627) WILL BE REQUIRED AFTER EACH REGULATED RELEASE.

FIGURE 4-123
000301

ACTUATION AND EXPELLENT GAS LINE REQUIREMENTS (Continued)

Expellant Gas Line

1. The expellant gas line is installed from the regulated release mechanism in double, three, and multiple-tank systems, and from the regulated actuator assembly in multiple-tank systems. The expellant gas line is the piping and/or hose between the regulator and the tank-enclosure/tank-bracket assembly. The total length of the expellant gas line from the regulated release mechanism or each regulated actuator assembly **must not exceed** 30 ft (9.1 m) when using a "double-tank" cartridge, an LT-A-101-30 Cartridge, or a 101-30 Cartridge. See Figures 4-124 and 4-125.

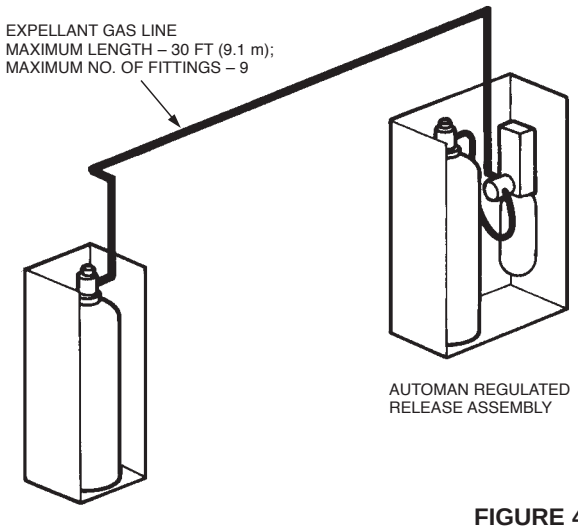


FIGURE 4-124
000776

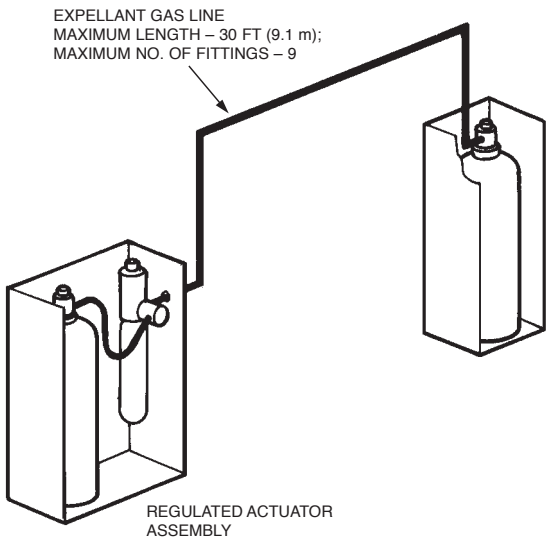


FIGURE 4-125
000777

2. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.
3. If two tanks are connected to the regulated release assembly in a multiple-tank system arrangement, the total combined length of the actuation and expellant gas lines **must not exceed** 30 ft (9.1 m) when using a "double-tank" nitrogen cartridge, an LT-A-101-30 nitrogen cartridge, or a 101-30 carbon dioxide cartridge. See Figure 4-122.
4. If three 3.0 gallon tanks are connected to the regulator in either a regulated release or regulated actuator assembly, only factory supplied expellant gas hose assemblies will be utilized. Refer to Distribution Piping Requirements – 9.0 Gallon System, page 4-70 for additional design requirements. ►

DISTRIBUTION PIPING REQUIREMENTS

Once the nozzle placement and quantity of tanks has been determined, it is then necessary to determine the piping configurations between the tank adaptor and each discharge nozzle. This section contains the guidelines and limitations for designing the distribution piping so that the liquid agent will discharge from the nozzles at a proper flow rate. These limitations should also be referred to when selecting the mounting location for the regulated release mechanism and agent tank.

General Piping Requirements

1. All R-102 system piping is straight line. Therefore, the need for critical lengths and balancing is minimized.
2. Two 45° elbows count as one 90° elbow.
3. Each branch line includes the tee or elbow leading to it, and all fittings within the branch line itself.
4. The minimum piping length of Schedule 40, 3/8 in. pipe from the tank outlet to any nozzle protecting a range, fryer, or wok must be 6 ft (1.9 m).
5. Pipe lengths are measured from center of fitting to center of fitting. See Figure 4-126.

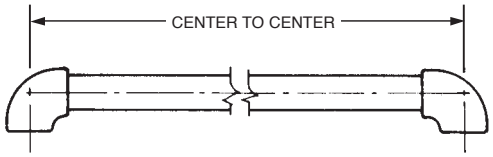


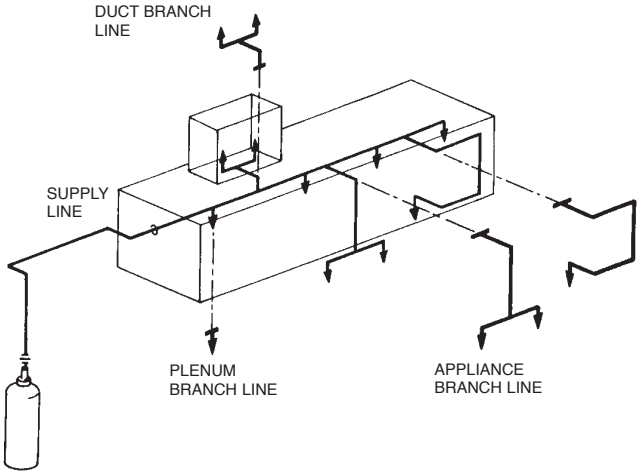
FIGURE 4-126
000778

6. All distribution piping must be 3/8 in. Schedule 40 black iron, chrome-plated, or stainless steel. **Do not use hot dipped galvanized pipe on the distribution piping.**
7. All threaded connections located in and above the protected area must be sealed with pipe tape. Tape should be applied to male threads only. Make certain tape does not extend over the end of the thread, as this could cause possible blockage of the agent distribution.
8. Before installing blow-off caps on nozzles, apply a small amount of Dow Corning No. 111 silicone grease across the opening in the nozzle tip and also a small amount coating the exterior of the blow-off cap. This will help keep cooking grease from building up on the cap.
9. Tees used in the distribution piping can be used as thru tees, side outlet tees, or bull tees.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Supply and Branch Line Identification

The R-102 distribution piping network is broken down into four specific pipe runs: the Supply Line, the Duct Branch Line, the Plenum Branch Line, and the Appliance Branch Line. See Figure 4-127.



NOTE: THIS IS A CONCEPTUAL DRAWING ONLY. THIS IS NOT AN ACTUAL INSTALLATION.

FIGURE 4-127
000779

NOTE: THESE ARE EXAMPLES ONLY. OTHER CONFIGURATIONS CAN BE DESIGNED.

SUPPLY LINE

The Supply Line is defined as the length of pipe which runs from the agent tank outlet to the last branch line (whether a duct, appliance, or plenum branch line). This includes all supply line fittings except for the tees or elbows leading to the branch lines. See Figures 4-127 and 4-128.

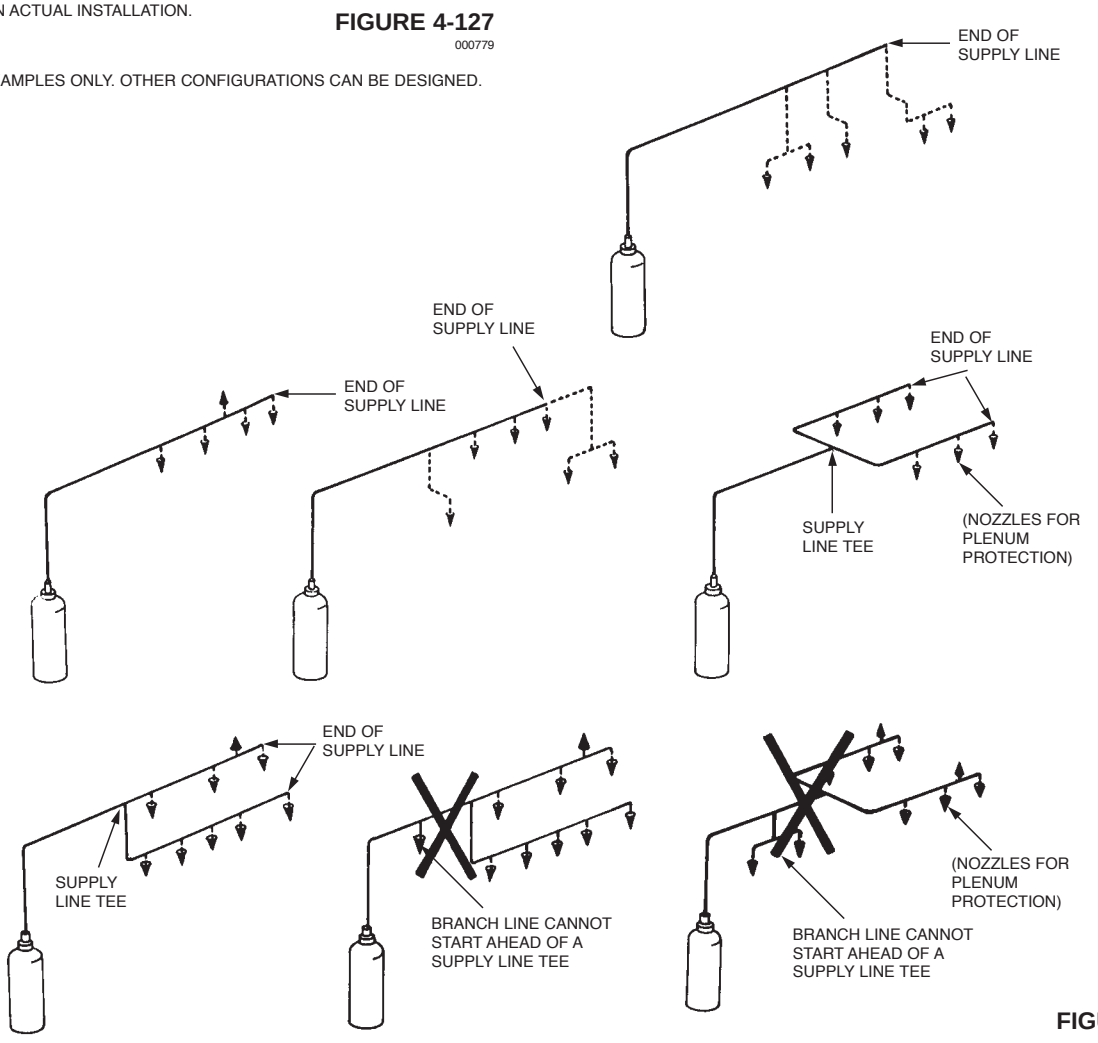


FIGURE 4-128
000780

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Supply and Branch Line Identification (Continued)

NOTICE

Branch lines cannot start ahead of a supply line tee.

DUCT BRANCH LINE

The Duct Branch Line is defined as the length of pipe which runs from the supply line to the duct nozzle(s). This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figures 4-128 and 4-129.

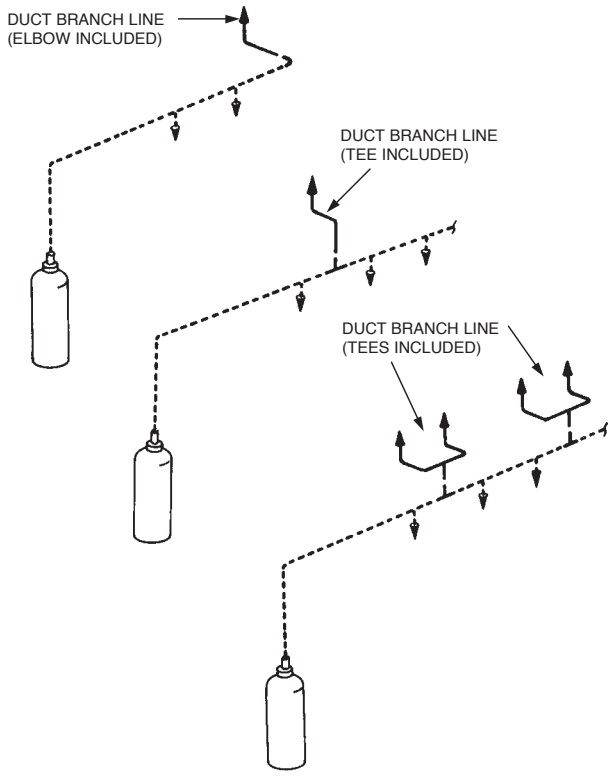


FIGURE 4-129
000781

PLENUM BRANCH LINE

The Plenum Branch Line is defined as the length of pipe which runs from the supply line to the plenum nozzle(s). This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figures 4-128 and 4-130.

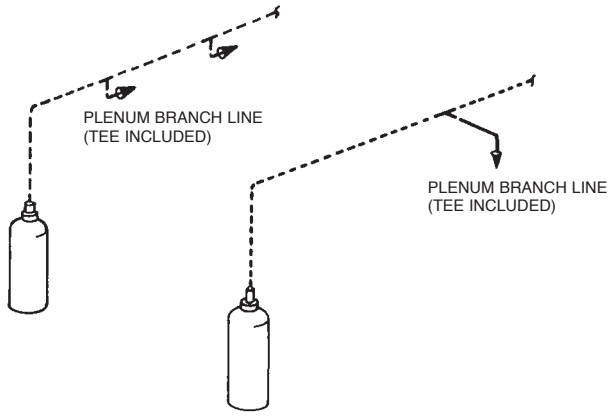


FIGURE 4-130
000782

APPLIANCE BRANCH LINE

The Appliance Branch Line is defined as the length of pipe which runs from the supply line to the appliance nozzle(s). This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figures 4-128 and 4-131.

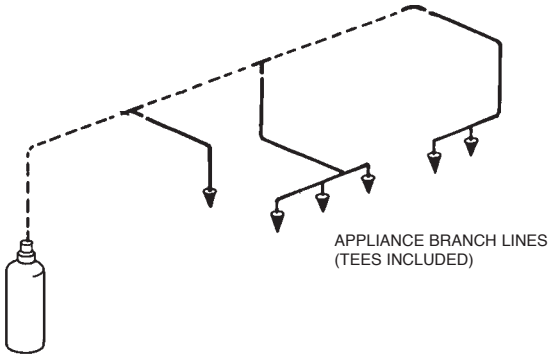


FIGURE 4-131
000783

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 1.5 Gallon System

DUCT, PLENUM, AND APPLIANCE PROTECTION

1. This option allows for duct protection, plenum protection, appliance protection, or any combination. However, only one duct nozzle may be used, either a 1W or a 2W, nozzle.
2. All distribution piping, supply and branch, must be 3/8 in. Schedule 40 black iron, chrome-plated, or stainless steel.
3. Each 1.5 gallon tank allows a maximum of five flow numbers.*
4. The pipe length between the start of the first branch line and the start of the last branch line must not exceed 8 ft (2.4 m). When the supply line is split, the **combined length** of both legs of the supply line (start of first branch line to start of last branch line) must not exceed 8 ft (2.4 m). See Figure 4-132.
5. The combined length of all branch lines must not exceed 22 ft (6.7 m). See Figure 4-133.
6. The requirements of the following table must not be exceeded:

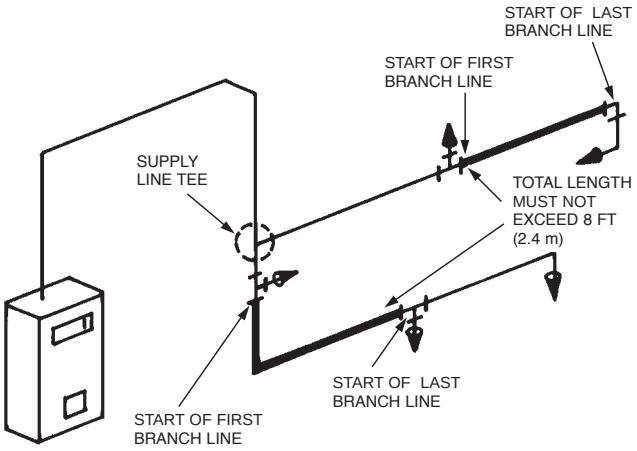


FIGURE 4-132
000784

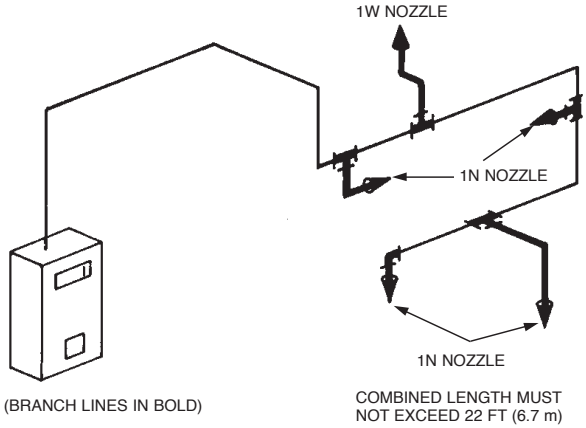


FIGURE 4-133
000785

▸ 1.5 GALLON SYSTEM

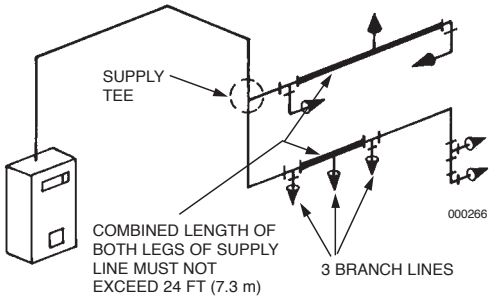
Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft	6 ft	4 ft	10 ft
	(12.1 m)	(1.8 m)	(1.2 m)	(3.0 m)
Maximum Tees	1	1	2	3
Maximum Flow Numbers	5*	2	2	3

* **Exceptions:**
1. Six flow numbers are allowed when a duct branch line is the last branch line on the piping network and no 1N nozzles are used to protect woks or griddles.
2. Six flow numbers are allowed when six 1N nozzles are used and none of the nozzles are used to protect woks, griddles, ranges, and salamanders.
   Note: Only five flow numbers are allowed if a 1N nozzle is used for wok, griddle, range, or salamander protection.
3. Six flow numbers are allowed when only two 3N nozzles are used.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 3.0 Gallon System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m). See Figure 4-134.
2. The total length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-134.
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.
4. A maximum of two nozzles are allowed per duct branch line.
5. The requirements of the following table must not be exceeded:



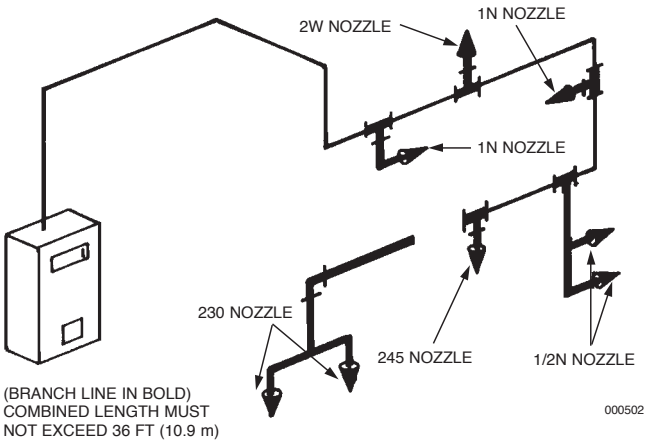


FIGURE 4-134

▸ 3.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

***Exceptions:**

1. Twelve flow numbers are allowed in any one tank for duct and plenum protection only.
2. Twelve flow numbers are allowed with any one tank using only two-flow appliance nozzles.
3. Twelve flow numbers are allowed with any one tank using only three-flow appliance nozzles.

Special Instructions:

1. Twelve flow numbers are allowed when four Dean Industries GTI Gas Fryers are protected at low proximity as shown in Figure 4-66 on Page 4-32. The discharge piping must be as shown in Figure 4-67 on Page 4-32.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one 2W duct nozzle, one 1/2N electrostatic precipitator nozzle, one 1N plenum nozzle, and four two-flow appliance nozzles. Contact the Applications Engineering Department for additional information.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 6.0 Gallon Manifolded System

As an option to piping two 3.0 gallon tanks separately, two 3.0 gallon tanks can be manifolded together to share a common agent distribution line. Only 3.0 gallon tanks connected to the same regulator can be manifolded. The following requirements must be met when manifolding:

1. All piping must be 3/8 in. Schedule 40.
2. See Figure 4-136 for tank connections.
3. The length of supply line piping between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). See Figure 4-135. When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m).
4. The combined length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-135.
5. A maximum of 22 flow numbers are allowed.
6. The requirements of the following table must not be exceeded.

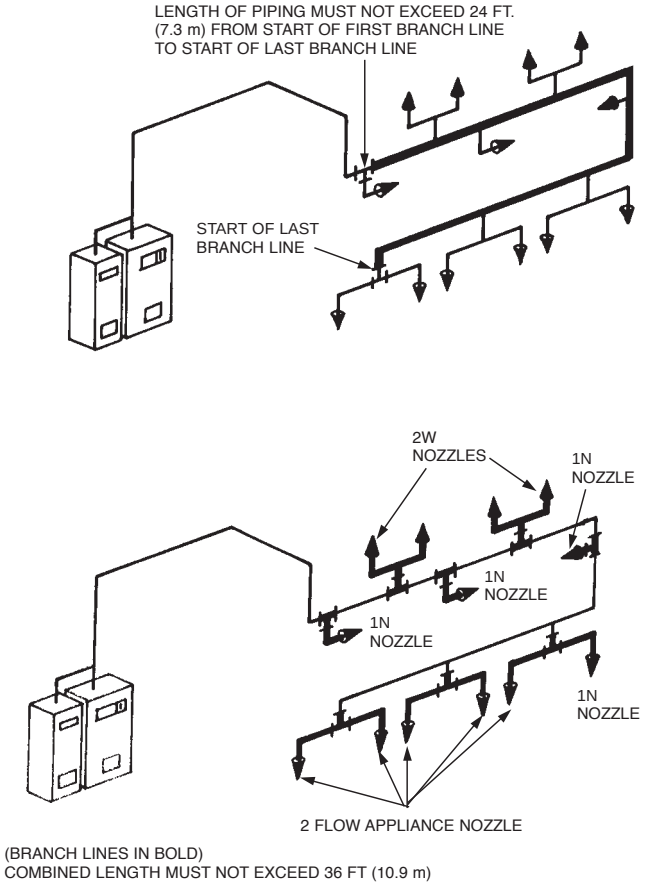


FIGURE 4-135
000267

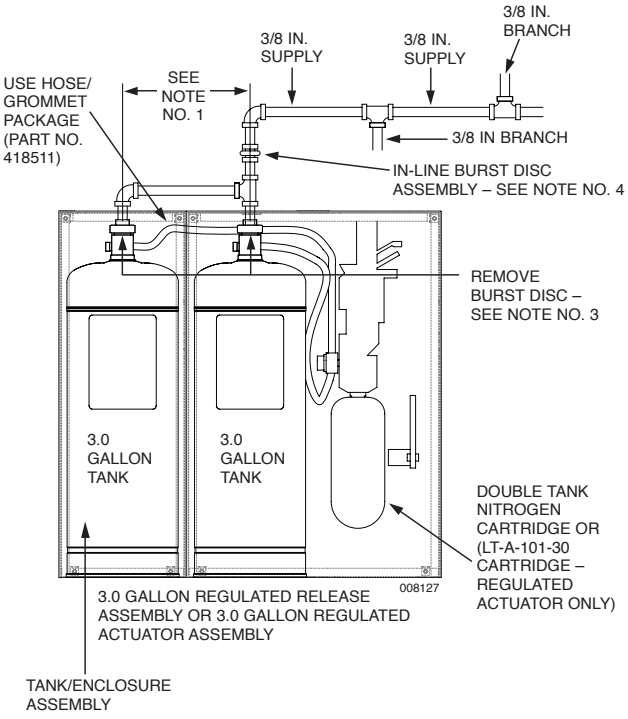
▸ 6.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	32 ft (9.7 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbows	8	4	4	6
Maximum Tees	2	2	2	4
Maximum Flow Numbers	22	4	2	4

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 6.0 Gallon Manifolded System (Continued)

This configuration consists of two 3 gallon tanks. Both tanks are connected to a common manifold tee and are pressurized from a single double tank (Part No. 73022) nitrogen cartridge in the regulated release assembly. See Figure 4-136. **Note**: A tank mounting bracket can be utilized instead of the tank/enclosure assembly.



NOTE 1: THE PIPE CONNECTION FROM TANK CENTER TO TANK CENTER CANNOT EXCEED 8 1/2 IN. (215 mm). ALSO, OEM RELEASE/BRACKET ASSEMBLY CAN BE UTILIZED WHEN MANIFOLDING 3.0 GALLON TANK.

NOTE 2: ONLY 3 GALLON TANKS CAN BE MANIFOLDED.

NOTE 3: THE BURST DISC THAT IS PART OF THE TANK ADAPTOR/ BURST DISC ASSEMBLY MUST BE REMOVED AND MODIFIED. SEPARATE THE ALUMINUM DISC MATERIAL FROM THE PLASTIC GASKET. DISCARD THE ALUMINUM DISC MATERIAL AND REINSTALL THE PLASTIC GASKET BACK INTO THE TANK ADAPTOR/BURST DISC ASSEMBLY.

► **NOTE 4:** THE IN-LINE BURST DISC ASSEMBLY (PART NO. 416970) IS TO BE MOUNTED AS CLOSE TO THE TANK OUTLET AS POSSIBLE. AFTER SYSTEM DISCHARGE, THE ASSEMBLY MUST BE DISASSEMBLED AND A NEW BURST DISC INSTALLED.

FIGURE 4-136

Distribution Piping Requirements – With Independent Pipe Runs

Independent pipe runs can also be used with the regulated release assembly and the tank/enclosure assembly or tank mounting brackets. See Figure 4-137. When manifolding is not used, each of the two 3 gallon tanks utilize the piping limitations of a single tank system.

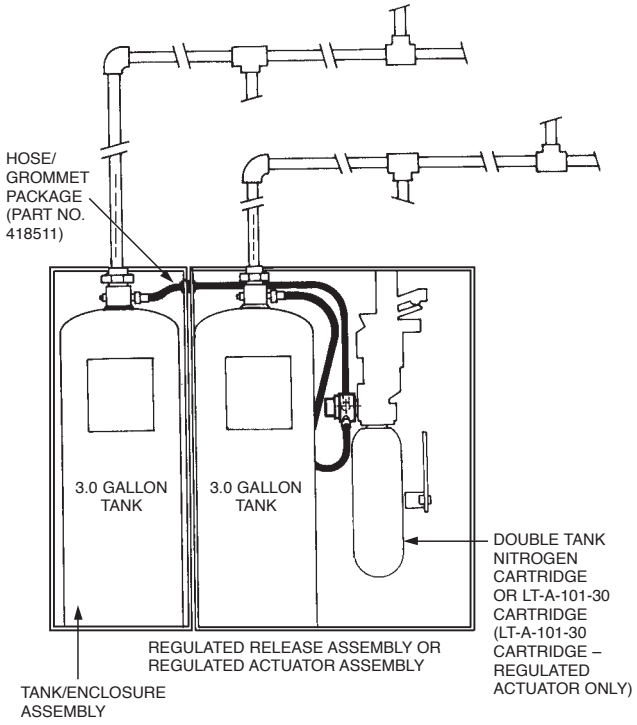


FIGURE 4-137
000786

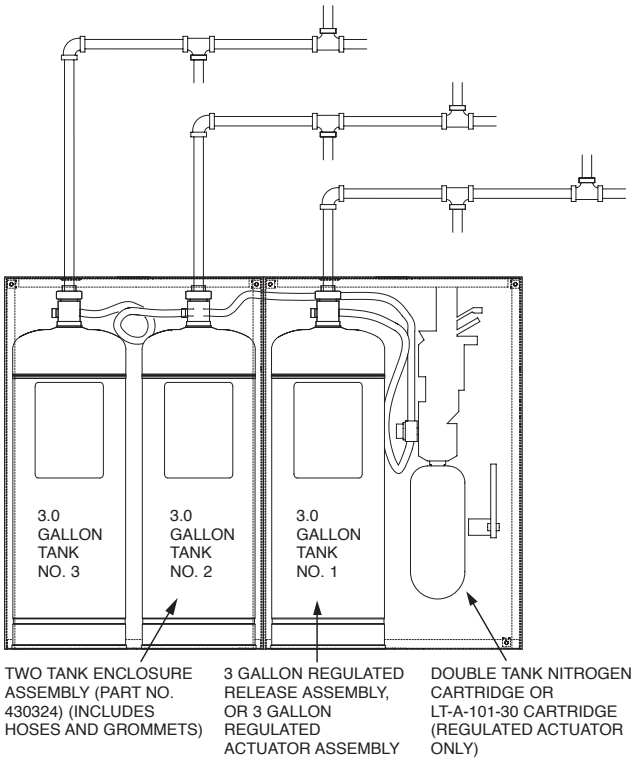
Note: If an expellant gas hose is to be used for a second tank in an adjacent tank enclosure or tank bracket assembly, the second tank will need to be installed on the left side of the AUTOMAN Regulated Release, with the outlets a maximum of 8.5 in. (215 mm) from center to center, similar to the manifolded system in Figure 4-136. Otherwise, the second tank will require 1/4 in. NPT pipe instead of expellant gas hose.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 9.0 Gallon System

This optional configuration consists only of three 3-gallon tanks, all pressurized from a single double-tank nitrogen cartridge with expellant gas hoses connected as shown in Figure 4-138. Tanks No. 1 and No. 2 must be connected directly to the regulator with separate expellant gas hoses and Tank No. 3 must be connected to Tank No. 2 with a third expellant gas hose as shown in Figure 4-136. Each tank must be connected to an independent distribution piping network as shown in Figure 4-138. Distribution piping requirements for each network must be as follows:

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m). See Figure 4-134.
2. The total length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-138.
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.
4. A maximum of two nozzles are allowed per duct branch line.
5. When using this 9.0 gallon system configuration, **no manifolding** of distribution piping is allowed.
6. When an AUTOMAN Regulated Release is utilized in this configuration, additional regulator actuators cannot be used.
7. Only 3-gallon tanks can be utilized in this configuration.
8. The requirements of the following table must not be exceeded for each 3-gallon tank:



NOTE: WHEN THREE 3.0 GALLON TANKS ARE CONNECTED TO ONE AUTOMAN REGULATED RELEASE ASSEMBLY, NO ADDITIONAL REGULATED ACTUATOR(S) ASSEMBLIES CAN BE USED.

FIGURE 4-138
008126

▸ 9.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

***Exceptions:**
1. Twelve flow numbers are allowed in any one tank for duct and plenum protection ONLY.
2. Twelve flow numbers are allowed with any one tank using only two-flow appliance nozzles.
3. Twelve flow numbers are allowed with any one tank using only three-flow appliance nozzles.

Special Instructions:
1. When four Dean Industries GTI Gas Fryers are protected at low proximity as shown in Figure 4-66 on Page 4-32, the discharge piping must be as shown in Figure 4-67 on Page 4-32.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one 2W duct nozzle, one 1/2N electrostatic precipitator nozzle, one 1N plenum nozzle, and four two-flow appliance nozzles. Contact the Applications Engineering Department for additional information.

DETECTION SYSTEM REQUIREMENTS

Once the fire suppression system design has been determined, a detection system design must be completed. This section contains guidelines and limitations for detection system installation.

Detector Identification

The two types of detectors are distinguished from each other by their location in the detection system.

1. The Terminal Detector is the last in a series of detectors, or the only detector used in a single-detector system. This detector is thus named because it is at the point at which the wire rope ends, or "terminates."
2. A Series Detector is any detector located in-line between the regulated release mechanism and the terminal detector.

Detector/Pulley Elbow/Conduit Offset Design Limitations

1. Conduit runs, pulley elbows, and number of detectors per system must be within the approved system guidelines. The following requirements must not be exceeded:

	Maximum Number of Detectors per System	Maximum Number of Elbows per System	Maximum Length of 1/2 in. Conduit per System
Scissors Style Detector (Without Offset Conduit	15	20	150 ft (45.7 m)
Scissors Style Detector (With Offset Conduit	15	16	150 ft (45.7 m)

2. If the hazard requires more than 15 detectors, up to five 101 Remote Releases (Part No. 433485) can be used for system actuation. Each 101 remote release allows the use of a maximum of 15 "scissor" style detectors (14 series and 1 terminal) for a total of 75 detectors if needed.

Detector Placement Requirements

EXHAUST DUCTS

Each exhaust duct must have at least one detector installed in the duct entrance, located in the airstream of the cooking vapors, or at a maximum of 20 ft (6.0 m) into the duct opening. See Figure 4-139

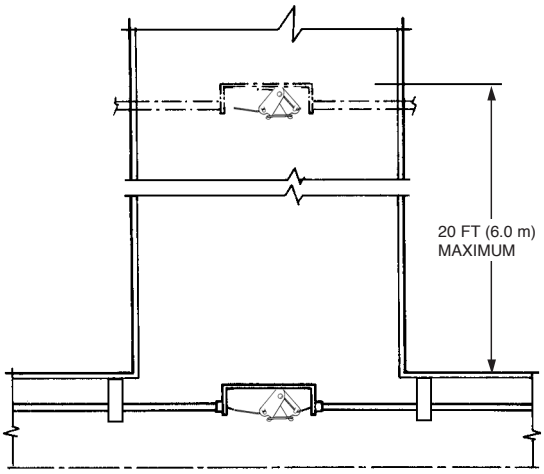


FIGURE 4-139
000271

NOTICE

When gas appliances are used and the flue gases from the burner are exhausted into the duct, the detector must be kept out of the air stream of these exhaust gases. These gases can be very hot and could actuate the system unnecessarily.

Duct openings that are long and narrow or large enough to require multiple duct nozzles may require additional detectors.

ELECTROSTATIC PRECIPITATOR

If an electrostatic precipitator is located at or near the base of the exhaust duct, it is necessary to locate a detector below the precipitator, at the base of the duct, and also locate one in the duct, just above the precipitator. See Figure 4-140.

When installing the detector bracket and system conduit, make certain they do not interfere with the operation of the precipitator.

Note: On secondary filtration units utilizing multiple filter stages/ media, contact Technical Services for instructions.

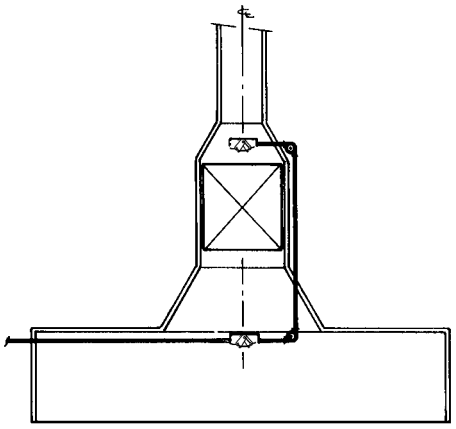


FIGURE 4-140
000268

DETECTION SYSTEM REQUIREMENTS (Continued)

Detector Placement Requirements (Continued)

COOKING APPLIANCES

If the cooking appliance is located under an exhaust duct where a detector has been mounted, it is normally not necessary to utilize another detector for that cooking appliance, provided the detector is not more than 12 in. (304 mm) into the duct and the appliance has no larger cooking surface than 48 in. x 48 in. (1219 mm x 1219 mm). See Figure 4-141.

Note: If two appliances are located under a duct opening where a detector has been mounted and both appliances together do not exceed a cooking surface of 48 in. x 48 in. (1219 mm x 1219 mm) and the detector is located above both the protected appliances, it is not necessary to utilize an additional detector provided the duct detector is not more than 12 in. (304 mm) into the duct opening.

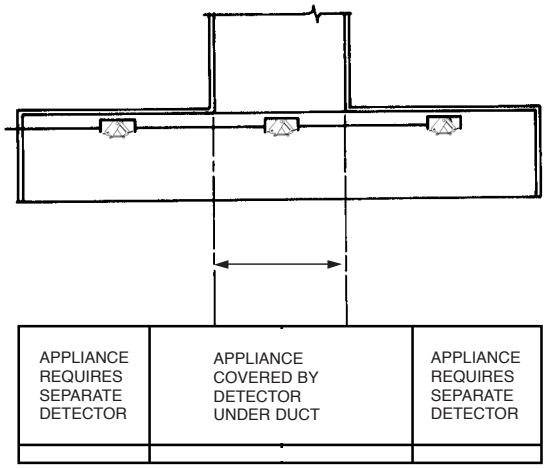


FIGURE 4-141
000269

Each cooking appliance with a continuous cooking surface not exceeding 48 in. x 48 in. (1219 x 1219 mm) can be protected by a minimum of **one** detector. Cooking appliances with a continuous cooking surface exceeding 48 in. x 48 in. (1219 x 1219 mm) must be protected by at least **one detector per 48 in. x 48 in. (1219 x 1219 mm) cooking area.** Detectors used for cooking appliances must be located above the protected appliance toward the exhaust duct side of the appliance. The detector should be located in the air stream of the appliance to enhance system response time.

Note: For overlapping detector coverage, see Page 4-60 for design requirements.

Detection Line Requirements

CONDUIT

Rigid conduit or 1/2 inch EMT thin-wall conduit may be used. Standard steel conduit fittings (compression type are recommended) must be employed to properly install the detection system. All conduit or pipe must be firmly supported. When using pipe, make certain that all ends are carefully reamed, deburred and blown clear of chips and scale before assembly.

NOTICE

The conduit offset can be used at the top or bottom of the regulated release to change direction of the conduit. The conduit offset cannot be used with pulley tees. All other changes in direction must be made by using ANSUL approved pulley elbows (Part No. 423254 or 415670). See Figure 4-142.

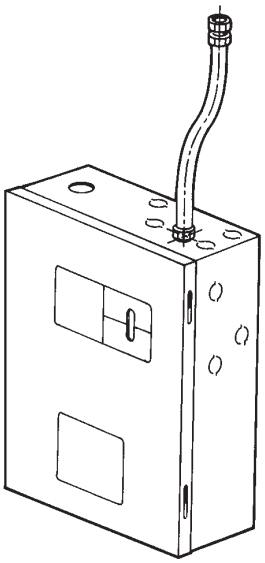


FIGURE 4-142
000270

Fusible Link Selection

When possible, temperature readings should be taken at each detector location to determine correct fusible link temperature rating. Temperature can be recorded using either a maximum registering thermometer (Part No. 15240) temperature tape or any other accurate thermometer.

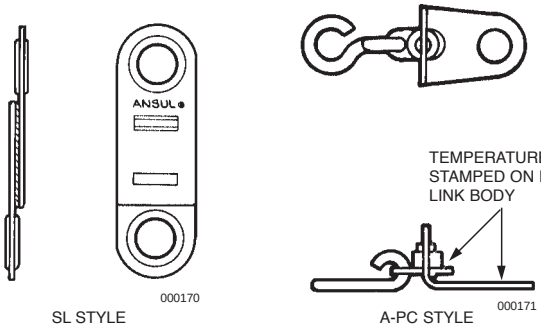


FIGURE 4-143

Select correct UL Listed fusible link(s) for installation in detector(s) according to the temperature condition. Two styles are available. See Figure 4-143. See Component Section for detailed temperature ratings.

DETECTION SYSTEM REQUIREMENTS (Continued)

Electric Thermal Detector

When electric thermal detection is used, the detection circuit must be supervised in accordance with NFPA 17A, Standard for Wet Chemical Extinguishing Systems. Electric thermal detectors must be used in conjunction with either the AUTOPULSE 542R Control Panel (Part No. 433607) or the AUTOPULSE Z-10 Control Panel (Part No. 430525), and the 24VDC Regulated Release Assembly.

Note: Consider the rate of temperature increase in the location chosen for the detector when using electric thermal detection. A transient rush of warm air up to 40 °F (4 °C) per minute may expand the shell, but not enough to trigger the AUTOPULSE control panel. Temperature increases over 40 °F (4 °C) per minute however, may initiate an alarm condition in the control panel.

After determining the maximum ambient temperature at the thermal detector location, select the correct thermal detector according to the temperature condition chart in the "System Components" section.

MANUAL PULL STATION REQUIREMENTS

A remote manual pull station allows the R-102 system to be manually operated at some point distant from the regulated release assembly. The pull station should be installed at a height of 42-48 in. (1067-1219 mm), in accordance with the requirements of the American Disabilities Act (ADA) and the Authority having Jurisdiction. and located in the path of egress. The pull station is the only source of manual actuation of the regulated release assembly.

The total length of the cable used for each manual pull station within a system must not exceed 150 ft (45.7 m).

The maximum number of pulley elbows that may be used per pull station is 20.

One pulley tee is allowed per cable system.

The maximum length of cable from the AUTOMAN to a pull station is 150 ft (45.7 m) with a maximum of 20 pulley elbows used per side of the tee. As the tee is located farther from the AUTOMAN, the 150 ft (45.7 m) maximum must be observed but as pulley elbows are placed between the AUTOMAN and the tee, they must be deducted from the available pulley elbows (20) allowed on each side.

Example: If 10 pulley elbows are placed between the AUTOMAN and the pulley tee, the maximum available pulley elbows left for use on each side of the tee is 10 per side. See Figure 4-144 for three different examples. (**Note:** Both must be gas valves or both must be pull stations. Mixing is not allowed.)

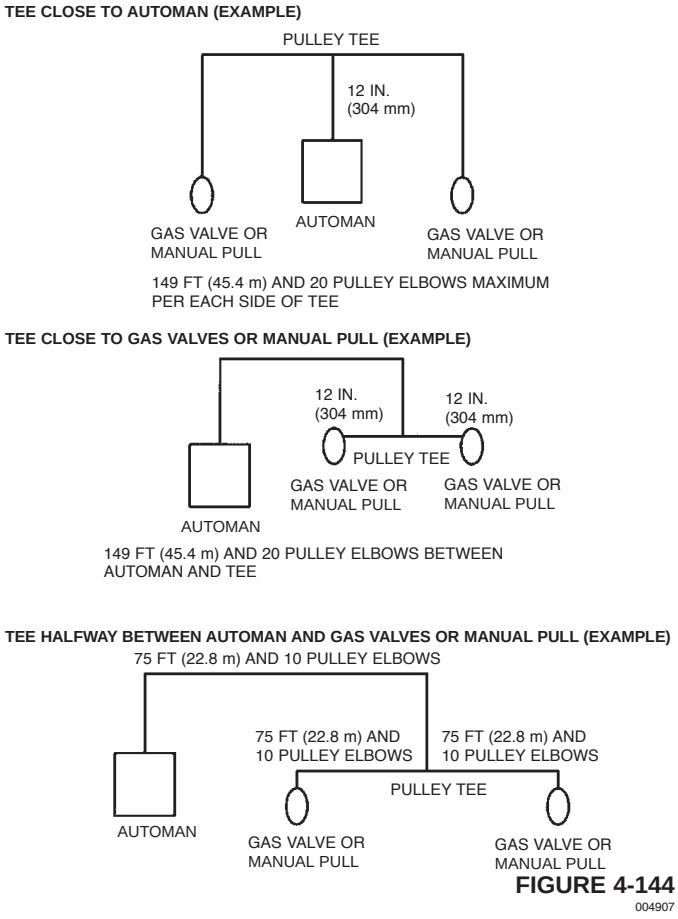


FIGURE 4-144
004907

Manual Pull Station – Part No. 435960 or 434618

Parts that may be used for installation of a metal stamped remote manual pull station are:

Description	Part No.
Remote Manual Pull Station Assembly*	435960
Remote Manual Pull Station Assembly	434618
Pulley Elbow	423250
Pulley Elbow	415670
Pulley Tee	427929

*Assembly includes parts listed below:

1/16 in. Stainless Steel Cable 50 ft (15.2 m)	15821
Oval Press-To-Crimp Sleeves	4596
Glass Break Rod (1)	4834

MECHANICAL GAS VALVE REQUIREMENTS

An ANSUL or ANSUL approved mechanical gas shut-off valve system can be attached to the R-102 system. The system works both mechanically and pneumatically by use of an air cylinder located inside the regulated release assembly. Upon actuation of the fire suppression system, a pneumatically-operated air cylinder assembly will mechanically close the gas shut-off valve.

The total length of the cable for each mechanical gas valve must not exceed 150 ft (45.7 m). The maximum number of pulley elbows that may be used is 20 for each valve.

One pulley tee is allowed per cable system.

The maximum length of cable from the AUTOMAN to a gas valve is 150 ft (45.7 m) with a maximum of 20 pulley elbows used per side of the tee. As the tee is located farther from the AUTOMAN, the 150 ft (45.7 m) maximum must be observed but as pulley elbows are placed between the AUTOMAN and the tee, they must be deducted from the available pulley elbows (20) allowed on each side.

Example: If 10 pulley elbows are placed between the AUTOMAN and the pulley tee, the maximum available pulley elbows left for use on each side of the tee is 10 per side. See Figure 4-144 for three different examples.

Parts that may be used for installation of a Mechanical Gas Shut-off Valve are:

Description	Part No.
Gas Valve/Actuator 3/4 in. Assembly (ANSUL)*	55598
Gas Valve/Actuator 1 in. Assembly (ANSUL)*	55601
Gas Valve/Actuator 1 1/4 in. Assembly (ANSUL)*	55604
Gas Valve/Actuator 1 1/2 in. Assembly (ANSUL)*	55607
Gas Valve/Actuator 2 in. Assembly (ANSUL)*	55610
Gas Valve/Actuator 2 1/2 in. Assembly (ASCO)*	25937
Gas Valve/Actuator 3 in. Assembly (ASCO)*	25938
Pulley Elbow	423250
Pulley Elbow	415670
Pulley Tee	427929
1/16 in. Stainless Steel Cable	15821 or
50 ft (15.2 m) or 500 ft (152.4 m) roll	79653
Oval Press-To-Crimp Sleeve	4596
Stop Sleeve (2)	26317
*Assembly includes parts listed below:	
Air Cylinder Assembly	15733
Air Cylinder	15521
Tubing Assembly	15529
Copper Tubing, 1/8 in.	15525
Male Elbow	15523
Male Connector	15522
Machine Screw (2)	15421
Hex Nut (2)	15527
Lockwasher (2)	4141
Visual Inspection Seal (2)	197

All valves above are UL listed and approved. They may be mounted in any position. Pipe threads are type NPT. Ambient operating temperature range of all valves is 32 °F to 120 °F (0 °C to 49 °C). The valves are not weatherproof and must be located indoors in areas approved by the “authority having jurisdiction.”

ELECTRICAL GAS VALVE REQUIREMENTS

A UL Listed electrically-operated gas shut-off valve can be attached to the R-102 system to provide an electrical means of shutting off the gas line at a predetermined point. If an electric gas shut-off valve is used in the system it must be attached with both an electric (snap-action) switch and a manual reset relay. For more information on the types of electric (snap-action) switches, refer to the Electrical Switch, Field Installation section. The manual reset relay is reviewed in this section.

All electrical connections should be performed by a **QUALIFIED ELECTRICIAN** and in accordance with authority having jurisdiction.

The following is a brief explanation of how the R-102 system operates with an Electric Gas Shut-off Valve attached:

With the regulated release cocked in the ready condition, the normally closed contacts in the snap-action switch allow current to flow to the manual reset relay. With the relay coil energized, normally open contacts in the reset relay close, allowing the solenoid in the gas valve to be energized.

Once the R-102 system is activated, the normally closed contacts in the snap-action switch will open, de-energizing the reset relay. This will, in turn, open the contacts in the relay which will cause the gas valve to become de-energized and close.

The system must be re-armed and the “push to reset” button on the reset relay must be operated to reopen the gas valve.

It is important to note that a power failure or an electrical power interruption will cause the gas valve to close even though the system was not fired.

In either case, whether in a fired condition or when a power failure has occurred, the manual reset relay and electric gas shut-off valve must be reset to resume a normal operating condition. **For resetting, refer to the “Recharge and Resetting Procedures” section in this manual.**

ELECTRICAL GAS VALVE REQUIREMENTS (Continued)

Approvals

ANSUL gas valves listed in this section are UL listed and approved for 110 VAC. If more information is required, refer to the Gas and Oil Equipment List of Underwriters Laboratories, Inc. under "Electrically Operated Valves Guide No. 440 A5" or consult Tyco Fire Protection Products, Marinette, Wisconsin 54143-2542.

If other gas valves are used, they shall be "UL listed electrically-operated safety valves for natural or LP gas as required, of appropriate pressure and temperature rating, 110 VAC/60 Hz." The information on temperature and type of gas that the valves are suitable for may be found in the Gas and Oil Equipment List of Underwriters Laboratories, Inc. under "Electrically Operated Valves Guide No. 440 A5."

The electrically operated gas valve must be of the type that needs to be energized to remain open.

Note: For electrical wiring diagrams, see "Installation Instructions" Section, Pages 5-40 through 5-42.

Parts that may be used for installation of a 110 VAC Gas Shut-off Valve are:

Description	Part No.
Electric Solenoid Valve, 3/4 in. NPT*	13707
Electric Solenoid Valve, 1 in. NPT*	13708
▸ Electric Solenoid Valve, 1 1/4 in. NPT*	550360
Electric Solenoid Valve, 1 1/2 in. NPT*	13709
Electric Solenoid Valve, 2 in. NPT*	13710
▸ Electric Solenoid Valve, 2 1/2 in. NPT*	550363
Electric Solenoid Valve, 3 in. NPT*	17643
▸ Manual Reset Relay (110 VAC)	426151

*Valves are normally closed when de-energized.

ALARM INITIATING SWITCH REQUIREMENTS

The Alarm Initiating Switch can be field mounted within the AUTOMAN release. The switch must be used to close a supervised alarm circuit to the building main fire alarm panel when the AUTOMAN release actuates. This action will signal the fire alarm panel that there was a system actuation in the kitchen area. The switch kit contains all necessary mounting components along with a mounting instruction sheet. See Page 5-39 for wiring information.

The switch is rated 50 mA, 28VDC.

Part No.	Description
428311	Alarm Initiating Switch Kit

ELECTRICAL SWITCH REQUIREMENTS

Note: Electrical connections shall not be made in the AUTOMAN.

The electric (snap-action) switches for the R-102 system are specially designed to fit the regulated release assembly. The switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices, and other electrical devices that are designed to shut off or turn on when the fire suppression system is actuated. (See Figures 5-122 through 5-124 in Installation Section for reference).

Contractors shall supply "UL listed, enclosed industrial control equipment or magnetic switch having a rating matching that of the cooking appliance, coil 110 VAC/60 Hz or 24 VAC/60 Hz."

All electrical connections should be performed by a **QUALIFIED ELECTRICIAN** and in accordance with authority having jurisdiction.

Electric (Snap-Action) Switches that may be field installed are:

Part No.	Description
423878	One Switch Kit
423879	Two Switch Kit
423880	Three Switch Kit
423881	Four Switch Kit
▸ 436770	Two Switch Kit (no wire leads)

Each switch has a set of single-pole, double throw contacts rated at 21 amp, 1 HP, 125, 250, 277 VAC or 2 HP, 250, 277 VAC.

Note: A relay must be supplied by others if the equipment load exceeds the rated capacity of the switch.

Electrical wiring and equipment shall be installed in accordance with NFPA 70 (National Electrical Code) or the requirements of the authority having jurisdiction.

If a fire alarm system is provided, the fire extinguishing system shall be connected to the alarm system in accordance with the requirements of NFPA 72, National Fire Alarm Code, so that the actuation of the extinguishing system will sound the fire alarm as well as provide the extinguishing function of the system.

If supervision of the electrical detection, electrical actuation or electrical power supply circuit is provided, it shall give prompt audible or visual indication of trouble and shall be distinctive from alarms or indicators indicating operation or hazardous conditions as specified in NFPA 17A.

NOTES:

INSTALLATION INSTRUCTIONS

The installation information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the installation of the R-102 system must be trained and hold a current ANSUL certificate in an R-102 training program.

Before attempting any installation, the entire system design must have been determined including: Nozzle Placement, Tank Quantity, Actuation and Expellant Gas Piping, Distribution Piping, and Detection System Requirements and an installation sketch should be completed.

INSTALLING RELEASE ASSEMBLY COMPONENTS

For successful system performance, the regulated release assembly, regulated actuator assembly(ies), and tank-enclosure(s) or tank-bracket assembly(ies) used must be located in areas where the air temperature will not fall below 32 °F (0 °C) or exceed 130 °F (54 °C). The R-102 system is limited to interior applications only. Also, the components must be arranged to conform to the actuation and expellant gas line, and the distribution piping guidelines noted in “System Design.”

1.

CAUTION

Use only an AUTOMAN Regulated Release assembly or OEM Release/Bracket Assembly. The regulator in this assembly is specifically designed to allow a regulated flow of expellant gas into the agent tank(s). Absence of this regulator could cause the tank(s) to rupture or create an improper system discharge.

Mount the regulated release assembly, OEM Release Assembly, and each regulated actuator assembly required by completing the following steps: See Figures 5-1, 5-2, and 5-3.

a. Select a rigid surface for mounting the enclosure. The mounting locations must allow the regulated release assembly and the regulated actuator assembly(ies) to be within the limitation of the actuation and expellant gas line lengths and must be able to support the weight of the assembly(ies). When the OEM Release Assembly is mounted inside a cabinet, clearances shall be provided for unrestricted movement of the release assembly components within the closed cabinet.

b. Detach cover from the enclosure. Remove agent tank from enclosure and the expellant gas line hose from the tank/adaptor assembly.

c. Secure enclosure box to selected mounting location using the four mounting holes. Use appropriate type of fasteners depending on the mounting surface.

d. When mounting a 6 gallon manifolded system (or a 6 gallon individual piped system) it is critical that each mounting box is located as shown in Figure 5-3. There must be a 5/16 in. (7.9 mm) space between each box. Less than 5/16 in. (7.9 mm) will cause interference with the covers, and more than 5/16 in. (7.9 mm) will cause a gap between the two hose grommets which will expose the hose to possible tampering or damage.

Remove the 7/8 in. (22 mm) knockout on the left side of the AUTOMAN release box and remove the 1 in. (25 mm) knockout on the right side of the tank-enclosure box. Install grommets in each (use ANSUL hose/grommet package (Part No. 418511)). Remove 1/4 in. plug from back side of R-102 regulator and install fixed end of secondary expellant gas hose (included in hose/grommet package in 1/4 in. regulator outlet and wrench tighten.

If not already done, mount both boxes to a rigid surface using appropriate fasteners.

Fill tanks per instructions listed in Steps 3 and 4 on Page 5-3.

Next, route hose through grommets and wrench tighten into 1/4 in. inlet of the adaptor on the tank in the tank/enclosure assembly. Also install hose to tank adaptor in regulated release and wrench tighten. See Figure 4-135 in “System Design” for details of hose routing.

REGULATED RELEASE ASSEMBLY/REGULATED ACTUATOR ASSEMBLY/DOUBLE TANK ENCLOSURE

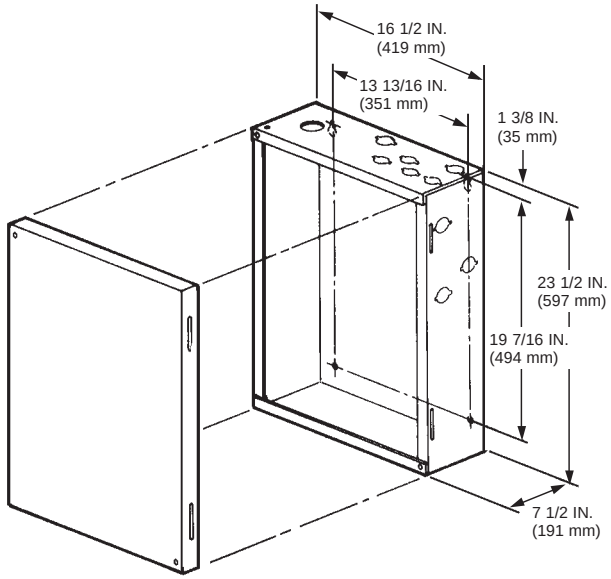


FIGURE 5-1
000287

MOUNTING THE COMPONENTS (Continued)

OEM RELEASE/BRACKET ASSEMBLY

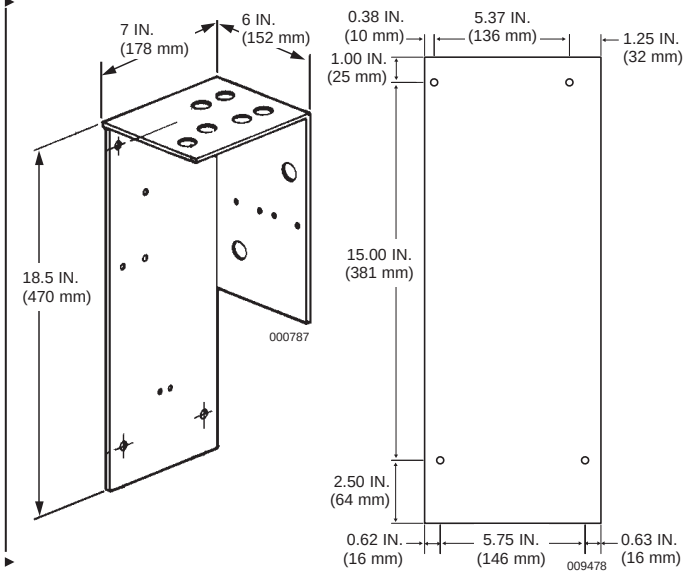


FIGURE 5-2

MOUNTING HOLE DIMENSIONS

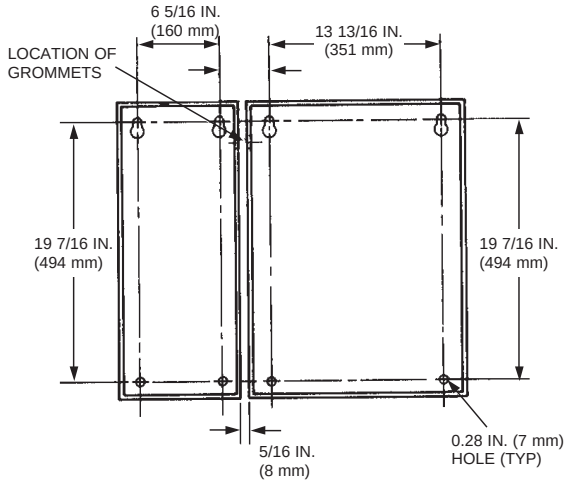
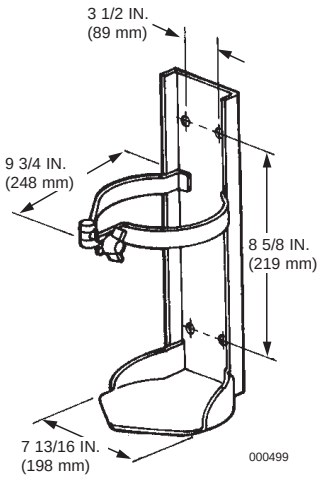


FIGURE 5-3
000788

3 GALLON TANK BRACKET



SINGLE TANK ENCLOSURE/REMOTE RELEASE

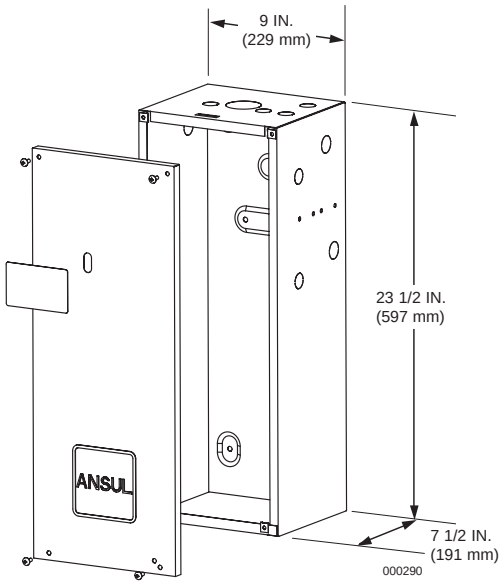


FIGURE 5-4

CAUTION

Do not install cartridge at this time. Failure to comply may result in accidental system actuation.

2. Mount each tank-enclosure or tank-bracket assembly by completing the following steps:
   a. Select a rigid, vertical surface for mounting the enclosure or bracket. (Keep in mind that the 3 gallon tank is taller than the bracket. (See Figure 5-4) Allow sufficient space for convenient piping and removal).
   b. Remove tank from enclosure or bracket, and secure enclosure or bracket to the mounting location using the four mounting holes. Use appropriate type of fasteners depending on the mounting surface.

MOUNTING THE COMPONENTS (Continued)

3. Fill each agent tank by completing the following steps:
   a. Remove tank adaptor/tube assembly from tank fill opening. Visually inspect tank adaptor to determine bursting disc is in place and that silver side is away from tank. See Figure 5-5.

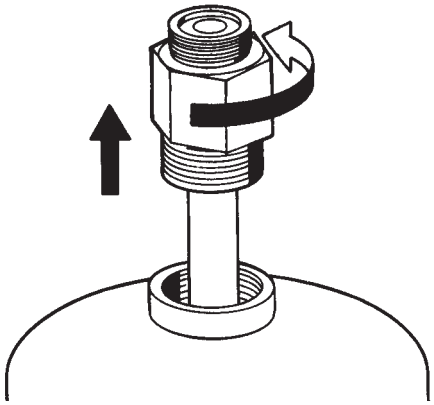


FIGURE 5-5
000291

   b.

⚠ CAUTION

Safety glasses should be worn during transfer operations of ANSULEX Low pH Liquid Fire Suppressant. Avoid contact with skin or eyes. In case of contact, flush immediately with water for 15 minutes. If irritation persists, contact a physician. Do not take internally. If taken internally do not induce vomiting. Dilute with water or milk and contact a physician immediately.

Place plastic funnel in fill opening and fill tank with 1.5 (5.8 L) or 3.0 (11.6 L) gallons of only ANSULEX Low pH Liquid Fire Suppressant. See Figure 5-6 for detailed filling tolerances. **Note:** Use a funnel with a screen to stop any foreign material from entering the tank. See Figure 5-6.

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **DO NOT FILL WITH COLD AGENT. DO NOT OVERFILL.** Overfilling may result in agent entering gas hoses and regulator potentially causing system malfunction.

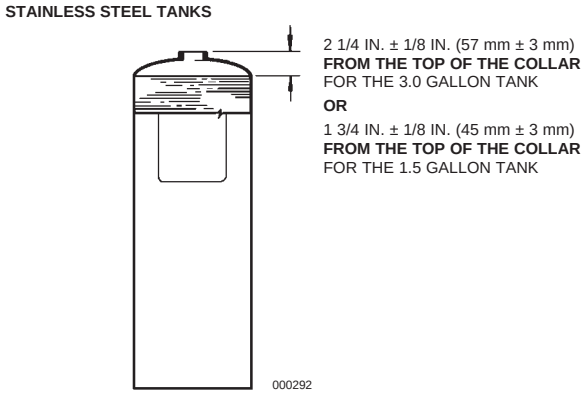


FIGURE 5-6

   c. Reinstall adaptor/tube assembly to tank by tightening until metal to metal contact is achieved between bottom of adaptor and tank collar.

4. Place each tank into its enclosure or bracket.

INSTALLING THE DISTRIBUTION PIPING

Before the following procedures can be completed, the piping design must already be determined; and the actuation and expellant gas lines from the regulated release, each regulated actuator, and each tank-enclosure or tank-bracket assembly should already be installed.

These installation instructions are identical for single, double, and multiple-tank systems except for the quantity of tanks and hazard areas to be covered.

General Piping Requirements

1. Use Schedule 40 black iron, chrome-plated, or stainless steel pipe and fittings.

> ***NOTICE***
>
> Do not use hot-dipped galvanized iron pipe or fittings in the agent distribution piping.

2. Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.
3. The distribution piping and fitting connections, located in or above the hood or the protected area, must be sealed with pipe tape. When applying pipe tape, start at the second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening.

> ***NOTICE***
>
> Do not allow tape to overlap the pipe opening as the pipe and nozzles could become plugged.
>
> Thread sealant or compound must not be used as it could plug the nozzles.

4. Distribution piping may be run independently or two agent tanks may be manifolded together and run to the predetermined hazard area. Only agent tanks expelled from the same cartridge may be manifolded.

> ***NOTICE***
>
> Closely follow the piping requirements for each size system, as detailed in the "System Design" section, when installing distribution piping.

5. Branchline tees can be used to create more than one branch and can be installed as a thru tee, side outlet tee or bull tee.

Pipe Hanger Recommended Guidelines

1. Space hangers as follows:

Pipe Size	Maximum Recommended Distance Between Hangers
3/8 in.	5 ft (1.5 m)

2. Hangers should be placed between elbows when the distance is greater than 2 ft (0.6 m).

Piping Installation

1. Starting at the tank, pipe directly from the union located on the tank adaptor. A reducing fitting may be necessary to conform to the distribution piping.
2. Based on the piping sketch developed in the "System Design" section of this manual, install the supply line and position the tees at points where branch lines must be installed. See Figure 5-7.
3. Run all branch lines to the hazard area and connect each nozzle. (Make certain all piping is securely bracketed.)

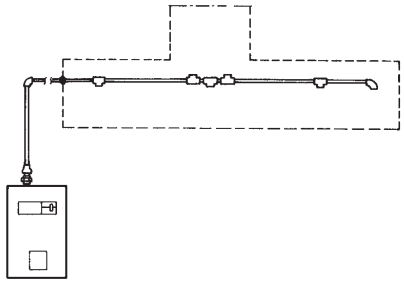


FIGURE 5-7
000302

4. Make certain all threaded connections are properly tightened. Threaded connections located in the protected area(s) and above the hood must be sealed with Teflon pipe tape, as a minimum. Apply pipe tape to male threads only. Make certain tape does not extend over the end of the thread, as this could cause possible blockage of the agent distribution.

   Pipe tape minimizes friction between bearing surfaces of the threads when threading pipe to fittings. The resulting heat may expand the pipe threads before the joint is properly made. When the pipe threads cool and contract in the fitting, the joint may become loosened causing cooking grease to migrate into the distribution piping, and/or leakage at the fitting during a pressure test or agent discharge.

   Note: When required to provide pressure testing of pipe or a system discharge test, it is recommended that all pipe connections utilize Teflon pipe tape.

5. Install the correct nozzle(s) for each hazard area as previously designed. Some nozzles are required to be properly oriented before they are positioned for aiming.

INSTALLING THE DISTRIBUTION PIPING (Continued)

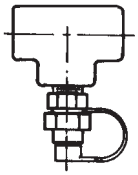
Piping Installation (Continued)

6. Aim the nozzles to a pre-determined aim point in accordance with the instructions in the "System Design" section. Using the Nozzle Aiming Device will aid in the aiming process. The device clamps to the nozzle and emits a small laser light that reflects on the surface where it is aiming. If the nozzle is used with a Swivel Adapter, the nozzle with the Aiming Device can be rotated to the exact aiming point and then tightened to hold that angle.
7. Before installing blow-off caps on nozzles, apply a small amount of Dow Corning No. 111 silicone grease across the opening in the nozzle tip. Also apply a small amount to coat the exterior of the blow-off cap. DO NOT FORCE SILICONE GREASE INTO NOZZLE TIP OPENING OR FILL CAP WITH GREASE.

NOTICE

When using old style metal blow-off cap with spring clips, make certain the spring clip rotates freely on the metal cap and coat the outside of the cap, including the clip, with Dow Corning No. 111 silicone grease.

8. Make certain a blow-off cap is in place over each nozzle tip. These blow-off caps are designed to keep grease from building-up on the nozzle orifice and inhibiting the agent flow. See Figure 5-8.



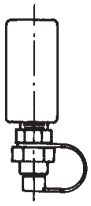


FIGURE 5-8

INSTALLING THE AGENT DISTRIBUTION HOSE (FOR CASTERED/MOVEABLE EQUIPMENT)

Agent Distribution Hose can be used in the supply line or appliance branch line to allow a castered cooking appliance with castered supports with nozzles attached directly to the appliance, to be moved out of its normal operating position for service or cleaning.

CAUTION

The following instructions must be followed in their entirety. Failure to do so may result in the R-102 Fire Suppression System not functioning properly due to incorrect installation.

CRITICAL INSTALLATION REQUIREMENTS

1. Design and installation must be performed by qualified personnel.
2. The Agent Distribution Hose shall not be concealed within or run through any wall, floor, or partition, and shall not have any direct exposure to excessive heat or radiant flame from the cooking appliances.
3. Strong cleaning solutions or chemical substances must not come in contact with the Agent Distribution Hose. These may include acids, solvents, fluxes with zinc chloride, or other chlorinated chemicals. In case of contact, rinse down the Agent Distribution Hose with water and dry thoroughly.
4. Contact with foreign objects, sharp edges, wiring, or substances must be avoided.
5. Bending and flexing of Agent Distribution Hose on moveable appliances (i.e. those factory equipped with casters) should be limited to pulling and pushing the appliances in or out for cleaning or maintenance. The hose shall never be installed or bent tighter than a 3 in. (76 mm) radius (6 in. (152 mm) diameter) loop.
6. The Agent Distribution Hose must not be kinked, twisted, or have sharp bends when installed or when equipment is pulled away from the wall.
7. Make sure that all fittings are tightened properly.
8. Adequate means must be provided to limit the movement of castered appliances. A 36 in. (914 mm) long Restraining Cable supplied with the agent distribution hose is required to be used for all castered appliances using the Agent Distribution Hose. (Refer to Restraining Cable Installation Instructions.)
9. The Restraining Cable requires periodic maintenance to ensure proper operation.
10. The Restraining Cable must be attached to the wall and appliance anytime the distribution hose is connected to the appliance.
11. Do not over-extend the Agent Distribution Hose when moving equipment (for cleaning, maintenance, etc.).

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS

Before proceeding, **CAREFULLY** read all instructions, including all **CRITICAL INSTALLATION REQUIREMENTS.**

General Requirements

1. The Agent Distribution Hose (which is part of the Discharge Hose and Restraining Cable Kit), is 0.5 in. (13 mm) diameter x 60 in. (1524 mm) long and is provided with two male NPT swivels for ease of installation.
2. Maximum of six Agent Distribution Hoses can be used in each agent distribution piping network.
3. Agent Distribution Hose can only be used for castered appliances or appliances setting on castered supports.

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)

General Requirements (Continued)

4. Maximum of two Agent Distribution Hoses are allowed in the supply line. However, the Agent Distribution Hose can only be used at the castered appliance.
5. Maximum of two Agent Distribution Hoses are allowed in the branch line. An acceptable installation scenario would be providing separate protection of two (side-by-side) appliances, each with its own Agent Distribution Hose and tether, supplied from the same appliance branch.
6. The Agent Distribution Hose is to only be used in the distribution piping of a single 1 1/2 or 3 gal (5.7 or 11.4 L) tank or two manifolded 3 gal (11.4 L) R-102 extinguishing systems or larger systems using combinations thereof. However, the Agent Distribution Hose is never to be used to manifold two 3 gal (11.4 L) tanks.

Installation Requirements

1. Agent Distribution Hose must be connected to 3/8 in. NPT black iron, chrome-plated, or stainless steel fittings. The connection from hose to fitting requires a 1/2 in. x 3/8 in. reducing coupling (Part No. 436228). All Agent Distribution Hose connections must be sealed with pipe tape. When applying pipe tape, start at the second male thread on the swivel ends of the hose. Wrap the tape (two turns maximum) clockwise around the threads, away from the hose end fitting opening.
2. All connections of distribution piping to Agent Distribution Hose for castered appliances, with distribution nozzles installed/affixed to the appliance, must be located behind the cooking equipment in an area protected from obstructions and possible wear or damage.
3. 3/8 in. schedule 40 pipe will need to be run from the hose connection to the distribution nozzle(s) installed/affixed to the appliance. Pipe must be installed and adequately secured at a height at or below the cooking surface of the appliance. (See Figure 5-14.)
4. All existing distribution pipe and fitting limitations must be observed and followed. Each flex distribution hose used is to be considered as an equivalent length of 3/8 in. pipe when calculating the acceptable length of allowable distribution pipe. Each hose is 5 ft (1.5 m) long. ►
5. All hose-to-pipe connection fittings are to be oriented in a vertical down position.
6. The hose connections must be positioned below an elevation where the hose could be exposed to the radiant or convected heat generated by normal cooking operations (such as the horizontal plane of appliance's cooking surface), or to heat from appliance exhaust. As a minimum height, the hose connection shall be no lower than 30 in. (762 mm) from the floor. The distribution piping shall be supported and secured per local plumbing practices.
7. Hose ends are to be offset 6 to 8 in. (152 to 203 mm) center to center of fittings (See Figure 5-9) to maximize hose life expectancy and facilitate appliance movement. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (76 mm) bend radius (6 in. (152 mm) diameter).

OVERHEAD VIEW

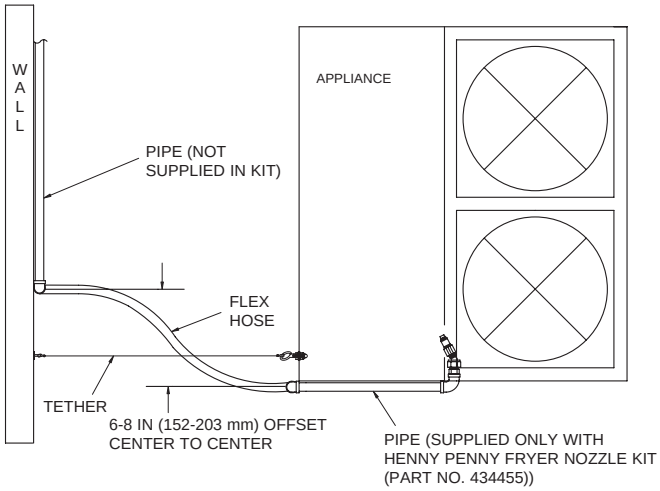


FIGURE 5-9
007828

Restraining Cable Installation

Important: A Restraining Cable shall always be permanently attached to the appliance and wall directly behind the appliance when the Agent Distribution Hose is installed. Removal of this cable shall only occur when the Agent Distribution Hose is not installed to the appliance.

See Figure 5-10 for mounting the Restraining Cable to the wall. See Figure 5-11 for mounting the Restraining Cable to the back of an appliance.

RESTRAINING CABLE – WALL-MOUNTED OPTION

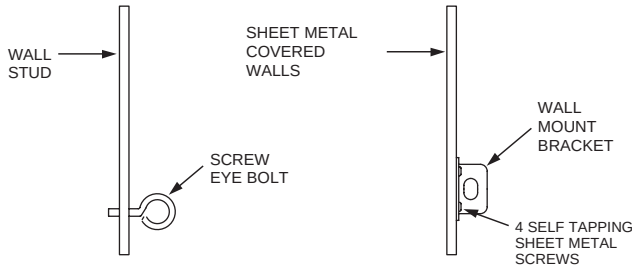


FIGURE 5-10
008088

RESTRAINING CABLE – APPLIANCE-MOUNTED OPTION

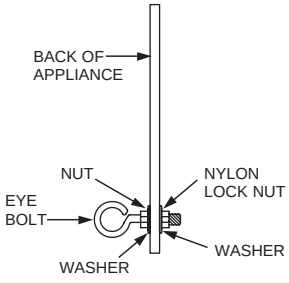


FIGURE 5-11
008089

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)

Restraining Cable Installation (Continued)

RESTRAINING CABLE – HENNY PENNY-MOUNTED OPTION

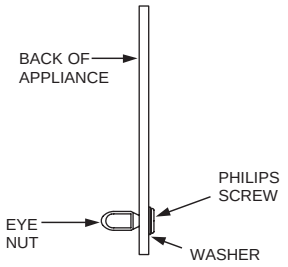


FIGURE 5-12
008090

1. The Restraining Cable must be connected from the appliance to the wall or some other structurally sound object capable of restraining the castered appliance from being able to be pulled or pushed out to a point that will result in strain or stress to the Agent Distribution Hose.
2. The Restraining Cable should be installed in line with the Agent Distribution Hose.
3. For sheet metal covered walls, the Restraining Cable Assembly includes four 3/4 in. x #8 self tapping sheet metal screws, and a Restraining Cable Bracket. Securely attach the Restraining Cable Bracket to the sheet metal covered wall using the 3/4 in. x #8 self tapping metal screws provided.
4. For mounting to wall studs, the Restraining Cable Assembly includes one screw eye lag bolt, 5/16 in. x 2.5 in. (64 mm) long.
5. Locate a structural area (frame) on the rear side of the equipment that is in line with the wall attachment. **Note:** It may be necessary to contact the appliance manufacturer for a suitable location. Drill a 5/16 in. (7.9 mm) diameter hole. Use caution when drilling hole, so that internal components are not damaged.
6. The Restraining Cable Assembly also includes a 5/16 in. threaded eye-bolt, 5/16 in. hex head nut, 5/16 in nylon lock nut, and two 5/16 in. flat washers. Thread the included hex nut onto the eye-bolt. Slide one washer onto the eye-bolt threads next to the nut. Then, slide the eye-bolt through the drilled hole and place a washer and nylon locknut onto the eye-bolt on the inside frame of the equipment. Tighten securely.
7. Attach one of the snap hooks (included in the Restraining Cable package) on the end of the Restraining Cable to the wall bracket and the other snap hook to the eye-bolt (See Figure 5-13). After snap-hooking the assembly, seal the Restraining Cable Loops to the wall bracketry and appliance connection hardware with Lead Wire Seal (Part No. 197).

   Note: For the Henny Penny Pressure Fryers that utilize the ANSUL Henny Penny Fryer Nozzle Kit, Part No. 434455, the 5/16 in. philips screw supplied in the Henny Penny Fryer Nozzle Kit, the 5/16 in. eye nut, and 5/16 in. washer included in the Restraining Cable Assembly Kit, must be used. (See Figure 5-12).

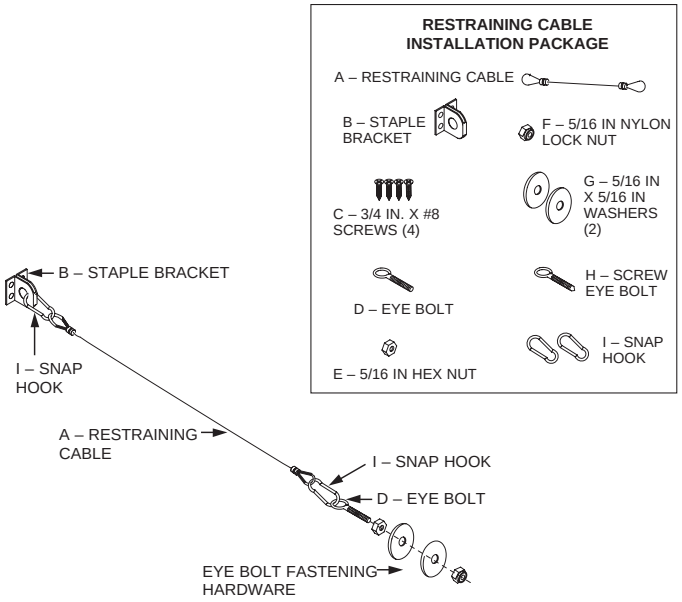


FIGURE 5-13
007829

Final Installation Guidelines and Checkout Procedures

After the Agent Distribution Hose and the Restraining Cable is properly installed, carefully push the appliance back to its normal operating position. Check that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance.

1. Verify the Restraining Cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the Agent Distribution Hose or hose-to-pipe connections.
2. Make certain there are no sharp bends and kinks in the hose when pulling out the cooking equipment.
3. The Agent Distribution Hose should always be in a vertical natural loop, never having any bends greater than a 3 in. (76 mm) radius (6 in. (152 mm) diameter), hose twists, or sharp bends. (See Figure 5-14.) If any of these conditions exist, the hose and/or hose connections will require installation modifications.

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)

Final Installation Guidelines and Checkout Procedures (Continued)

SIDE VIEW

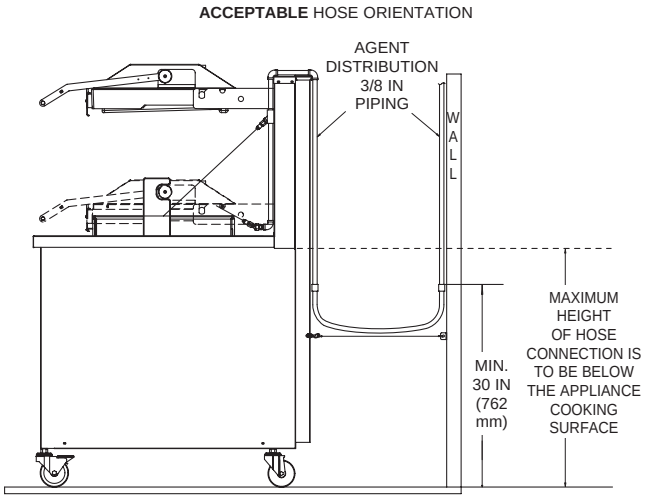


FIGURE 5-14
007830

4. Return the appliance to its normal operating position in accordance with NFPA 96. Means shall be provided to verify that the appliance returns to its original designed positioning. Failure to do so may result in undue stress and fatigue of the hose and hose connections.

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE

Before installing any actuation or expellant gas line, the design must be determined; and the regulated release assembly, each regulated actuator assembly and each tank-bracket assembly should be securely mounted.

General Piping Requirements

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings.
2. Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.
3. The piping and fitting connections must be sealed with pipe tape. When applying pipe tape, start at the second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening.

> ***NOTICE***
>
> Do not allow tape to overlap the pipe opening, as this could cause possible blockage of the gas pressure.
>
> Thread sealant or compound must not be used.

4. When connecting actuation or expellant gas line piping, install a 1/4 in. union near the tank inlet for easy disassembly later.

Note: Expellant gas line cannot use stainless steel braided hose.

Actuation Gas Line

Install actuation gas line from the regulated release mechanism high pressure side outlet (side opposite regulated outlet) through the appropriate knockout in the enclosure by completing the following steps:

1. Remove the 1/8 in. plug from high pressure side outlet. Install the appropriate fitting for additional equipment attachment as required. A 1/4 x 1/8 in. reducing fitting is required to connect the 1/4 in. actuation line. See Figure 5-15.
2. Run piping or hose up through the regulated release assembly enclosure knockout to the inlet on top of each regulated actuator assembly used within the system.

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

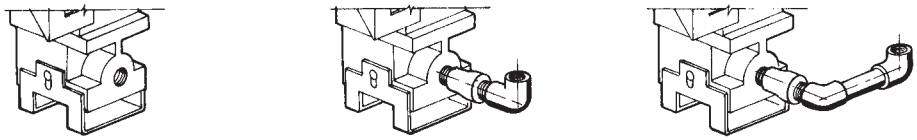
Actuation Gas Line (Continued)

3. The total combined length of the actuation gas line from the regulated release assembly to all regulated actuator assemblies must not exceed 20 ft (6 m) when using an LT-20-R nitrogen cartridge, an LT-30-R nitrogen cartridge, a 101-10 CO_2 cartridge, or a 101-20 CO_2 cartridge. See Figure 5-16.

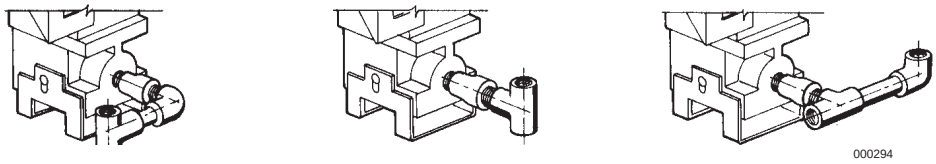
   Note: When using stainless steel actuation line, a maximum of 17.5 ft (5.3 m) of hose may be used.

4. If an expellant gas line is connected to the regulated release assembly along with an actuation gas line, the total combined length of the actuation and expellant gas line **must not** exceed 30 ft (9.1 m). See Figure 5-17.
5. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

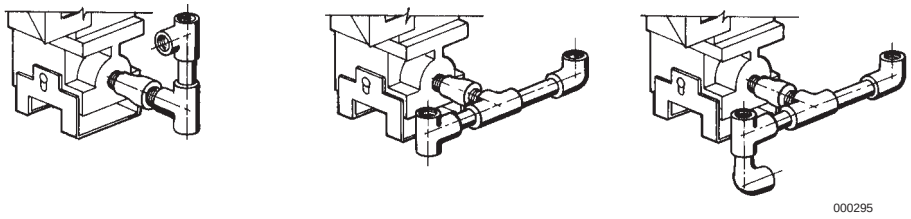
Typical Arrangements for a One Device Connection to Cartridge Receiver



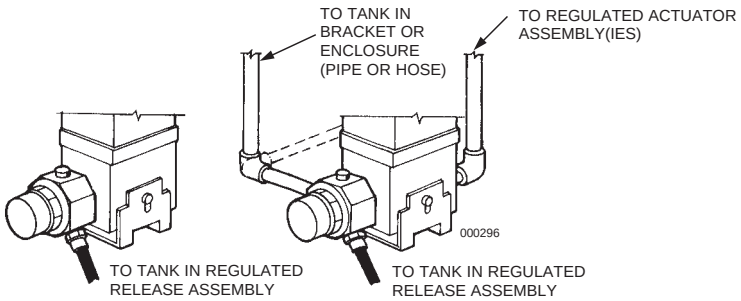
Typical Arrangements for a Two Device Connection to Cartridge Receiver



Typical Arrangements for a Three Device Connection to Cartridge Receiver



Typical Arrangements for Regulator Connections



NOTE: WHEN PIPE IS USED, ALL PIPE AND FITTINGS SHALL BE SCHEDULE 40 (STANDARD WEIGHT) BLACK IRON, HOT-TIPPED GALVANIZED, CHROME-PLATED, OR STAINLESS STEEL.

FIGURE 5-15

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

Actuation Gas Line (Continued)

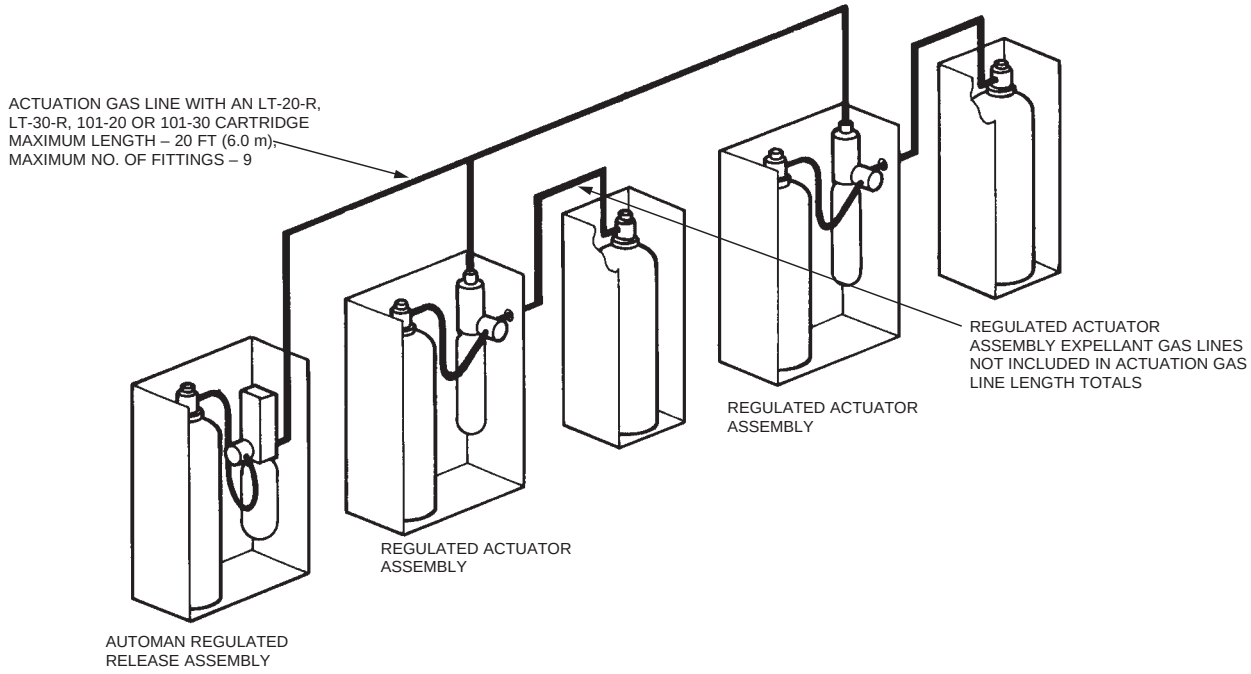


FIGURE 5-16
000775

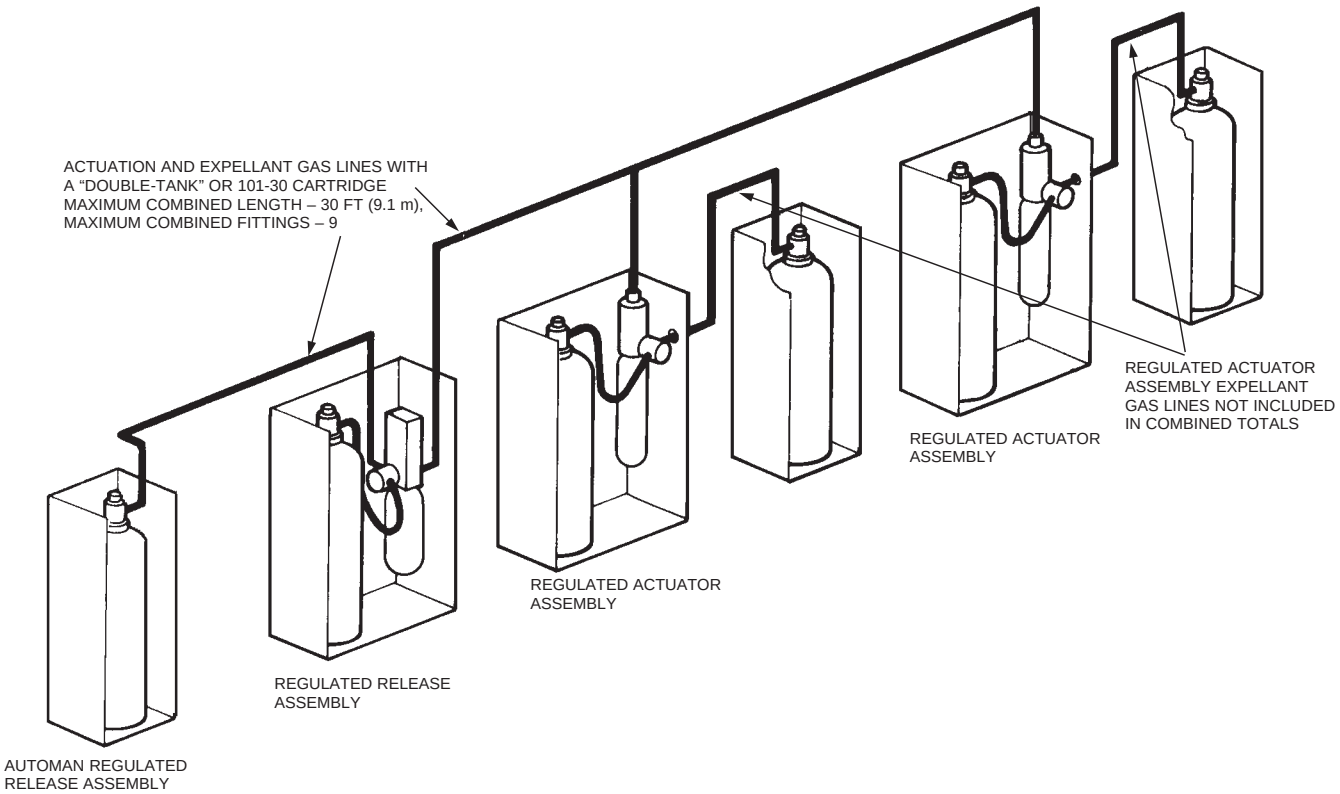


FIGURE 5-17
000298

INSTALLING THE ACTUATION AND EXPELLENT GAS LINE (Continued)

Expellant Gas Line From The Regulated Release Assembly

Install expellant gas line from the regulated release assembly regulator in the enclosure by completing the following steps:

1. The regulated release assembly is shipped with a factory-installed regulator. The regulator has two 1/4 in. outlets, one at the back and one at the bottom. The bottom outlet connects the expellant gas hose to the agent tank which is mounted inside the enclosure. The back outlet is sealed with a 1/4 in. plug.
2. Connect expellant gas hose to the agent tank mounted inside the enclosure.

   TWO TANK, THREE TANK, AND MULTIPLE TANK SYSTEMS:

   If the expellant gas piping is required because an additional tank-enclosure or tank-bracket assembly is being installed, the plug installed in the back outlet must be removed. (See Figure 5-6 for proper connections to the regulator.)
3. Pipe the 1/4 in. expellant gas line from the regulator back outlet through one of the knockouts provided in the enclosure.

   The total length of the expellant gas line from the regulated release assembly **must not** exceed 30 ft (9.1 m) when using a “double-tank” nitrogen cartridge or a 101-30 CO_2 cartridge. See Figure 5-18.

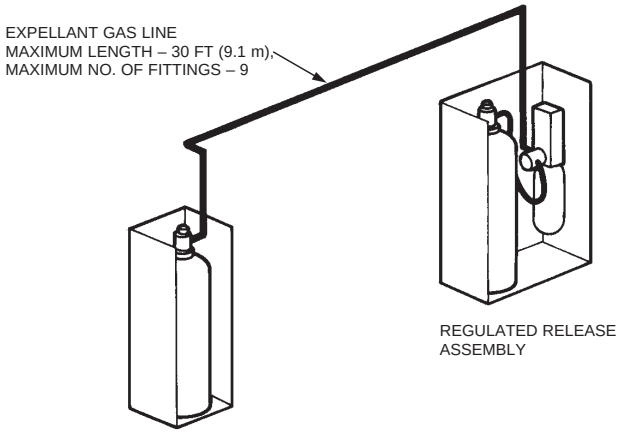


FIGURE 5-18
000776

4. If an actuation gas line is connected to the regulated release assembly along with an expellant gas line, the total combined length of the gas lines **must not** exceed 30 ft (9.1 m) when using a “double-tank” nitrogen cartridge or a 101-30 CO_2 cartridge. See Figure 5-17.
5. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

Expellant Gas Line From The Regulated Actuator Assembly

Install expellant gas piping from the regulated actuator assembly regulator through the appropriate knockout in the enclosure by completing the following steps:

1. The regulated actuator is shipped with a factory-installed regulator. The regulator has two 1/4 in. outlets 135° from each other. One outlet is sealed by a 1/4 in. plug and the other contains the expellant gas hose for the agent tank which will be mounted within the enclosure. Connect expellant gas hose to the agent tank that is mounted inside the enclosure.
2. Remove the 1/4 in. pipe plug from the regulator side outlet and pipe the 1/4 in. expellant gas line from the regulator through the knockout provided in the enclosure to a tank-enclosure or tank-bracket assembly. A maximum of one tank-enclosure or tank-bracket assembly is allowed per regulated actuator assembly.

   The maximum length of the expellant gas line from the regulated actuator to the tank-bracket assembly must not exceed 30 ft (9.1 m). See Figure 5-19.
3. A total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

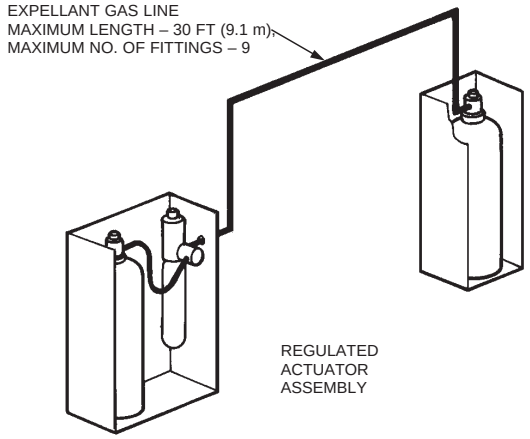


FIGURE 5-19
000777

INSTALLING THE ACTUATION AND EXPELLENT GAS LINE (Continued)

Actuation Gas Line From Remote Release(s) to Regulated Actuators

Install actuation gas piping from the remote release(s) to the regulated actuators by completing the following:

1. Pipe the 1/4 in. actuation gas line from the 1/4 in. outlet in the remote release receiver, through the knockout provided in the top of the release enclosure, to each regulated actuator assembly.

   The maximum length of the actuation gas line from the remote release to all regulated actuators **must not** exceed 100 ft (30.4). See Figure 5-20.

2. A maximum of nine tees and twenty elbows are allowed in the actuation piping. Two 45° elbows equal one 90° elbow. See Figure 5-20.

3. A safety relief valve (Part No. 15677) must be installed in the actuation piping. See Figure 5-20.

Actuation Gas Line – 15* Tanks Maximum – Using 1/4 in. Stainless Steel Hose

Note: Not for use with expellent gas line.

1. Maximum hose length cannot exceed 17.5 ft (5.3 m). See Figure 5-21.
2. Maximum of five regulated actuators allowed.
3. Actuated with Remote Release (Part No. 433485) or Regulated Release Assembly (Part No. 429853).

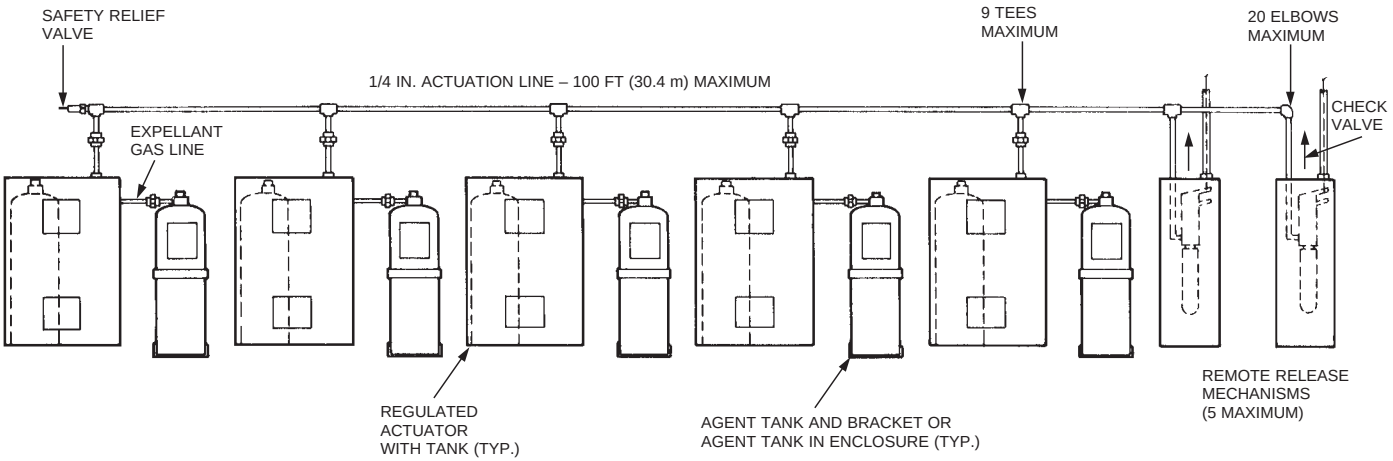
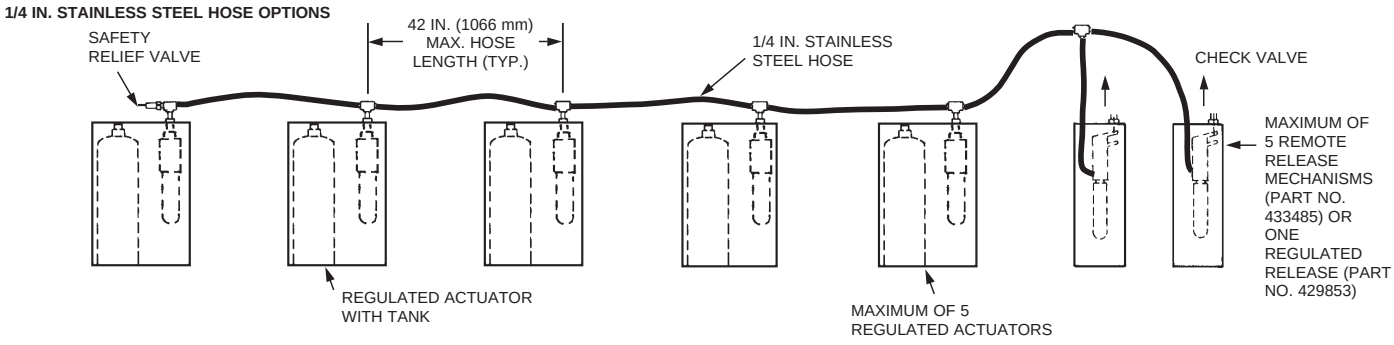


FIGURE 5-20
000301



NOTE: WHEN MULTIPLE RELEASE ASSEMBLIES ARE UTILIZED, A 1/4 IN. CHECK VALVE (PART NO. 25627) WILL BE REQUIRED AFTER EACH REGULATED RELEASE.

NOTE: *15 TANKS MAXIMUM REFLECTS THE UTILIZATION OF THREE TANK REGULATED ACTUATORS.

FIGURE 5-21
000301

INSTALLING THE DETECTION SYSTEM

Before the following procedures can be completed, the detection design must already be completed. These installation instructions are identical for single, double, and multiple-tank systems except for the number of hazard areas to be covered.

NOTICE

Inform customer that fusible links should not be exposed to ammonia-based chemical cleaners or steam.

NOTICE

No attempt is to be made to disassemble, repair, or clean a Model SL or Model A-PC fusible link. The complete assembly must be replaced if there is any sign of potential malfunction.

1. Based on the requirements listed in the "System Design" section, mount the detectors in their predetermined locations.
2. Run 1/2 in. conduit from the regulated release mechanism trip hammer assembly knockout hole to locations selected for mounting the detectors.

   Note: Before assembling the conduit and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.

   When changing the direction of conduit, use only ANSUL pulley elbows, except, at the top of the regulated release, it is acceptable to use the Conduit Offset Assembly.

   Note: If stainless steel scissor linkage is used in the system while using conduit offset assembly, the following limitations must be observed:

   - Maximum number of elbows – 16
   - Maximum number of detectors – 15
   - Maximum length of 1/2 in. EMT Conduit – 150 ft (45.7 m)

   Part No. 435546 and 435547 are the "scissor" style series and terminal detector assemblies. These detector assemblies use a detector linkage assembly which does not require the wire rope to be threaded through the linkage assembly while it is being fed through the detection system.

"Scissor" Style Linkage Installation

1. Secure the conduit to the detector bracket using the two 1/2 in. steel compression fittings on the series detector bracket or the single 1/2 in. steel compression fitting on the terminal detector bracket. See Figure 5-22.

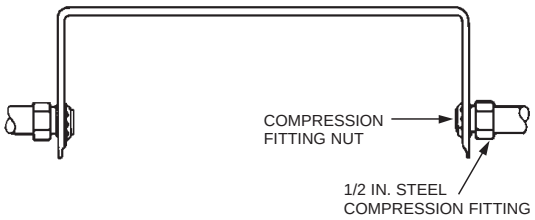
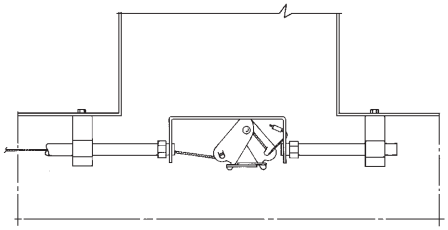


FIGURE 5-22
000306

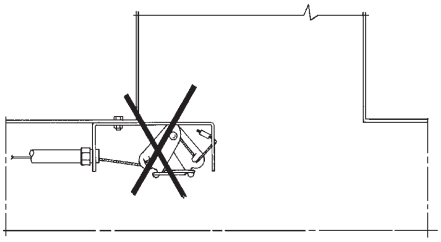
NOTICE

Do not use zinc die cast compression connectors on the detection conduit lines as these will not withstand the normally high temperatures experienced in the plenum area.

2. For a terminal detector located in a duct or header opening, secure both sides of the detector bracket with conduit, as shown in Figure 5-23.



002463



002464

FIGURE 5-23

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

3. Starting at the release assembly, feed the wire rope through the hole in the release mechanism locking clamp, allowing the excess wire rope to hang down. (Do not tighten set screws in locking clamp at this time.) See Figure 5-24.

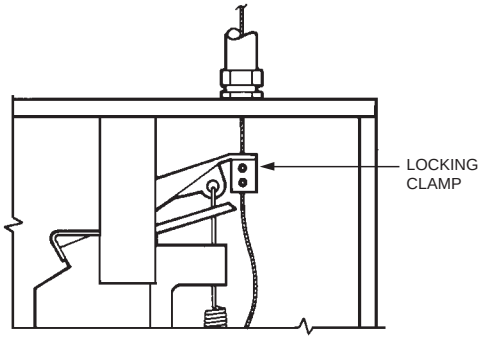


FIGURE 5-24
000309

4. From the release assembly, run the stainless steel wire rope through the conduit, pulley elbows and detector brackets to the terminal detector.

> ***NOTICE***
>
> If wire rope requires splicing, make certain splice is at least 12 in. (305 mm) away from any pulley elbow or conduit adaptor to avoid interference.

5. Feed the wire rope through the terminal detector bracket as shown in Figure 5-25 or as shown in Figure 5-26 if the terminal detector is mounted within a duct or header opening, and install the stop sleeve approximately 2 to 3 in. (51 to 76 mm) from the end of the wire rope. See Figure 5-27. Use the National Telephone Supply Company Nicopress Sleeve Tool (Stock No. 51-C-887) or equal to properly crimp the stop sleeve.

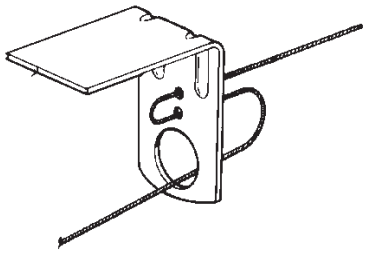


FIGURE 5-25
000310

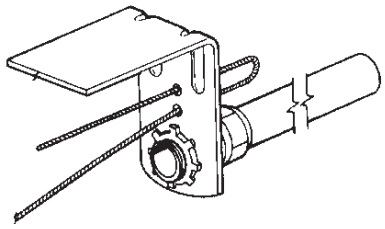


FIGURE 5-26
000311

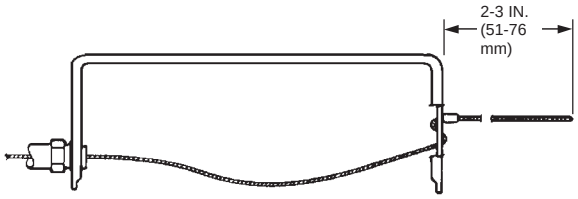


FIGURE 5-27
000312

6. To give a constant tension on the wire rope during installation of the detector linkage, hang a vice grip or other weighted device on the excess stainless steel wire rope, leaving an adequate length of spare wire rope between the locking clamp and the weighted device.

> ***NOTICE***
>
> When attaching the weighted device to the excess wire rope, allow approximately 3 in. (76 mm) of wire rope for each detector linkage for proper installation.

Example: If the system has six detectors, there should be approximately 18 in. (457 mm) of excess wire rope between the locking clamp and the weighted device, which will be utilized when the linkage is put in place.

7. Install detector scissor assembly as shown in Figure 5-28. Note that the AUTOMAN release or remote release assembly is located on the left side of the detector bracket. **Slightly** crimp the two assembly "boot-hooks" over the cable with pliers so the cable is captured under each hook but the whole assembly can move from side to side. Center the assembly in the detector bracket.

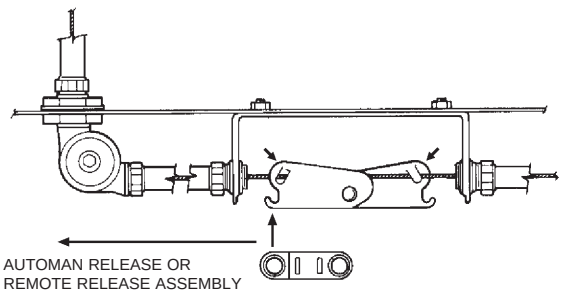


FIGURE 5-28
000503

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

8. Hook the fusible link on the AUTOMAN release or remote release assembly side of the hook assembly, then pull the fusible link to the opposite side and complete the hookup as shown in Figures 5-29 and 5-30. The top of the hook assembly must be inside the bracket stiffeners. The hook assembly with the ANSUL fusible link in place must be located toward the terminal detector side of the bracket.

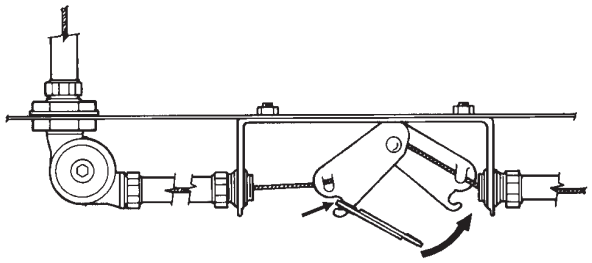


FIGURE 5-29
000504

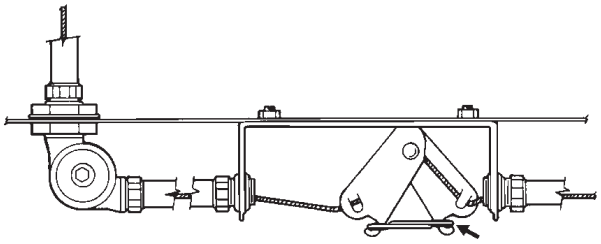


FIGURE 5-30
000324

9. Install the linkage and the correct ANSUL approved fusible link in the remainder of the detector brackets. Make certain all detector linkages are positioned against either the front or back upper lip of the formed detector bracket. See Figure 5-31.

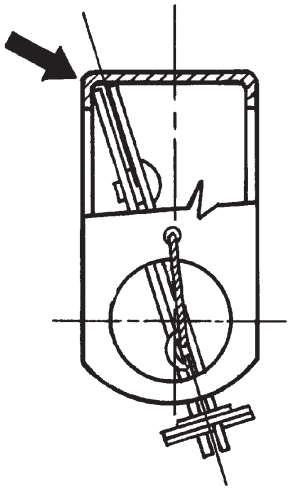


FIGURE 5-31
004429

10. Insert cocking lever (Part No. 441042 or Part No. 441041) on left side of the release mechanism, with the movable flange resting securely against the corner of the cartridge receiver and spring housing, and with the notched lever portion engaging the cocking pin on **both** sides of the release mechanism. See Figure 5-32.

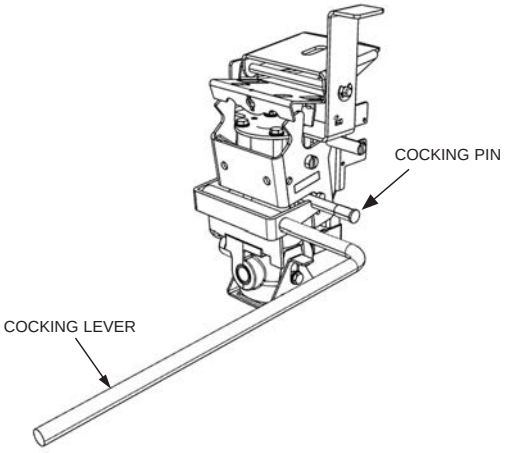


FIGURE 5-32
009461

11. Using long handle cocking lever (Part No. 441041) or wrench on short handle cocking lever (Part No. 441042), pull down to raise cocking pin until the trip lever indented surface moves underneath the pin and locks the pin in the up position. See Figure 5-33.

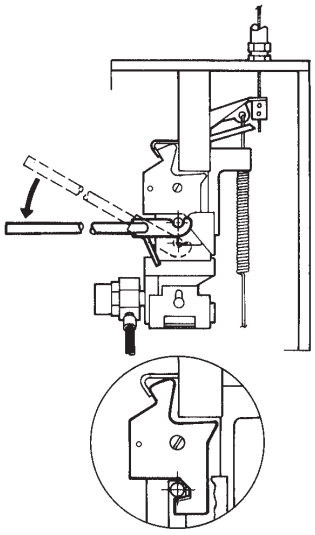


FIGURE 5-33
000320

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

12. Remove cocking lever and fully insert Lock Pin (Part No. 438031) through the hole in the trip lever on the left side of the release. (The release mechanism cannot be actuated, nor can enclosure cover be replaced until the lock pin is removed.) See Figure 5-34.

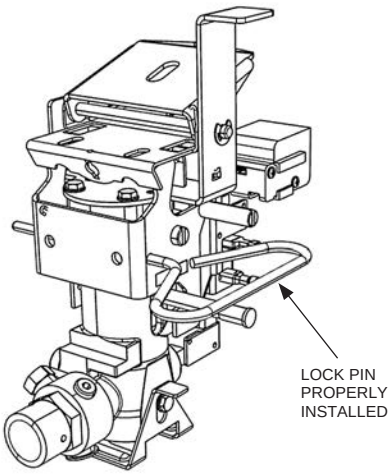


FIGURE 5-34
009462

13. Make certain tension lever is in the "UP" position. See Figure 5-35.

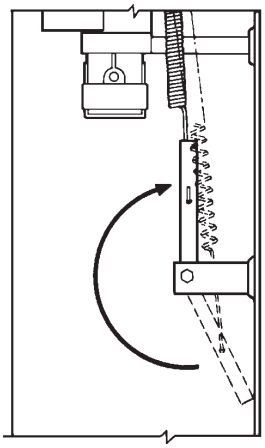


FIGURE 5-35
000322

14. Verify each detector linkage assembly, with correct fusible link, is in the detector bracket, located fully toward the terminal detector side.

NOTICE

Due to the close adjustment between the trip hammer and cable lever assemblies, use only the particular fusible link(s) selected for installation in each detector, including terminal detector, to ensure correct adjustment when performing Steps 15 and 16.

15. Raise trip hammer 3/8 in. to 1/2 in. (9.5 to 12.7 mm), pull all slack out of wire rope, and tighten set screws on locking clamp.
16. Lower tension lever to "DOWN" position and inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 5-36. (If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever, loosen set screws on locking clamp and repeat Steps 15 and 16.)

CAUTION

Make certain the hook assembly with the ANSUL fusible link in place is located toward the terminal detector side of each bracket. Failure to do so may restrict travel of detection line, causing system to malfunction.

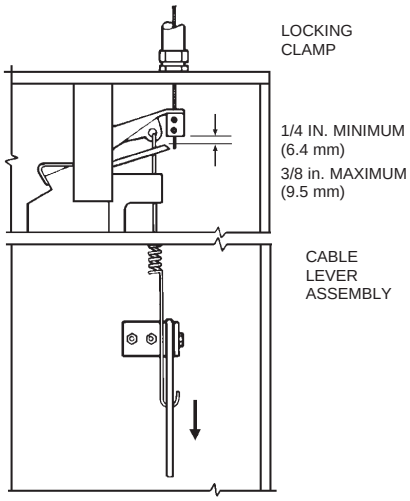


FIGURE 5-36
000323

CAUTION

Do not install cartridge at this time as an accidental actuation could cause system discharge.

17. Test detection system in accordance with the Testing and Placing in Service Section, Page 6-3 – 6-4, of this manual.
18. When testing has been completed, cut off excess wire rope in the regulated release assembly, leaving approximately 2 in. (51 mm) of wire rope below the locking clamp.

INSTALLING REMOTE MANUAL PULL STATION

GENERAL INSTALLATION REQUIREMENTS

To install a remote manual pull station complete the following steps:

1. Make certain that regulated release assembly enclosure cover is detached and lock pin is properly inserted within the regulated release mechanism.

> ***NOTICE***
>
> Failure to follow these instructions may lead to system actuation.

2. Verify that cartridge has been removed from regulated release assembly and that the regulated release assembly is in the cocked position.
3. If regulated release assembly does not have lock pin inserted or cartridge removed, refer to the "Semi-Annual Maintenance," Page 8-1, in "Maintenance Examination" section, and complete Steps 2 and 3 before completing the following installation steps.
4. Select a convenient location in the path of egress for mounting the pull station(s) to the wall. The pull station should be installed at a height of 42 in. to 48 in. (1067 mm to 1219 mm) in accordance with the authority having jurisdiction and the American Disabilities Act (ADA) requirements.

   A maximum of two manual pull stations can be connected to each AUTOMAN release.

INSTALLATION FOR REMOTE MANUAL PULL STATION UTILIZING EMT CONDUIT ONLY

1. The total length of the wire rope used for each manual pull station within a system must not exceed 150 ft (45.7 m).

   The maximum number of pulley elbows that may be used per each manual pull station is 20.
2. If junction box(es) is used, fasten a 4 in. (102 mm) junction box to wall or in wall where pull station is to be mounted, with mounting screws positioned so that when pull station cover is positioned in place, the printing will appear right side up and readable.
3. Install and secure 1/2 in. conduit, pulley tee (if required), and pulley elbows from each pull station junction box to regulated release assembly as necessary. See Figure 5-37.

   See Figures 5-38 thru 5-40 for optional methods of installing wire rope when utilizing a pulley tee.

REMOTE MANUAL PULL STATION SINGLE APPLICATION

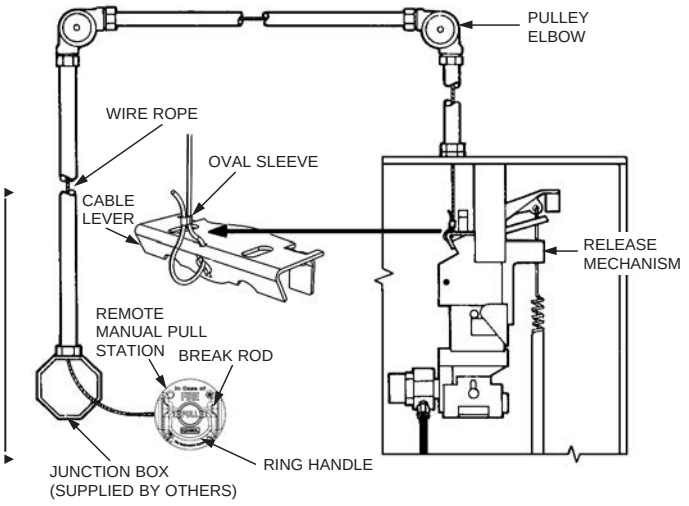


FIGURE 5-37
009463

REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 1
(ONE WIRE ROPE CONNECTED TO CABLE LEVER ASSEMBLY)

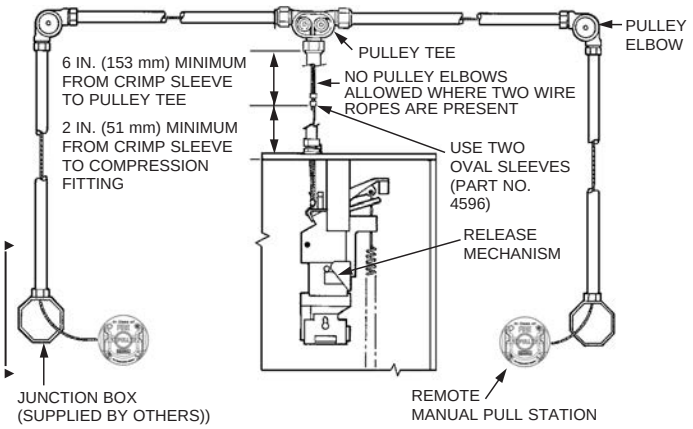


FIGURE 5-38
009464

REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 2
(TWO WIRE ROPES CONNECTED TO CABLE LEVER ASSEMBLY)

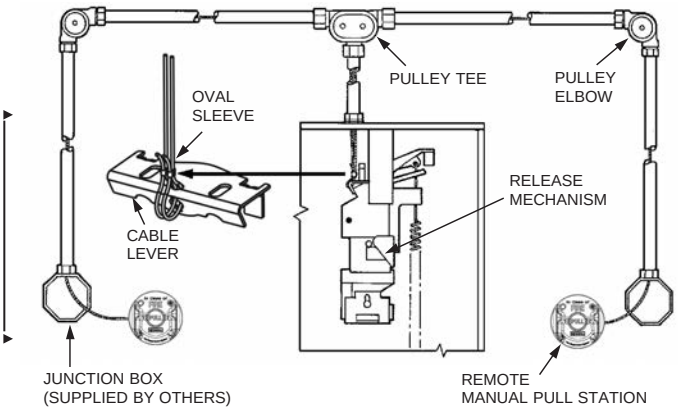


FIGURE 5-39
009465

INSTALLING REMOTE MANUAL PULL STATION (Continued)

INSTALLATION FOR REMOTE MANUAL PULL STATION UTILIZING EMT CONDUIT ONLY (Continued)

REMOTE MANUAL PULL STATION APPLICATION – OPTION 3

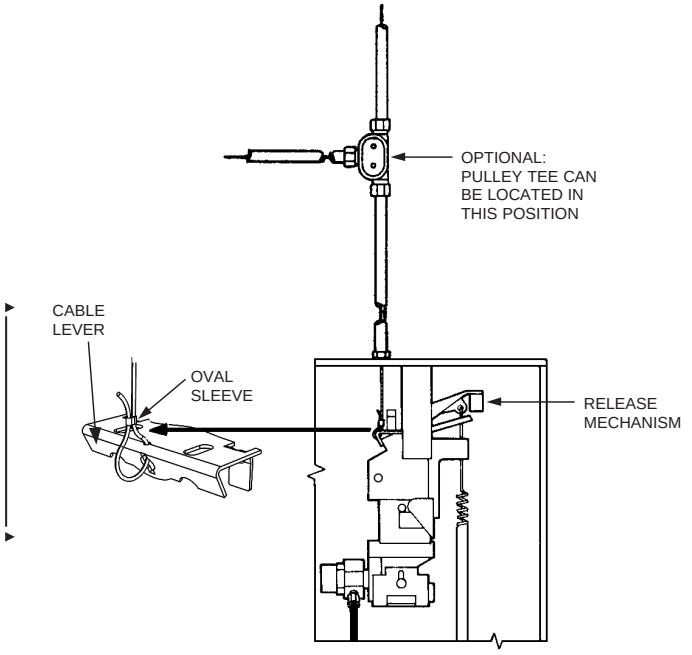
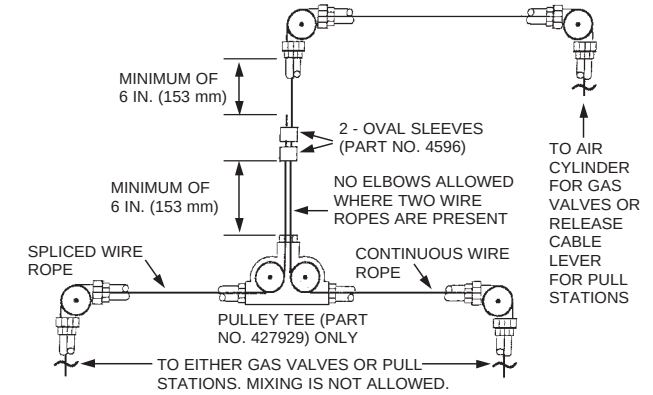


FIGURE 5-40
009466



TWO WIRE ROPES CONNECTED BETWEEN A PULLEY ELBOW AND A PULLEY TEE

FIGURE 5-41
008393

4. Feed wire rope from the AUTOMAN release through conduit and pulley elbows and pulley tee, if provided, to the pull station junction box. Follow the instructions for assembling the pull station and block assembly and attaching the wire rope to the pull station pull knob (see Figures 5-70 through 5-85).

NOTICE

Make certain that wire rope rides on top and in center of pulley sheave. If the 50 ft (15.2 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 6 in. (153 mm) of any pulley elbow or conduit adaptor.

5. Fasten pull station assembly to each junction box (if junction box is used).
6. Slide oval crimp sleeve onto wire rope. Loop wire rope through cable lever guide holes and back through the oval crimp sleeve. See Figure 5-37.
7. Pull slack out of each wire rope and crimp sleeve. (Use the National Telephone Supply Company Nicopress Sleeve Tool Stock No. 51-C-887 or equal to properly crimp stop sleeve.) See Figure 5-37.

Note: When utilizing flexible conduit for remote manual pull station or mechanical gas valve installation, refer to "Installation of Remote Manual Pull Station or Mechanical Gas Valve Utilizing Flexible Conduit" instructions on pages 5-22 through 5-34.

INSTALLING MECHANICAL GAS VALVE

NOTICE

Mechanical gas valves are designed for indoor installation only.

To install each Mechanical Gas Shut-off Valve complete the following steps. (All gas valve installation and testing shall be made in accordance with the authority having jurisdiction.)

Note: Mechanical gas valve air cylinder(s) can be installed in regulated release assemblies and also regulated actuator assemblies. Installation in either is the same.

1. Make certain that regulated release assembly enclosure cover is detached and lock pin is properly inserted in the regulated release mechanism.

NOTICE

Failure to follow these instructions may lead to system actuation.

2. Verify that cartridge has been removed from regulated release assembly and that the regulated release mechanism is in the cocked position.

If regulated release mechanism does not have lock pin inserted or cartridge removed, refer to the "Semi-Annual Maintenance," Page 8-1, in "Maintenance Examination" section, and complete Steps 2 and 3 before completing the following installation steps.

INSTALLING MECHANICAL GAS VALVE (Continued)

3. Remove plug from cartridge receiver. See Figure 5-42.

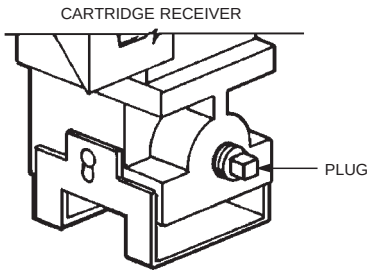


FIGURE 5-42
000339

4. Locate air cylinder and bracket assembly over the two 7/32 in. (5.6 mm) holes on right side of the enclosure. Assemble with screws, lockwashers, and nuts. Wrench tighten. See Figure 5-43. Air cylinder(s) can also be mounted in the inverted position, allowing for direct exit out the knockout(s) in the bottom of the enclosure. See Figure 5-44.

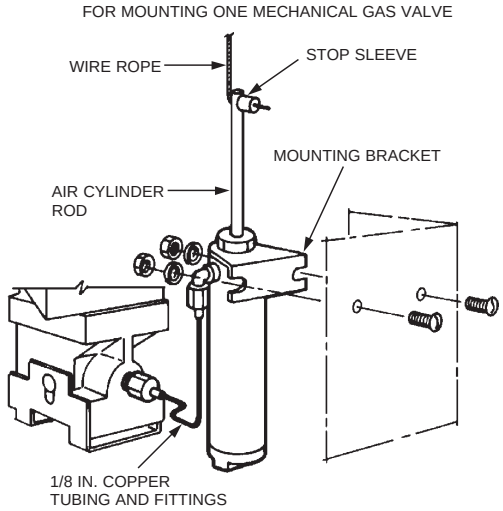


FIGURE 5-43
000340

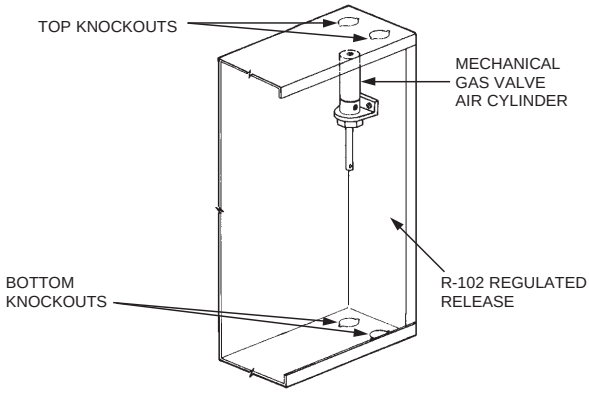
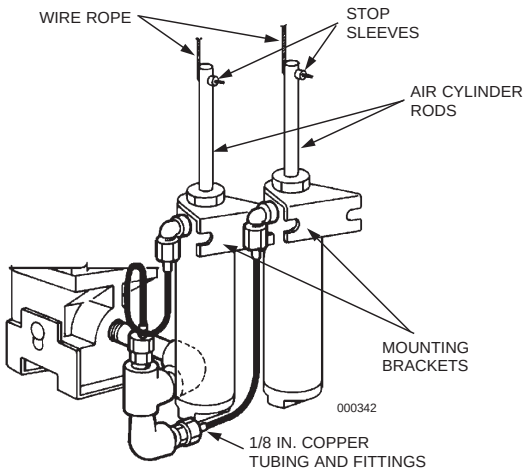


FIGURE 5-44
000341

Note: Two air cylinders are necessary only if the old style pulley tee (Part No. 15342) is utilized. If new style pulley tee (Part No. 427929) is utilized, only one air cylinder is required. Individual wire ropes can be run from each gas valve to a single air cylinder. See Figure 5-45.

5. To install second mechanical gas valve shut-off system, locate second air cylinder and bracket assembly adjacent to first assembly and over the two remaining 7/32 in. (6 mm) holes provided on right side of the enclosure. Assemble second cylinder with screws, lockwashers, and nuts as required. Wrench tighten. See Figure 5-45.

SYSTEMS USING PULLEY TEE (PART NO. 15342)



SYSTEMS USING PULLEY TEE (PART NO. 427929)

NOTE: NO ELBOWS ARE ALLOWED BETWEEN AUTOMAN RELEASE AND PULLEY TEE

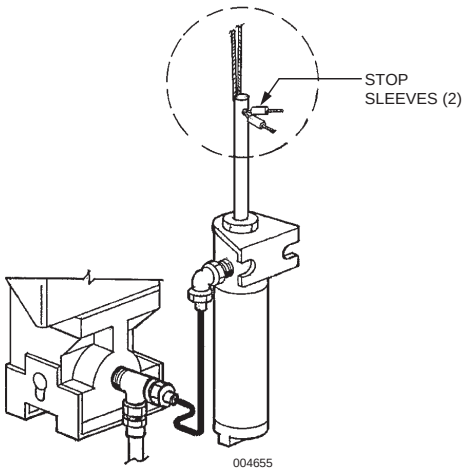


FIGURE 5-45
000342

INSTALLING MECHANICAL GAS VALVE (Continued)

6. Install the necessary 1/8 in. copper tubing and fittings for each air cylinder to the accessories piping arrangement on the regulated release mechanism. See Figures 5-43 and 5-45.

NOTICE

Do not kink 1/8 in. copper tubing or form a bend too close to a fitting. Secure each fitting without over tightening. Over tightening could result in pressure leakage or line separation at actuation.

7. ▸ **⚠ WARNING**

To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting ▸ the gas valve. Failure to comply may result in serious ▸ personal injury or death. Gas valve installation shall be performed by qualified individuals in accordance with local jurisdiction requirements.

Install mechanical gas valve to its selected location in gas line so that it ensures safe shut-off to all predetermined appliances being protected upon actuation of the system. Mechanical gas valves may be mounted in any convenient horizontal or vertical position. See Figure 5-46.

a. Use new pipe, properly reamed and cleaned of metal chips.

b. Make certain gas flow is in the same direction as arrow shown on gas valve. To avoid cracking the gas valve casting, do not overtighten pipe connections. If pipe tape, paste, spray, or similar lubricant is used, extra care should be taken to avoid overtightening. Apply lubricant to male threads only.

c. Wrench tighten pipe to gas valve. **DO NOT USE GAS VALVE AS A LEVER WHEN INSTALLING OR VALVE DAMAGE MAY OCCUR.** See Figure 5-46.

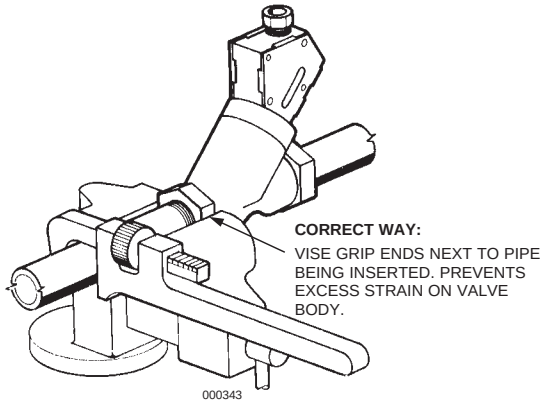
d. If strainer is utilized, attach strainer ahead of gas valve.

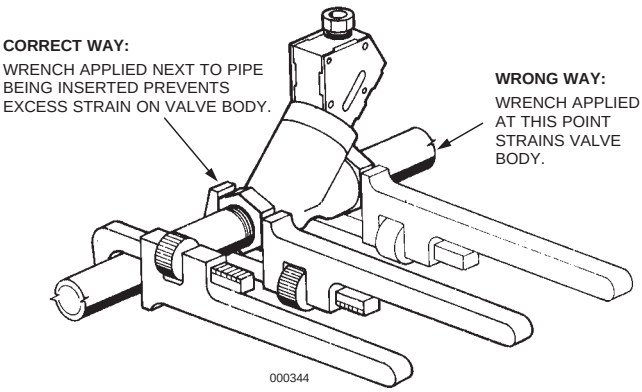
e. If necessary, install drip leg in gas line in accordance with the authority having jurisdiction.

f. The total length of wire rope allowed for each valve must not exceed 150 ft (45.7 m).

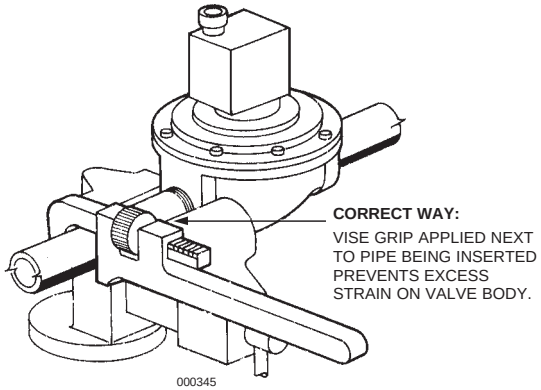
g. The maximum number of pulley elbows allowed for each gas valve is 20.

ANSUL MECHANICAL GAS VALVES





ASCO MECHANICAL GAS VALVES



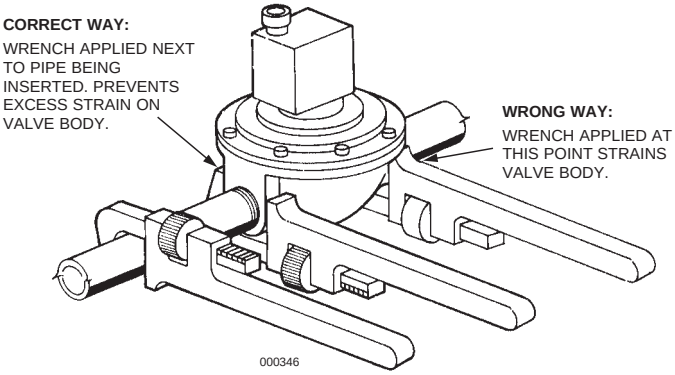


FIGURE 5-46

INSTALLING MECHANICAL GAS VALVE (Continued)

8. Install 1/2 in. conduit, and pulley elbow(s) from the mechanical gas valve to regulated release assembly enclosure as necessary.
9. Beginning at the regulated release assembly, thread the end of the wire rope through hole provided in air cylinder rod. See Figure 5-43.
10. Feed end of wire rope through conduit and each pulley elbow.

    Make certain that wire rope rides on top and in center of pulley sheave. If the 50 ft (15.2 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 12 in. (305 mm) of any pulley elbow or conduit adaptor.
11. Remove side cover on gas valve and thread end of wire rope through hole in cocking lever. Slide stop sleeve (Part No. 26317) on to wire rope and crimp. (Use the National Telephone Supply Company Nicopress Sleeve Tool Stock No. 51-C-887 or equal to properly crimp stop sleeve.) Make certain crimp is on top of trigger, with wire rope curled under lever. See Figure 5-47.

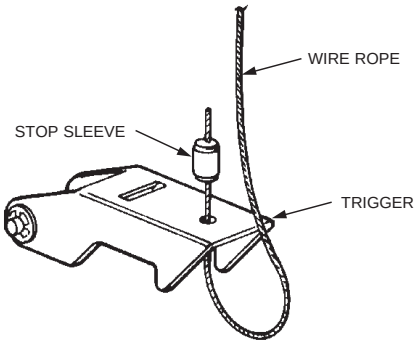
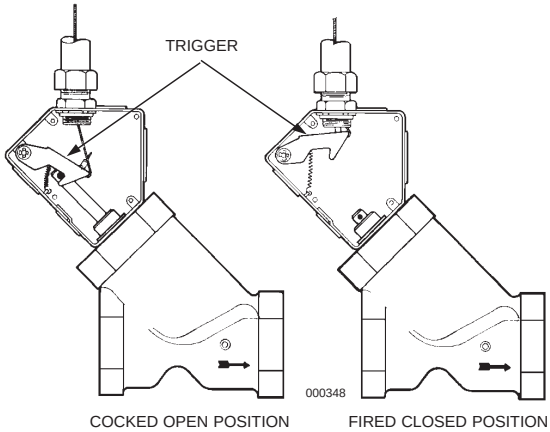


FIGURE 5-47
000347

12. With the end of wire rope already threaded through hole in air cylinder rod, slide stop sleeve (Part No. 26317) onto wire rope and leave loose. Do not crimp stop sleeve at this time. See Figure 5-43.
13. Cock mechanical gas valve as shown in Figure 5-48. **Note:** A valve cocking tool is available. Order Part No. 416018.

ANSUL MECHANICAL GAS VALVE



ASCO MECHANICAL GAS VALVE

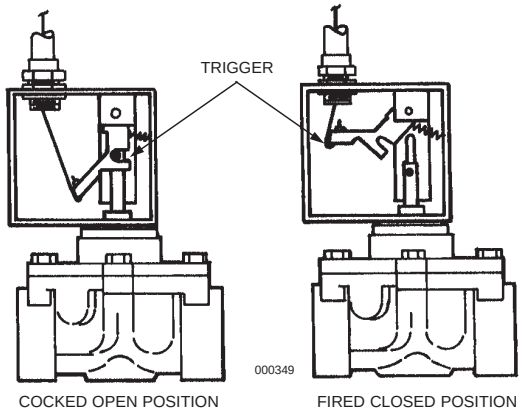


FIGURE 5-48

14. Raise air cylinder rod “UP” to its maximum extended position. See Figure 5-43.
15. Manually pull wire rope to remove excess slack.

> ***NOTICE***
>
> DO NOT ACTUATE THE MECHANICAL GAS VALVE. Each Mechanical Gas Valve System must have gas valve cocked and air cylinder rod extended “UP” to its maximum extension before completing next step.

16. Slide stop sleeve against air cylinder rod, make certain all slack is removed from wire, and crimp stop sleeve. See Figure 5-43.
17. Cut off any excess wire rope approximately 3/4 in. (19 mm) from end of stop sleeve.
18. **Note:** If utilizing a pulley tee to operate either a single mechanical gas valve from two AUTOMAN releases or two mechanical gas valves from one air cylinder in an AUTOMAN release, see Figures 5-49 and 5-50 for installation instructions. Maximum length of wire rope to each AUTOMAN release must not exceed 150 ft (45.7 m) and maximum number of elbows must not exceed 20.

TWO AIR CYLINDERS – ONE MECHANICAL GAS VALVE

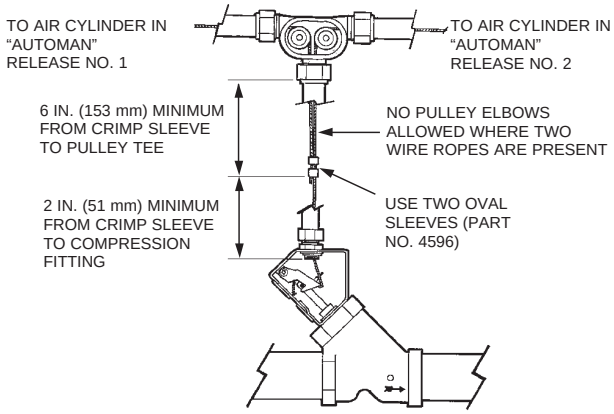


FIGURE 5-49
001091

INSTALLING MECHANICAL GAS VALVE (Continued)

ONE AIR CYLINDER – TWO MECHANICAL GAS VALVES

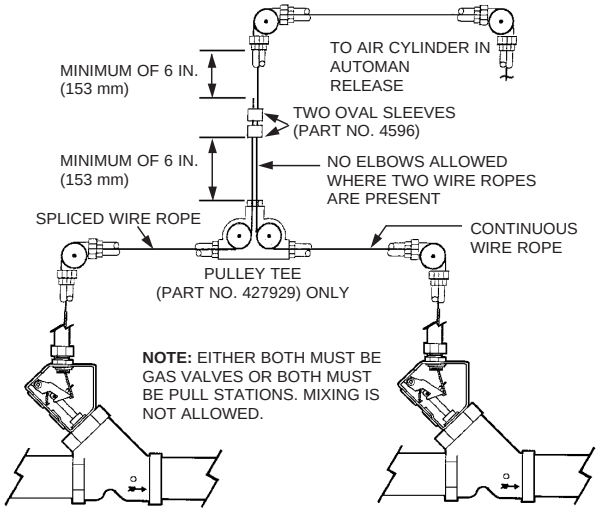


FIGURE 5-50
008394

NOTICE

When connecting two mechanical gas valves to one air cylinder, make certain both gas valves properly operate (close) when the air cylinder rod is in the down (operated) position.

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT

Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles.

Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

NOTICE

Flexible conduit can be used only with NEW Remote Pull Station (Part No. 434618) and mechanical gas valve installations. **Flexible conduit is intended for indoor use ONLY.**

These instructions address the components and installation of both the pull station (Part No. 434618) and the flexible conduit.

Design Requirements

- Flexible conduit **cannot** be utilized in detection systems.
- Flexible conduit inserts (Part No. 434347) can ONLY be used with the flexible conduit system.
- The maximum distance from an AUTOMAN release to a pull station is 140 ft (42.6 m) with a maximum of 360° (for example, 3-90° and 2-45° bends, 2-90° and 4-45° bends, etc.) bends in the flexible conduit, one pulley tee (refer to pages 5-31 through 5-33 for detailed splicing instructions), two splices, and 15 pulley elbows.

Note: When installing flexible conduit, make sure to feed wire rope through conduit directly from the spool. DO NOT pre-cut wire rope. Feeding pre-cut rope through flexible conduit will cause excessive kinks in the rope, making it difficult to install.

- The maximum distance from an AUTOMAN release to a mechanical gas valve is 75 ft (22.8 m) with a maximum of 4-90° bends in the flexible conduit and 4 pulley elbows.
- Any portion of the flexible conduit system can be substituted with EMT conduit provided the proper connections are used to join the two types of conduit.
- All bends in the flexible conduit system must have a minimum bend diameter of 6 in. (153 mm).
- When the flexible conduit is used to make 90° bends between an AUTOMAN release and a mechanical gas valve, the bends must start at the gas valve. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When the flexible conduit is used to make 90° bends between an AUTOMAN release and a pull station, the bends must start at the AUTOMAN release. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When not utilizing a conduit offset 2-45° bends in the flexible conduit are allowed between the strain relief fitting on top of the AUTOMAN release, and the location where the flexible conduit is supported.
- When installing flexible conduit, conduit should be secured at intervals not to exceed 5 ft (1.5 m) and before and after each bend. Flexible conduit CANNOT slide in the clamp(s) used for mounting. Make certain mounting clamp(s) do not pinch the conduit. The following style clamp ('P' clip) (Part No. 436150) is a suitable type for use on flexible conduit. See Figure 5-51.

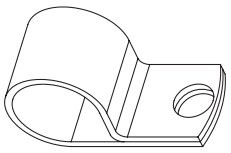


FIGURE 5-51
008141

TABLE 1

	Manual Pull	Mechanical Gas Valve	Detection
90° Cable Bends	4	4	N/A
Bend Diameter – in. (mm)	6 (153)	6 (153)	N/A
Mechanical Corner Pulley	15	4	N/A
Conduit Secured Max. ft (m)	5 (1.5)	5 (1.5)	N/A
Conduit Max. Length ft (m)	140 (42.6)	75 (22.8)	N/A
Conduit Offset / 2-45° Bends (Only between strain relief fitting and support location)	1	0	N/A
Pulley Tees	1	0	N/A
Splices	2	0	N/A

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Installation Instructions

Note: Do not add any type of lubricants inside or on the flexible conduit. Make certain stainless steel wire rope is clean and debris-free.

The flexible conduit should be routed along the same path that EMT conduit would normally be run. Stainless steel wire rope should be routed through the flexible conduit as it is in EMT conduit.

DO NOT cut the wire rope to length before feeding it into the flexible conduit. **The wire rope should be fed directly from its spool through the flexible conduit.** This method will help avoid possible kinking of the wire rope which can make it difficult to feed.

⚠ CAUTION

Flexible conduit must not be located within 6 in. (153 mm) of the hood or in areas exceeding 130 °F (54 °C). Also, do not route flexible conduit in areas where conduit can be crushed, pinched, or broken.

Flexible conduit can be used to connect an AUTOMAN release to a remote pull station or mechanical gas valves.

Before starting the system installation, take a few minutes to plan the layout of the system. This will minimize the amount of components needed to complete the installation. Once the path of the flexible conduit has been determined, verify that the layout does not exceed the design requirements.

Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Junction Box, or MECHANICAL Gas Valve

1. Layout the flexible conduit and secure it in place. **Note:** If inner liner is crimped, turn a drywall screw into the end to open it. See Figure 5-52.

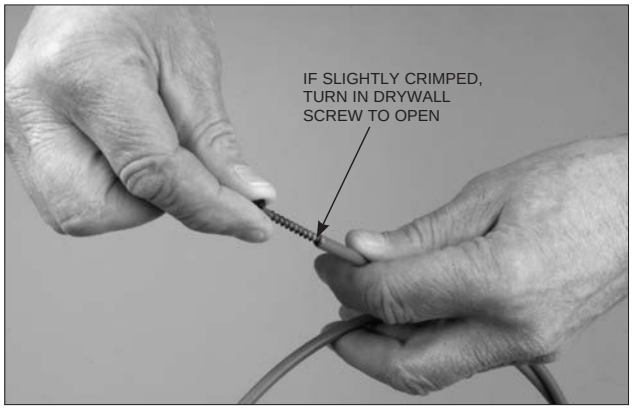


FIGURE 5-52
007985

2. Starting at the AUTOMAN release, connect the conduit connector using the supplied nut. Use only ANSUL conduit fittings (Part No. 55813). See Figure 5-53.

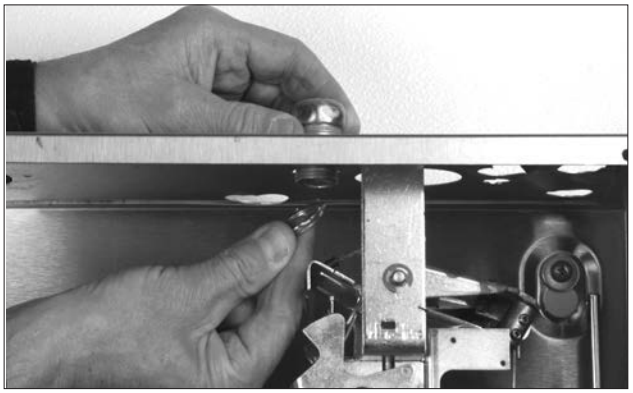


FIGURE 5-53
007986

3. Unscrew the nut from the EMT conduit connector and remove the compression ring. Discard ring. See Figure 5-54.

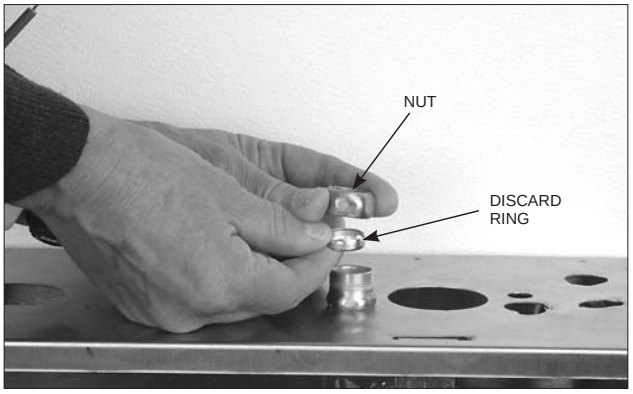


FIGURE 5-54
007987

4. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 5-55.

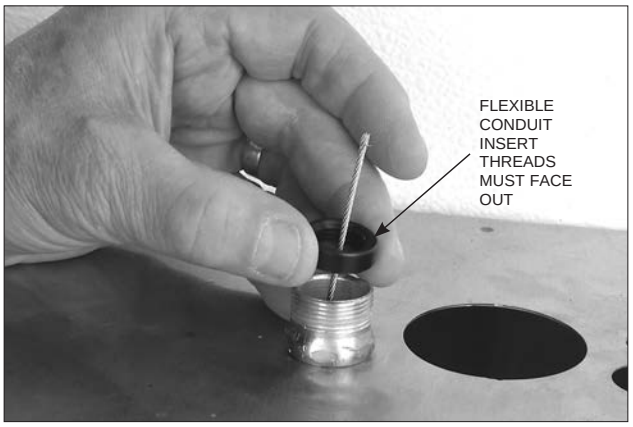


FIGURE 5-55
007988

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Junction Box, or Mechanical Gas Valve (Continued)

5. Tighten the nut to the connector body, locking the flexible conduit insert in place. See Figure 5-56.

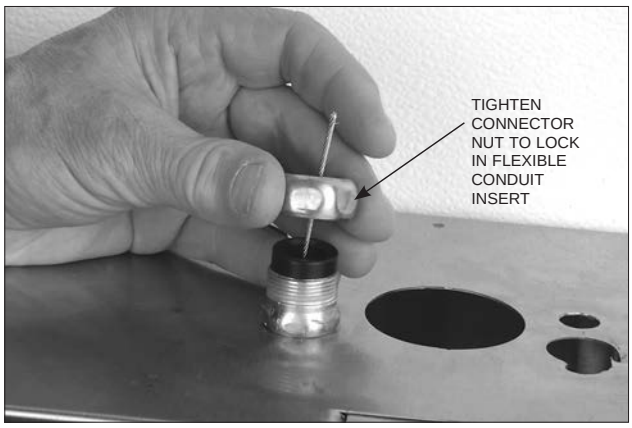


FIGURE 5-56
007989

6. Loosen the nut on the strain relief and thread the wire rope through a strain relief. See Figure 5-57.

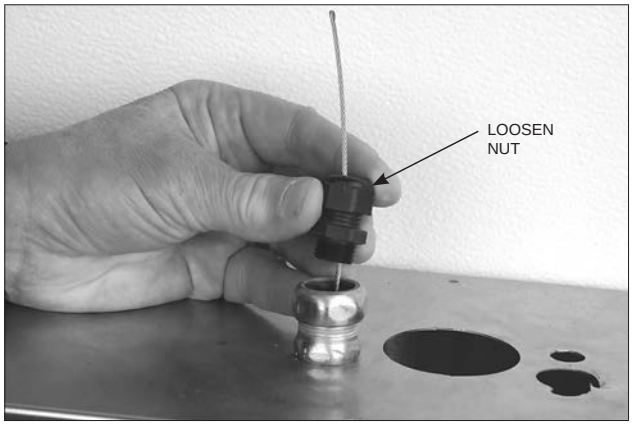


FIGURE 5-57
007990

7. Tighten the body of the strain relief to the conduit connector. See Figure 5-58.

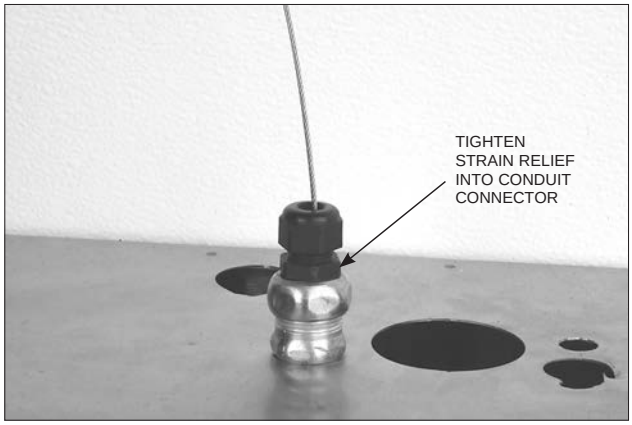


FIGURE 5-58
007991

8. Thread the wire rope through the flexible conduit. See Figure 5-59. (If a splice is required in the flexible conduit, proceed to “Splicing Installation Instructions.”

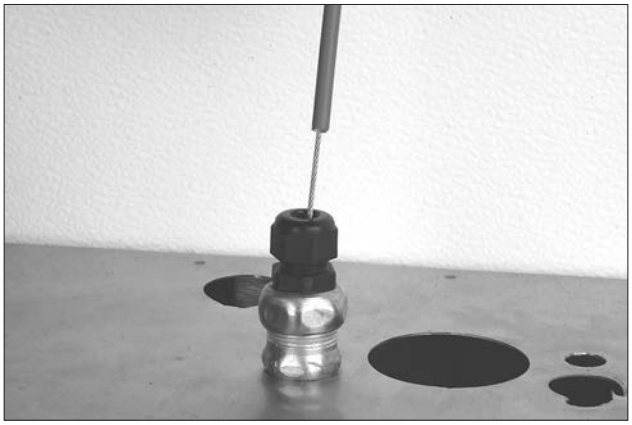


FIGURE 5-59
007992

9. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 5-60.

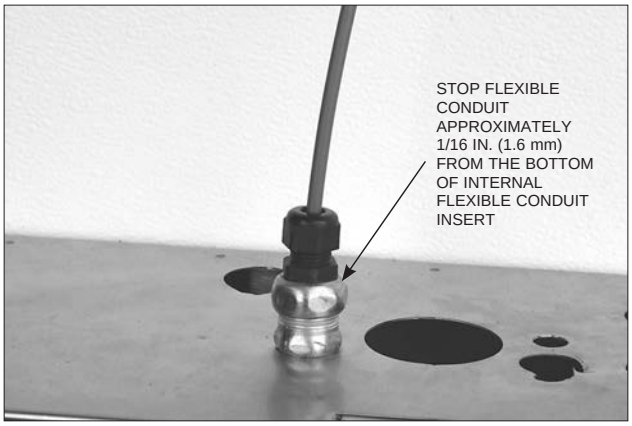


FIGURE 5-60
007993

10. Tighten the strain relief nut onto the strain relief. See Figure 5-61.

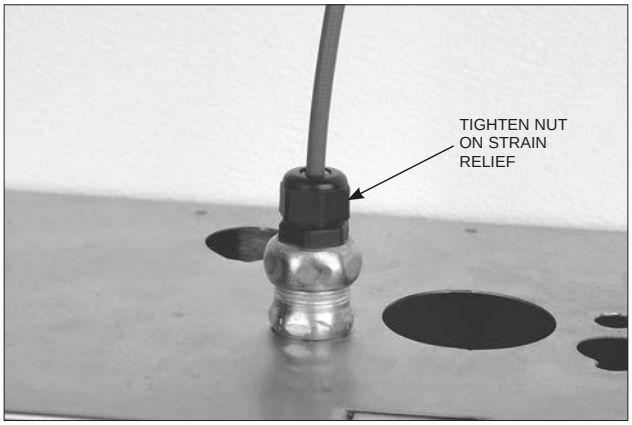


FIGURE 5-61
007994

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings

1. Unscrew the nut from pulley elbow, pulley tee, or EMT conduit connector and remove the compression ring. Discard ring. See Figure 5-62.

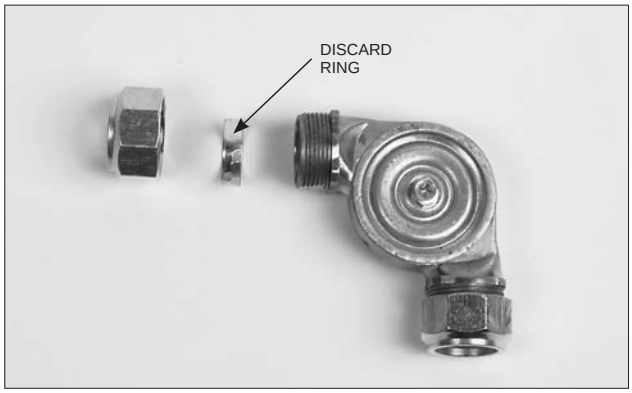


FIGURE 5-62
007995

2. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 5-63.

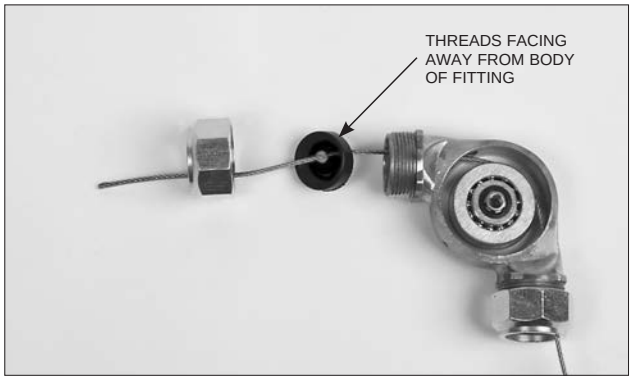


FIGURE 5-63
007996

3. Tighten the nut to the connector conduit body, locking the flexible conduit insert in place. See Figure 5-64.

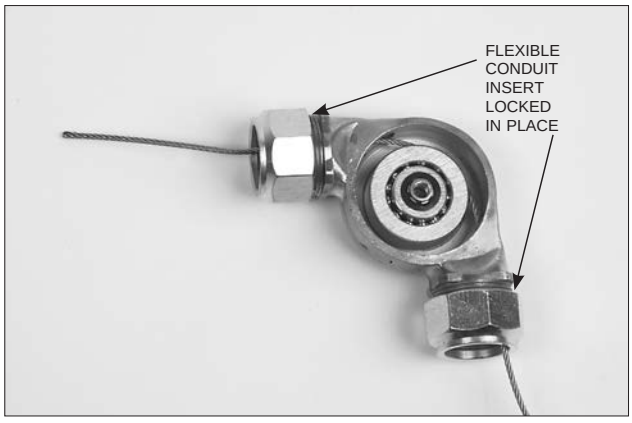


FIGURE 5-64
007997

4. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 5-65.

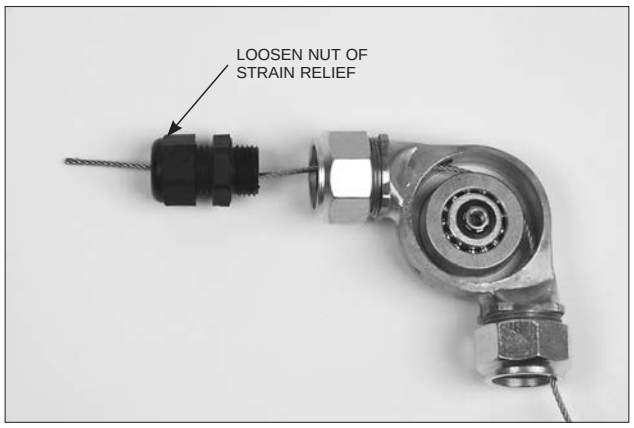


FIGURE 5-65
007998

5. Tighten the body of the strain relief to the conduit connector. See Figure 5-66.

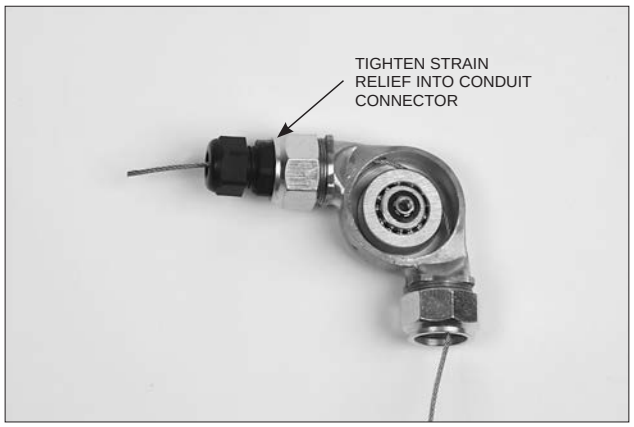


FIGURE 5-66
007999

6. Push the wire rope into the flexible conduit. See Figure 5-67.

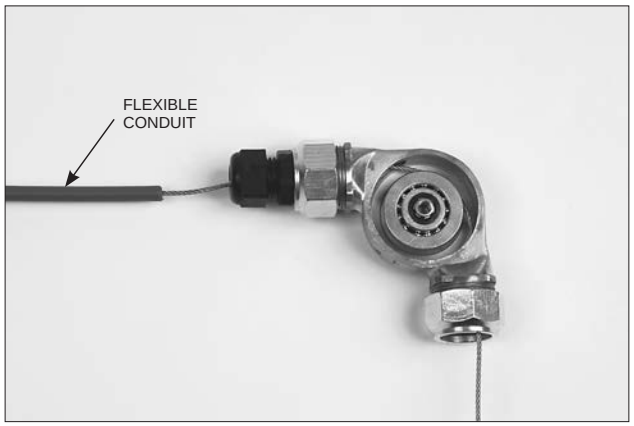


FIGURE 5-67
008000

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings (Continued)

7. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 5-68.

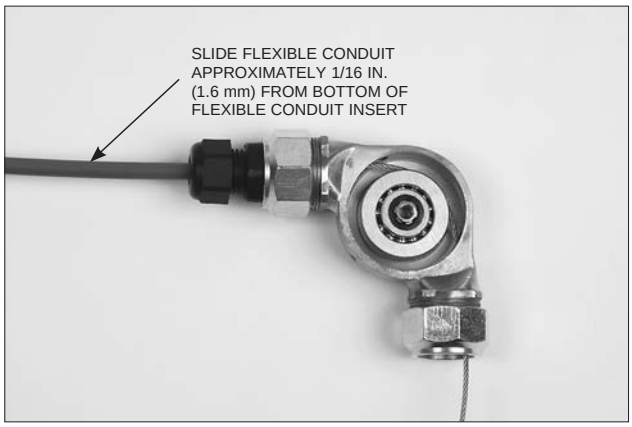


FIGURE 5-68
008001

8. Tighten the strain relief nut onto the strain relief. See Figure 5-69.

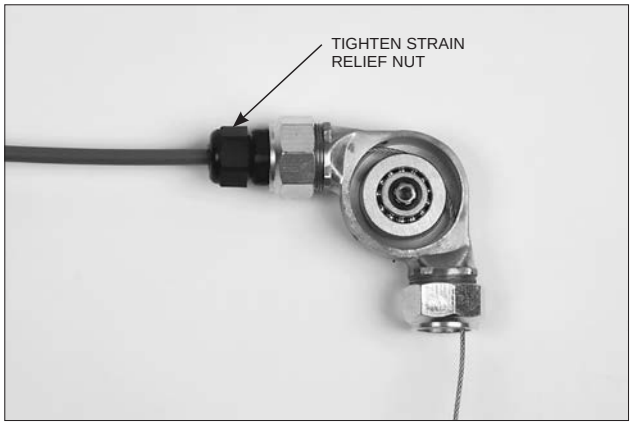


FIGURE 5-69
008002

9. Complete the same procedures on the other end of the conduit fitting as described in Steps 1 through Step 8 above.

Assembling the Block

Note: For installations that do not require the tee block, refer to page 5-34 for instructions.

1. The flexible conduit and wire rope should be connected to the electrical box as described in “Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Box, or Mechanical Gas Valve.” See Figure 5-70.

Note: For 1 1/2 in. (38 mm) deep electrical box, the bearing should be installed in the block’s shallow box location.

For 2 1/8 in. (54 mm) deep electrical box, the bearing should be installed in the block’s deep box location.

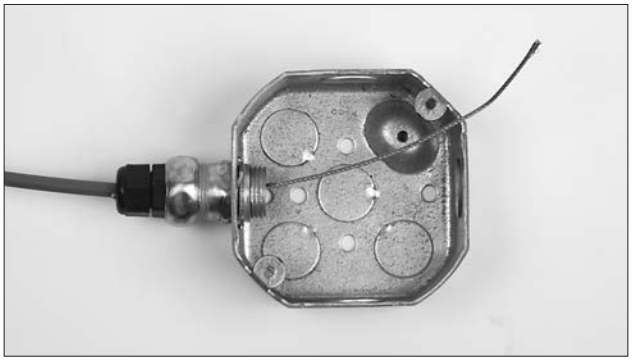


FIGURE 5-70
008003

2. Thread the wire rope through the small end of the block into the bearing area to be used. See Figure 5-71.

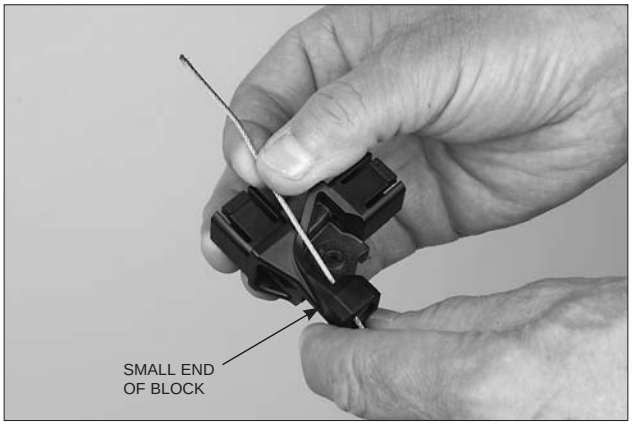


FIGURE 5-71
008004

3. Pull slack, make a loop and insert the rope through the larger opening in the bearing area. See Figure 5-72.

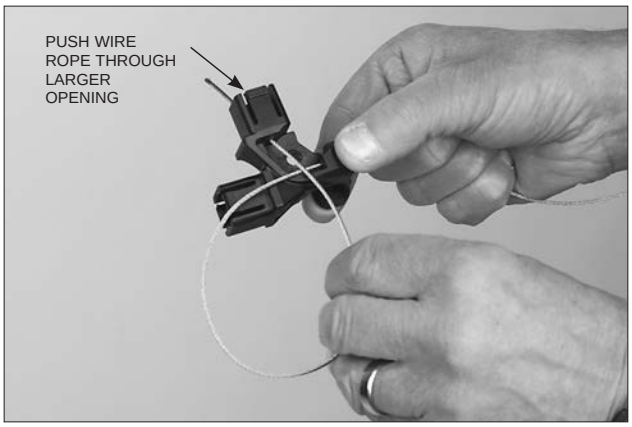


FIGURE 5-72
008005

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Assembling the Block (Continued)

4. Pull wire rope out of the large end of the block. See Figure 5-73.

FIGURE 5-73
008006

5. Place the bearing against the wire rope. Make certain wire rope is in the bearing groove. See Figure 5-74.

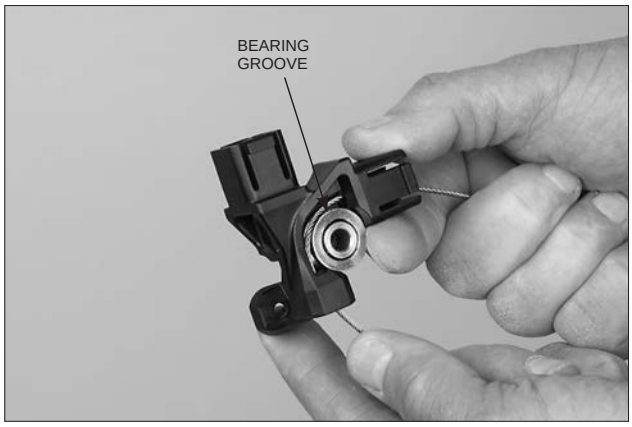


FIGURE 5-74
008007

6. Align the bearing against the wire rope so that the bearing center and the hole in the block line up. See Figure 5-75.

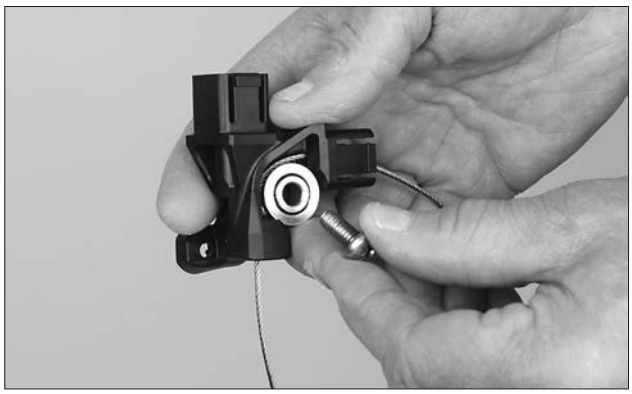


FIGURE 5-75
008008

7. Insert the supplied bolt into the bearing and tighten securely. Take care not to strip the thread. See Figure 5-76.

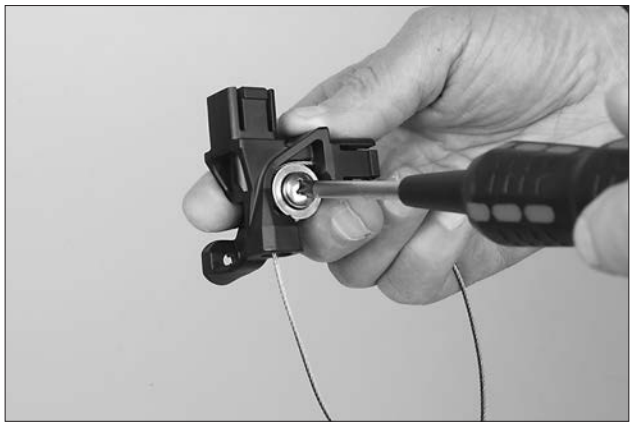


FIGURE 5-76
008009

Connecting the Block and the Faceplate

1. The block can be inserted into the faceplate at 90° intervals. See Figure 5-77.

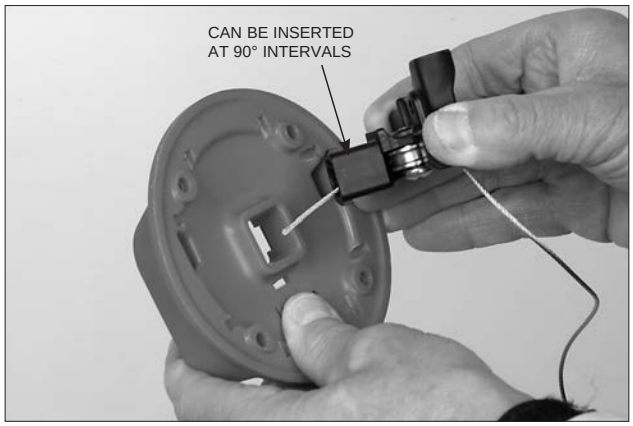


FIGURE 5-77
008010

2. Thread the wire rope through the faceplate. Insert the block by depressing the tabs and pushing the block into the faceplate until it snaps in place. See Figure 5-78.

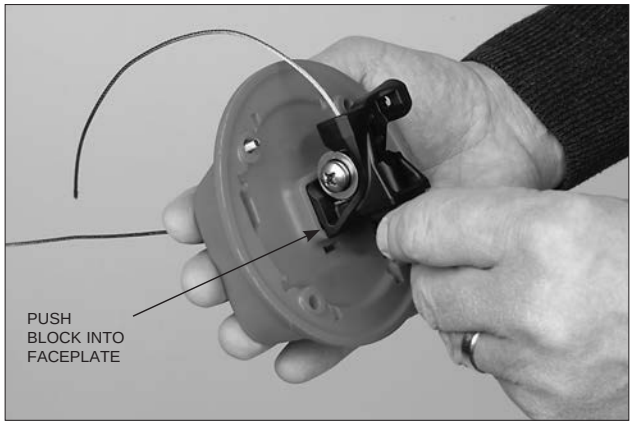


FIGURE 5-78
008011

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Connecting the Block and the Faceplate (Continued)

3. Place the faceplate over the top of the electrical box and insert the two screws to secure the faceplate. See Figure 5-79.

FIGURE 5-79
008012

4. Thread the wire rope through the pull knob. See Figure 5-80.

FIGURE 5-80
008013

5. Thread the wire rope through stop sleeve and leave approximately 1/4-3/8 in. (6.4-9.5 mm) extended past sleeve. Crimp stop sleeve twice using Crimping tool, National Telephone Supply Co. Nicopress Sleeve Tool (Stock No. 51-C-887). Verify stop sleeve is secure on wire rope. See Figure 5-81.

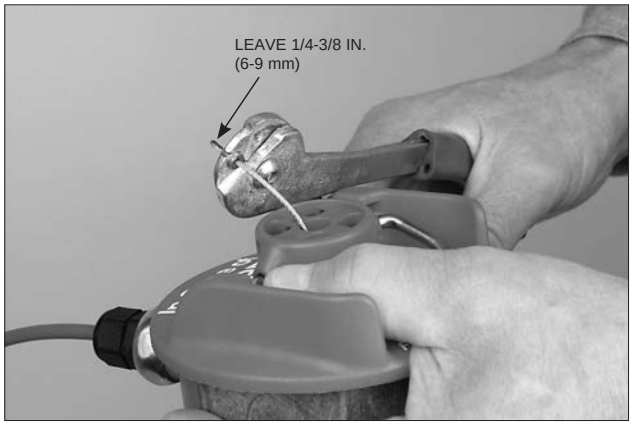


FIGURE 5-81
008014

6. Insert the break rod into the two holes toward the top of the pull knob. See Figure 5-82.

FIGURE 5-82
008015

7. Pull the excess slack back to the AUTOMAN release. This will pull the pull knob assembly in place. See Figure 5-83.

FIGURE 5-83
008016

8. Hold the pull knob assembly against the faceplate. Rotate the pull knob assembly counterclockwise until the break rod and pull knob snap in place. See Figure 5-84.

   Note: Take care in snapping in the ends of the break rod into the pull station side shields while rotating the entire assembly.

FIGURE 5-84
008017

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Connecting the Block and the Faceplate (Continued)

9. Snap the pull tab onto the pull knob so it is legible. See Figure 5-85.

FIGURE 5-85
008018

10. Refer to R-102 or PIRANHA installation manual to complete system installation.
11. Test Remote Manual Pull Station and Mechanical Gas Valves in accordance with the "Testing and Placing in Service – Testing Manual Pull Station and Testing Mechanical Gas Valves" section of this manual.

Installing Flexible Conduit Through a Conduit Offset

1. Starting at the AUTOMAN release, connect the conduit connector using the supplied nut. Use only ANSUL conduit fittings (Part No. 55813). See Figure 5-86.

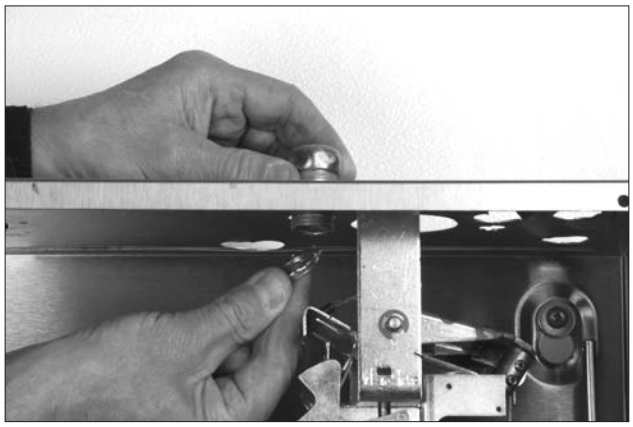


FIGURE 5-86
007986

► 2. Install Conduit Offset (Part No. 435961) into conduit connector and tighten nut. See Figure 5-87.

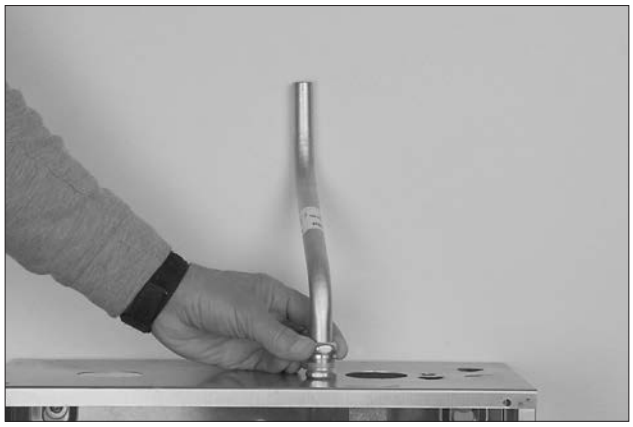


FIGURE 5-87
008039

3. Install compression union to opposite end of conduit offset. Tighten securely. See Figure 5-88.

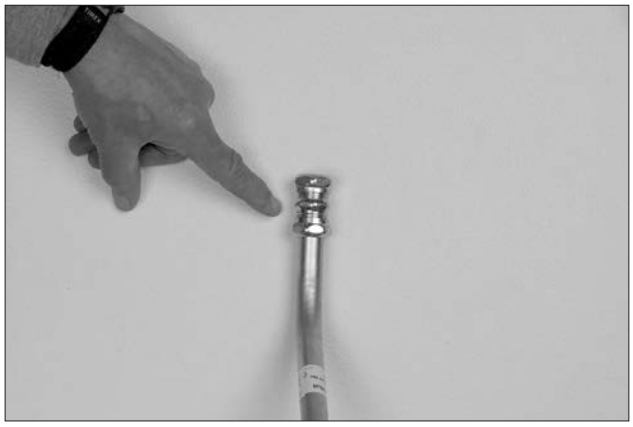


FIGURE 5-88
008040

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Installing Flexible Conduit Through a Conduit Offset (Continued)

4. Install the conduit required to get above the ceiling. See Figure 5-89.

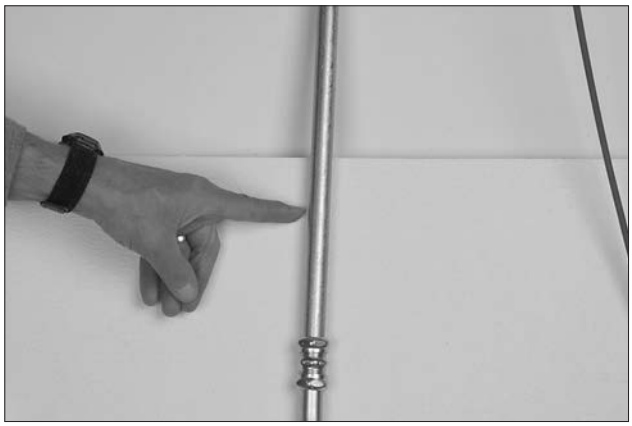


FIGURE 5-89
008041

5. Install compression union to top of conduit riser. See Figure 5-90.

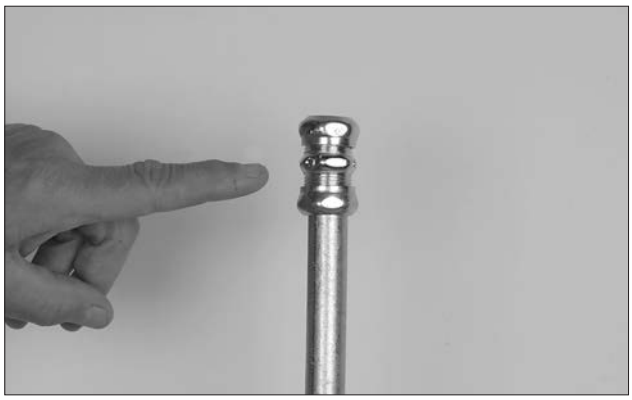


FIGURE 5-90
008042

6. Remove union nut and ring. Discard ring. Do not reinstall nut at this time. See Figure 5-91.

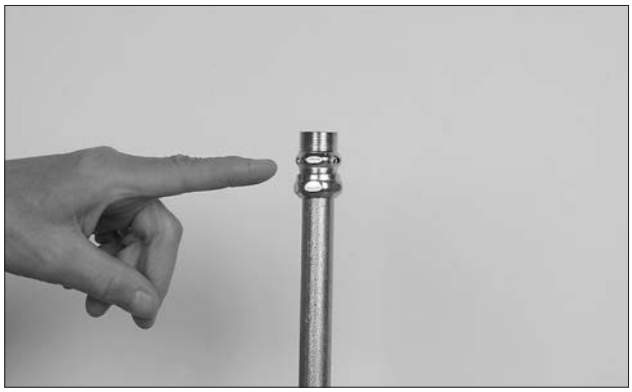


FIGURE 5-91
008043

7. Remove strain relief nut and install strain relief body into compression union. See Figure 5-92.

FIGURE 5-92
008044

8. Install union nut over strain relief body and tighten nut. See Figure 5-93.

FIGURE 5-93
008045

9. Install strain relief nut onto strain relief body. Do not tighten nut at this time. See Figure 5-94.

FIGURE 5-94
008046

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Installing Flexible Conduit Through a Conduit Offset (Continued)

10. Push flexible conduit completely through conduit offset. Flexible conduit should stop flush or +/– 1/2 in. (13 mm) from bottom conduit fitting in AUTOMAN release. See Figure 5-95.

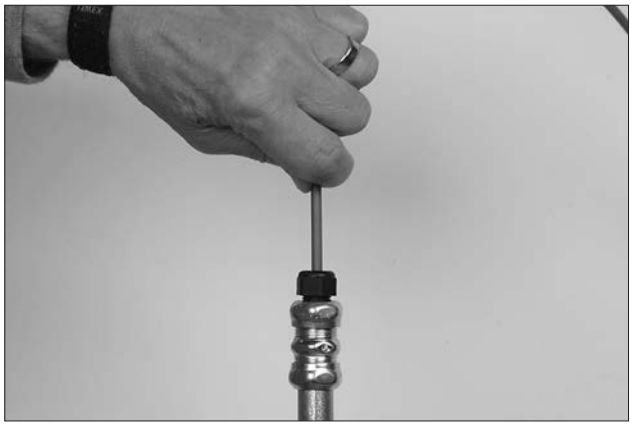


FIGURE 5-95
008047

11. Tighten nut on strain relief on top of conduit riser. See Figure 5-96.

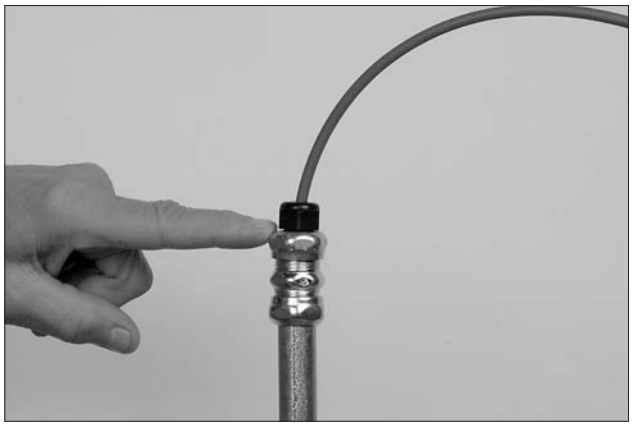


FIGURE 5-96
008048

12. Complete the remainder of the flexible conduit and wire rope installation to the pull station or the gas valve.

Flexible Conduit Splicing (Allowed on Pull Station Installations Only)

Note: Wire rope cannot be spliced together, only the flexible conduit.

Flexible conduit can be spliced together using EMT compression fitting union (Part No. 79827).

1. Remove rings from both ends of compression union. See Figure 5-97.

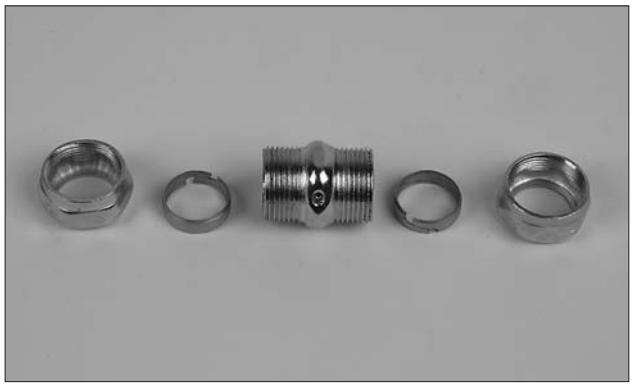


FIGURE 5-97
008061

2. Install strain relief nut, strain relief, compression union nut, flexible conduit insert and compression union over the flexible conduit with wire rope installed. See Figure 5-98.

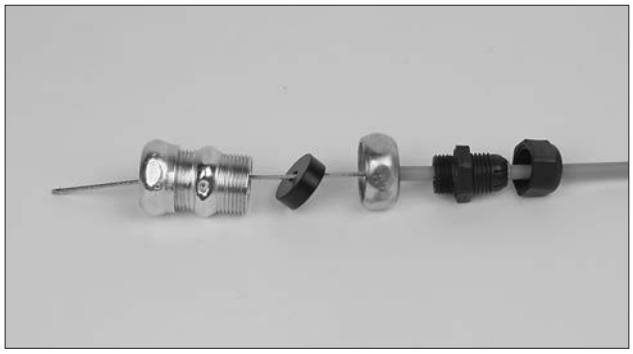


FIGURE 5-98
008049

3. Tighten compression union nut onto union body, locking flexible conduit insert in place. See Figure 5-99.

FIGURE 5-99
008050

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Flexible Conduit Splicing (Allowed on Pull Station Installations Only) (Continued)

4. Install strain relief body into compression union and tighten. See Figure 5-100.

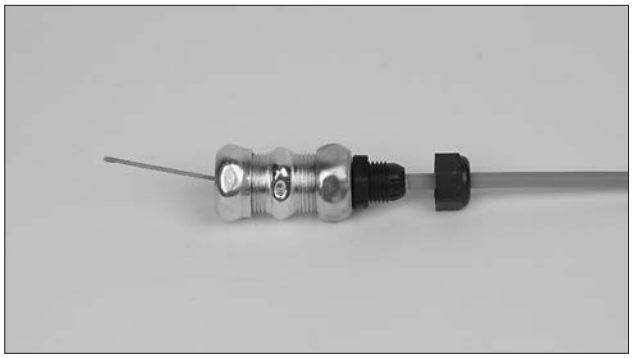


FIGURE 5-100
008051

5. Push flexible conduit into strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 5-101.

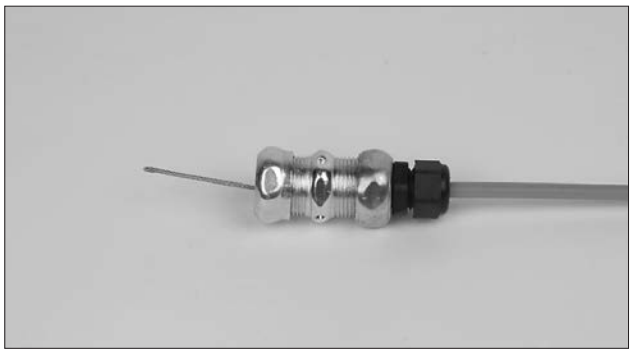


FIGURE 5-101
008052

6. Starting on the opposite end of the compression union, remove the nut. See Figure 5-102.

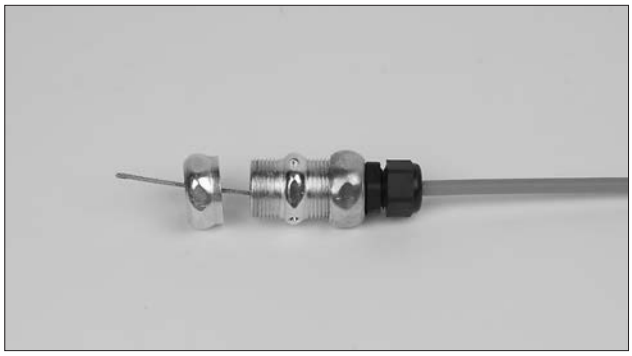


FIGURE 5-102
008053

7. Install strain relief nut, strain relief, and compression union nut on remaining section of flexible conduit and install flexible conduit insert on wire rope. See Figure 5-103.

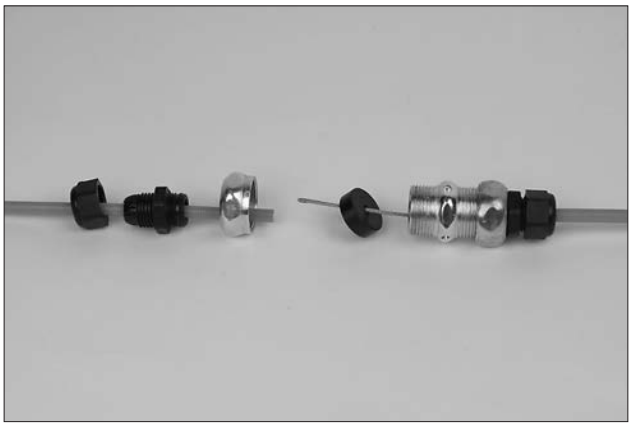


FIGURE 5-103
008054

8. Push wire rope completely through remaining section of flexible conduit. See Figure 5-104.

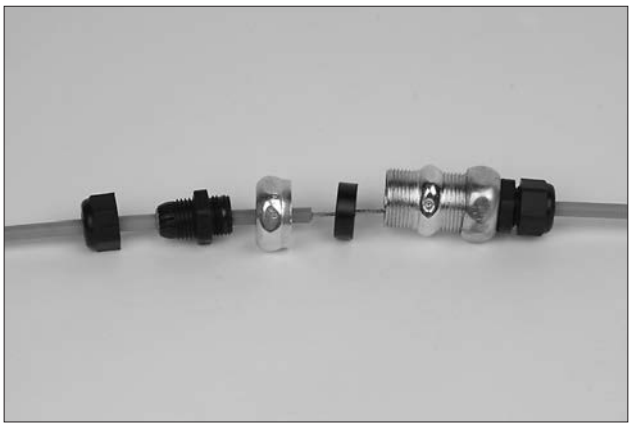


FIGURE 5-104
008055

9. Tighten compression union nut onto union body, securing flexible conduit insert in place. See Figure 5-105.

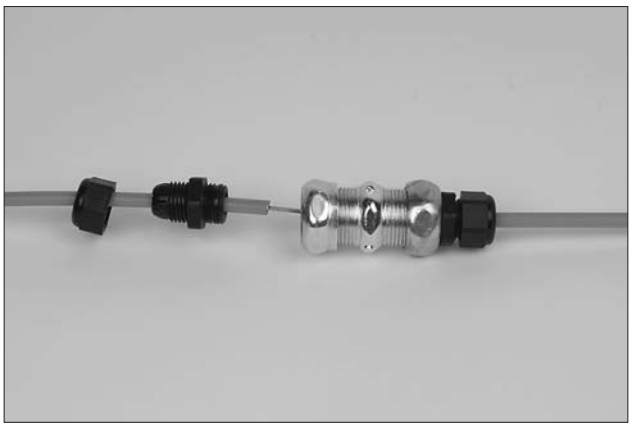


FIGURE 5-105
008056

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Flexible Conduit Splicing (Allowed on Pull Station Installations Only) (Continued)

10. Tighten strain relief into compression union. See Figure 5-106.

FIGURE 5-106
008057

11. Push flexible conduit into strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 5-107.

FIGURE 5-107
008058

12. Complete the remainder of the flexible conduit and wire rope installation to the pull station or the gas valve.

Component Removal Instructions

REMOVAL OF BLOCK

Using thumbs on the clips on each side of the block, press firmly in the direction of the center of the block, at the same time pressing in a slightly downward direction. As the clips on the side of the block release from the pull station cover, the block will release and be free to be removed from the backside of the cover. See Figure 5-108.

FIGURE 5-108
007884

REMOVAL OF PULL KNOB

Insert a small screwdriver into slot at bottom of pull knob. Push slightly on the screwdriver and turn pull knob clockwise, then pull knob can be removed without breaking the glass rod. See Figure 5-109.

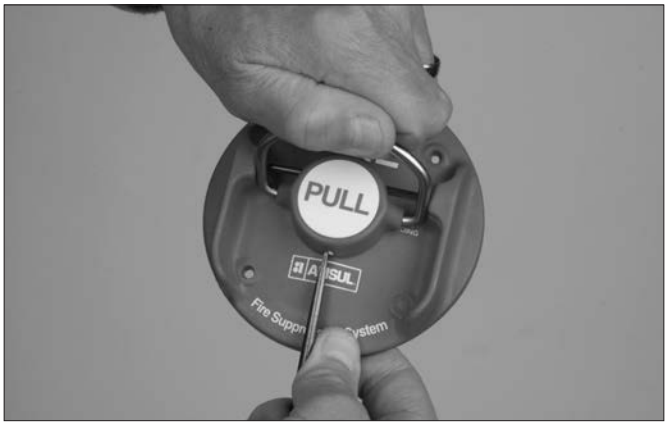


FIGURE 5-109
008059

REMOVAL OF PULL CAP

Using a small screwdriver or other blunt object, push on the back-side of the pull cap. This will free the cap from the pull knob. See Figure 5-110.

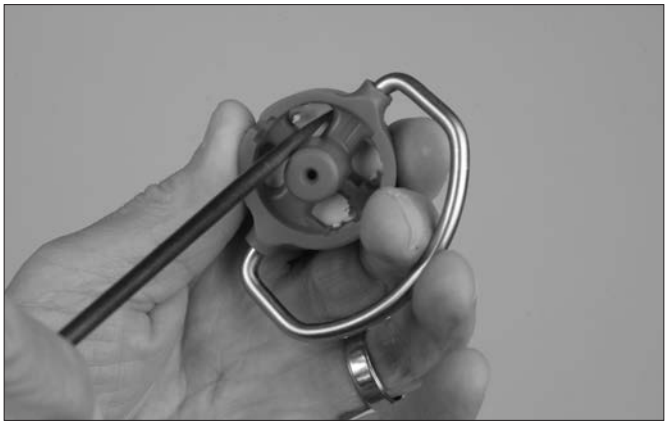


FIGURE 5-110
008060

INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

Pull Station Installation without Pulley Block Assembly

Note 1: When using this installation option, the distance from the back of the faceplate and the connection to the 1/2 in. EMT conduit compression fitting must not exceed 6 in. (152 mm).

Note 2: To provide for a straight run of wire rope from the pull station, an octagonal junction box with a center knockout in the back of the junction box will be needed. See Figure 5-111. If a pre-fabricated box or enclosure is to be used, it must allow the pull station face plate to be firmly attached to the box or enclosure, with a hole or knockout suitable for a 1/2 in. EMT threaded conduit compression connector to be installed directly in line with the center of the pull station pull knob.

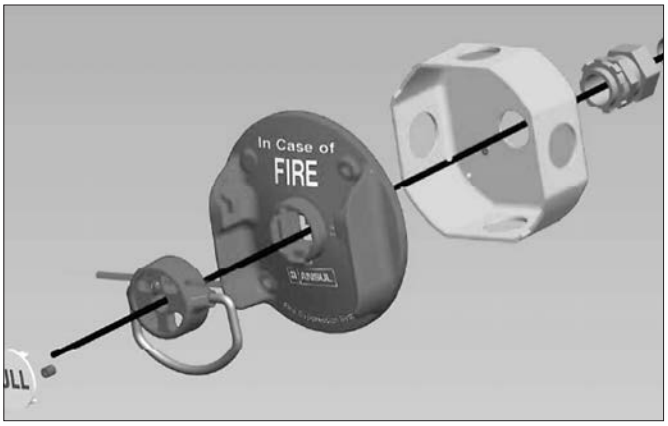


FIGURE 5-111
008415

1. Attach a 1/2 in. EMT conduit compression fitting (Part No. 55813) to the back center knock out of the junction box. If something other than a junction box is to be utilized, a method of securing the flexible conduit or EMT conduit directly in line with the center of the pull station pull knob must be used. This will ensure that in the event of manual operation the wire rope, exiting the back of the pull station faceplate, will be pulled straight out without binding or resulting in undue additional pull force due to friction loss.
2. Remove the block assembly from the pull station face plate. Thread the wire rope from either flexible conduit or 1/2 in. EMT conduit attached to the back of the junction box or fabricated enclosure through the back side of the pull station faceplate and through the pull knob.
3. Thread the wire rope through the stop sleeve (Part No. 26317) and leave approximately 1/4 in. to 3/8 in. (6.4 mm to 9.5 mm) extending past the sleeve.
4. Crimp the stop sleeve twice using the crimping tool National Telephone Supply Co. Nicopress Sleeve Toll (Stock No, 51-C-887). Verify the sleeve is secure on the wire rope.

INSTALLING ELECTRICAL GAS VALVES

NOTICE

Electric gas valves are designed for indoor installation only.

The following instructions and schematics illustrate methods of procedures for installing 110 VAC Electric Gas Shut-off Valves.

1. Make certain that regulated release assembly enclosure cover is detached and lock pin is properly inserted within the regulated release mechanism.

NOTICE

Failure to follow these instructions may lead to system actuation.

2. Verify that cartridge has been removed from regulated release assembly and that the regulated release mechanism is in the cocked position.

If regulated release mechanism does not have lock pin inserted or cartridge removed, refer to the "Semi-Annual Maintenance," Page 8-1, in "Maintenance Examination" section, and complete Steps 2 and 3 before completing the following installation steps.

3. **⚠ WARNING**

To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve. Failure to comply may result in serious personal injury or death. Gas valve installation shall be performed by qualified individuals in accordance with local jurisdiction requirements.

Install each electric gas valve to its selected location in gas line so that it ensures safe shut-off to all predetermined appliances being protected upon actuation of the system. Refer to manufacturer's instructions (if provided). See Figure 5-112.

a. Use new pipe properly reamed and clean of metal chips.

b. Install valve so that the actuator is above the horizontal pipe line with no more than a five degree (5°) lean either way.

c. Make certain gas flow is in the same direction as arrow shown on gas valve.

d. If strainer is utilized, attach strainer ahead of gas valve.

e. If necessary, install drip leg in gas line in accordance with authority having jurisdiction.

4. Install and secure 1/2 in. conduit from each electric gas valve to manual reset relay enclosure.

5. Tag and connect electrical wiring to each electric gas valve. Then, feed wire through conduit to manual reset relay. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction. Refer to Figures 5-122 — 5-125 at the end of this section for typical wiring diagrams.

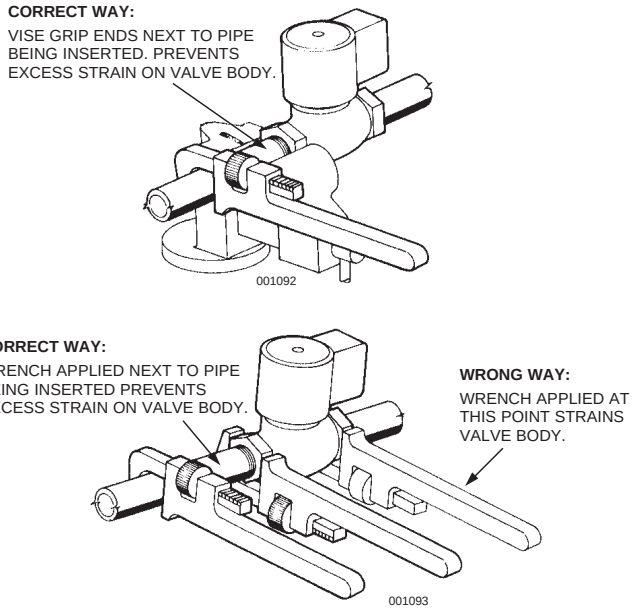


FIGURE 5-112

6. **⚠ WARNING**

Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power may cause serious personal injury or death if contact is made with energized wires

NOTICE

All electrical wiring/connections shall be performed by qualified individuals in accordance with local jurisdiction requirements.

Connect electrical wiring to manual reset relay along with any contactor, or contractor supplied devices needed. Refer to manufacturer's instructions and proper figure listed for assistance.

7. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.

8. Install and secure 1/2 in. conduit from the regulated release assembly enclosure to manual reset relay enclosure.

If snap-action switches have not been attached, go to "Electric Switch" section and install them at this time by completing Steps 3 through 8.

9. Tag and connect electrical wiring to each electric (snap-action) switch. Then, feed wire through conduit to manual reset relay.

10. Connect wiring from each electric (snap-action) switch to manual reset relay terminals. Refer to manufacturer's instructions (if provided) and proper figure for assistance.

11. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.

12. Properly return electrical power to the system.

INSTALLING ELECTRICAL SWITCHES

The procedure for field installing an electric (snap-action) switch is as follows:

⚠ CAUTION

Unused wire leads will become "hot" when the system is operated. Failure to adequately cover exposed wire end(s) will cause electric shock if touched.

⚠ CAUTION

Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power could cause personal injury or death if contact is made with energized wires.

NOTICE

Except for the Alarm Initiating Switch, all electrical wiring connections are to be made outside the AUTOMAN release enclosure in suitable enclosures in accordance with local jurisdiction requirements.

1. Make certain that regulated release assembly enclosure cover is detached with lock pin properly inserted within the regulated release mechanism.

NOTICE

Failure to follow these instructions may lead to system actuation.

2. Verify that cartridge has been removed from regulated release assembly and that the regulated release mechanism is in the cocked position. If regulated release mechanism does not have lock pin inserted or cartridge removed, refer to "Semi-Annual Maintenance," Page 8-1, in "Maintenance Examination" section, and complete Steps 2 and 3 before completing the following installation steps.

   If regulated release mechanism has a factory installed solenoid, it will also have two factory installed switches.

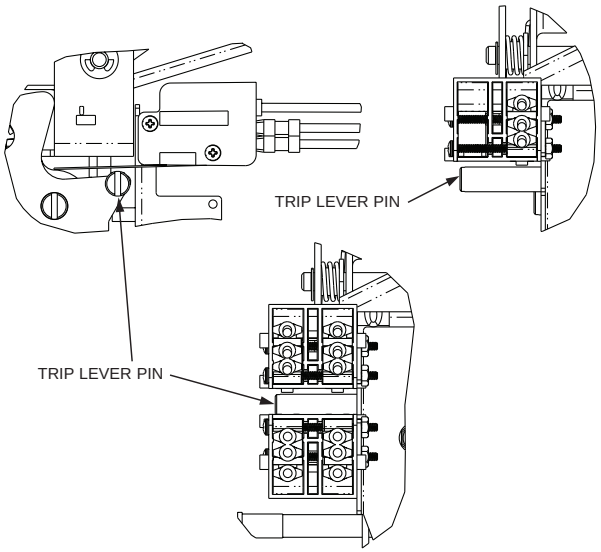


FIGURE 5-113
001621

3. Install one or two of the electrical (snap-action) switches into the switch cover for the upper tab of the switch mounting bracket. See Figure 5-114.

   Note: When applicable, always place the low voltage alarm initiating switch(es) on the upper tab of the switch mounting bracket. Never place low voltage alarm initiating switch(es) on the lower tab of the switch mounting bracket.

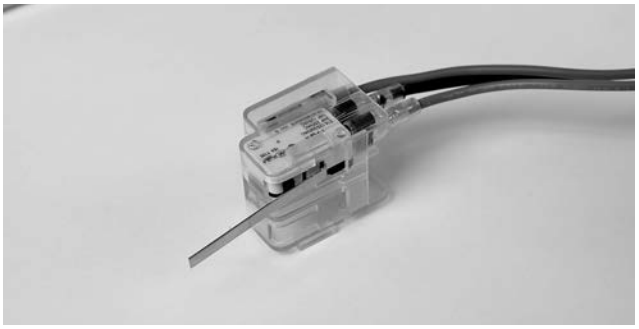


FIGURE 5-114
009128

4. Slide switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5-115.

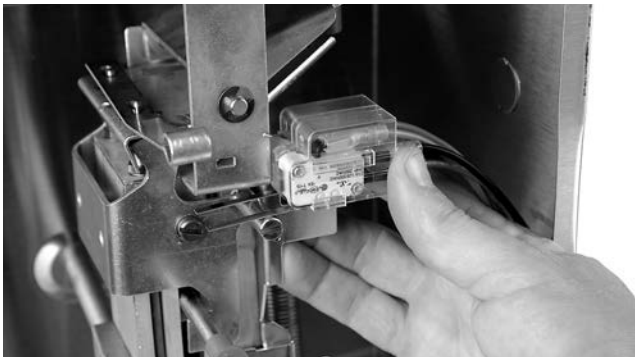


FIGURE 5-115
009129

INSTALLING ELECTRICAL SWITCHES (Continued)

5. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. See Figure 5-116. Tighten screws securely.

   Note: To meet UL requirements, the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.

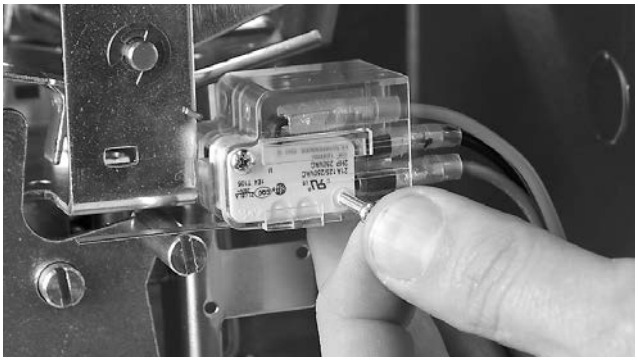


FIGURE 5-116
009130

6. Wire the upper switch(es) according to the switch wiring diagram provided with each release mechanism. See Figure 5-117.

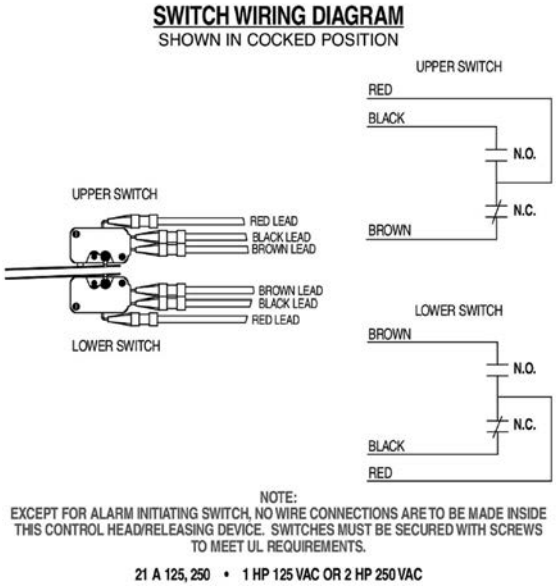


FIGURE 5-117
009145

7. If necessary, install one or two of the snap-action switches into the switch cover for the lower tab of the switch mounting bracket. These switches will be oriented opposite of the upper switch(es) so that the levers will appear on the top side of the switch when mounted to the lower tab of the switch mounting bracket.

   Note: Never place low voltage alarm initiating switch(es) on the lower tab of the switch mounting bracket.

8. Slide switch cover onto the lower tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5-118.

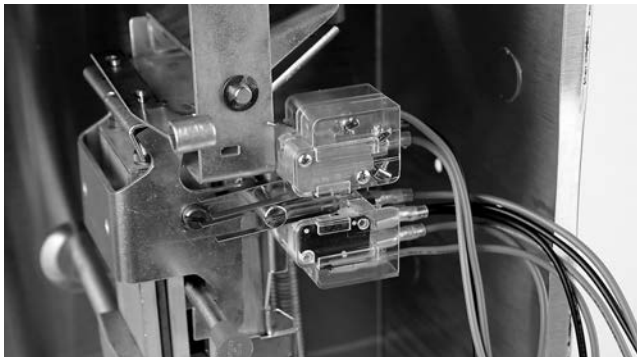


FIGURE 5-118
009131

9. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. Tighten screws securely.

   Note: To meet UL requirements, the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.

10. Wire the lower switches according to the switch wiring diagram provided with each release mechanism. See Figure 5-117.

    Note: All wiring to be performed by a certified individual(s).

11. Restore power to release assembly.

12. Before proceeding with Step 13, test electric (snap-action) switches:

    a. Remove lock pin. With the AUTOMAN release in the cocked or ready position, press the lever of each switch up. If the switch is working properly there should be an audible click. See Figure 5-119.

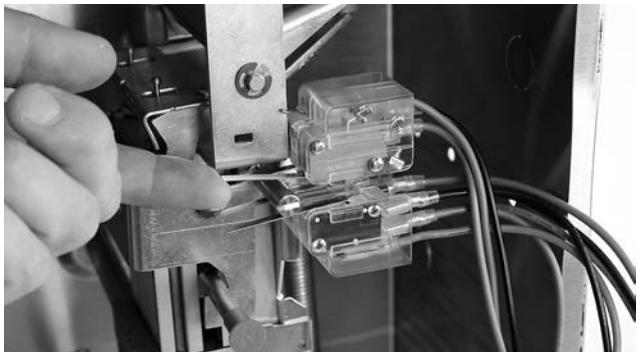


FIGURE 5-119
009133

    b. With the AUTOMAN release in the fired position, press the lever of each switch up, there should be no audible click.

    When installing multiple switches, make certain all switches transfer when the release operates. If they do not, readjust their position.

INSTALLING ELECTRICAL SWITCHES (Continued)

c. If an audible click is heard in the fired position adjustments can be made by removing the snap action switch and bending the lever slightly.

d. After adjustments repeat steps a and b. Then, recock AUTOMAN release and install lock pin.

NOTICE

All electrical wiring/connections shall be performed by qualified individuals in accordance with local jurisdiction requirements

13. The switch may now be connected to compatible components that are predetermined to shut off or turn on. Refer to component manufacturer's instructions for proper wiring connections to compatible components.

NOTICE

Except for the Alarm Initiating Switch, all electrical wiring connections are to be made outside the AUTOMAN release enclosure in suitable enclosures in accordance with local jurisdiction requirements.

14. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.

NOTICE

Do not connect power source to any relay, contactor, or contractor supplied devices until all other electrical connections are made. Refer to proper section or manufacturer supplied instructions for recommended installation procedures for these devices.

15. Turn off power source and connect power line to any relay, contactor, or contractor supplied devices where used.

INSTALLING ALARM INITIATING SWITCH

The Alarm Initiating Switch Kit (Part No. 428311) consists of:

- Alarm Initiating Switch Assembly – Rated 50 mA 28VDC (or 0.1A, 125VAC)
- Switch Cover
- Mounting Screw with Nut (4)
- Self-Tapping Screws (2)
- Trip Lever Pin
- Hex Nut for Trip Lever Pin
- Instruction Sheet

The Alarm Initiating Switch is installed in the AUTOMAN Release on the upper tab of the switch mounting bracket.

1. Install round trip lever pin with hex nut provided.
2. Install the alarm initiating switch into the switch cover for the upper tab of the switch mounting bracket. To install the alarm initiating switch in the switch cover, slide the switch into the large opening of the switch cover, oriented with the switch lever on the bottom side of the switch. See Figure 5-120.

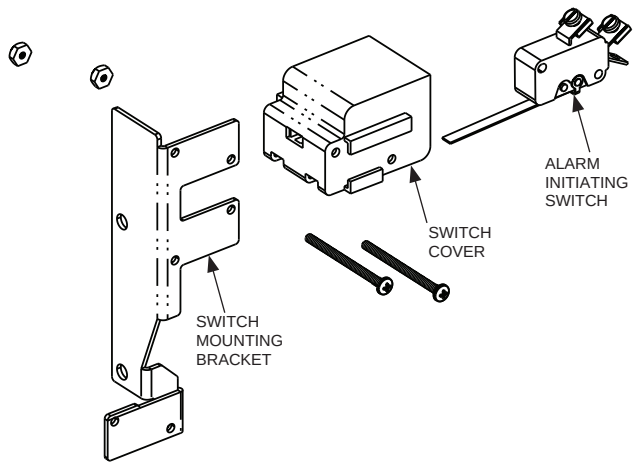


FIGURE 5-120
009137

NOTICE

The alarm initiating switch must always be installed on the upper tab of the switch mounting bracket.

3. Slide switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up.
4. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. Tighten screws securely.

   Note: To meet UL requirements the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.

   See NFPA 72, "National Fire Alarm Code," Initiating Devices section, for the correct method of wiring connection to the fire alarm panel.

NOTICE

All connections to fire alarm control panels must be made by trained and qualified personnel in accordance with fire alarm control panel manufacturer's recommendations.

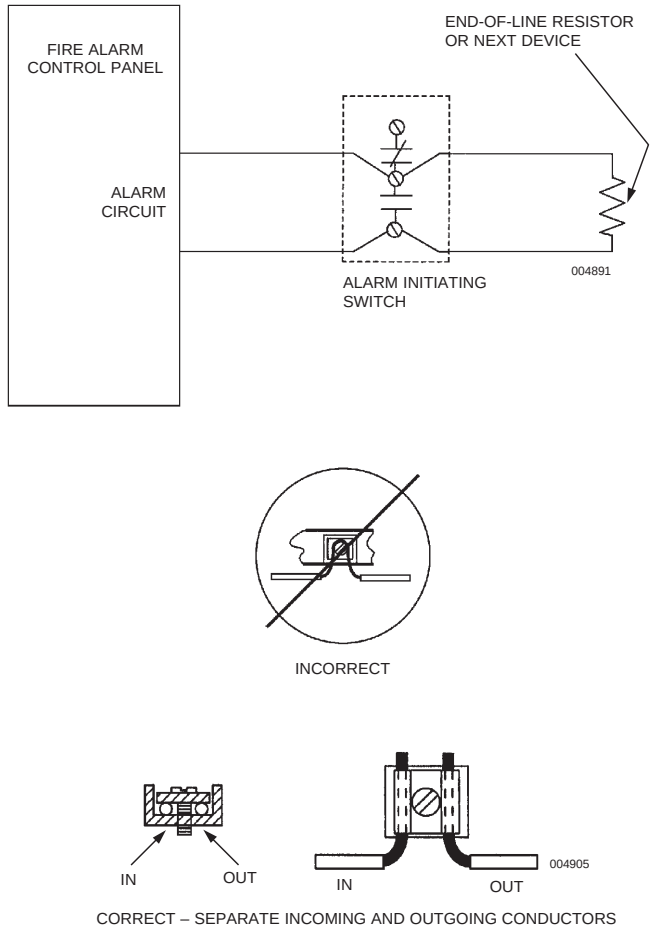


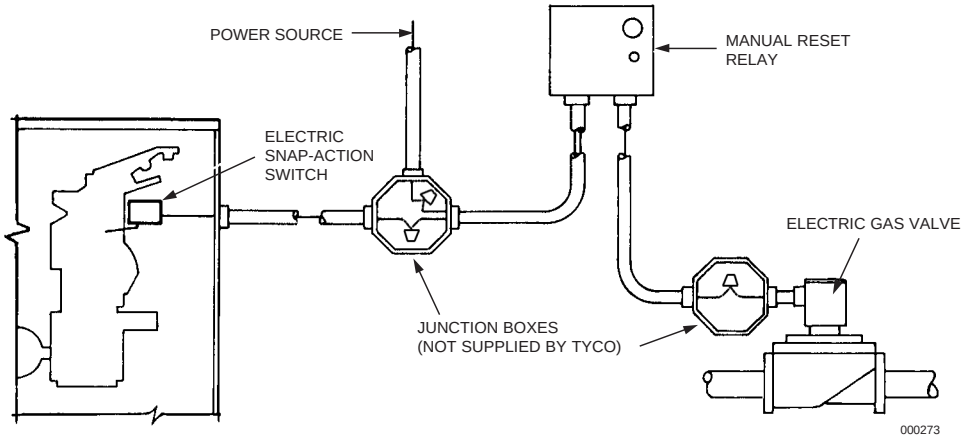
FIGURE 5-121

Note: With the exception of the Alarm Initiating Switch, all electrical connections must be made in an approved electrical box which also meets NEC article 314.40 (D) Grounding Provisions.

ELECTRICAL SWITCH REQUIREMENTS

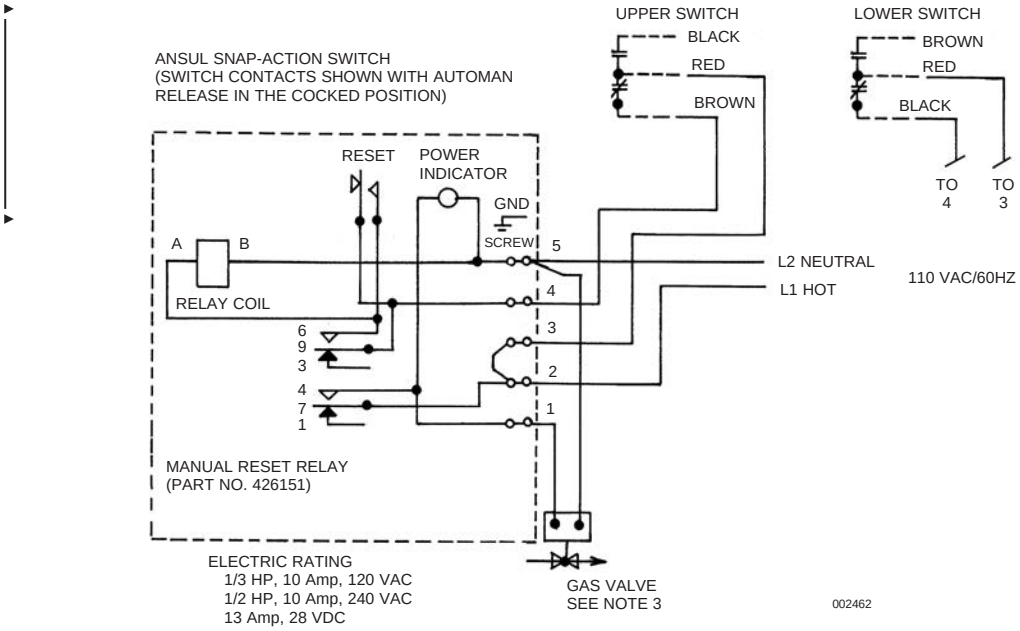
Electric (110 VAC/60 Hz) Gas Shut-off Valve

INSTALLATION OVERVIEW



WIRING SCHEMATIC

WIRING SCHEMATIC – RELAY PART NO. 426151



NOTE:

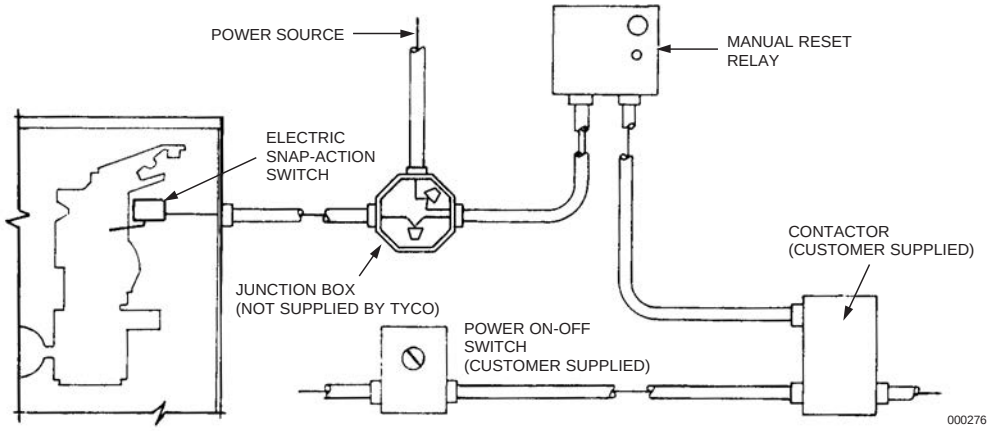
1. _____ DENOTES FIELD INSTALLATION.
2. __ __ __ __ __ DENOTES FACTORY INSTALLATION.
3. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110V/60HZ."
4. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARM, LIGHT CIRCUITS, ETC.

FIGURE 5-122

ELECTRICAL SWITCH REQUIREMENTS (Continued)

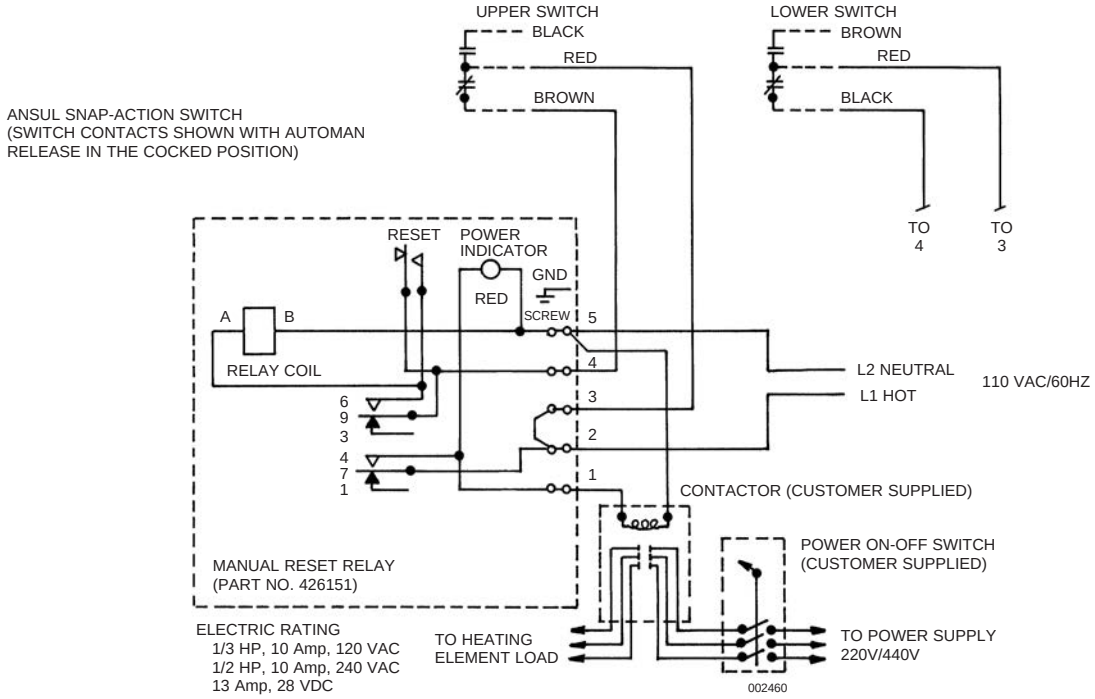
Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load

INSTALLATION OVERVIEW



WIRING SCHEMATIC

WIRING SCHEMATIC – RELAY PART NO. 426151



NOTE:

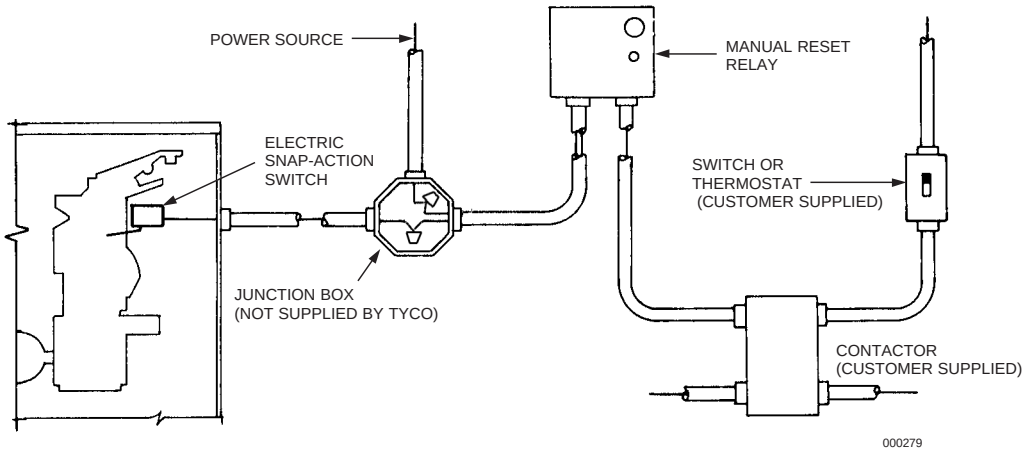
1. _____ DENOTES FIELD INSTALLATION.
2. __ __ __ __ __ DENOTES FACTORY INSTALLATION.
3. GAS VALVES: "UL LISTED ELECTRICALLY-OPERATED SAFETY VALVE FOR NATURAL, OR LP GAS AS NEEDED OF APPROPRIATE PRESSURE AND TEMPERATURE RATING, 110V/60 HZ" OR ANSUL GAS VALVES, PART NUMBERS 13707, 13708, 13709, 13710, AND 17643.
4. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARM, LIGHT CIRCUITS, ETC.

FIGURE 5-123

ELECTRICAL SWITCH REQUIREMENTS (Continued)

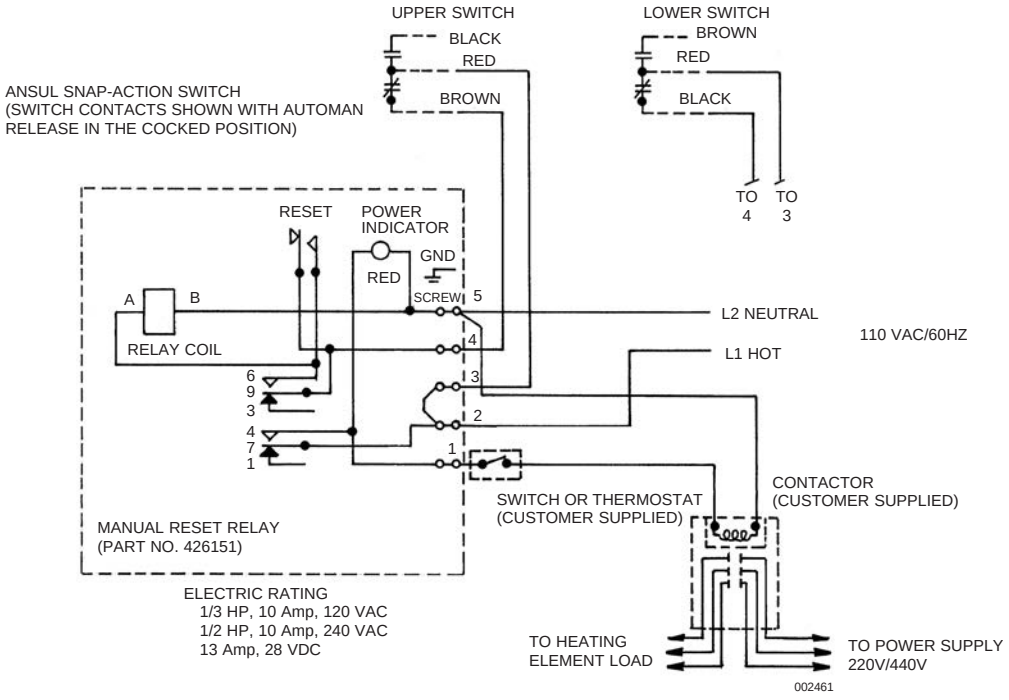
Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load, and Power Supply Switch

INSTALLATION OVERVIEW



WIRING SCHEMATIC

WIRING SCHEMATIC – RELAY PART NO. 426151



NOTE:

1. _____ DENOTES FIELD INSTALLATION.
2. __ __ __ __ __ DENOTES FACTORY INSTALLATION.
3. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110V/60HZ."
4. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARM, LIGHT CIRCUITS, ETC.

FIGURE 5-124

WIRING 24VDC REGULATED RELEASE ASSEMBLY

CAUTION

Do not install cartridge or remove tank assembly unless release is cocked and ring pin is in place. Failure to comply may result in accidental system actuation.

If the following occurs during installation, the solenoid for the releasing assembly may be damaged, rendering the system inoperable.

1. If the release is electrically tripped (fired) with the ring pin inserted such that the release mechanism is pinned in the cocked position.
2. The lever arm of the mounted switch is bent such that the switch does not operate when the release roll pin is bottomed out in the fired position.
3. Trying to recock the release mechanism while power is applied to the release through the alarm contacts.

For complete recharging, inspection, and maintenance instructions, refer to applicable fire suppression system manual.

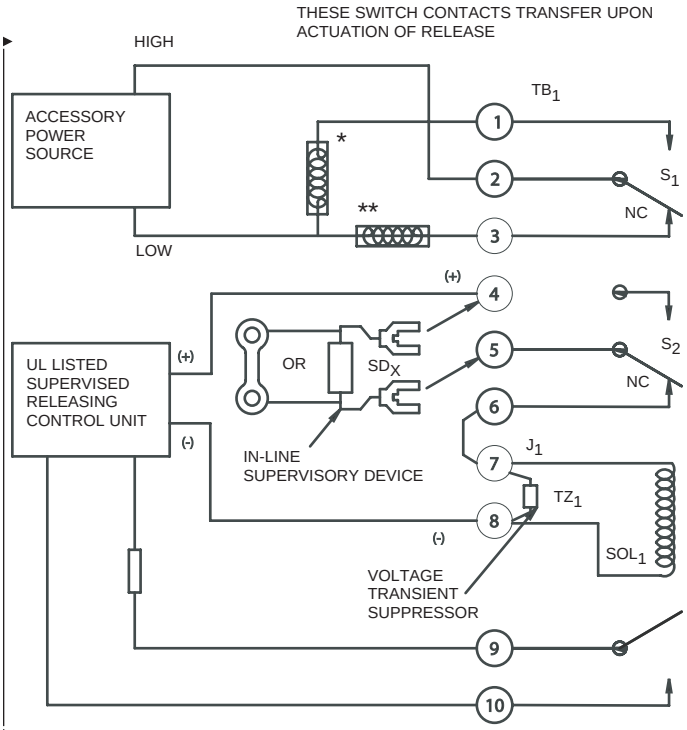
⚠ WARNING

Take extreme care when wiring release assembly. Failure to comply may cause an electrical shock, resulting in possible serious injury or death.

Refer to the following notes and wiring diagram for instruction on wiring the 24VDC regulated release assembly.

Notes:

1. To be connected to a nominal 24VDC releasing circuit. Input power: 750 mA at 24VDC nominal (1.02 at 30VDC maximum).
2. Polarization: Observe polarity when connected to a release circuit; Terminal 4 positive, Terminal 8 negative.
3. All interconnecting wiring number 14 - 18 AWG.
4. S_1 and S_2 contact ratings: 20A, 125/250 VAC 2 HP, 250 VAC 1 HP, 125 VAC.
5. SOL_1 coil resistance: 28 OHMS +/- 10% at 77 °F (25 °C).
6. Install the in-line supervisory device SD_x across terminals No. 4 and No. 5. Refer to the releasing panel installation instructions for supervisory device requirements. If an in-line supervisory device is not required, install jumper J_2 across terminals No. 4 and No. 5.
7. S_3 contact ratings: 24VDC, 240mA maximum.



* AUXILIARY ALARMING DEVICES, SEE S_1 RATINGS

** FUEL SHUT-OFF VALVE, BLOWER MOTOR, DOOR CLOSER, ETC., SEE S_1 RATINGS.

FIGURE 5-125
008468

NOTES:

After the system has been completely installed, and **BEFORE INSTALLING THE CARTRIDGE,** the system must be tested at the regulated release assembly. The testing information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the testing of the R-102 system must be trained and hold a current ANSUL certificate in an R-102 training program.

Note: AUTOMAN Release must be in the cocked position before testing manual pull station. Make certain to remove lock pin before performing pull station testing.

TESTING MANUAL PULL STATION

To test each remote manual pull station, complete the following steps:

1. With the expellant gas cartridge removed, remove lock pin from regulated release assembly cable lever.
2. On pull station, remove break rod from the pull station by inserting a small screwdriver into slot at bottom of pull knob to facilitate turning the pull knob. Push slightly on the screwdriver and turn pull knob clockwise, then the pull knob can be removed without breaking the glass rod.

NOTICE

Take care in removing the break rod from the pull station side shields while rotating the break rod/pull knob assembly.

3. Pull ring handle on pull station. If the regulated release assembly is tripped easily, the remote manual pull station is properly installed. If the regulated release assembly does not trip, remove pulley tee (if provided) and each pulley elbow cover to make certain wire rope is resting on the pulley sheave. If this does not correct the problem, there is too much slack in the line and it must be retightened.
4. Recock regulated release assembly using cocking lever (Part No. 441042 or 441041) and reinstall lock pin (Part No. 438031).
5. On pull station, insert the break rod into the two holes toward the top of the pull knob. Rotate the pull knob counterclockwise.

NOTICE

Take care in snapping in the ends of the break rod into the pull station side shields while rotating the entire assembly.

NOTICE

If no other devices are being attached, proceed to Page 6-3, Step No. 1, and test the detection system.

TESTING MECHANICAL GAS VALVES

To test each mechanical gas shut-off valve complete the following steps:

1. **⚠ WARNING**

   To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

   Turn gas line on.
2. Manually push each air cylinder rod to full ‘‘DOWN’’ position. The gas valve should close. If mechanical gas valve does not trip, remove each pulley elbow cover to make certain wire rope is resting on each pulley elbow sheave. If this does not correct the problem there may be too much slack in the line and it should be retightened.
3. Test for gas leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear and repeat test again to make certain no other gas leaks exist.
4. If no gas leak is found, pull air cylinder rod to full ‘‘UP’’ position.
5. Recock mechanical gas valve.
6. Check burners for gaseous odor. **IF GASEOUS ODOR EXISTS, MANUALLY PUSH THE AIR CYLINDER ROD TO THE FULL ‘‘DOWN’’ POSITION IMMEDIATELY.** This will cause the mechanical gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
7. If no gaseous odor exists, pilot light may be ignited at this time.
8. Reinstall side covers to gas valve housing. Make certain roll pin is positioned within both sides of the valve housing slot. Connect visual inspection seals (Part No. 197) on ANSUL type valves. See Figure 6-1 (next page).
9. Make certain the regulated release mechanism is cocked with lock pin in place.

NOTICE

If no other devices are being attached, proceed to Page 6-3, Step No. 1, and test the detection system.

TESTING MECHANICAL GAS VALVES (Continued)

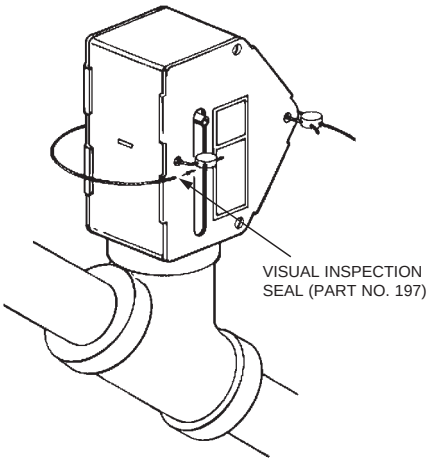


FIGURE 6-1
000359

TESTING ELECTRICAL GAS VALVES

To test each Electric Gas Shut-off Valve complete the following steps:

1. **⚠ WARNING**

   To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

   Turn gas line on.

2. Make certain electric (snap-action) switch is properly wired.
3. Make certain all other devices connected to the manual reset relay are properly wired. Refer to typical wiring diagrams in Figures 5-122, 5-123, 5-124, and 5-125 in "Installation Instructions" section.
4. Test for gas leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear. Repeat test again to make certain no other gas leaks exist.
5. If no gas leaks are found, turn power source on and depress the reset button on the manual reset relay (RED LIGHT ON) to energize (OPEN) electric gas valve.
6. Remove lock pin from regulated release mechanism.

   CAUTION

   Do not install cartridge at this time or system may be actuated.

7. Manually actuate the system by operating the remote pull station. (It may be necessary to remove the glass break rod prior to operating pull station.) Manual reset relay (RED LIGHT OUT) will de-energize (CLOSE) the electric gas valve, thus shutting off the gas line. If this does not happen, turn power source off. Then re-examine all wiring connections for proper hookup. Refer to Figures 5-122, 5-123, 5-124, and 5-125 in ''Installation Instructions'' section for typical wiring diagrams.
8. If test is successful, recock regulated release mechanism using cocking lever (Part No. 441042 or 441041) and reinstall lock pin (Part No. 438301). Depress reset button on manual reset relay (RED LIGHT ON).
9. Check burners for gaseous odor. **IF GASEOUS ODOR EXISTS, TURN OFF POWER SOURCE IMMEDIATELY.** This will cause the electric gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
10. If no gaseous odor exists, pilot light may be ignited at this time.

NOTICE

If no other devices are being attached, proceed to Page 6-3, Step No. 1, and test the detection system.

TESTING ELECTRIC SWITCH

The procedure for testing a field installed electric (snap-action) switch is as follows:

NOTICE

If an electrical gas shut-off valve is attached to system, perform proper test procedure for the gas valve first, before completing the following steps.

1. Turn power source on and if installed, depress reset button on manual reset relay (RED LIGHT ON). All electrical devices should be operating at this time.
2. Remove lock pin.

   CAUTION

   Do not install cartridge at this time or system may be actuated.

3. Manually actuate the system by operating the remote pull station. It may be necessary to remove the glass break rod prior to operating pull station. (If installed, the manual reset relay will de-energize the electric gas valve, thus shutting off the gas line.) All electrically-operated devices predetermined to shut off or turn on should do so. If this does not occur, turn power source off and make sure all wiring is properly connected and retest. Refer to Figures 5-122, 5-123, 5-124, and 5-125 in "Installation Instructions" section for typical wiring diagrams.

TESTING ELECTRIC SWITCH (Continued)

4. If test is successful, recock regulated release mechanism using cocking lever (Part No. 441042 or 441041) and reinstall lock pin (Part No. 438031). If a manual reset relay is installed, depress the reset button (RED LIGHT ON). It will also be necessary to re-light any pilot lights on the cooking appliances.

NOTICE

If no other devices are being attached, proceed to Page 6-3, Step No. 1, and test the detection system.

TESTING DETECTION SYSTEM

1. Test detection system by completing the following steps:
   a. Raise the regulated release mechanism tension lever to the ‘‘UP’’ position.
   b. Remove the fusible link from the terminal detector and install a test link (Part No. 24916). See Figure 6-2.

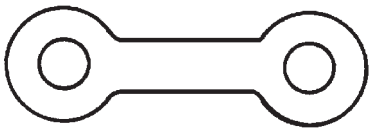


FIGURE 6-2
000363

   c. Locate detector linkage and center in each bracket.

      For ‘‘clip on’’ style linkage, locate linkage in bracket slightly toward termination end of detection run.

      For ‘‘scissor’’ style linkage, locate linkage in bracket all the way toward termination end of detection run.

   d. Lower regulated release mechanism tension lever to ‘‘DOWN’’ position and **remove lock pin.**
   e. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
   f. If system actuates successfully, go to Step 4.
2. If the regulated release mechanism does not actuate, check the following components and remedy any disorder as follows:
   a. Check the detector linkage for correct positioning.
   b. Check the wire rope for knotting or jamming.
   c. Check pulley elbows to see that wire rope is free and centered in pulley sheaves. If any evidence of pulley elbow deformation is found, replace the pulley elbow.
   d. Make certain that lock pin is removed.
   e. Make certain that regulated release mechanism is cocked.
   f. Make certain that tension lever is in ‘‘DOWN’’ position.
3. Re-test the system by completing the following steps:
   a. Make certain regulated release is cocked and lock pin is inserted.
   b. Raise the regulated release mechanism tension lever to the ‘‘UP’’ position.
   c. Install a new test link (Part No. 24916) on the terminal detector.
   d. Lower the regulated release mechanism tension lever to the ‘‘DOWN’’ position.
   e. Check for 1/4 in. (6.4 mm) minimum 3/8 in. (9.5 mm) maximum clearance between the trip hammer assembly and the cable lever assembly.
   f. Remove the lock pin.
   g. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
4. Upon successful actuation of the system, complete the following steps:
   a. Raise tension lever to ‘‘UP’’ position and install a properly-rated fusible link in the terminal detector.
   b. Cock regulated release mechanism using cocking lever (Part No. 441042 or 441041) and insert lock pin (Part No. 438031).
   c. Lower tension lever to ‘‘DOWN’’ position.
   d. For scissor-style linkage, locate linkage in bracket all the way toward termination end of detection run.
   e. Make certain the 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum clearance was maintained between the base of the trip hammer assembly and the cable lever assembly.

NOTICE

Reset any electrical equipment that may have been affected by the system actuation.

   f. Remove shipping cap and weigh each cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
   g. Install cartridge into the regulated release mechanism receiver and each regulated actuator receiver. Hand tighten firmly.
   h. Remove the lock pin.

TESTING DETECTION SYSTEM (Continued)

i. Install cover on regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or visual inspection seal. Insert seal (Part No. 197) in each upper and lower cover hole, if applicable. If system is installed in an OEM enclosure, attach enclosure cover and secure with appropriate hardware or procedure.

CAUTION

Before installing cover, make certain detection tension lever is secured in the "DOWN" position to enable automatic detection and operation of the AUTOMAN Regulated Release.

j. Record installation date on tag attached to unit and/or in a permanent file.

The recharge information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the recharge of the R-102 system must be trained and hold a current ANSUL certificate in an R-102 training program.

For continued fire protection, the R-102 restaurant fire suppression system must be recharged immediately after use. Recharge procedures for single, double, and multiple-tank systems are as follows.

CLEANUP PROCEDURES

Although there is no unusual cleanup procedure of ANSULEX or ANSULEX Low pH agents, due to the alkaline nature of these agents, they should be cleaned from kitchen surfaces within 24 hours after system discharge. The reaction from the wet chemical agent on cooking grease or oil produces a foamy bi-product that can be wiped up with a cloth or sponge. The following procedures should be followed:

⚠ CAUTION

Before attempting any cleanup, make certain that all fuel sources to the equipment to be cleaned have been shut off. Make certain that the exhaust hood and all appliance electrical controls have been de-energized to avoid any chance of electrical shock resulting from the cleaning process or from electrically conductive alkaline liquid agent and/or its residue.

Make certain all surfaces to be cleaned have cooled down to room temperature.

Do not use water to clean any appliances that contain hot grease or cooking oils. Doing so may result in violent steaming and/or spattering causing personal injury.

1. The agent is non-toxic; however, food product and cooking grease/oil that has come in contact with the agent will no longer be suitable for human consumption and should be discarded.
2. Sponge up as much of the agent as possible using sponges or clean rags. Dispose of these sponges or rags in a local sanitary land fill site in accordance to local authorities.

⚠ CAUTION

Wear rubber gloves during cleanup as sensitive skin may become irritated. If the ANSULEX agent or its residue comes in contact with skin or eyes, flush thoroughly with clean water.

3. Using hot, soapy water and either a clean cloth or sponge, wipe away all foamy residue and thoroughly scrub all surfaces that have come in contact with the agent.
4. After thoroughly cleaning all affected surfaces, adequately rinse and allow to completely dry before re-energizing the equipment.

RECHARGE

NOTICE

Determine the cause of system discharge and correct immediately before performing system recharge.

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. From tank in regulated release enclosure: Disconnect the expellant gas hose from each tank adaptor assembly.

   From tank in mounting bracket or mounting enclosure: Disconnect expellant gas piping union at each tank adaptor inlet line(s).
3. Disconnect distribution piping union at each tank adaptor outlet line(s).
4. From tank in enclosure: Remove tank.

   From tank in bracket assembly: Loosen wingnut, disengage bracket band, and remove each tank.
5. Remove each tank adaptor/tube assembly and complete the following:
   a. Remove o-ring and inspect for damage.
   b. Clean and coat o-ring with a good grade of extreme temperature grease and reinstall into adaptor groove. See Figure 7-1.
   c. Remove 1/4 in. vent plug.
   d. Clean and inspect for free movement and corrosion. If necessary, replace Vent Plug (Part No. 74247).
   e. Reinstall vent plug into adaptor body.

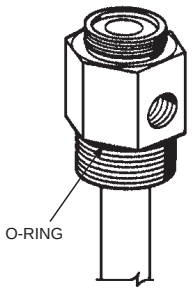


FIGURE 7-1
000364

RECHARGE (Continued)

6. **CAUTION**

   Do not flush pipe with only water or other non-approved material, as this could cause internal corrosion, leading to possible improper discharge.

   Piping system must be flushed to remove any wet chemical residue. To prepare the system for flushing:

   a. Pour the complete contents of one 32-oz. bottle of ANSUL Flushing Concentrate (Part No. 79656) into an empty R-102 agent tank. One complete bottle is used for either size tank, the 1.5 gallon or the 3 gallon.

   b. Fill the tank approximately half full with warm, clean water. Agitate the tank for a few seconds and then add more warm water to bring the fill level to within approximately 1 in. (25 mm) from the bottom of the fill opening.

   c. Install adaptor/tube assembly and tighten.

7. To perform the flushing procedure, either secure heavy-duty plastic bags to each nozzle (See Figure 7-2) or remove each nozzle tip and strainer and attach plastic tubing. See Figure 7-3.

   If using plastic bags, secure bags and proceed to Step 9.

   If using plastic tubing, proceed to Step 8.

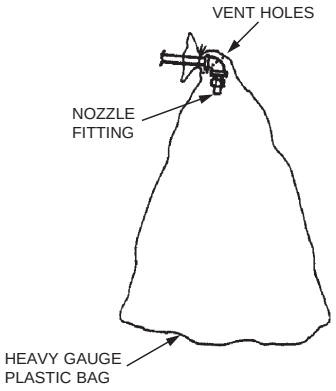


FIGURE 7-2
001739

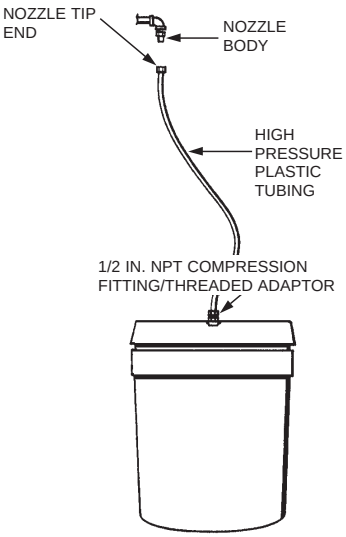


FIGURE 7-3
001740

8. If using the plastic tubing option, utilize 1/2 in. (13 mm) OD plastic tubing with wall thickness not to exceed 0.062 in. (1.5 mm), and make certain it can withstand the pressures of at least 90 psi (6.2 bar) expelled during the flushing and blowdown procedures.

   Also required is a container with some means of securing tubing to it such as a five-gallon plastic pail and cover that snaps onto the pail.

   To prepare the plastic tubing:

   a. Cut as many tubing lengths as required, making them long enough to reach the container from each nozzle outlet.

   b. Using the nozzle tip end, slide a length of 1/2 in. (13 mm) plastic tubing over the rib on the nozzle tip and secure with a 1/2 in. (13 mm) adjustable hose clamp. See Figure 7-4.

   c. In the pail cover, drill the number of holes required, large enough to insert 1/2 in. NPT fittings, with one additional hole that can be used for venting.

   d. Secure 1/2 in. compression fitting/threaded adaptors to the pail cover, using 1/2 in. conduit nuts. See Figure 7-4.

RECHARGE (Continued)

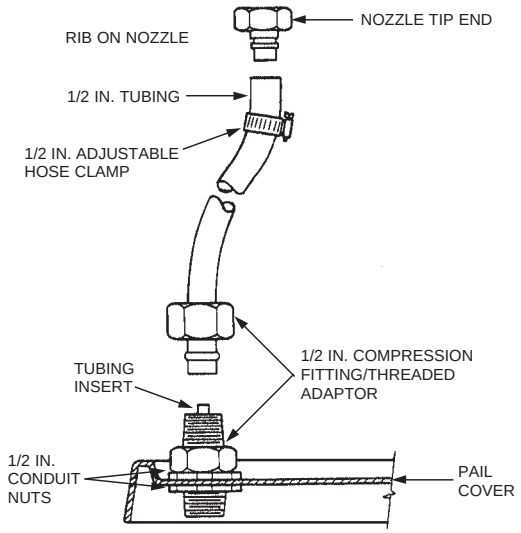


FIGURE 7-4

e. Attach the tubing ends to the compression fittings. Tubing inserts will be required. See Figure 7-4.

f. Install nozzle/tubing ends to nozzle bodies in discharge piping.

g. Make certain each length of tubing is fastened to the pail cover with the cover snapped securely to the pail.

9. Complete the following steps in the flushing procedure:

a. Connect discharge piping and expellant gas line to agent tank adaptor.

b. Cock AUTOMAN Release Mechanism and insert lock pin. Refer to Components Section of this manual for detailed part numbers.

c. Install LT-30-R Cartridge; hand tighten.

d. Remove lock pin.

e. If regulated actuators are included in the system, also install LT-30-R cartridges in them.

f. Actuate system via pull station.

g. Wash out all system nozzles and strainers in warm soapy water, rinse and return all nozzles and strainers to their appropriate locations in the discharge piping.

h. Verify that all nozzle types are correct. Utilizing the nozzle aiming device, ensure that all nozzles are correctly aimed at the appropriate location on the appliance.

i. Apply a small amount of Dow Corning No. 111 silicone grease across the opening of the nozzle tip. Install blow-off caps onto nozzles.

j. Remove empty tank.

10. Fill each tank with 1.5 gal (5.8 L) or 3.0 gal (11.6 L) of ANSULEX Low pH Liquid Fire Suppressant. See Figure 7-5. **Note:** Use a funnel with a screen to stop any foreign material from entering the tank. **See Page 5-3, Figure 5-6, for additional detailed filling instructions.**

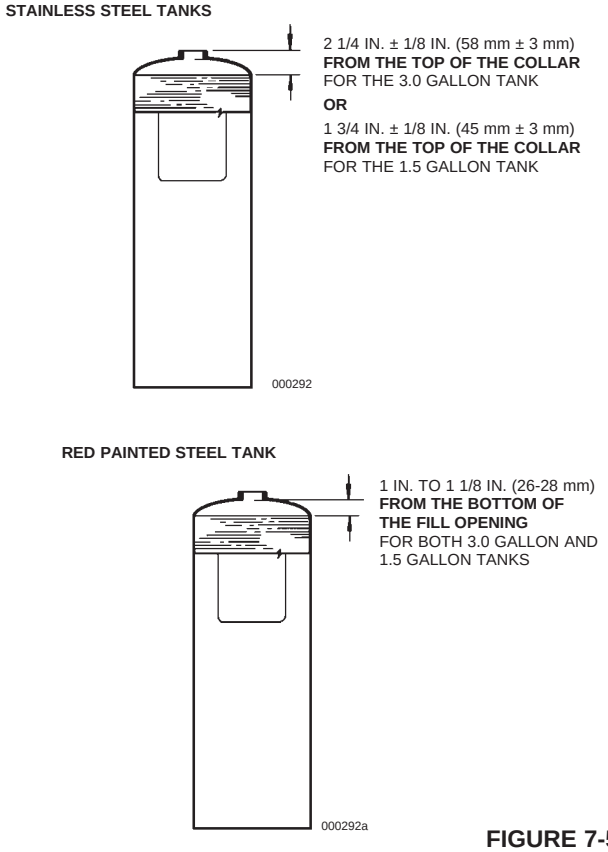


FIGURE 7-5

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **DO NOT FILL WITH COLD AGENT. DO NOT OVERFILL.** Overfilling may result in agent entering gas hose and regulator potentially causing system malfunction. See Page 5-3.

11. Replace bursting disc (Part No. 416974) in adaptor assembly. Make certain silver side of disc is away from tank.

12. Replace adaptor/tube assembly and tighten into place. Return and secure each tank in regulated release assembly and mounting bracket/enclosure. Reconnect expellant gas and distribution piping and/or as required.

13. Raise tension lever to “UP” position.

14. Cock regulated release mechanism using cocking lever (Part No. 441042 or 441041) and install lock pin (Part No. 438031).

RECHARGE (Continued)

15. Remove empty cartridge from regulated release assembly and each regulated actuator assembly as required.

CAUTION

Do not install replacement cartridge at this time or system may be actuated.

16. Install properly-rated fusible links in all detectors except the terminal detector.

NOTICE

If actuation was caused by a fire situation, all fusible links must be replaced.

17. Install test link (Part No. 24916) in terminal detector.
18. Lower tension lever to "DOWN" position.
19. Remove the lock pin.
20. Using wire cutter, cut the test link at the terminal detector to simulate automatic actuation.

NOTICE

If regulated release mechanism does not actuate, refer to Steps 2 and 3 of the "Testing Detection System" portion of the "Testing and Placing In Service" section, Page 6-3, of this manual.

21. After successful actuation, raise the tension lever to "UP" position
22. Install properly-rated, ANSUL approved, fusible link in terminal detector.
23. Cock the regulated release mechanism and install lock pin (Part No. 438031).
24. Locate detector linkage and correctly position in each bracket.
25. Lower tension lever to "DOWN" position.
26. Inspect the base of the wire rope clamping device to make certain there is a minimum of 1/4 in. (6.4 mm) to a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer assembly and the cable lever assembly.

NOTICE

If clearance is not 1/4 in. (6.4 mm) minimum to a maximum of 3/8 in. (9.5 mm), raise tension lever to "UP" position, raise trip hammer 3/8-1/2 in. (9.6-12.7 mm), tighten set screws, and repeat Steps 25 and 26.

27. Remove lock pin.
28. Manually test the regulated release mechanism by operating the remote manual pull station.
29. Recock the regulated release mechanism and insert the lock pin.
30. Reset all devices which were affected by the system actuation. Refer to the following "Resetting" section.

RESETTING

Resetting Remote Manual Pull Station

Metal Stamped Style (Part No. 4835 and 54011)

Reset each remote manual pull station by completing the following steps:

1. If necessary, remove set screw that is retaining the break glass rod.
2. If necessary, carefully remove any remaining broken glass from station.
3. Press and position ring handle in proper location against cover and slide the replacement glass break rod (Part No. 4834) through stud and handle.
4. Tighten set screw into stud.
5. If no other resetting is required, refer to "Replacement Cartridge," Page 7-5, and complete steps 1 through 5.

Molded Composite Style with Side Shields (Part No. 434618 and 435960)

1. If necessary, carefully remove any remaining broken glass from station.
2. Insert the break rod into the two holes toward the top of the pull knob.
3. Pull the excess slack back into the AUTOMAN Release. This will pull the pull knob assembly in place.

NOTICE

Take care in snapping in the ends of the break rod into the pull station side shields while rotating the entire assembly.

4. Hold the pull knob assembly against the faceplate. Rotate the pull knob assembly counterclockwise until the break rod and pull knob snap in place.
5. Snap the PULL tab onto the pull knob so it is legible.
6. If no other resetting is required, refer to "Replacement Cartridge," Page 7-5, and complete steps 1 through 5.

RESETTING (Continued)

Resetting Mechanical Gas Shut-Off Valve

Reset each mechanical gas shut-off valve by completing the following steps:

⚠ WARNING

To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

1. Remove side cover from gas valve housing.
2. Extend air cylinder rod to full “UP” position. Air cylinder is located inside the regulated release assembly enclosure.
3. Recock gas valve by pulling valve stem up so pin in stem engages in cocking lever.
4. Check burners for gaseous odor. IF GASEOUS ODOR EXISTS, MANUALLY PUSH THE AIR CYLINDER ROD TO THE FULL “DOWN” POSITION IMMEDIATELY. This will cause the mechanical gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
5. If no gaseous odor exists, pilot light may be ignited at this time.
6. Reinstall side cover to gas valve housing. On ANSUL type valve, make certain roll pin is positioned within both sides of the valve housing slot and secure visual inspection seal (Part No. 197).
7. If no other resetting is required, refer to “Cartridge Replacement” and complete steps 1 through 5.

Resetting Electrical (Snap-Action) Switch

Reset the electrical (snap-action) switch by completing the following steps:

1. Make certain the power source is on.
2. Electric (snap-action) switch is reset automatically when the regulated release mechanism is recocked.
3. If no other resetting is required, refer to “Cartridge Replacement” and complete steps 1 through 5.

Resetting Electrical Gas Shut-Off Valve

Reset each electric gas shut-off valve by completing the following steps:

⚠ WARNING

To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

1. Make certain the power source is on.
2. Depress reset button on manual reset relay (red light on). Gas valve will resume its normal operating (open) position.
3. Check burners for gaseous odor. **IF GASEOUS ODOR EXISTS, TURN OFF POWER SOURCE IMMEDIATELY.** This will cause the electric gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
4. If no gaseous odor exists, pilot light may be ignited at this time.
5. If no other resetting is required, refer to “Replacement Cartridge” and complete steps 1 through 5.

RESETTING (Continued)

Resetting Pressure Switch

Reset the pressure switch by completing the following:

1. Depress the reset button(s) on the pressure switch cover. The pressure switch assembly(ies) is located on the right side of the regulated release enclosure. An audible click will be heard to verify the pressure switch has resumed its normal (non-actuated) condition.
2. If no other resetting is required, refer to "Replacement Cartridge" and complete steps 1 through 5.

REPLACEMENT CARTRIDGE

To complete the recharge and resetting procedures:

1. Remove shipping cap and weigh replacement cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
2. Make certain regulated release mechanism is cocked and lock pin is installed. Then, install replacement cartridge into the regulated release assembly and each regulated actuator receiver and hand tighten.
3. Remove lock pin.
4. Snap cover on regulated release and each regulated actuator assembly, insert visual seal (Part No. 197) in upper and lower cover hole and secure.

CAUTION

Before installing cover, make certain detection tension lever is secured in the "DOWN" position to enable automatic detection and operation of the AUTOMAN Regulated Release.

5. Record recharge date on tag attached to unit and/or in a permanent file.

The maintenance information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the maintenance of the R-102 system must be trained and hold a current ANSUL certificate in an R-102 training program.

Maintenance is required semi-annually. At the 12 year interval, along with the normal maintenance exam, the tank(s) must be hydro-tested and the regulator(s) must be flow tested.

Prior to performing the required maintenance steps, verify that the R-102 system protection is designed and installed correctly for the existing appliance and ventilation system configuration. If not, make corrections as required.

SEMI-ANNUAL MAINTENANCE EXAMINATION

Semi-annual maintenance procedures for single, double, and multiple-tank systems are as follows.

NOTICE

Under certain circumstances hood and duct cleaning operations may render the fire suppression system ineffective due to a coating of cleaning chemical left on the detection equipment or mishandling of the system by cleaning service personnel. **Therefore, it is strongly recommended that the R-102 system be completely inspected and serviced by an authorized ANSUL distributor immediately following any such cleaning operations.**

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) or lock pin (Part No. 438031) on the cocked regulated release mechanism. See Figure 8-1 or Figure 8-2.

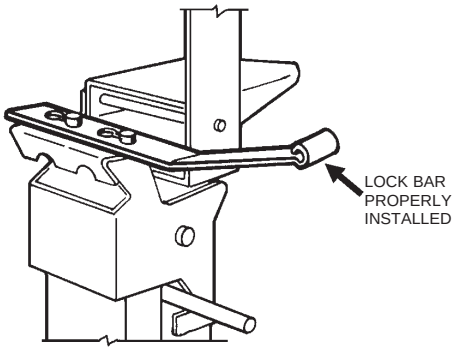


FIGURE 8-1
000321

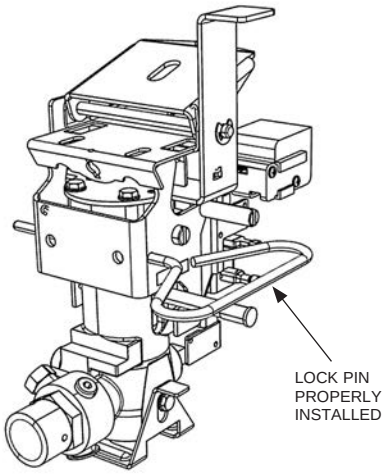


FIGURE 8-2
009462

3. Remove cartridge from regulated release assembly and each regulated actuator assembly, install safety shipping cap, and set aside in a safe location.
4. Check to make certain the actuation line used to connect the regulated actuator assembly(s) to the AUTOMAN regulated release assembly is connected to the high pressure side (right side) of the cartridge receiver in the AUTOMAN and that it is intact, with all fittings securely tightened. This includes any 1/8 in. copper tubing and fittings used to connect to the air cylinder for the ANSUL mechanical gas valve.

CAUTION

If the actuation line leaks pressure, the regulated actuator assembly(s) may not operate. A severe leak can render the entire system inoperable.

5. To check for leaks in the actuation line, a hand held or electric vacuum pump may be used:
   a. Disconnect the actuation line from the AUTOMAN regulated release cartridge receiver and connect the pump to the line.
   b. The pump should pull a vacuum to 20 inches of mercury, as shown on the gauge. Leaks should not exceed 5 inches of mercury loss within a 30 second time frame.
   c. If the gauge indicates a leak in the line, examine for loose connections or damage. Repair or replace as needed.
   d. If leakage is not due to piping, disassemble the pneumatic actuator assembly(s) in the regulated actuator(s) and inspect the actuator and the o-ring in the actuator. Repair or replace as needed.

   Note: Vacuum pumps can be obtained from automotive parts/supply stores.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

Alternate Test Method:

The actuation line can also be pressurized with either CO_2 or N_2 from a cartridge or with dry air, CO_2, or N_2 from a larger cylinder.

a. Cock the AUTOMAN regulated release assembly and carefully insert lock bar (Part No. 14985) or lock pin (Part No. 438031). See Figure 8-9 or Figure 8-10.

b. Make certain expellant gas line hose and/or pipe from the regulator in the AUTOMAN regulated release is disconnected from agent storage tanks.

c. Connect Regulator Test Kit (Part No. 56972) to one of the expellant gas line hoses and securely cap the remaining hose or pipe. See Figure 8-12.

d. Verify that no cartridges are installed in the AUTOMAN or the regulated actuator assembly(s).

e. To verify operation of the regulated actuator assembly(s), Pressure Adaptor (Part No. 427560) can be used to connect to a pressurized CO_2 or N_2 cylinder, instead of using a CO_2 or N_2 cartridge.

Note: The pressure adaptor assembly comes with a 1/4 in. NPT pipe plug that is required to be installed in the side of the adaptor.

f. Install a suitable 1/4 inch air pressure quick connect fitting (supplied by others) to the bottom of the adaptor.

g. Install and hand tighten the adaptor to the cartridge receiver and securely attach the corresponding connector from the gas cylinder hose assembly.

h. With the valve on the regulator test kit closed, remove the lock bar or lock pin and operate the remote cable operated pull station to operate the regulated release.

i. Open the pressure cylinder valve to verify that the regulated actuator assembly(s) has operated properly and the air cylinder has unlatched the ANSUL mechanical gas valve, if used.

j. Once regulated actuator and gas valve operation is verified, close the valve on the pressurized cylinder, if used, and open the valve on the regulator test kit to relieve any residual pressure.

Note: Although only required at 12 year intervals, the regulator in the AUTOMAN regulated release can also be verified. See Maintenance steps on page 8-6.

k. Re-cock the AUTOMAN regulated release and remove the spent cartridge or pressure adaptor from the cartridge receiver.

l. If there were leaks in the actuation line or in the 1/8 inch copper gas tubing for the air cylinder(s), re-tighten the fittings or replace damaged components.

m. If the cartridge puncture pin in the regulated actuator(s) did not fully extend, dismantle the actuator and inspect components of the actuator assembly.

- Once the pneumatic actuator is disassembled, remove the actuator piston assembly and check the interior walls of the actuator body for signs of damage or corrosion.
- Check the o-ring for elasticity or cuts. Replace, if necessary. Clean and coat o-ring with a good grade of extreme temperature silicone grease and reinstall.
- Re-assemble the actuator assembly(s), and reconnect all actuation and all expellant piping or hose.

6. Remove gasket from cartridge receiver in regulated release mechanism and each regulated actuator. Check gasket for elasticity or cuts and replace Gasket (Part No. 181) if necessary. Clean and coat gasket lightly with a good grade of extreme temperature grease. Reinstall gasket into cartridge receiver(s).

7. From tank in regulated release assembly: Disconnect the expellant gas hose from each tank adaptor assembly.

   From tank in bracket/enclosure assembly: Disconnect the expellant gas piping union at each tank adaptor inlet line.

8. Disconnect distribution piping union at each tank adaptor outlet line.

9. From tank in enclosure: Remove tank. Keep in upright position to avoid spilling the agent.

   From tank in bracket assembly: Loosen wingnut, disengage bracket band, and remove each tank. Keep tank in upright position to avoid spilling the agent.

10. Remove tank adaptor/tube assembly from each tank. See Figure 8-3.

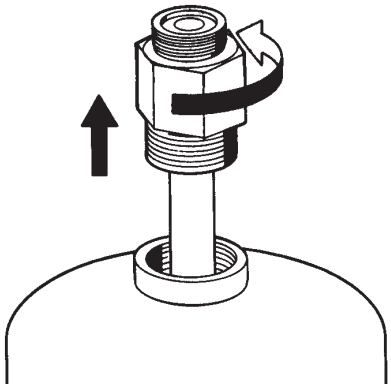


FIGURE 8-3
000291

11. Make certain that each tank is filled with 1.5 (5.8 L) or 3.0 (11.6 L) gallons of only ANSULEX Low pH Liquid Fire Suppressant. Fill level to be ONLY to the level indicated in the “Installation” section. See Page 5-3, Figure 5-6, for detailed filling tolerances.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

Alternate Test Method: (Continued)

12. Examine threads on each tank adaptor and tank collar for nicks, burrs, or cross-threading. Clean and coat o-ring with a good grade of extreme temperature grease. See Figure 8-4. Remove 1/4 in. vent plug and clean and inspect for free movement and corrosion (if necessary, replace Vent Plug (Part No. 74247)). Reinstall vent plug. Make certain bursting disc is in place and silver side is away from tank. Clean seating surface and return adaptor/tube assembly to each tank. Tighten securely.

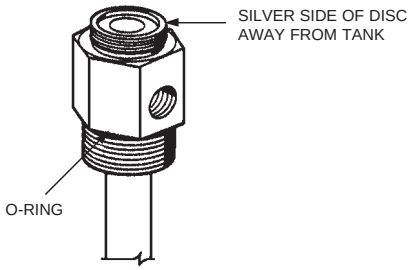


FIGURE 8-4
000364

13. Place fully charged tanks in enclosures and/or brackets and secure.
14. Carefully assemble and wrench tighten all expellant gas and agent distribution piping.
15. Remove blow-off caps from nozzles. Inspect each blow-off cap and replace if deteriorated. On older style metal blow-off caps with spring clips, make certain spring clip rotates freely on cap. On newer metal blow-off caps, make certain integral o-ring is intact and undamaged. If there are signs of deterioration, replace cap(s).

> ***NOTICE***
>
> Rubber blow-off caps that have been installed in the system for one year or more must be replaced.

16. Verify that all nozzle types are correct. Check all nozzles to ensure that they are free of cooking grease build-up and have a thin coating of clean silicone grease across the orifice.

    Note: Do not allow silicone grease to enter nozzle orifice.

    Note: If there is any evidence of cooking grease or other residue in the nozzles or distribution piping or agent or agent residue in the distribution piping, the entire piping network must be inspected and thoroughly cleaned. Portions of piping that cannot be thoroughly cleaned must be replaced.

    Utilizing the Nozzle Aiming Device (Part No. 431992 or Part No. 439877) ensure that all nozzles are correctly aimed at the appropriate location on the appliance. Reinstall blow-off caps.

17. Remove the lock bar or lock pin and manually test the regulated release assembly by operating the remote manual pull station. Check pull station cover for damage or wear. Replace cover if cable has worn a groove in the cover as deep as the diameter of the cable. If flexible conduit is used in installation, check conduit for damage, cuts and sharp bends.
18. Cock the regulated release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041). See Figure 8-5.

    Before proceeding with Step 18, test electric (snap-action) switches:

    a. With the AUTOMAN in the cocked or ready position, press the lever of each switch up. If the switch is working properly, there should be an audible click.

    b. With the AUTOMAN in the fired position, press the lever of each switch up, there should be no audible click.

    c. If an audible click is heard in the fired position several adjustments can be made. The trip lever extension pin can be rotated so the peak of one of the hex points is pointed up against the switch levers. Tighten it in that position. If this doesn't resolve the problem, loosen the screws holding the switches, apply a small counterclockwise torque on the switches and retighten the screws. If necessary, a final adjustment can be made by removing the snap action switch and bending the lever slightly.

    d. After adjustments, repeat Steps a. and b. Then, recock AUTOMAN and insert lock bar or lock pin.

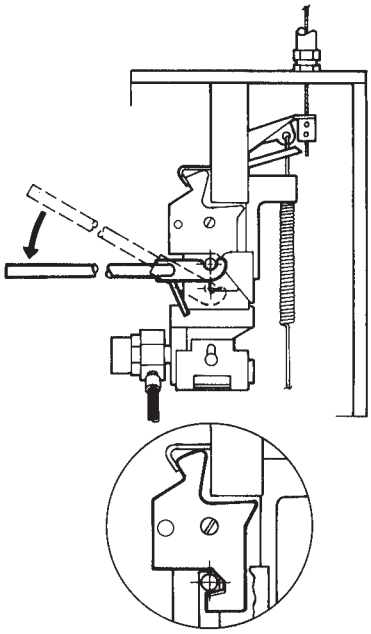


FIGURE 8-5
009468

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

Alternate Test Method: (Continued)

19. Raise tension lever to "UP" position. See Figure 8-6.

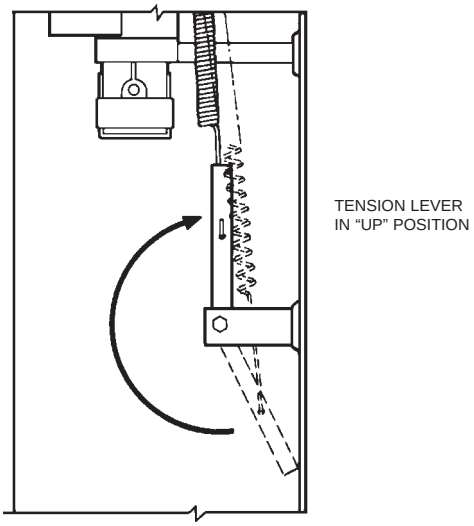


FIGURE 8-6
000322

▸ 20. Install test link (Part No. 24916) in terminal detector.

21. Lower tension lever to "DOWN" position. See Figure 8-7.

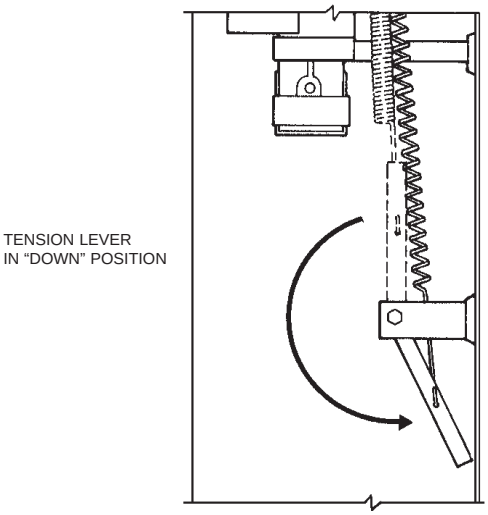


FIGURE 8-7
001096

22. Using wire cutter, cut test link at terminal detector to simulate automatic actuation.

> ***NOTICE***
>
> If regulated release mechanism does not actuate, refer to Steps 2 and 3 of "Testing Detection System" in "Testing and Placing in Service," Section 6, Page 6-3.

23. After successful actuation, raise the tension lever to "UP" position.

24. Remove and destroy all existing fusible links from the terminal and series detector brackets and replace with properly-rated ANSUL approved, fusible links in accordance with NFPA 17A.

25. Inspect wire rope at all detector locations, pulley elbows, pulley tee and at AUTOMAN release. If wire rope shows signs of wear or fraying, replace entire length.

26. Lower the tension lever to "DOWN" position.

▸ 27. Recock the regulated release mechanism and insert the lock bar or lock pin.

28. Inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 8-8.

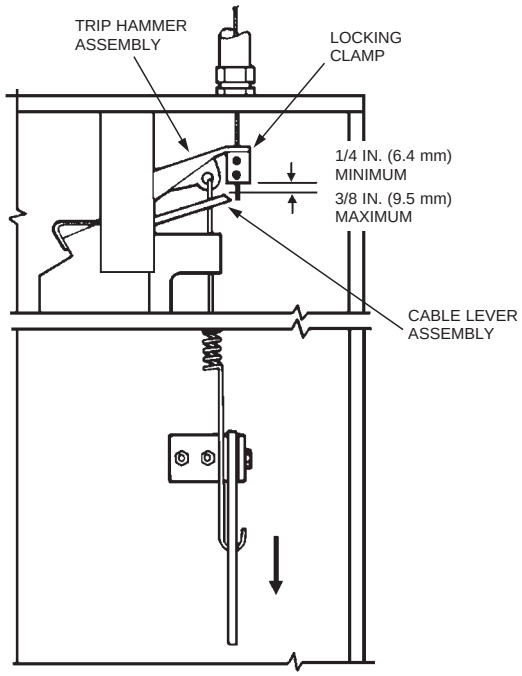


FIGURE 8-8
000329

> ***NOTICE***
>
> If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever to "UP" position, raise trip hammer 3/8-1/2 in. (9.5-12.7 mm), tighten set screws, and repeat Steps 24 and 26.

29. For scissor-style linkage, locate linkage and properly position in each bracket all the way toward termination end of detection run.

30. If a mechanical gas valve is installed, begin the test procedure by removing both side covers.

31. At the regulated release, push the air cylinder rod fully down.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

Alternate Test Method: (Continued)

32. The gas valve should operate.
33. Pull the air cylinder rod to its fully extended position.
34. Re-cock the gas valve by pulling the valve stem up until the pin in the stem engages the cocking lever.
35. Reinstall side covers on the gas valve and connect the visual indication seal.
36. Test electric switches and electric gas valves by completing steps on Page 6-2 in Section 6, “Testing and Placing In Service.”
37. Before reinstalling cartridge, reset all additional equipment by referring to appropriate section of “Recharge and Resetting Procedures,” Section 7.
38. Remove shipping cap and weigh each cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
39. Make certain regulated release mechanism is cocked and lock bar or lock pin is installed, then screw replacement cartridge into regulated release mechanism and each regulated actuator receiver(s) and hand tighten.
40. Remove lock bar or lock pin.

CAUTION

Make certain tension lever is in the “DOWN” position after completing all tests. Failure to put the tension lever in the “DOWN” position will cause the system to not operate automatically.

41. Snap cover on regulated release and each regulated actuator, insert visual seal (Part No. 197) through holes in cover and box, and secure.
42. If system contains an Agent Distribution Hose and Restraining Cable Assembly, also perform the following steps:
    a. Carefully pull or push out the appliance and verify that the Restraining Cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the Agent Distribution Hose or hose-to-pipe connections.
    b. Check the Restraining Cable to verify it is not frayed and is securely fastened to the appliance and the wall or restraining location.
    c. Check the hose and hose fittings and verify that the hose remains in a vertical natural loop with no noticeable fatigue at hose end couplings, no hose twists, no hose kinking or sharp bends.
    d. Check the outer hose covering for signs of damage, checking, tears, or wear. If any of these signs are observed, replace the hose.
    e. Return the appliance to its normal operating position. Again, check the hose and hose fittings to verify that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance. If any of these conditions exist, the hose and/or hose connections will require installation modifications.
    f. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (77 mm) bend radius (6 in. (153 mm) diameter). If less, replace hose.
    g. Verify that the appliance is returned to its original desired location. Failure to do so may result in undue stress and fatigue of the hose and hose connections.
43. Record semi-annual maintenance date on tag attached to unit and/or in a permanent file.

ANNUAL MAINTENANCE EXAMINATION

In addition to performing all the steps necessary for Semi-Annual Maintenance, disconnect the agent discharge piping from the storage tank outlet(s) and verify that the agent distribution piping is not obstructed.

1. At least annually, use dry air or nitrogen and blow through the agent distribution piping with the nozzle blow-off caps removed, verifying that dry air or nitrogen is discharging at each nozzle location.

CAUTION

If nozzles show signs of cooking grease migration into the orifice of the nozzle, or if there is evidence of agent residue in the nozzle(s) or the inlet to the agent distribution piping, some or all of the piping may require dismantling to verify that the piping is not obstructed.

2. At least annually, all rubber nozzle blow-off caps must be replaced.

   Note: Annual replacement is not necessary for metal blow-off caps.

12-YEAR MAINTENANCE EXAMINATION

In addition to performing all of the steps necessary for semi-annual and annual maintenance, the following twelve-year maintenance procedures for single, double, and multiple-tank systems must be performed.

NOTICE

Under certain circumstances hood and duct cleaning operations may render your fire suppression system ineffective due to a coating of cleaning chemical left on the detection equipment or mishandling of the system by cleaning service personnel.

Therefore, it is strongly recommended that the R-102 system be completely inspected and serviced by an authorized ANSUL distributor immediately following any such cleaning operations.

At twelve-year intervals, the liquid agent tank(s) must be hydrostatically tested and refilled with a fresh charge of ANSULEX Low pH Liquid Fire Suppressant. The date of manufacture is stamped on the bottom of the agent tank or on the tank label.

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) or lock pin (Part No. 438031) on the cocked regulated release mechanism. See Figure 8-9 or Figure 8-10.

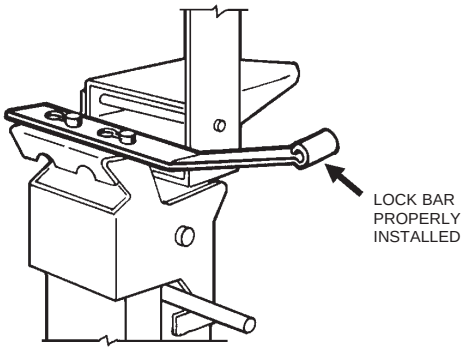


FIGURE 8-9
000321

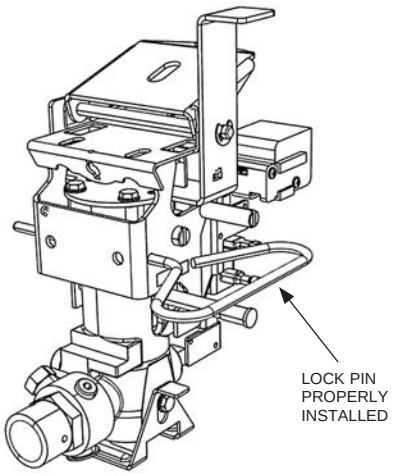


FIGURE 8-10
009462

3. Remove cartridge from regulated release assembly and each regulated actuator assembly, install safety shipping cap, and set aside in a safe location.

CAUTION

Do not reinstall cartridge at this time or system may be actuated.

4. Remove gasket from cartridge receiver in regulated release mechanism and each regulated actuator. Check gasket for elasticity or cuts and replace Gasket (Part No. 181) if necessary. Clean and coat gasket lightly with a good grade of extreme temperature grease. Reinstall gasket into cartridge receiver(s).
5. From tank in enclosure: Disconnect the expellant gas piping or hose from each tank adaptor assembly.

   From tank in bracket assembly: Disconnect expellant gas piping union at each tank adaptor inlet line.
6. Disconnect distribution piping union at each tank adaptor outlet line.
7. From tank in enclosure: Remove tank.

   From tank in bracket assembly: Loosen wingnut, disengage bracket band, and remove each tank. Keep tank in upright position to avoid spilling the agent.
8. Loosen tank adaptor/tube assembly and remove.

12-YEAR MAINTENANCE EXAMINATION (Continued)

9. **⚠ CAUTION**

   Safety glasses should be worn during transfer operations of ANSULEX Low pH Liquid Fire Suppressant. Avoid contact with skin or eyes. In case of contact, flush immediately with water for 15 minutes. If irritation persists, contact a physician. Do not take internally. If taken internally do not induce vomiting. Dilute with water or milk and contact a physician.

   Pour the liquid agent from the tank into a clean, plastic container, and flush tank with clear water.

10. At this point, each liquid agent tank, including the 1/4 in. gas hose assembly, must be HYDROSTATICALLY TESTED to 330 psi (26.6 bar). Refer to "Hydrostatic Test Instructions," F-7602, for test adaptors and instructions.

    NOTICE

    DO NOT hydrostatically test a red painted mild steel agent storage tank. Instead, replace the tank with a new stainless steel tank shipping assembly (3 Gallon (Part No. 429862) or 1.5 Gallon (Part No. 429864)).

11. Verify date stamped on cartridge. The cartridge must also be hydrotested at intervals not greater than 12 years. (European cartridges are not refillable, therefore cannot be hydrotested and refilled. They must be discarded).

12. If cartridge date indicates the need for hydrotesting, the cartridge must be bled down through normal AUTOMAN release operation, returned to Tyco Fire Protection Products for credit (or hydrotested by properly trained personnel at authorized cartridge refilling stations), and replaced with a charged, replacement cartridge.

    NOTICE

    Cartridge bleed down can be used to verify pneumatic accessories operation.

13. If system contains an Agent Distribution Hose and Restraining Cable Assembly, a hydrostatic test is required at 220 psi (15.2 bar) for hose assembly.

14. The regulator must be flow tested at 12 year intervals. Check the date code stamped on the regulator body to determine if the regulator(s) requires the 12 year testing (see data code table). If regulator does not require testing, proceed to step 12. Flow test the regulator(s) per the following table:

Date Code Table

UL 541L

Month*	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	J
Oct	K
Nov	L
Dec	M

Year*	
1981	K
1982	L
1983	M
1984	N
1985	P
1986	R
1987	S
1988	T
1989	U
1990	V
1991	W
1992	Y
1993	Z
1994	A
1995	B
1996	C
1997	D
1998	E
1999	F
2000	G
2001	H
2002	J
2003	K
2004	L
2005	M

*STAMPED MONTH 1ST, YEAR 2ND

UL 74FF

Year*	
2005	E
2006	F
2007	G
2008	H
2009	I
2010	J
2011	K

Month**	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	I
Oct	J
Nov	K
Dec	L

*STAMPED YEAR 1ST, MONTH 2ND

**STAMPED "I" FOR SEPTEMBER

UL 74FF

Month*	
Jan	A
Feb	B
Mar	C
Apr	D
May	E
Jun	F
Jul	G
Aug	H
Sep	J
Oct	K
Nov	L
Dec	M

Year*	
2011	T
2012	U1
2013	U2
2014	U3
2015	U4
2016	U5
2017	U6
2018	U7
2019	U8
2020	U9
2021	V1
2022	V2
2023	V3
2024	V4
2025	V5

*STAMPED MONTH 1ST, YEAR 2ND

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 14 (Continued)

a. Regulated Release Mechanism

For First Tank: Disconnect expellant gas pipe or hose from tank. Connect regulator test kit (Part No. 56972) to hose. See Figure 8-11.

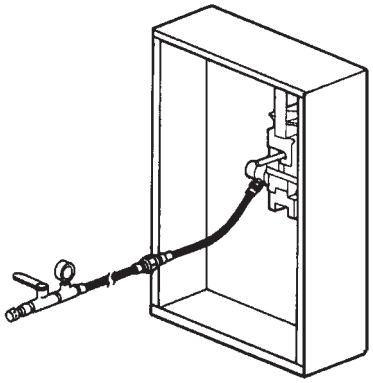


FIGURE 8-11
000369

For Second Tank: Disconnect expellant gas piping at union. Remove union from expellant gas piping and install pipe cap to prevent cartridge pressure from escaping during test. See Figure 8-12.

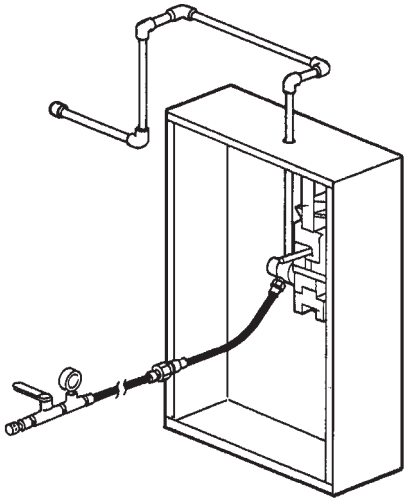


FIGURE 8-12
000370

Pressure Switch: If an ANSUL supplied pressure switch is still in good operating condition, it should remain connected as part of system maintenance test.

NOTICE

For multiple-tank systems, one test kit (Part No. 56972) is required for each regulator in the system.

b. Regulated Actuator

For First Tank: Disconnect expellant gas hose from tank. Connect regulator test kit (Part No. 56972) to hose. See Figure 8-13.

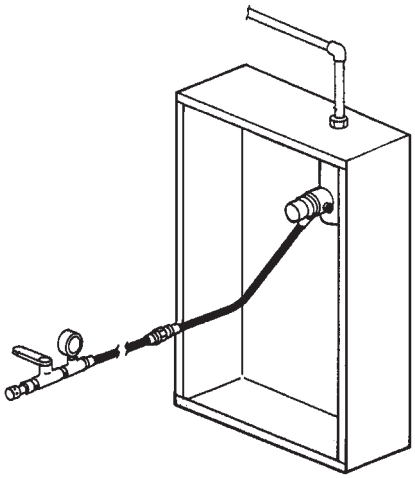


FIGURE 8-13
000371

For Second Tank: Disconnect expellant gas piping at union. Remove union from expellant gas piping and install pipe cap to prevent cartridge pressure from escaping during test. See Figure 8-14.

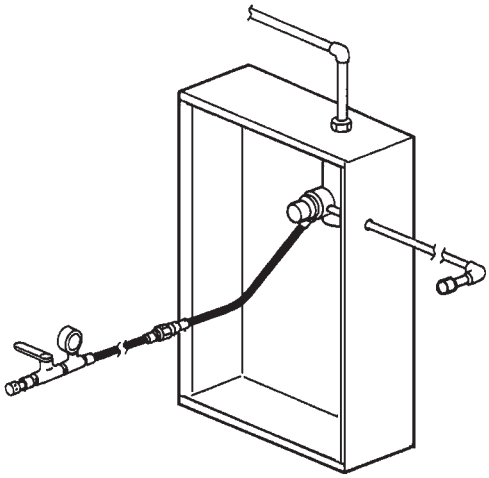


FIGURE 8-14
000372

NOTICE

Make certain valve is **closed** on regulator test kit or pressure will escape before test can be performed.

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 14 (Continued)

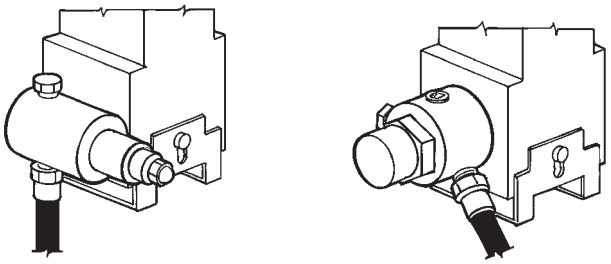
c. Install either a nitrogen or CO_2 cartridge into release mechanism and each regulated actuator provided with the system. (Cartridge should be conditioned to approximately 70 °F (21 °C) before test.)

NOTICE

Before continuing with Step d, make certain valve on test kit is closed.

d. Remove lock bar or lock pin and operate remote manual pull station to actuate the regulated release and supply pressure to each test kit.

Two styles of regulators are used with the R-102 release mechanisms. The diaphragm style (see Figure 8-15) was used in R-102 systems up to approximately 1988. The piston style (see Figure 8-15) has been used since 1988. Each style requires a slightly different flow test procedure. Use the appropriate flow test procedure as stated in Step e.



DIAPHRAGM STYLE (USED UNTIL 1988)

PISTON STYLE (USED AFTER 1988)

FIGURE 8-15
002301

e. Flow test each regulator by completing the following steps:

Diaphragm Style – The correct pressure should read 90 to 110 psi (6.2 to 7.6 bar) with the valve on the test kit closed and 80 psi (5.5 bar) with the valve on the test kit opened. Keep the valve opened to completely empty the pressure cartridge after pressure test has been verified.

Piston Style – Open the valve on the regulator test kit. The correct pressure should read between 95 to 125 psi (6.6 to 8.6 bar). Keep the valve open to completely empty the pressure cartridge.

If necessary, continue to flow test at each additional regulated actuator. Test each regulated actuator by repeating Step e.

f. Cock release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041) and insert lock bar (Part No. 14985) or lock pin (Part No. 438031).

g. Remove empty nitrogen cartridge(s) from release mechanism and each regulated actuator.

h. Remove test kit(s) from release mechanism and each regulated actuator.

i. If regulator test was not successful, replace regulator.

j. Reconnect all expellant gas lines.

k. Reset all additional equipment that was operated by release mechanism.

15. Examine threads on each adaptor and tank collar for nicks, burrs, or cross-threading. Clean and coat o-ring with a good grade of extreme temperature grease. Make certain bursting disc is in place and silver side is away from tank. See Figure 8-16.

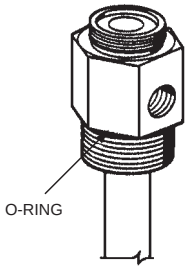


FIGURE 8-16
000364

16. Examine pick-up tube for signs of damage or corrosion. Replace assembly if needed.

17. Refill each tank with 1.5 (5.8 L) or 3.0 (11.6 L) gallons of only new ANSULEX Low pH Liquid Fire Suppressant. **Note:** Use a funnel with a screen to stop any foreign material from entering the tank.

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **DO NOT FILL WITH COLD AGENT.** Refer to the “Installation” section, Page 5-3 for maximum fill heights for ANSULEX Low pH agent storage tanks. **DO NOT OVERFILL.** Overfilling may result in agent entering gas hose and regulator, potentially causing system malfunction.

18. Clean seating surface and return each adaptor/tube assembly to tank. Firmly tighten.

NOTICE

Do not reinstall any tank at this time.

19. Remove blow-off caps from nozzles. Inspect each blow-off cap and replace if deteriorated. On older style metal blow-off caps with spring clips, make certain spring clip rotates freely on cap. On newer metal blow-off caps, make certain integral o-ring is intact and undamaged. If there are signs of deterioration, replace cap(s).

NOTICE

Rubber blow-off caps that have been installed in the system for one year or more must be replaced.

12-YEAR MAINTENANCE EXAMINATION (Continued)

20. Check all nozzles to ensure that they are free of cooking grease build-up and have a covering of clean silicone grease on the orifice. Reinstall blow-off caps.
21. Remove lock bar or lock pin and manually test the regulated release assembly by operating the remote manual pull station.
22. Cock the regulated release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041). See Figure 8-17.

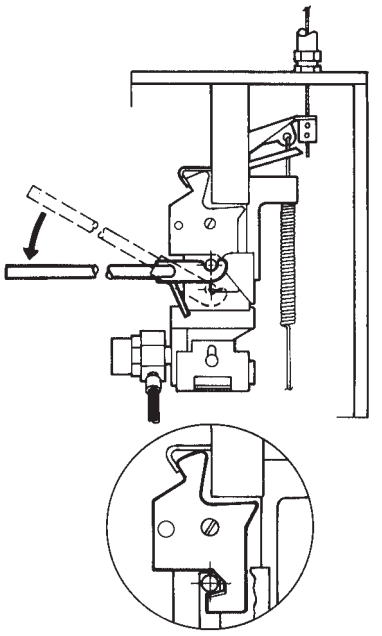


FIGURE 8-17
009468

23. Raise the tension lever to “UP” position. See Figure 8-18.

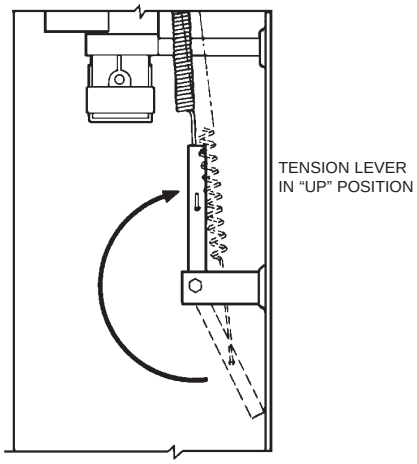


FIGURE 8-18
000362

24. Install test link (Part No. 24916) in terminal detector.
25. Lower tension lever to “DOWN” position. See Figure 8-19.

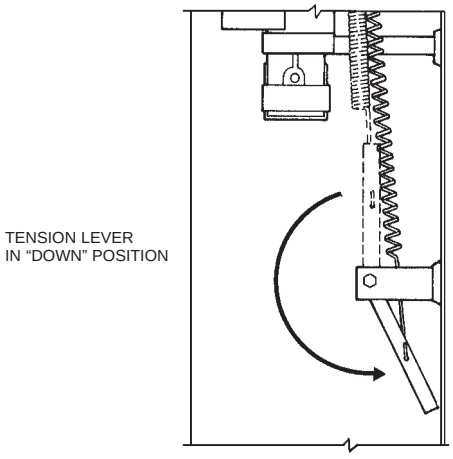


FIGURE 8-19
001096

26. Using wire cutter, cut test link at terminal detector to simulate automatic actuation.

NOTICE

If regulated release mechanism does not actuate, refer to Steps 2 and 3 of “Testing Detection System” in “Testing and Placing in Service,” Section 6.

27. After successful actuation, raise the tension lever to “UP” position.
28. Remove and destroy all existing fusible links from the terminal and series detector brackets and replace with properly-rated ANSUL approved, fusible links in accordance with NFPA 17A.
29. Lower tension lever to “DOWN” position.
30. Recock the regulated release mechanism and insert lock bar or lock pin.

12-YEAR MAINTENANCE EXAMINATION (Continued)

31. Inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 8-20.

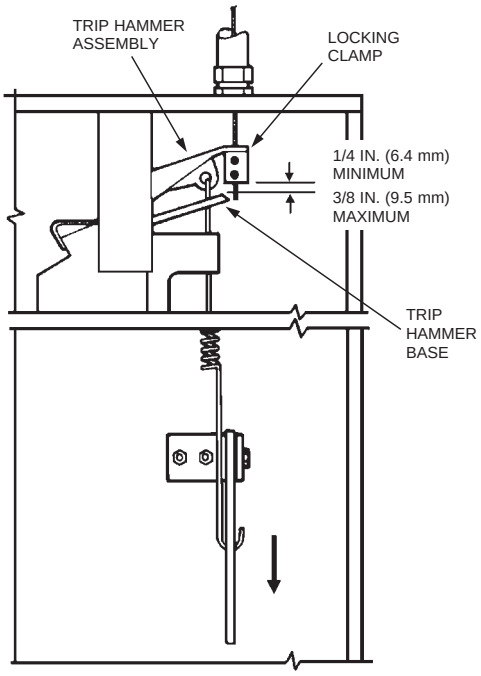


FIGURE 8-20
000329

NOTICE

If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever to "UP" position, raise trip hammer 3/8-1/2 in. (9.5-12.7 mm), tighten set screws, and repeat Steps 29 and 31.

32. Locate detector linkage and properly position in each bracket.
33. Make certain additional devices have operated as intended.
34. Before reinstalling cartridge, reset all additional equipment by referring to appropriate section of "Recharge and Resetting Procedures," Section 7.
35. Place each fully charged tank in enclosure and/or bracket and secure.
36. Reconnect all distribution piping and expellant gas piping unions as required. Wrench tighten.
37. Check each gas cartridge by removing shipping cap and weighing cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
38. ▸ Make certain regulated release mechanism is cocked and lock bar or lock pin is installed, then screw replacement cartridge into regulated release mechanism and each regulated actuator receiver(s) and hand tighten.
39. ▸ Remove lock bar or lock pin.
40. Install cover on regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or visual inspection seal. Insert seal (Part No. 197) in each upper and lower cover hole, if applicable. If system is installed in an OEM enclosure, attach enclosure cover and secure with appropriate hardware or procedure.

▸ **CAUTION**

Before installing cover, make certain tension lever is in the "DOWN" position after completing all tests. Failure to put the tension lever in the "DOWN" position will cause the system to not operate automatically.

41. Record date of 12 year maintenance examination on tag attached to enclosure and/or in a permanent file.

NOTES:

SYSTEM SELECTION GUIDE

Note: System options do not cover all conceivable/acceptable variations. They are listed here as a general guideline to show the most common type arrangement for multiple systems. Based on certain system designs utilizing manifolding, non-manifolding, 3-tank systems, etc., other tank/cartridge combinations can be designed. The combinations below are based on 11 flow, 3 gallon tanks and 5 flow, 1.5 gallon tanks. More competitive designs may be available by utilizing 12 flow and 6 flow systems when appropriate.

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
1-5	1	Single	1.5 Gal. Reg. Release	101-10 (423439)	LT-20-R (423429)
6-11	1	Single	3 Gal. Reg. Release	101-20 (423441)	LT-30-R (423435)
12-16	2	Double	1.5 Gal. Reg. Release 3 Gal. Additional Tank	101-30 (423443)	Double (423493)
17-22	2	Double	3 Gal. Reg. Release 3 Gal. Additional Tank	101-30 (423443)**	Double (423493)
▸ 17-22	2	Manifold	3 Gal. Reg. Release 3 Gal. Additional Tank	—	Double (423493)
23-27	3	Multiple	1.5 Gal. Reg. Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-10 (423439) 101-30 (423443)***	LT-20-R (423429) LT-A-101-30 (423491)
23-33	3	Multiple	3 Gal. Reg. Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-20 (423441) 101-30 (423443)***	LT-30-R (423435) LT-A-101-30 (423491)
▸ 23-33 (Optional)	3	Multiple	3 Gal. Reg. Release (2) 3 Gal. Additional Tanks	N/A	Double (423493)
34-38	4	Multiple	1.5 Gal. Reg. Release 3 Gal. Reg. Actuator Double 3 Gal. Tank Box	101-10 (423439) N/A	LT-20-R (423435) LT-A-101-30 (423491)
34-38 (Optional)	4	Multiple	1.5 Gal. Reg. Release 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-30 (423443) 101-30 (423443)***	Double (423493) LT-A-101-30 (423491)
39-44	4	Multiple	3 Gal. Reg. Release 3 Gal. Reg. Actuator Double 3 Gal. Tank Box	101-20 (423441) N/A	LT-30-R (423435) LT-A-101-30 (423491)
39-44 (Optional)	4	Multiple	3 Gal. Reg. Release 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-30 (423443)** 101-30 (423443)***	Double (423493) LT-A-101-30 (423491)
45-49	5	Multiple	1.5 Gal. Reg. Release 3 Gal. Additional Tank 3 Gal. Reg. Actuator Double 3 Gal. Tank Box	101-30 (423443) N/A	Double (423493) LT-A-101-30 (423491)

* Based on 5 flow numbers for a 1.5 gal system and 11 flow numbers for a 3 gal. system.

** If tanks are manifolded, only a "double tank" nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
45-49 (Optional)	5	Multiple	1.5 Gal. Reg. Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-10 (423439) 101-30 (423443)*** 101-30 (423443)***	LT-20-R (423429) LT-A-101-30 (423491) LT-A-101-30 (423491)
50-55	5	Multiple	3 Gal. Reg. Release 3 Gal. Additional Tank 3 Reg. Actuator Double 3 Gal. Tank Box	101-30 (423443) N/A	Double (423493) LT-A-101-30 (423491)
50-55 (Optional)	5	Multiple	3 Gal. Reg. Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-20 (423441) 101-30 (423443)*** 101-30 (423443)***	LT-30-R (423435) LT-A-101-30 (423491) LT-A-101-30 (423491)
56-60	6	Multiple	1.5 Gal. Reg. Release 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-30 (423443) 101-30 (423443)*** 101-30 (423443)***	Double (423493) LT-A-101-30 (423491) LT-A-101-30 (423491)
61-66	6	Multiple	3 Gal. Reg. Release 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-30 (423443)** 101-30 (423443)*** 101-30 (423443)***	Double (423493) LT-A-101-30 (423491) LT-A-101-30 (423491)
67-71	7	Multiple	1.5 Gal. Reg. Release (2) 3 Gal. Reg. Actuator (2) Double 3 Gal. Tank Box	101-10 (423439) N/A	LT-20-R (423429) (2) LT-A-101-30 (423491)
67-71 (Optional)	7	Multiple	Remote Mechanical Release 3 Gal. Reg. Actuator 1.5 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator	101-10 (423439) 101-30 (423443) 101-30 (423443)*** 101-30 (423443)*** 101-20 (423441)***	– – LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-30-R (423435)
72-77	7	Multiple	3 Gal. Reg. Release (2) 3 Gal. Reg. Actuator (2) Double 3 Gal. Tank Box	101-20 (423441) N/A	LT-30-R (423435) (2) LT-A-101-30 (423491)
72-77 (Optional)	7	Multiple	Remote Mechanical Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator	101-10 (423439) 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)*** 101-20 (423441)	– – LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-30-R (423435)

* Based on 5 flow numbers for a 1.5 gal. system and 11 flow numbers for a 3 gal. system.

** If tanks are manifolded, only a “double tank” nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
78-82	8	Multiple	1.5 Gal. Reg. Release	101-30 (423443)	LT-30-R (423435)
			3 Gal. Additional Tank		
			(2) 3 Gal. Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal. Tank Box		
78-82	8	Multiple	Remote Mechanical Release	101-10 (423439)	– –
(Optional)			3 Gal. Reg. Actuator	101-30 (423443)	LT-A-101-30 (423491)
			1.5 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
83-88	8	Multiple	3 Gal. Reg. Release	101-30 (423443)	LT-30-R (423435)
			3 Gal. Additional Tank		
			(2) 3 Gal. Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal. Tank Box		
83-88	8	Multiple	Remote Mechanical Release	101-10 (423439)	– –
(Optional)			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
89-99	9	Multiple	Remote Mech. Release	101-10 (423439)	N/A
			(3) 3 Gal. Reg. Actuator	N/A	(3) LT-A-101-30 (423491)
			(3) Double 3 Gal. Tank Box		
89-93	9	Multiple	Remote Mechanical Release	101-10 (423439)	– –
(Optional)			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			1.5 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-20 (423441)	LT-30-R (423435)
94-99	9	Multiple	Remote Mechanical Release	101-10 (423439)	– –
(Optional)			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal. Additional Tank		
			3 Gal. Reg. Actuator	101-20 (423441)	LT-30-R (423435)

* Based on 5 flow numbers for a 1.5 gal. system and 11 flow numbers for a 3 gal. system.

** If tanks are manifolded, only a "double tank" nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
100-110	10	Multiple	Remote Mech. Release (3) 3 Gal. Reg. Actuator (3) Double 3 Gal. Tank Box 3 Gal. Reg. Actuator	101-10 (423439) N/A 101-20 (423441)	N/A (3) LT-A-101-30 (423491) LT-30-R (423435)
100-104 (Optional)	10	Multiple	Remote Mechanical Release 3 Gal. Reg. Actuator 1.5 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-10 (423439) 101-30 (423443) 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)***	– – LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491)
100-104 (Optional)	10	Multiple	Remote Mech. Release (2) 3 Gal. Reg. Actuator (2) Double 3 Gal. Tank Box (2) 3 Gal. Reg. Actuator 3 Gal. Additional Tank 1.5 Gal. Additional Tank	101-10 (423439) N/A (2) 101-30 (423443)	N/A (2) LT-A-101-30 (423491) (2) LT-A-101-30 (423491)
105-110 (Optional)	10	Multiple	Remote Mechanical Release 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank 3 Gal. Reg. Actuator 3 Gal. Additional Tank	101-10 (423439) 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)*** 101-30 (423443)***	– – LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491) LT-A-101-30 (423491)

* Based on 5 flow numbers for a 1.5 gal. system and 11 flow numbers for a 3 gal. system.

** If tanks are manifolded, only a “double tank” nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

Options are available up to a maximum of 15 tanks. Contact Technical Services Department for detailed information.

SYSTEM COMPONENT INDEX

Part No.	Description
429853	Mechanical AUTOMAN Regulated Release Shipping Assembly Includes: Regulated Release Mechanism in Stainless Steel Mounting Enclosure
429856	Electric AUTOMAN Regulated Release Shipping Assembly (120VAC) Includes: Regulated Release Mechanism with Solenoid and Switch in Stainless Steel Mounting Enclosure
429850	Regulated Actuator Shipping Assembly Includes: Actuator and Regulator in Stainless Steel Mounting Enclosure
429870	Stainless Steel Mounting Box Shipping Assembly Includes: Stainless Steel Mounting Box
429872	Two Tank Enclosure Shipping Assembly Includes: Two Expellant Gas Hoses Two Grommets Stainless Steel Mounting Box
429859	24VDC Regulated Release Shipping Assembly Includes: 24VDC AUTOMAN II-C Release Mechanism in Stainless Steel Mounting Box
430299	3 Gallon Mechanical Release Shipping Assembly including: 429853 Mechanical Regulated Release Assembly 429862 3 Gallon Tank Assembly
430300	1.5 Gallon Mechanical Release Shipping Assembly including: 429853 Mechanical Regulated Release Assembly 429864 1.5 Gallon Tank Assembly
430309	3 Gallon Regulated Actuator Shipping Assembly including: 429850 Regulated Actuator Assembly 429862 3 Gallon Tank Assembly
430316	1.5 Gallon Stainless Steel Enclosure Shipping Assembly including: 429870 Single Tank Mounting Box Assembly 429864 1.5 Gallon Tank Assembly
430317	3 Gallon Stainless Steel Enclosure Shipping Assembly including: 429870 Single Tank Mounting Box Assembly 429862 3 Gallon Tank Assembly
430324	6 Gallon Stainless Steel Enclosure Shipping Assembly including: 429872 Two Tank Mounting Box Assembly 429862 3 Gallon Tank Assembly (2)
430332	3 Gallon Mounting Bracket Shipping Assembly including: 429878 3 Gallon Mounting Bracket Assembly 429862 3 Gallon Tank Assembly

Part No.	Description
418054	OEM Regulated Electric Release Shipping Assembly (120VAC) Includes: Regulated Release Mechanism with Solenoid and Switch 1/4 in. Hose and Mounting Bracket
79493	OEM Regulated Mechanical Release Shipping Assembly Includes: Regulated Release Mechanism 1/4 in. Hose and Mounting Bracket
418691	OEM Regulated Actuator Shipping Assembly Includes: Actuator and Regulator Hose Bracket
429878	3 Gallon Bracket Assembly (Bracket Only)
433485	Remote Release Assembly
439946	OEM Remote Release Assembly
418522	OEM Regulated Actuator Shipping Assembly Includes: Actuator and Regulator Hose
429862	3 Gallon Tank Shipping Assembly
429864	1.5 Gallon Tank Shipping Assembly
56972	Regulator Test Kit Includes: Gauge, Hose and Valve Assembly
79694	1.5 Gallon (5.8 L) Container of ANSULEX Low pH Liquid Fire Suppressant
79372	3.0 Gallon (11.6 L) Container of ANSULEX Low pHLiquid Fire Suppressant
423429	Cartridge Shipping Assembly (LT-20-R) (TC/DOT)
423435	Cartridge Shipping Assembly (LT-30-R) (TC/DOT)
423493	Cartridge Shipping Assembly (R-102 Double-Tank) (TC/DOT)
423491	Cartridge Shipping Assembly (LT-A-101-30) (TC/DOT)
423439	Cartridge Shipping Assembly (101-10) (TC/DOT)
15850	Cartridge Shipping Assembly (101-10) (DOT)
423441	Cartridge Shipping Assembly (101-20) (TC/DOT)
423443	Cartridge Shipping Assembly (101-30) (TC/DOT)
428440	Cartridge Shipping Assembly (LT-20-R) (European)
428441	Cartridge Shipping Assembly (LT-30-R) (European)
428446	Cartridge Shipping Assembly (R-102 Double Tank) (European)
428442	Cartridge Shipping Assembly (LT-A-101-30) (European)

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
428443	Cartridge Shipping Assembly (101-10) (European)
428445	Cartridge Shipping Assembly (101-20) (European)
428444	Cartridge Shipping Assembly (101-30) (European)
428948	Cartridge Shipping Assembly (LT-20-R) (Australian)
426553	Cartridge Shipping Assembly (LT-30-R) (Australian)
426563	Cartridge Shipping Assembly (R-102 Double Tank) (Australian)
426555	Cartridge Shipping Assembly (LT-A-101-30) (Australian)
▸ 439839	Nozzle Shipping Assembly (1W) Includes: 25 1W Nozzles 25 Blow-Off Caps
▸ 439837	Nozzle Shipping Assembly (1/2N) Includes: 9 1/2N Nozzles 9 Blow-Off Caps
▸ 439838	Nozzle Shipping Assembly (1N) Includes: 25 1N Nozzles 25 Blow-Off Caps
▸ 439841	Nozzle Shipping Assembly (3N) Includes: 9 3N Nozzles 9 Blow-Off Caps
▸ 439840	Nozzle Shipping Assembly (2W) Includes: 25 2W Nozzles 25 Blow-Off Caps
▸ 439842	Nozzle Shipping Assembly (230) Includes: 25 230 Nozzles 25 Blow-Off Caps
▸ 439843	Nozzle Shipping Assembly (245) Includes: 25 245 Nozzles 25 Blow-Off Caps
▸ 439844	Nozzle Shipping Assembly (260) Includes: 9 260 Nozzles 9 Blow-Off Caps
▸ 439845	Nozzle Shipping Assembly (290) Includes: 9 290 Nozzles 9 Blow-Off Caps
▸ 439846	Nozzle Shipping Assembly (2120) Includes: 9 2120 Nozzles 9 Blow-Off Caps
▸ 439836	Nozzle Shipping Assembly (1F) Includes: 9 1F Nozzles 9 Blow-Off Caps
▸ 439865	Stainless Steel Nozzle Shipping Assembly (1N) Includes: 1 Blow-Off Cap
▸ 439864	Stainless Steel Nozzle Shipping Assembly (1W) Includes: 1 Blow-Off Cap

Part No.	Description
419385	Swivel Adaptor Shipping Assembly Includes: 9 Swivel Adaptors
423572	Swivel Adaptor Shipping Assembly Includes: 25 Swivel Adaptors
77695	Blow-Off Cap Shipping Assembly (Spare) Includes: 50 Blow-Off Caps
77411	Blow-Off Cap Shipping Assembly Includes: 12 Blow-Off Caps
433208	CB Metal Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps
▸ 439861	Metal Blow-Off Cap Shipping Assembly ▸ Includes: 10 Blow-Off Caps
434707	CB Stainless Steel Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps
▸ 439866	Stainless Steel Blow-Off Cap Shipping Assembly ▸ Includes: 10 Blow-Off Caps
▸ 439848	Metal Blow-Off Cap O-Ring Shipping Assembly ▸ Includes: 25 O-Rings
▸ 416970	In-Line Burst Disc Union Assembly
417911	In-Line Burst Disc Shipping Assembly Includes: 10 Burst Discs
25627	1/4 in. Check Valve
▸ 551265	Nozzle Aiming Device (without Adaptor)
439877	Nozzle Aiming Device with Adaptor
439876	Aiming Device Adaptor
435547	Series Detector Shipping Assembly (“Scissor”)
435548	Series Detector, Pack of 25 (“Scissor”)
435546	Terminal Detector Shipping Assembly (“Scissor”) Includes: Test Link
435545	Detector Hook Assembly (“Scissor”)
▸ 439515	Detector Hook Assembly (“Scissor”) Includes: 10 Detectors
415671	Pulley Elbows Shipping Assembly (Socket End) – to 700 °F (371 °C) Includes: 50 Elbows
423251	Pulley Elbows Shipping Assembly (Compression End) – to 700 °F (371 °C) Includes: 50 Elbows
427929	Pulley Tee
15821	Wire Rope (50 ft (15.2 m))
79653	Wire Rope (500 ft (152.4 m))
24919	Stop Sleeve Package Includes: 10 Stop Sleeves

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
550122	Oval Sleeve Package Includes: 100 Oval Sleeves
436063	Conduit Offset Shipping Assembly Includes: 6 Conduit Offsets
78196	1/4 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seals”
77285	3/8 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seals”
77287	1/2 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seals”
77289	3/4 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seals”
79149	1/4 in. “Compression-Seal” Pipe Adaptor Package Includes: 24 “Compression-Seals”
79151	3/8 in. “Compression-Seal” Pipe Adaptor Package Includes: 24 “Compression-Seals”
79147	1/2 in. “Compression-Seal” Pipe Adaptor Package Includes: 24 “Compression-Seals”
79153	1/2 in. “Compression-Seal” EMT Conduit Adaptor Package Includes: 24 “Compression-Seals”
423253	Hood Seal Adaptor Shipping Assembly Includes: 6 Hood Seals
436228	Reducing Coupling
▸441042	Short Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
▸441041	Long Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
26310	Cocking Lever (AUTOMAN II-C)
416018	Cocking Lever (Mechanical Gas Valve)
▸438031	Lock Pin
13707	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 3/4 in.
13708	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 in.
550360	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 1/4 in.
13709	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 1/2 in.
13710	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 2 in.
550363	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 2 1/2 in.
17643	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 3 in.

Part No.	Description
426151	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Relay – Manual Reset
423878	One Electric Switch (Field Mounted) Kit Includes: Electric Switch (SPDT) Mounting Hardware
423879	Two Electric Switch (Field Mounted) Kit Includes: 2 Electric Switches (SPDT) Mounting Hardware
423880	Three Electric Switch (Field Mounted) Kit Includes: 3 Electric Switches (SPDT) Mounting Hardware
423881	Four Electric Switch (Field Mounted) Kit Includes: 4 Electric Switches (SPDT) Mounting Hardware
428311	Alarm Initiating Switch Kit
55598	Gas Shut-off Equipment Mechanical (ANSUL) Includes: Mechanical Gas Valve – 3/4 in.
55601	Gas Shut-off Equipment Mechanical (ANSUL) Includes: Mechanical Gas Valve – 1 in.
55604	Gas Shut-off Equipment Mechanical (ANSUL) Includes: Mechanical Gas Valve – 1 1/4 in.
55607	Gas Shut-off Equipment Mechanical (ANSUL) Includes: Mechanical Gas Valve – 1 1/2 in.
55610	Gas Shut-off Equipment Mechanical (ANSUL) Includes: Mechanical Gas Valve – 2 in.
25937	Gas Shut-off Equipment Mechanical (ASCO) Includes: Mechanical Gas Valve – 2 1/2 in.
25938	Gas Shut-off Equipment Mechanical (ASCO) Includes: Mechanical Gas Valve – 3 in.
15733	Gas Shut-off Equipment Includes: Air Cylinder and Tube Assembly
434618	Remote Manual Pull Station Assembly
435960	Remote Manual Pull Station Assembly Includes: 50 ft (15.2 m) of Wire Rope
24915	Break Rod Package Includes: 10 Glass Break Rods (Part No. 4834) (Replacement)
427074	Trim Rings (Pack of 10)
434525	Flexible Conduit – 500 ft (152.4 m)
435959	Flexible Conduit – 500 ft (152.4 m) Includes: 500 ft (152.4 m) of Wire Rope
435979	Flexible Conduit Strain Relief Includes: 50 Strain Reliefs
434347	Flexible Conduit Inserts Includes: 50 Inserts

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
439104	Pre-Fed Flexible Conduit – 50 ft (15.2 m)
436150	P-Clip Shipping Assembly Includes: 50 P-Clips
31809	16 in. (406 mm) Stainless Steel Actuation Hose
32335	20 in. (508 mm) Stainless Steel Actuation Hose
32336	24 in. (610 mm) Stainless Steel Actuation Hose
430815	42 in. (1067 mm) Stainless Steel Actuation Hose
435982	Agent Distribution Hose and Restraining Cable Kit
434455	Henny Penny Fryer Nozzle Kit
24916	Test Link Shipping Assembly Includes: 10 Test Links
439085	SL Style Fusible Link – 165 °F (74 °C) Includes: 25 Links
439086	SL Style Fusible Link – 212 °F (100 °C) Includes: 25 Links
439087	SL Style Fusible Link – 280 °F (138 °C) Includes: 25 Links
439088	SL Style Fusible Link – 360 °F (182 °C) Includes: 25 Links
439089	SL Style Fusible Link – 450 °F (232 °C) Includes: 25 Links
439227	Tyco A-PC Style Fusible Link – 165 °F (74 °C) Includes: 10 Links
439228	Tyco A-PC Style Fusible Link – 212 °F (100 °C) Includes: 10 Links
439229	Tyco A-PC Style Fusible Link – 280 °F (138 °C) Includes: 10 Links
439230	Tyco A-PC Style Fusible Link – 360 °F (182 °C) Includes: 10 Links
439231	Tyco A-PC Style Fusible Link – 450 °F (232 °C) Includes: 10 Links
439232	Tyco A-PC Style Fusible Link – 500 °F (260 °C Includes: 25 Links
439517	Trip Hammer Set Screw Includes: 25 Screws
15240	Maximum Registering Thermometer
197	Lead and Wire Seal
181	Cartridge Receiver Gasket
74274	Vent Plug Assembly
418087	R-102 System Manual

AUTOMAN REGULATED RELEASE ASSEMBLY

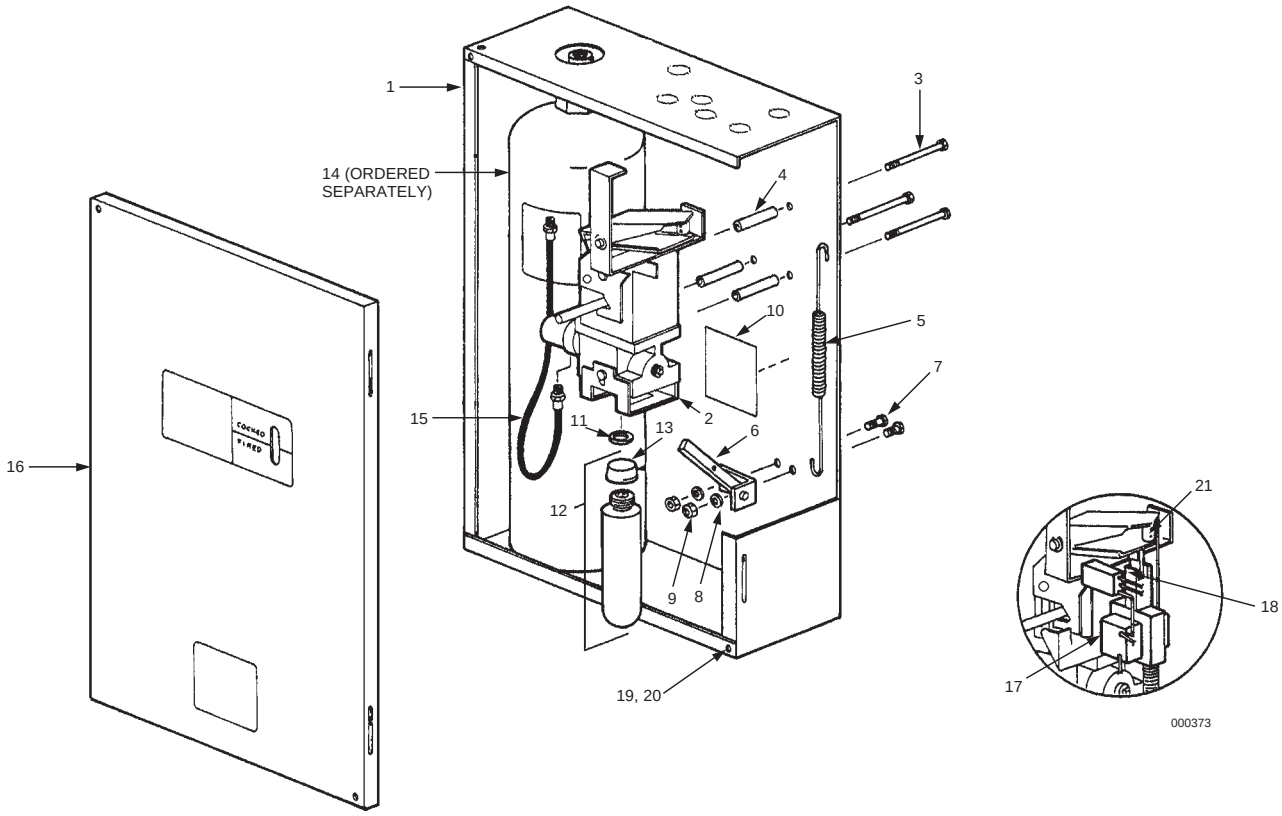


Figure No.	Description	Mechanical Part No.	Electrical Part No.
–	Regulated Release Shipping Assembly	429853	429856
1	Mounting Box	419293	419293
2	Basic Release w/Regulator	79140	–
	Basic Release w/Solenoid, Switch, and Regulator	–	79288
3	Self-Tapping Screw	71342	71342
4	Spacer	76555	76555
5	Tension Spring	79094	79094
6	Lever and Bracket Assembly	79300	79300
7	Machine Screw	14973	14973
8	Lockwasher	7310	7310
9	Hex Nut	14732	14732
10	Caution Label	57652	57652
11	Gasket	181	181
12	Expellant Gas Cartridge Assembly		
	LT-30-R/101-20 **(Ordered Separately)**	423435 / 423441	423435 / 423441
	Double Tank/101-30 **(Ordered Separately)**	423493 / 423443	423443 / 423443
13	Safety Shipping Cap	77251	77251
14	Tank Assembly 1.5/3 Gal. **(Ordered Separately)**	429864 / 429862	429864 / 429862
15	Hose Assembly	79007	79007
16	Enclosure Cover (Includes Label)	423744	423744
17	Solenoid Assembly	–	423575
18	Electric Snap-Action Switch	–	423878
19	Cover Screw	15362	15362
20	Speed Nut	423479	423479
▸ 21	Set Screw (25 Pack)	439517	439517

REGULATED ACTUATOR ASSEMBLY

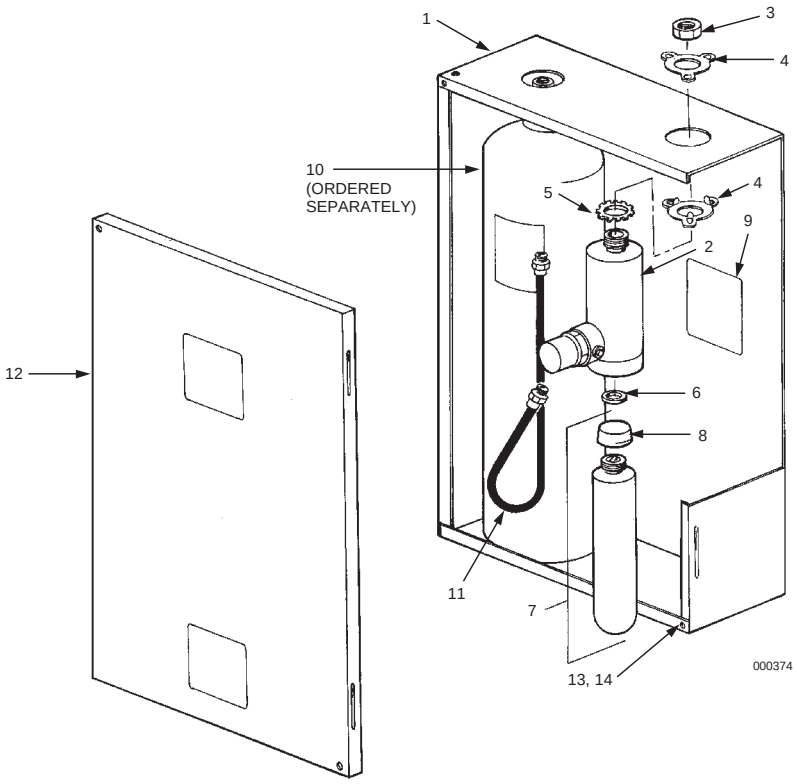


Figure No.	Description	Part No.
–	Regulated Actuator Assembly	429850
1	Mounting Box	419293
2	Pneumatic Actuator Assembly Including Regulator	79340
3	Hex Jam Nut	67990
4	Hole Adaptor (2)	423277
5	Lockwasher	69521
6	Gasket	181
7	Expellant Gas Cartridge Assembly	
	LT-20-R/101-10 **(Ordered Separately)**	423429 / 423439
	LT-30-R/101-20 **(Ordered Separately)**	423435 / 423441
	Double Tank/101-30 **(Ordered Separately)**	423493 / 423443
	LT-A-101-30/101-30 **(Ordered Separately)**	423491 / 423443
8	Safety Shipping Cap	77251
9	Label	426953
10	Tank Assembly 1.5 / 3 Gal. **(Ordered Separately)**	429864 / 429862
11	Hose Assembly	79007
12	Enclosure Cover (Without Labels)	419294
13	Cover Screw	15362
14	Speed Nut	423479

ENCLOSURE ASSEMBLY

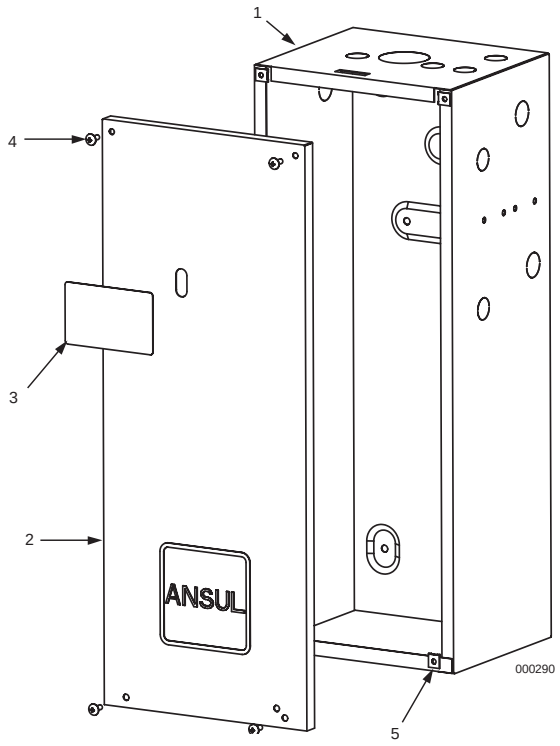


Figure No.	Description	Part No.
–	Enclosure Shipping Assembly	429870
1	Enclosure	419295
2	Cover	419296
3	Nameplate	429871
4	Screw	15362
5	Speed Nut	423479

BRACKET ASSEMBLY

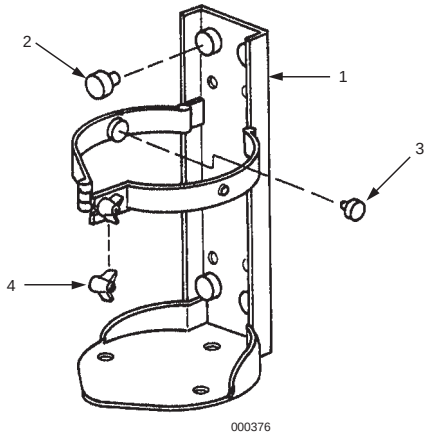


Figure No.	Description	3 Gallon Part No.
–	Bracket Shipping Assembly	429878
1	Bracket Assembly	–
2	Grommet	14089
3	Grommet	8688
4	Wing Nut	12065

TANK ASSEMBLY

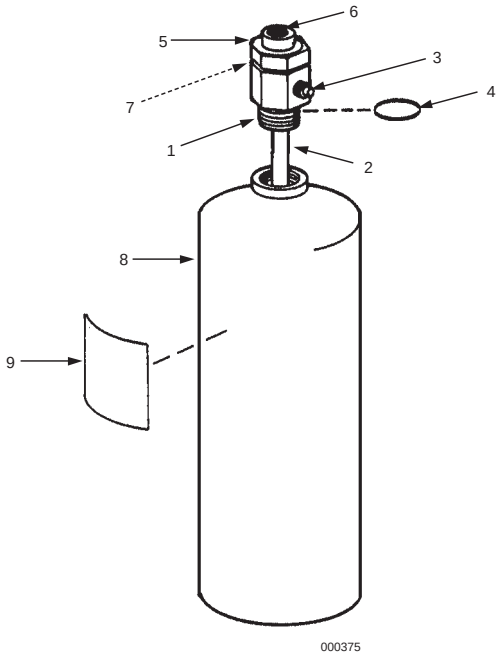


Figure No.	Description	1.5 Gallon Part No.	3 Gallon Part No.
–	Tank Assembly	429864	429862
1	Tank Adaptor Shipping Assembly	430103	79522
2	Pickup Tube Assembly	429883	417700
3	Vent Plug Assembly	74247	74247
4	O-Ring	56909	56909
5	Union Nut	417705	417705
6	Union Tail Piece	417706	417706
7	Burst Disc	416974	416974
8	Shell	429861	429860
9	Nameplate	N/A	N/A

REMOTE RELEASE

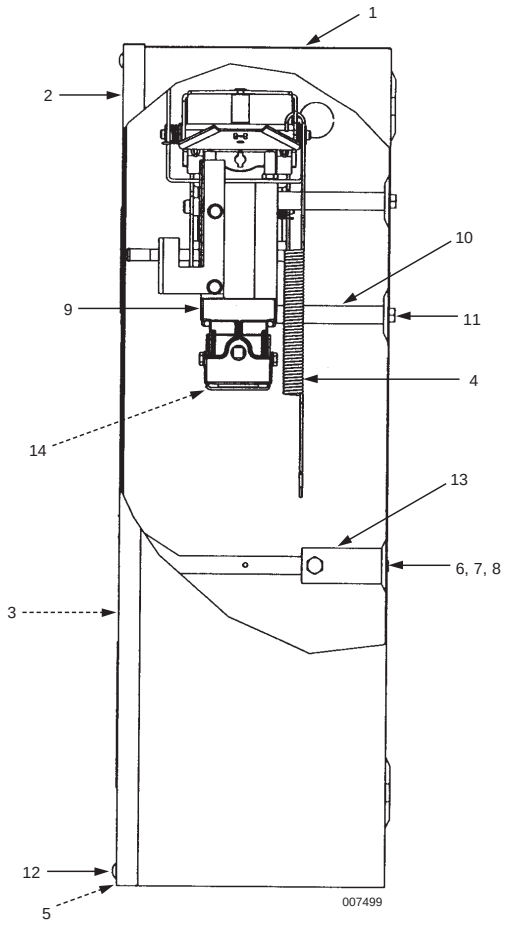


Figure No.	Description	Part No.
—	Remote Release	433485
1	Mounting Box	419295
2	Cover	419296
3	Maintenance Label	17351
4	Spring	79094
5	Speed Nut	423479
6	Machine Screw	14973
7	Hex Nut	14732
8	Lockwasher	7310
9	101 Release	433702
10	Spacer	76555
11	Screw	71342
12	Cover Screw	15362
13	Tension Lever and Bracket Assembly	79300
14	Gasket	181
15	101 Cartridge (Order Separately) (Not Shown)	(TC/DOT) 423439 (DOT) 15850

MULTIPLE NOZZLE FRYER PROTECTION CALCULATION EXAMPLES

Example No. 1 – Donut Fryer Without Dripboard. This fryer has a frypot that measures 26 in. depth x 28 in. length (660 mm x 711 mm). Because the frypot exceeds the maximum dimensions for one nozzle, multiple nozzles will be required.

Procedure:

Find the area of the fryer by multiplying the 26 in. depth x the 28 in. length (660 mm x 711 mm) which equals 728 in.^{2} (46,967 mm^2). Using the 3N nozzle (approved for fryers with the longest side of 25 3/8 in. (644 mm) and a maximum of 370.5 in.^{2} (23,903 mm^2) in area), divide the total area of 728 in.^{2} (46,967 mm^2) by 370.5 in.^{2} (23,903 mm^2) to find the number of nozzles needed. 728 in.^{2} (46,967 mm^2) divided by 370.5 in.^{2} (23,903 mm^2) per nozzle = 2 nozzles required. Then, verify the maximum longest side dimension of 25 3/8 in. (644 mm). Doing this will require doubling the 3N nozzles to **= a total of 4 nozzles,** if we are to protect the 26 in. (660 mm) depth and the 28 in. (711 mm) length of the fryer with this 3N nozzle option. See Figure 9-1.

Using the same process, but utilizing the 3N nozzle approved for fryer protection with the longest side of 27 5/8 in. (702 mm) and the maximum of 324 in.^{2} (20,903 mm^2) in area, the calculation will change to 728 in.^{2} (46,967 mm^2) divided by 324 in.^{2} (20,903 mm^2) per nozzle **= 3 nozzles.** Because this 3N nozzle option will protect 27 5/8 in. (701 mm) on the longest side, it will protect the 26 in. (660 mm) side in this example, thus eliminating the need for extra nozzles. Utilizing this option, in this example, will require a total of 9 flows, but allows less nozzles and less nozzle drops*. See Figure 9-1.

* **Note:** 2-flow appliance nozzles can also be used. This option requires a total of 4 nozzles (728 in.^{2} (46,967 mm^2) divided by 210 in.^{2} (13,548 mm^2) per nozzle = 4 nozzles, or 8 total flows). Using this option requires that the nozzles be placed over each quadrant of frypot area protected and aimed to the center of the modules. This option may be desirable if minimizing total system flows is important.

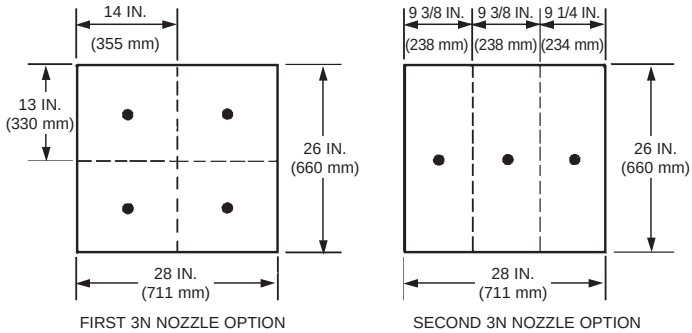


FIGURE 9-1
002466

Example No. 2 – Fryer With Dripboard. This fryer has an overall fry vat, including a dripboard, that measures 24 in. (609 mm) in depth x 20 in. (508 mm) in length. The actual frypot measures 20 in. x 20 in. (508 mm x 508 mm). Because both the frypot and the overall fry vat including the dripboard exceed the maximum dimensions for one nozzle, multiple nozzles will be required.

Procedure:

Divide the fryer cooking area from left to right or from front to back into modules that do not exceed single nozzle area limitations and longest side limitations as described in the table for "Fryer Multiple Nozzle Protection" located in the Design Section.

The example fryer can either be divided from left to right into two modules, each measuring 10 in. x 24 in. (254 mm x 609 mm), or it can be divided from front to back. See Figure 9-2.

If the fryer is divided from front to back, two 2-flow nozzles may be adequate. To determine this, first protect as much of the rear portion of the vat (the frypot area) that is allowed with 2-flow appliance nozzles using the maximum area of 210 in.^{2} (13,548 mm^2) per nozzle with the maximum longest side of 21 in. (533 mm) for multiple nozzles. See Figure 9-2.

In the example, the frypot is 20 in. (508 mm) from side to side. Use the maximum area of 210 in.^{2} (13,548 mm^2) allowed for one nozzle and divide it by 20 in. (508 mm), a total of 10 1/2 in. (266 mm) of the frypot can be protected with one 2-flow nozzle (210 in.^{2} divided by 20 in. = 10.5 in.). See Figure 9-2.

This leaves the remainder of 9 1/2 in. (241 mm) of frypot and the entire dripboard yet to protect. One 2-flow appliance nozzle will protect up to 10 1/2 in. (266 mm) of frypot, therefore, there is no need to verify the remaining 9 1/2 in. (241 mm). There is only the overall of 9 1/2 in. (241 mm) remaining plus the dripboard to verify.

The dripboard measures 4 in. x 20 in. (101 mm x 508 mm), with an overall remainder of frypot + dripboard area size of 13 1/2 in. x 20 in. (342 mm x 508 mm) = 270 in.^{2} (17,419 mm^2). Reviewing the "Multiple Nozzle Fryer Table," a 2-flow appliance nozzle can protect an area, including dripboard, of 294 in.^{2} (18,967 mm^2) with a longest side of 21 in. (533 mm). Because the area is less than the maximum of 294 in.^{2} (18,967 mm^2) and the longest side is less than the maximum of 21 in. (533 mm), a 2-flow nozzle will be sufficient. See Figure 9-2.

MULTIPLE NOZZLE FRYER PROTECTION CALCULATION EXAMPLES (Continued)

Example No. 2 – Fryer With Dripboard (Continued)

Adding the protection required for the back of the frypot to the front protection requires two **2-flow appliance nozzles as a minimum.** See Figure 9-2.

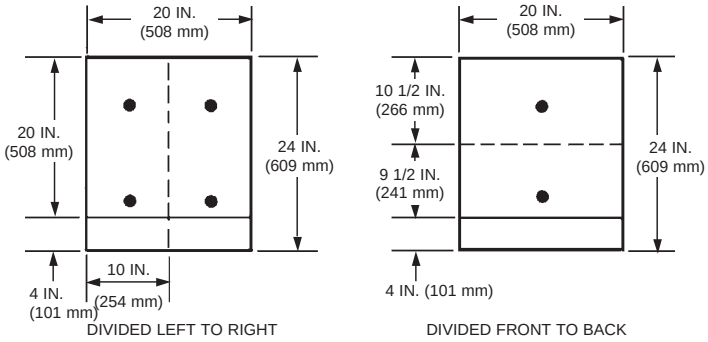


FIGURE 9-2
002467

WIRING DIAGRAM

NFPA standards require simultaneous operation for fire suppression systems when two or more hazards can be simultaneously involved in fire by reason of their proximity. To accomplish simultaneous operation, the 120 VAC Electric AUTOMAN Regulated Release Assembly can be used. This release can be activated independently by fusible line operation exactly like the mechanical version and can also be triggered electrically using a snap action switch from another 120 VAC Electric AUTOMAN Regulated Release Assembly or a Mechanical AUTOMAN Regulated Release Assembly. The electrical wiring used to connect from one AUTOMAN Regulated Release Assembly to another will not be supervised. However, NFPA 96 allows an exception for electrically operated systems which "include automatic mechanical detection (fusible link) and actuation as a backup detection system."

In the case of multiple hoods sharing a common exhaust duct, NFPA 17A requires one of two forms of simultaneous operation. The following wiring diagrams (See Figures 3 and 4) identify two principle uses for the 120 VAC Electric AUTOMAN Regulated Release Assembly. Refer to Components Section, Page 3-1, Figure 3-3.

1. Simultaneous operation of all independent hood, duct, and appliance protection systems. See Figure 9-3.
2. Simultaneous operation of any hood, duct, and appliance protection system and the system(s) protecting the entire common exhaust duct. See Figure 9-4.

Simultaneous Actuation of Multiple 120 VAC Electric AUTOMAN Regulated Release Assemblies

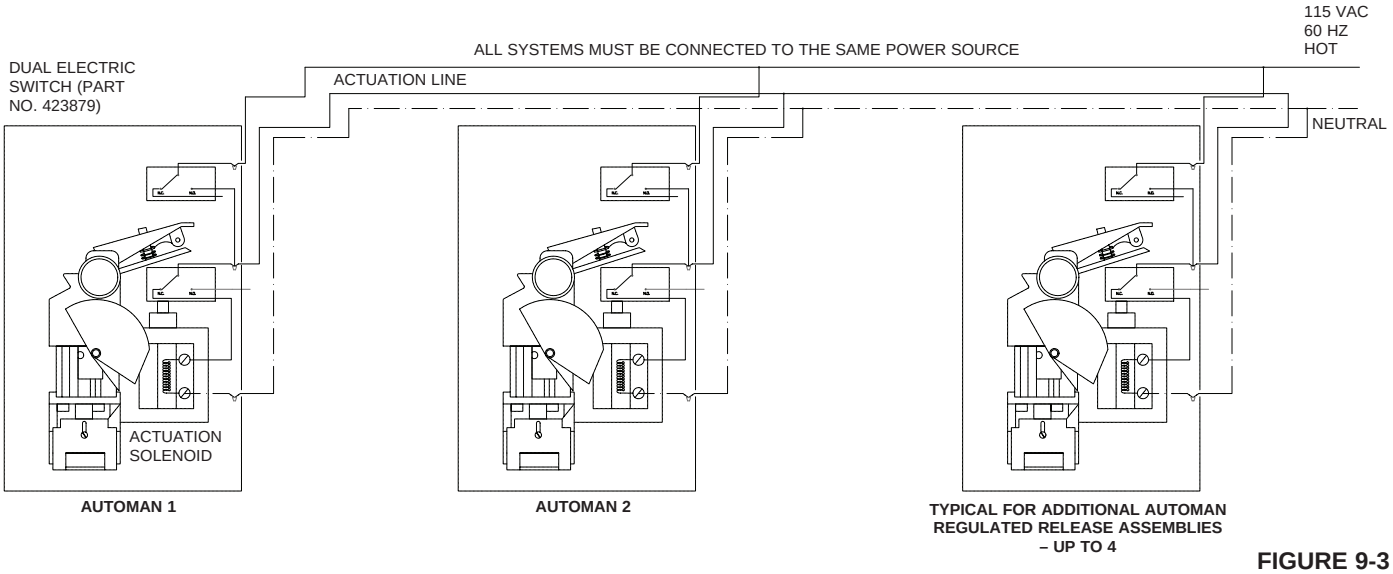


FIGURE 9-3
008405

WIRING DIAGRAM (Continued)

Simultaneous Actuation of One or More 120 VAC Electric AUTOMAN Assemblies from Multiple Mechanical AUTOMAN Assemblies

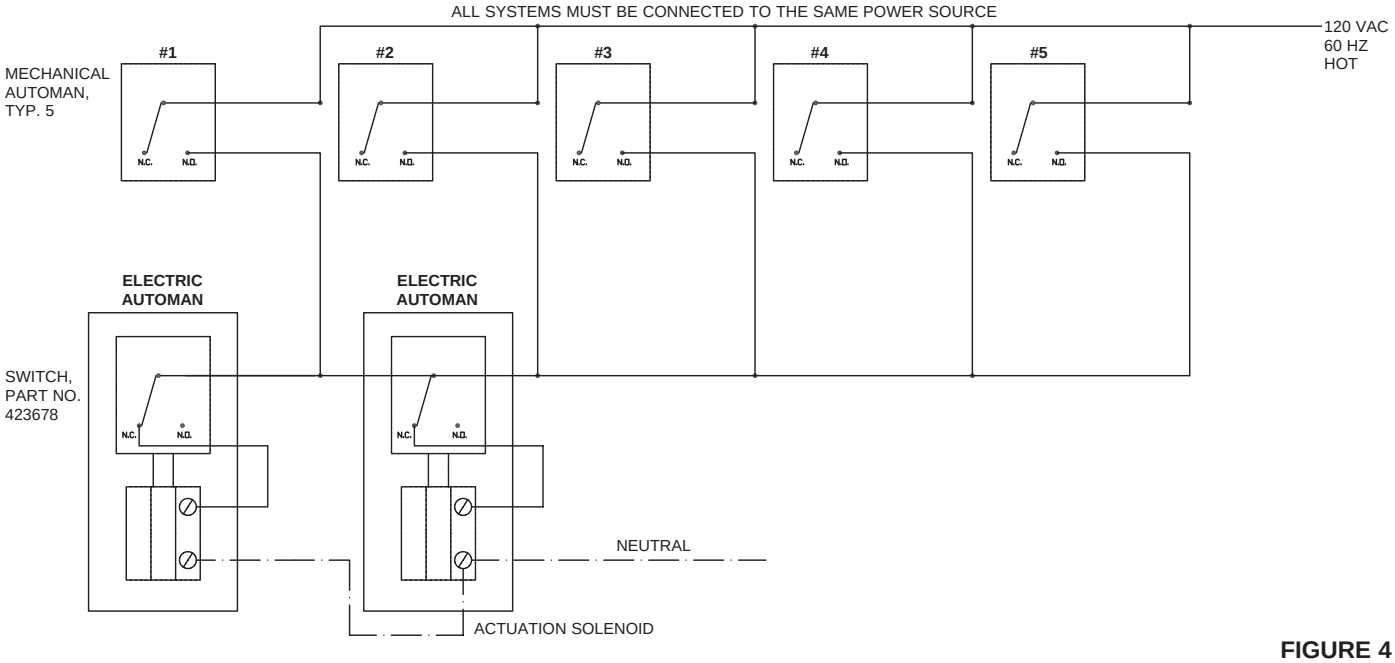


FIGURE 4
008406

Note 1: For fusible link detection only.

Note 2: Use AUTOMAN assemblies with solenoid and electric switch. Replace Single Electric Switch (Part No. 423878) with Dual Switch Kit (Part No. 423879).

Note 3: See Installation section of this manual for power capacity of solenoid and switches.

Note 4: This method does not provide supervision for battery or system wiring. The authority having jurisdiction (AHJ) may waive this requirement.

Note 5: When any one of the Mechanical AUTOMAN assembies is activated, the microswitch will transfer to the N.O. position, completing the circuit to the N.C. switch in the Electrical AUTOMAN assemby. This will activate the AUTOMAN assemby. When the AUTOMAN assemby fires, the N.C. switch transfers to the N.O. position, opening the circuit to the solenoid.

NOTES:

Bulletin No. 2015197
R-102: UL EX3470

DATE: October 5, 2015

TO: Authorized ANSUL® R-102 Restaurant System Distributors and OEM's

FROM: Product Management, Restaurant Systems

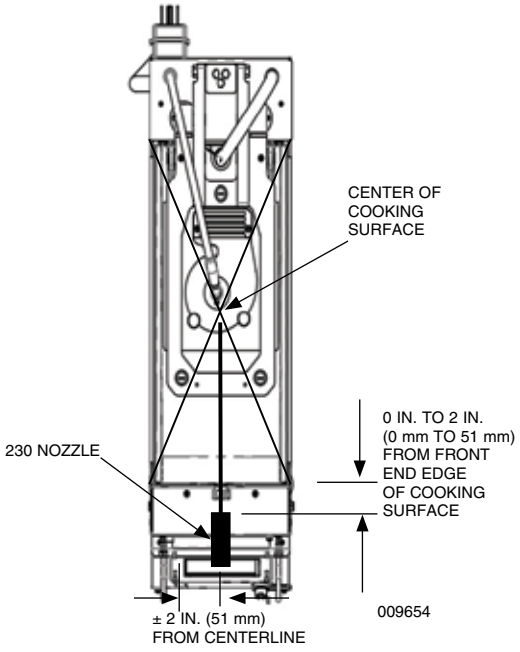
SUBJECT: Garland CXBE12 Broiler

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

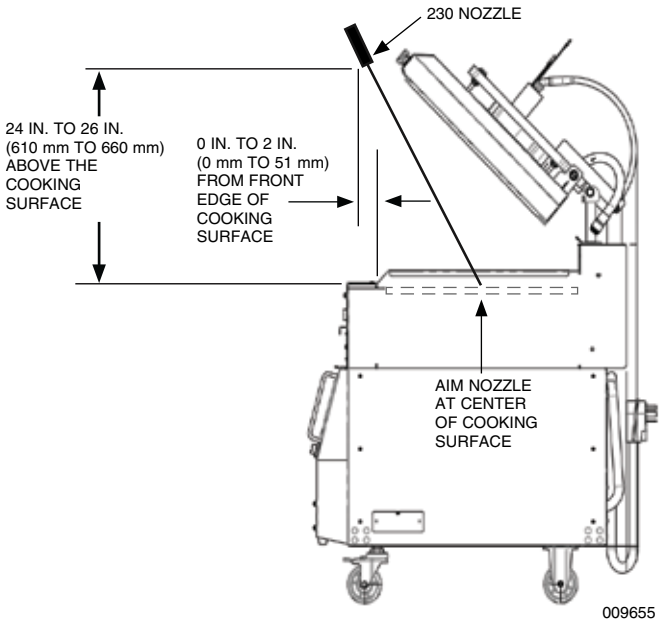
Tyco Fire Protection Products is pleased to announce an additional appliance-specific R-102 restaurant fire protection option for the Garland Electric Dual-Side Clamshell Broiler Model CXBE12. This is an additional option to the coverage shown in the ANSUL R-102 Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12).

The following nozzle positioning and coverage limitations must be followed.

Single 230 Nozzle Protection for Garland CXBE12 Broiler



Broiler Top View



Broiler Side View

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Main Telephone Numbers: +1-800-862-6785 or +1-715-735-7415
Customer Services..... Press 2
Technical Services ..... Press 4
Training Services ..... Press 6
Quality Assurance ..... Press 8

R102: UL EX3470

Specifications

Top Cooking Surface:	10.2 in. x 22.4 in. (259 mm x 568 mm)
Bottom Cooking Surface:	10.8 in. x 22.2 in (274 mm x 564 mm)
Total Load:	16 kW

This bulletin is a supplement to the ANSUL R-102 Restaurant System Design, Installation, Recharge, and Maintenance Manual (Part No. 418087-12), dated 2014-SEP-01.

This bulletin is NOT intended to replace the requirements and limitations outlined within the ANSUL R-102 System Manual listed in this bulletin. The information contained in this bulletin will be ADDED to the manual at the next update. However, we are providing this document immediately for appliance protection.

Should you have questions regarding this bulletin, please contact Technical Services as noted below.

Thank you for your continued support of ANSUL brand fire suppression products.

ANSUL®

Bulletin

Bulletin No. 2016045
UL EX3470

DATE: May 3, 2016

TO: All Authorized ANSUL Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: R-102 Coverage of the Imperial Model IABR-36, IABR-48, and IABR-60 Gas-Radiant Char-Broiler with Wood Smoker Box and Chip Holders

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce an appliance-specific coverage for R-102 Restaurant Fire Suppression Systems when protecting the following Imperial Gas Radiant Char-broilers: IABR-36, IABR-48, and IABR-60 with Wood Smoker Box and Chip Holders.

The information in this bulletin will serve as a manual supplement for the R-102 Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and will be added to the manual at the next reprint.

See Pages 2 and 3 for details.

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Bulletin No. 2016045
May 3, 2016

UL EX3470

Model IABR-36 with Wood Smoker Box and Chip Holders is to be protected within the parameters indicated below.

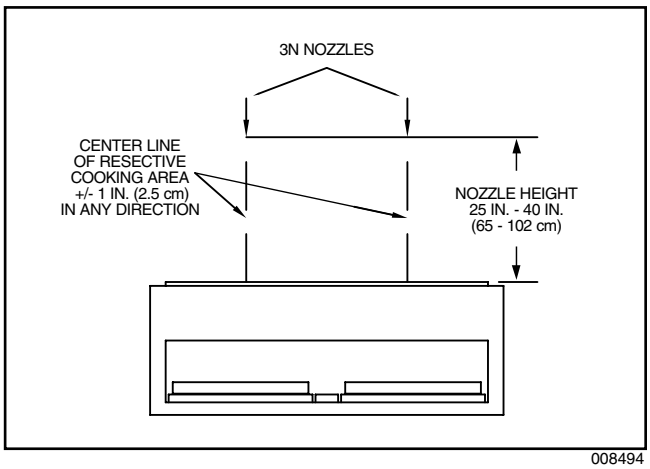
The following nozzle position and coverage limitations must be followed:

Nozzle Quantity: 2

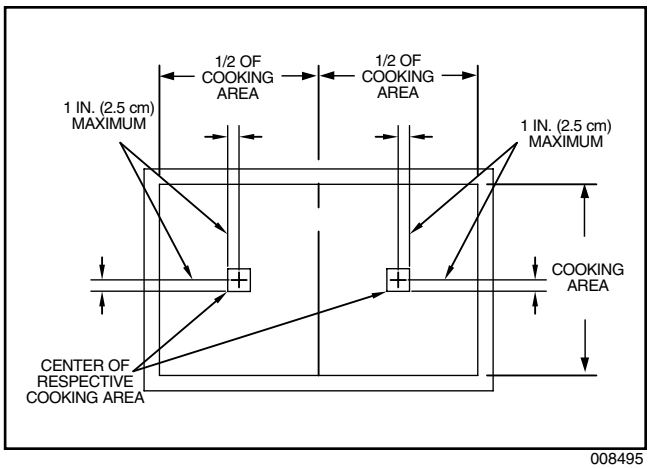
Nozzle Type: 3N

Nozzle Height: 25 in. (635 mm) to 40 in. (1016 mm) above the hazard surface

Nozzle Location: Each nozzle protects half of the cooking area. The nozzles are located within 1 in. (25 mm) of the center of the respective cooking area, aimed at the center of that hazard area.



008494



008495

Model	Grate Dimension	Gas Output
IABR-36	32.5 in. (825 mm) x 21 in. (533 mm)	90,000 BTU

UL EX3470

Model IABR-48 and IABR-60 with Wood Smoker Box and Chip Holder is to be protected within the parameters indicated below.

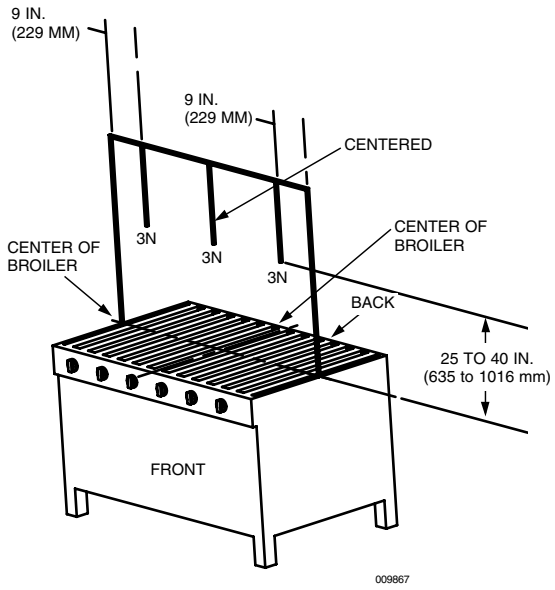
The following nozzle position and coverage limitations must be followed:

Nozzle Quantity: Three

Nozzle Type: 3N

Nozzle Height: 25 to 40 in. (635 to 1,016 mm) above the broiler surface

Nozzle Location: All three nozzles are to be centered front to back above the broiling surface. The middle nozzle is to be centered left to right above the broiling surface. The remaining two nozzles are to be located 9 in. (229 mm) inside the broiler sides.



Model	Grate Dimensions	Gas Output
IABR-48	44.5 in. (1,130 mm) x 21 in. (533 mm)	120,000 BTU
IABR-60	56.5 in. (1,435 mm) x 21 in. (533 mm)	150,000 BTU

For all models, the Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Should you have questions regarding this bulletin, please contact your US Standard Product Manager or International Area Manager, or contact Technical Services as listed below.

The Mechanical Control Head Spring Plate Replacement instructions are intended for use with the mechanical control head spring plate (Part No. 443216).

Personnel responsible for installation, recharge, and/or maintenance must read and fully understand these instructions prior to attempting to replace and install the new mechanical control head spring plate assembly (see Figure 1).

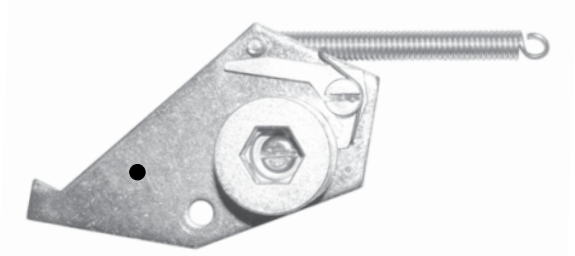


FIGURE 1
NEW SPRING PLATE ASSEMBLY
009756

CAUTION

The mechanical control head will not function correctly if the spring plate is not properly installed. Read and follow all instructions carefully.

DESCRIPTION

The retro-fit Spring Plate Assembly Kit (Part No. 443217) includes all parts required to replace the spring plate assembly in the EN-MCU3, MCH3 or NMCH3 mechanical control head.

CONTENTS – SPRING PLATE ASSEMBLY KIT

Part No.	Description	Image
25940	Visual Seal	 009801
550275	Washer	 009802
551130	Pan Head Screw (10-32 x 3/8 in.)	 009803
551220	#10 Washer Nut	 009804
26317	Stop Sleeve	 009805
443216	Spring Plate Assembly	See Figure 1

Note: Disconnect any fire control panel and/or alarms before performing the steps outlined in this procedure.

SPRING PLATE REMOVAL

1. Use an appropriate tool to remove the four screws holding cover to the mechanical control head. See Figure 2.
   Note: Keep screws for re-assembly.

⚠ CAUTION

Do NOT rotate the handle on the mechanical control head. Rotating the handle could cause a system release.

FIGURE 2
REMOVE SCREWS
009757

2. After removing screws, hold left and right sides of cover and pull cover straight out to remove cover from base. Pull pin and handle are removed with the cover.
3. **Model MCH3 only:** Separate the visual seal, pull pin and handle.

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SPRING PLATE REMOVAL (Continued)

4. After removing cover, insert pull pin into the indicated hole in the slide plate above the latching arm. See Figure 3 and Figure 4.

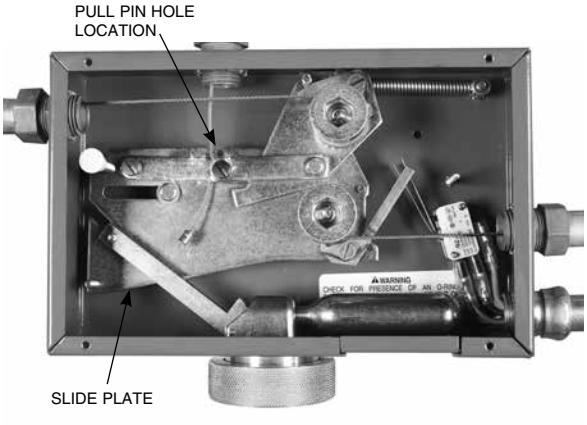


FIGURE 3
PULL PIN HOLE LOCATION
009784

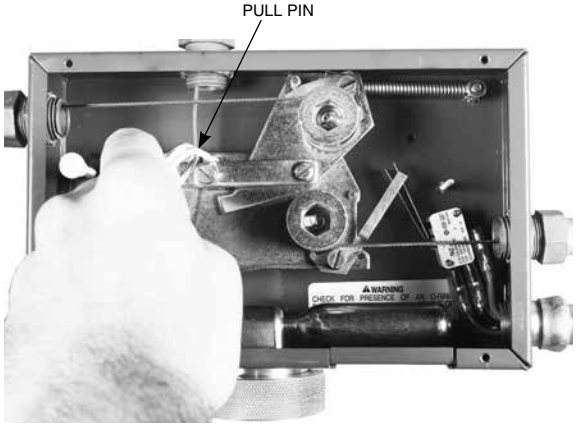


FIGURE 4
PULL PIN INSTALLATION
009760

⚠ CAUTION

Before continuing with the next step, disconnect the control head or pneumatic tubing from valve cap assembly of each agent cylinder.

5. Pull out and remove the mechanical control head base plate. See Figure 5 and Figure 6.

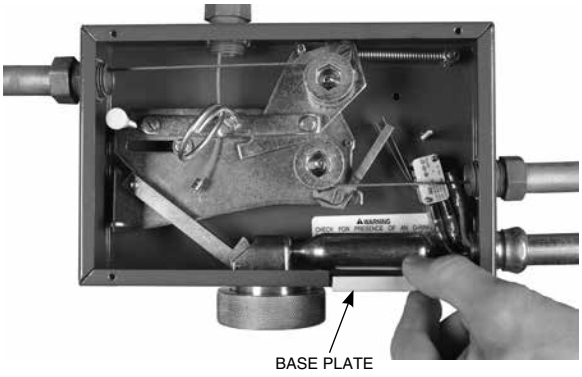


FIGURE 5
BASE PLATE REMOVAL
009761

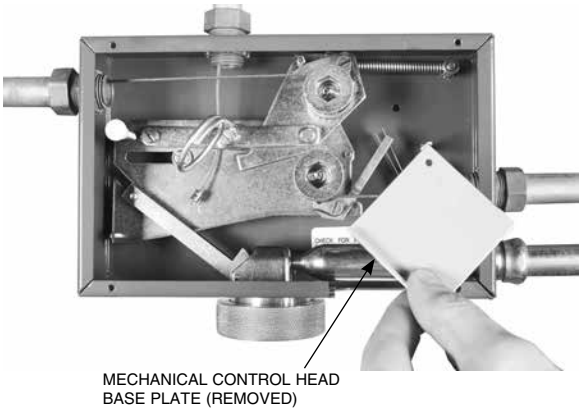


FIGURE 6
BASE PLATE REMOVED
009762

SPRING PLATE REMOVAL (Continued)

6. Remove the CO_2 cartridge from the mechanical control head assembly. Make sure the CO_2 cartridge is placed in a safe location. See Figure 7 and Figure 8.

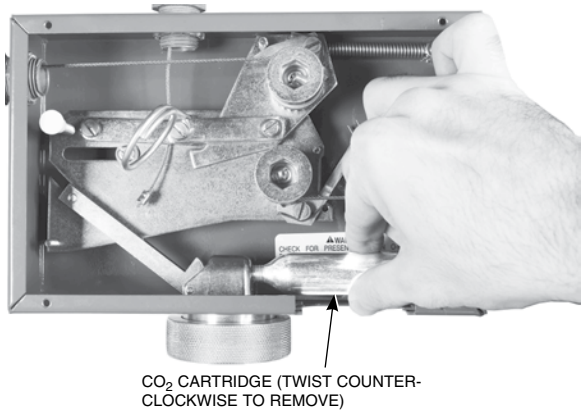


FIGURE 7
CO_2 CARTRIDGE REMOVAL
009763

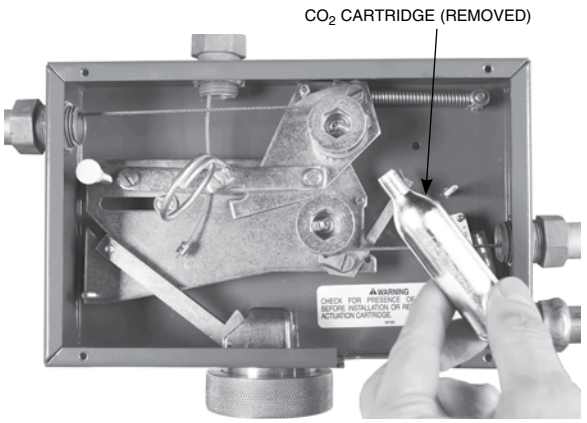


FIGURE 8
CO_2 CARTRIDGE REMOVED
009764

7. Loosen the tension applied to the detection line cable.
   a. Using a 1/2 in. hex wrench, slightly turn the spring plate ratchet wheel clockwise to relieve pressure on the pawl lock. See Figure 9.

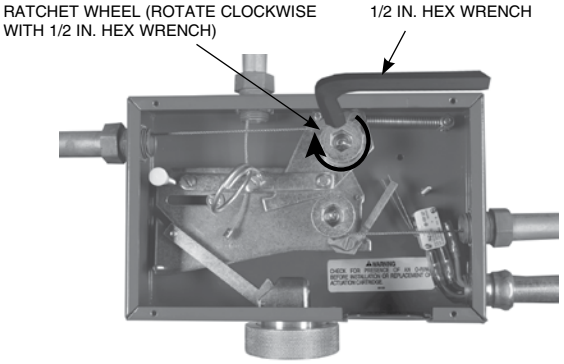


FIGURE 9
SPRING PLATE RATCHET WHEEL ROTATION
009765

   b. While the ratchet wheel is in the rotated position, push down on the pawl lock lever to release the cable tension. See Figure 10.

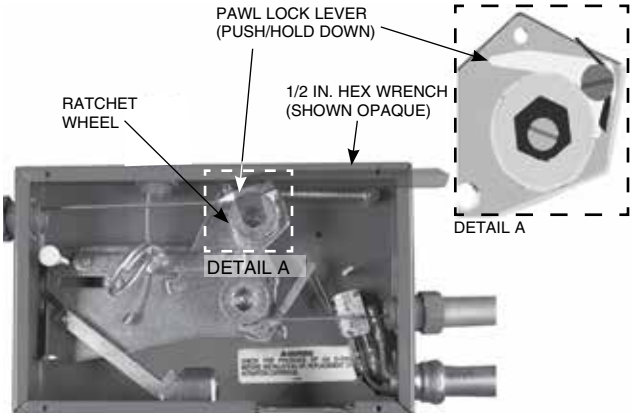


FIGURE 10
PUSH DOWN ON THE PAWL LOCK LEVER
009766

   c. While holding the pawl lock lever in place, using the 1/2 in. hex wrench, turn the ratchet wheel counter-clockwise to unspool all cable. See Figure 11.

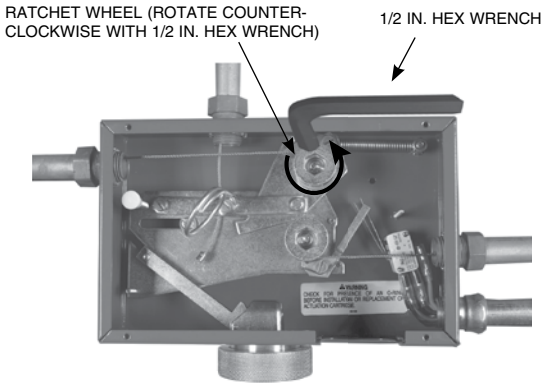


FIGURE 11
SPRING PLATE RATCHET WHEEL ROTATION
009767

   d. Once the cable has been unspooled (see Figure 12), cut off the stop sleeve at the end of the detection line cable and remove the detection line cable from the ratchet wheel.

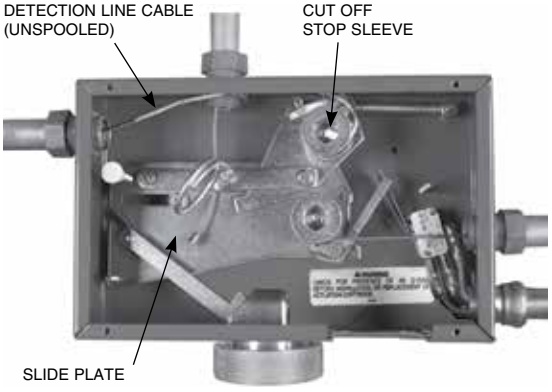


FIGURE 12
DETECTION LINE STOP SLEEVE REMOVAL
009768

SPRING PLATE REMOVAL (Continued)

8. Tightly hold the yellow indicator to keep the slide plate from snapping to the right; then remove pull pin. See Figure 13. After pull pin is removed, slowly allow slide plate to move to the right. Note: set pin aside for future use.

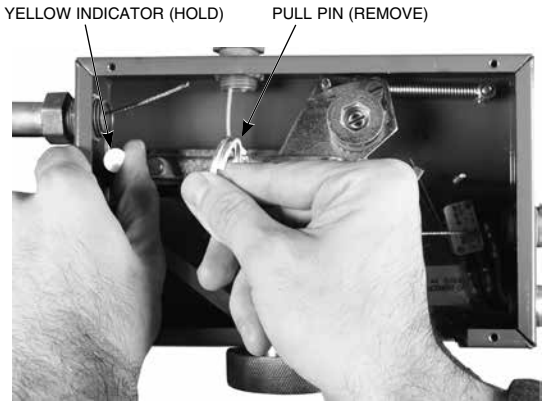


FIGURE 13
REMOVE THE PULL PIN
009769

9. Remove screw holding spring plate assembly in place. Collapse linkage, so it is out of the way of spring plate assembly. Dispose of screw. See Figure 14.

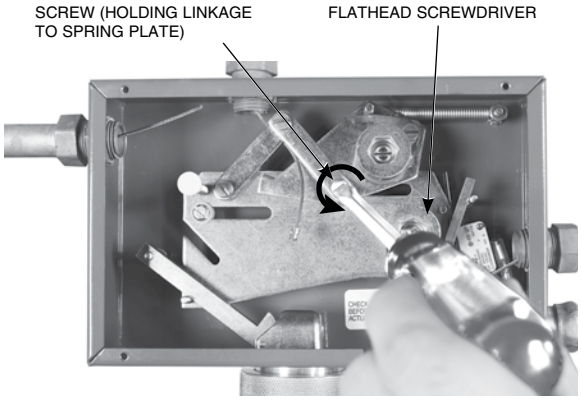


FIGURE 14
REMOVE SPRING PLATE LINKAGE SCREW
009770

10. After the linkage is collapsed, remove the washer from the mounting stud. Dispose of washer. See Figure 15.

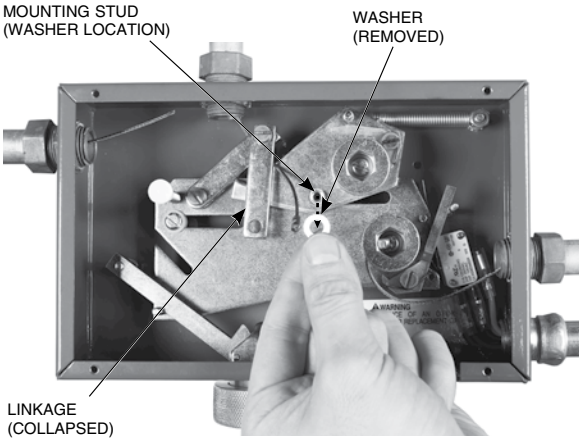


FIGURE 15
REMOVE SPRING PLATE LINKAGE WASHER
009777

11. Using a socket wrench or nut driver, remove the #10 nut in the upper right corner of the mechanical control head. See Figure 16 and Figure 17.

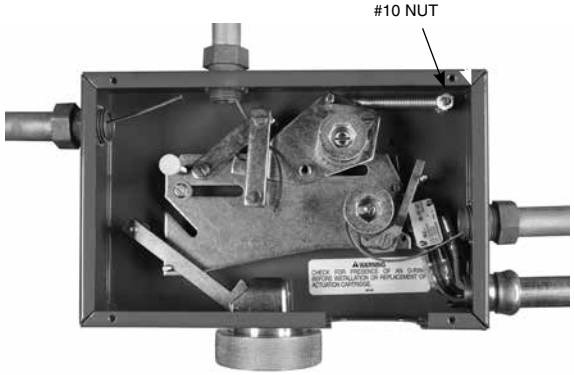


FIGURE 16
REMOVE #10 NUT
009772

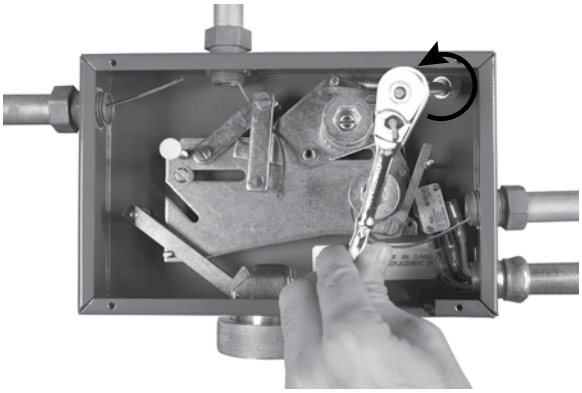


FIGURE 17
REMOVE #10 NUT
009773

SPRING PLATE REMOVAL (Continued)

12. Remove existing spring from threaded stud in upper right corner of the mechanical control head. See Figure 18.

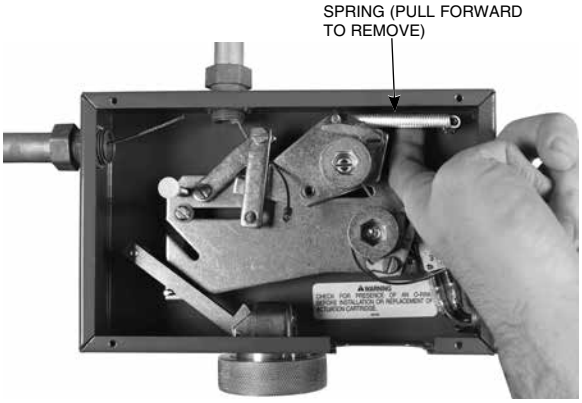


FIGURE 18
REMOVE SPRING FROM THREADED STUD
009774

13. Collapse the linkage (see Figure 19), and remove the existing spring plate from the mounting stud. See Figure 20.

    IMPORTANT:
    DO NOT LIFT OR REMOVE THE SLIDE PLATE ASSEMBLY FROM ITS LOCATION.

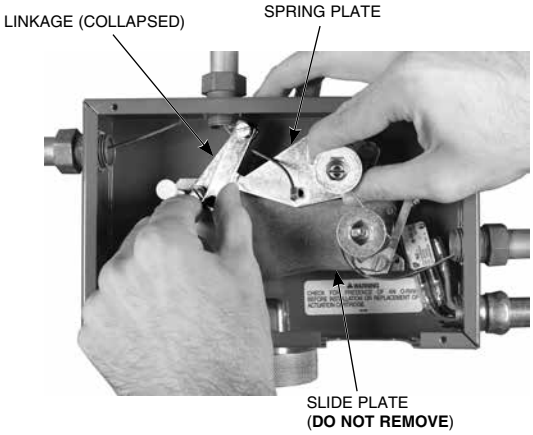


FIGURE 19
REMOVE EXISTING SPRING PLATE
009775

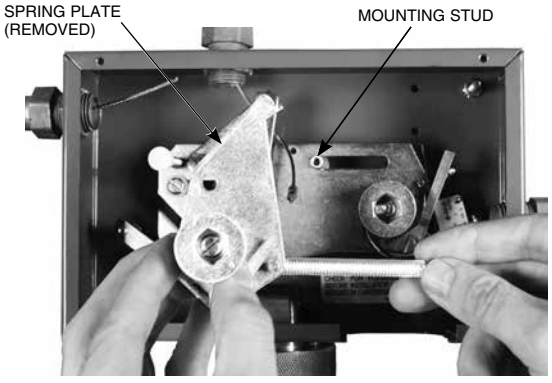


FIGURE 20
EXISTING SPRING PLATE REMOVED
009776

INSTALLATION

1. To install new spring plate (Part No. 443216), confirm linkage is still collapsed then insert spring plate on mounting stud. See Figure 21.

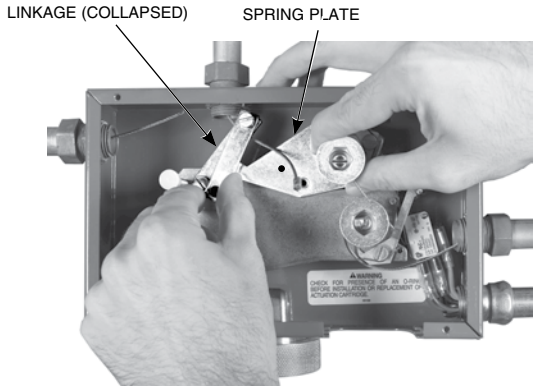


FIGURE 21
SPRING PLATE INSTALLATION
009810

2. Install new washer (Part No. 550275) supplied in the spring plate assembly kit. The washer fits on the mounting stud holding the spring plate in place (replaces washer removed in step 10, page 4). The washer is placed between the spring plate and linkage, and must be installed **BEFORE** the linkage is installed. See Figure 22.

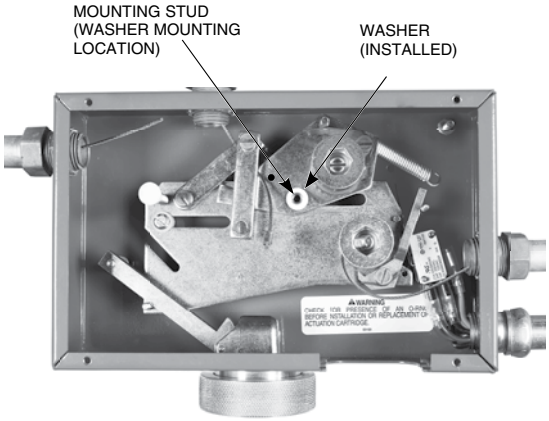


FIGURE 22
WASHER INSTALLATION
009811

INSTALLATION (Continued)

3. Reassemble the linkage to the mounting stud. The linkage fits over the mounting stud on top of washer and slides into place. See Figure 23.

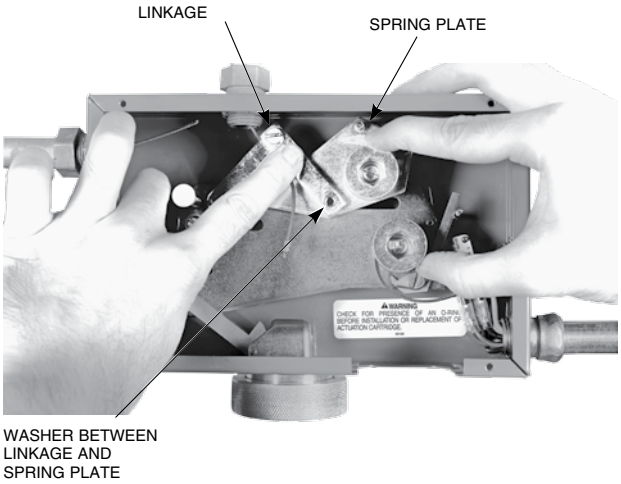


FIGURE 23
RE-INSTALL LINKAGE
009778

4. Fasten slide plate linkage to spring plate using new pan head screw (Part No. 551130) provided in the spring plate assembly kit. See Figure 24.

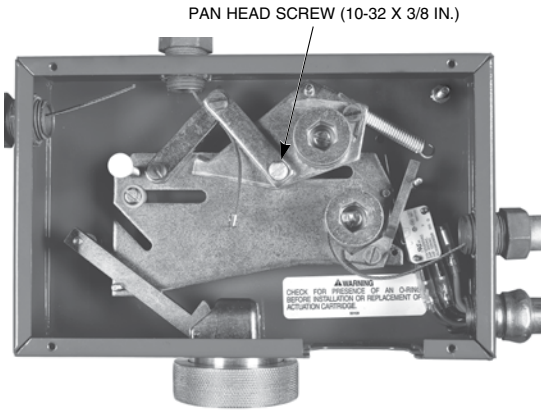


FIGURE 24
SPRING PLATE/LINKAGE INSTALLATION
009779

5. Install the spring to the threaded stud in the upper right corner of the mechanical control head. See Figure 25.

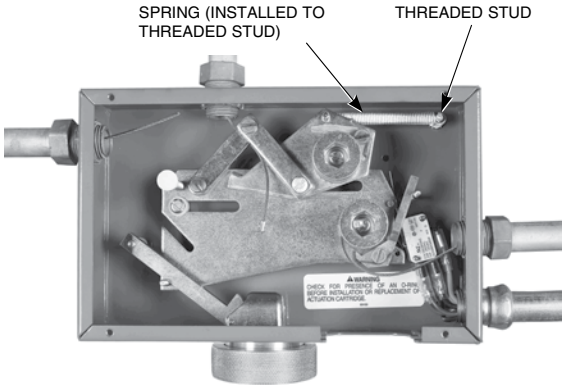


FIGURE 25
SPRING INSTALLATION
009780

6. Once the spring is in place install the new washer nut (Part No. 551220), supplied in the spring plate assembly kit, to the threaded stud and snug, using an appropriately sized nut driver or socket wrench, to secure. See Figure 38. When installing the washer nut, **make sure the washer on the nut is facing toward the spring.** See Figure 26.

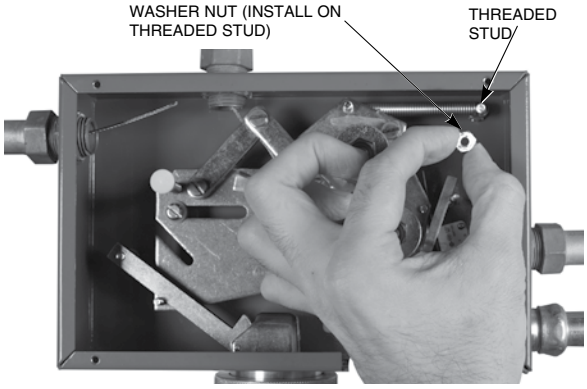


FIGURE 26
INSTALL WASHER NUT ON THREADED STUD
009781

7. Replace all fusible links in the system with the proper temperature rated A-PC style fusible link.
8. Verify the detection line is properly installed. Feed the wire rope through the hole in the fusible link ratchet wheel. The new stop sleeve (Part No. 26317) must then be crimped on the detection line, and the crimp must be positioned inside the center of the ratchet wheel.

INSTALLATION (Continued)

9. The detection (fusible link) line can now be put into a set position by applying tension to the fusible link line. This can be accomplished by using a 1/2 in. hex wrench on the fusible link ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top* of the control head box. See Figure 27.

   * If the EN-MCU3 is being used, only tighten the ratchet wheel until the spring plate is parallel to the top of the enclosure.

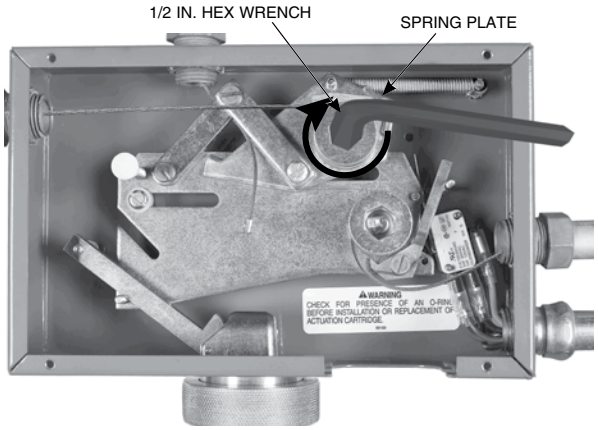


FIGURE 27
SET DETECTION LINE
009782

Note: Figure 27 displays the MCH3 or NMCH3 control head.

10. Ensure the fusible link(s) remain centered in the bracket after the fusible link line is set.
11. Set the control head by moving the slide plate from right to left, and ensure the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position.
12. Insert pull pin into the hole in slide plate above the latching arm. This will lock the control head in set position, eliminating accidental actuation during the remaining installation procedure. See Figure 28.

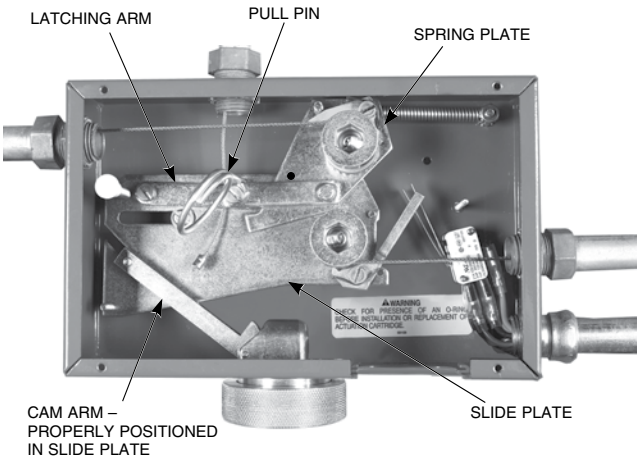


FIGURE 28
CONTROL HEAD – SET POSITION
009783

SYSTEM CHECKOUT

Before placing the system back in service, all components must be checked for proper operation. During this checkout, ensure the carbon dioxide pilot cartridge is not installed in the control head.

1. Remove the pull pin from the hole in the slide plate.
2. Cut the terminal link or the “S” hook holding the link. This will relieve tension on fusible link line and operate the control head. Verify slide plate completely moved to the right and gas valve cable released, causing gas valve to close. Confirm any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the electrical (Snap-Action) switch in the control head operated.

   NOTICE

   If any of these events fail to occur, the problem must be investigated and repaired.

3. Repair the terminal link or “S” hook and return fusible link line to the set position. After fusible link line is set, place control head into the set position. Follow Steps 9 through 11 (page 7) for setting the detection line and control head.

SYSTEM CHECKOUT (Continued)

4. Once the control head is set, remove the pull handle on the remote pull station to ensure the control head operates. If the control head operates normally, the control head can be reset. Insert the pull pin into the hole in the slide plate above the latching arm. See Figure 28. Replace the remote pull station handle and break rod.
5. Ensure the gas valve is fully open by ratcheting the gas valve ratchet wheel. Do not over tighten.

⚠ CAUTION

Be sure to light any applicable pilot lights immediately following opening of the gas valve.

6. Before installing the 16 gram carbon dioxide pilot cartridge into the actuator, ensure the actuator has an o-ring installed. Install the cartridge into the actuator by hand-tightening until it is fully secure. Once hand-tightened, further tighten 1/4 to 3/4 turn using a needle-nose locking pliers.

   IMPORTANT: Use caution when tightening the cartridge. Do not damage the cartridge with the locking pliers.

   Note: When the cartridge is properly engaged, 4 to 5 threads should be showing. It is important that no more than 5 threads be showing.

⚠ CAUTION

Do not over-tighten the cartridge. Over tightening can result in premature puncturing of the cartridge seal.

7. Reconnect the control head or pneumatic tubing to the valve cap assembly of each agent cylinder.
8. Remove the pull pin from the hole in the slide plate.
9. Re-install the control head base plate, cover and screws to the control head enclosure (refer to step 5 (page 2) and step 1 (page 1)).
10. Model MCH3 requires the ring pin to be re-installed on the control head cover, and re-sealed using the new visual seal (Part No. 25940) supplied in the spring plate assembly kit.

Note: Once the spring plate installation procedure is complete, make sure to reactivate any alarms and/or fire control panels that were disabled for this procedure.

Bulletin No. 2016059
UL EX-3830

DATE: May 3, 2016

TO: All Authorized PYRO-CHEM Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: KITCHEN KNIGHT II System Coverage of the Imperial Model IABR-36 and IABR-48 Gas-Radiant Char-Broilers with Wood Smoker Boxes and Chip Holders.

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce the appliance-specific coverage for KITCHEN KNIGHT II Wet Chemical Restaurant Fire Suppression Systems when protecting the Imperial Gas Radiant Char-broilers: IABR-36 and IABR-48, with Wood Smoker Box and Chip Holders.

The outlined models are protected within the parameters indicated in this bulletin. The information in this bulletin will serve as a supplement for the KITCHEN KNIGHT II Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 551274-06) dated November 10, 2014 and will be added to the manual at the next reprint.

See Page 2 for details.

tyco Fire Protection Products

One Stanton Street
Marinette, WI 54143-2542

www.pyrochem.com

Main Telephone Numbers: +1-800-526-1079 or +1-715-732-3465
Customer Services..... Press 2
Training Services ..... Press 6
Technical Services ..... Press 4
Quality Assurance ..... Press 8

The following nozzle position and coverage limitations must be followed:

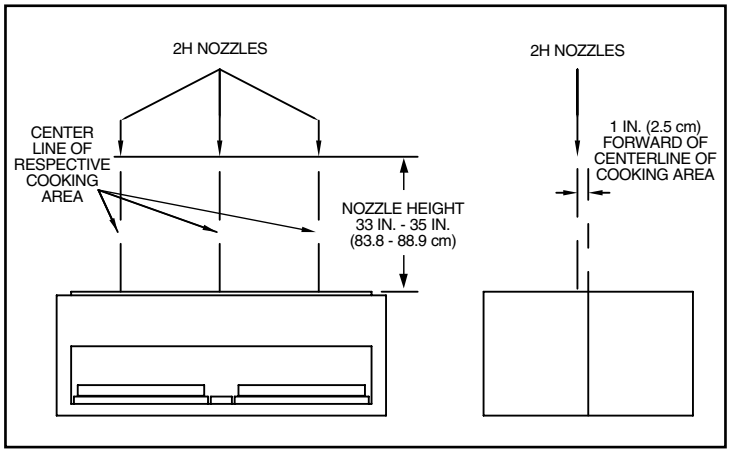
Nozzle Quantity: 3

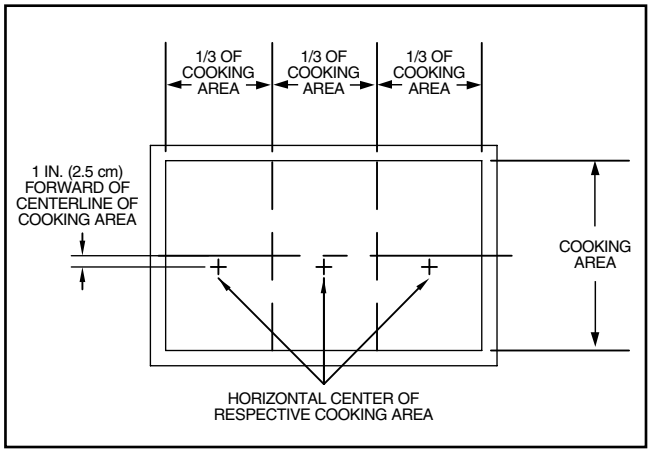
Nozzle Type: 2H

Nozzle Height: 33 in. to 35 in. (838 mm to 886 mm) above the top of the broiler grate surface

Nozzle Location: Each nozzle is to protect 1/3 of the cooking area and located in the horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.

Nozzle Aiming Point: Horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.





Model	Grate Dimension	Gas Output
IABR-36	32.5 in. (825 mm) x 21 in. (533 mm)	90,000 BTU
IABR-48	44.5 in. (1,130 mm) x 21 in. (533 mm)	120,000 BTU

The Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Should you have questions regarding this bulletin, please contact your Territory Sales Manager or International Area Manager, or contact Technical Services as listed below.

KITCHEN KNIGHT II RESTAURANT FIRE SUPPRESSION SYSTEM (PCL-160/300/460/600)

Pyro-Chem

DESIGN, INSTALLATION, RECHARGE, AND MAINTENANCE MANUAL

TECHNICAL MANUAL

- **COMPONENTS**
- **DESIGN**
- **INSTALLATION**
- **MAINTENANCE**
- **RECHARGE**

tyco Fire Protection Products

One Stanton Street / Marinette, WI 54143-2542, USA / +1-715-735-7411 / www.pyrochem.com

Bulletin No. 2016122
UL EX 3830; UL EX 3437

DATE: May 20, 2016

TO: To Authorized PYRO-CHEM Restaurant System Distributors

FROM: Product Management, Restaurant Systems

SUBJECT: NEW Stainless Steel Scissor Linkage and Fusible Link Offering

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce the New Stainless Steel Scissor Linkage used in the PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System and the MONARCH Industrial Dry Chemical System. The new scissor linkage will provide a means for easier installation of the detection line while using a continuous run of wire rope.

The new stainless steel scissor linkage offers the following limitations:

- Maximum Number of Detectors: **20**
- Maximum length of wire rope: **150 ft (45.7 m)**
- Maximum number of Elbows: **40**

New Part No.	Replaces Part No.	Description	Suggested List Price (USD)*
435547	550131/551032	Detector, Series (Scissor Linkage) Each	$ 35.25
435548	550035/550041	Detector, Series (Scissor Linkage) 25-Pack	$ 824.00
435546	N/A	Detector, Terminal (Scissor Linkage) Each	$ 44.00
440495	N/A	Detector, Terminal (Scissor Linkage) 10-Pack	$ 147.00
439515	N/A	Scissor Linkage 10-Pack	$ 150.00

***Note:** Prices are subject to change without notice. Always refer to the latest price files on the PYRO-CHEM extranet prior to ordering.

Note: The scissor linkage cannot be hooked inside the detector bracket channel when installed.

tyco Fire Protection Products

One Stanton Street
Marinette, WI 54143-2542
www.pyrochem.com

Main Telephone Numbers: +1-800-526-1079 or +1-715-732-3465
Customer Services..... Press 2
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Quality Assurance ..... Press 8

UL EX 3830; UL EX 3437

The SL style fusible link is also approved to be used with the PYRO-CHEM KITCHEN KNIGHT II and MONARCH fire suppression systems, when installed in the new scissor linkage and detector bracket. The SL fusible links are fully color-coded to help ensure the proper temperature-rated link is installed for the application. Color-coding allows for easy identification by installing technicians and simplifies inspection and validation by local Authorities Having Jurisdiction.

Part No. 439085	**Part No. 439086**	**Part No. 439087**	**Part No. 439088**	**Part No. 439089**
 009928	 009929	 009930	 009931	 009932
Temperature Rating: 165 °F (74 °C)	**Temperature Rating:** 212 °F (100 °C)	**Temperature Rating:** 280 °F (138 °C)	**Temperature Rating:** 360 °F (183 °C)	**Temperature Rating:** 450 °F (232 °C)
Maximum Allowable Temperature Exposure: 100 °F (38 °C)	**Maximum Allowable Temperature Exposure:** 150 °F (66 °C)	**Maximum Allowable Temperature Exposure:** 225 °F (107 °C)	**Maximum Allowable Temperature Exposure:** 290 °F (143 °C)	**Maximum Allowable Temperature Exposure:** 360 °F (182 °C)
Color of Link: Black	**Color of Link:** White	**Color of Link:** Blue	**Color of Link:** Red	**Color of Link:** Green
Quantity: Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25

This bulletin is a temporary supplement to the KITCHEN KNIGHT II Technical Manual (PN551274-06) dated November 10, 2014 and the MONARCH Technical Manual (PN553565) dated February 1, 2010. The information contained in this bulletin will be added to the manuals upon the next printing.

Should you have questions pertaining to this bulletin, please contact Technical Services as noted below.

Bulletin No. 2016059
UL EX-3830

DATE: May 3, 2016

TO: All Authorized PYRO-CHEM Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: KITCHEN KNIGHT II System Coverage of the Imperial Model IABR-36 and IABR-48 Gas-Radiant Char-Broilers with Wood Smoker Boxes and Chip Holders.

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce the appliance-specific coverage for KITCHEN KNIGHT II Wet Chemical Restaurant Fire Suppression Systems when protecting the Imperial Gas Radiant Char-broilers: IABR-36 and IABR-48, with Wood Smoker Box and Chip Holders.

The outlined models are protected within the parameters indicated in this bulletin. The information in this bulletin will serve as a supplement for the KITCHEN KNIGHT II Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 551274-06) dated November 10, 2014 and will be added to the manual at the next reprint.

See Page 2 for details.

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Customer Services..... Press 2
Training Services ..... Press 6
Technical Services ..... Press 4
Quality Assurance ..... Press 8

The following nozzle position and coverage limitations must be followed:

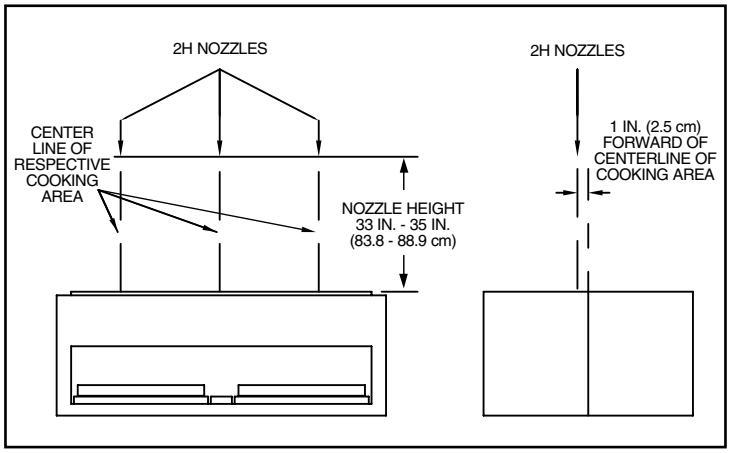
Nozzle Quantity: 3

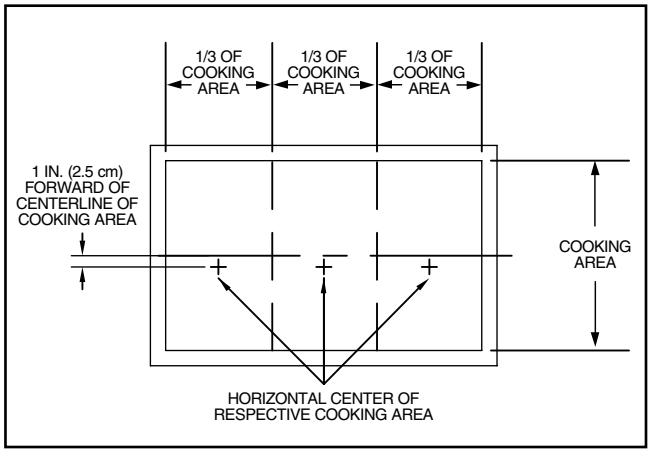
Nozzle Type: 2H

Nozzle Height: 33 in. to 35 in. (838 mm to 886 mm) above the top of the broiler grate surface

Nozzle Location: Each nozzle is to protect 1/3 of the cooking area and located in the horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.

Nozzle Aiming Point: Horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.





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IABR-48	44.5 in. (1,130 mm) x 21 in. (533 mm)	120,000 BTU

The Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Should you have questions regarding this bulletin, please contact your Territory Sales Manager or International Area Manager, or contact Technical Services as listed below.

US / INTERNATIONAL
Tyco Safety Products
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CANADA
Tyco Safety Products
871 Equestrian Court Unit 1A,
2nd Floor
Oakville, ON L6L 6L7 Canada
877-992-6785
905-847-0217

BULLETIN

Bulletin Number: 2320 **Date:** July 8, 2008

TO: All PYRO-CHEM® Restaurant System Distributors and OEM's

FROM: Product Management – Restaurant Systems

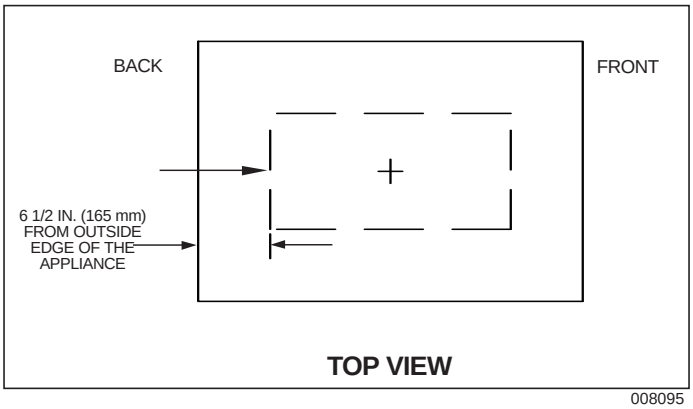
SUBJECT: KITCHEN KNIGHT® II Nieco Broiler Protection – Model MPB 94 - with Catalyst Only

PYRO-CHEM is pleased to announce KITCHEN KNIGHT II appliance-specific fire protection for the Nieco Broiler Model MBP 94 for low profile applications. This design was tested to offer overhead coverage protection versus the chain broiler protection currently being utilized. This bulletin is a temporary supplement to the KITCHEN KNIGHT II Technical Manual (PN551274-4) dated March 1, 2006 and is not intended to replace the requirements and limitations outlined in the current manual. The information contained in this bulletin will be added to the manual upon the next printing.

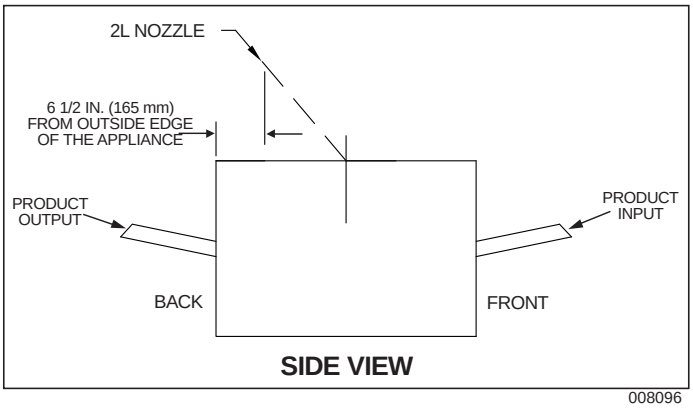
Nieco Broiler: Model MPB 94 (109,590 Btu/hr Maximum)

The following nozzle position and coverage limitations must be followed:

Nozzle quantity.....One
Nozzle type.....2L
Nozzle height.....20 in. (508 mm)
Nozzle location.....6 1/2 in. (165 mm) inside from outside edge of the appliance top
Nozzle aim point.....Aimed at center of catalyst



TOP VIEW
008095



SIDE VIEW
008096

If you should have any questions pertaining to this bulletin, please contact your Territory Sales Manager or call Technical Services at 1-800-526-1079 or 1-715-732-3465.

This manual is intended for use with PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems.

Those who install, operate, recharge, or maintain these fire suppression systems should read this entire manual. Specific sections will be of particular interest depending upon one's responsibilities.

Design, installation, recharge, and maintenance of the system must conform to the limitations detailed in this manual and performed by an individual who attended a PYRO-CHEM training program and became trained to install, recharge, design, and maintain the PYRO-CHEM system.

Fire suppression systems are mechanical devices. They need periodic care. Maintenance is a vital step in the performance of your fire suppression system. As such it must be performed in accordance with NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment) and NFPA 17A (Standard on Wet Chemical Extinguishing Systems) by an authorized PYRO-CHEM distributor. To provide maximum assurance that the fire suppression system will operate effectively and safely, maintenance must be conducted at six-month intervals, or earlier if the situation dictates. Twelve-year maintenance must include agent tank hydrostatic testing.

PART NO. 551274-06

⚠ DANGER

Indicates a hazardous situation in which a person will experience serious personal injury or death if the situation is not avoided.

⚠ WARNING

Indicates a hazardous situation in which a person could experience serious personal injury or death if the situation is not avoided.

⚠ CAUTION

Indicates a hazardous situation in which a person could experience minor or moderate personal injury if the situation is not avoided.

CAUTION

Addresses practices not related to personal injury, such as a system part malfunctioning, property damage, or system failure.

NOTICE

Addresses general practices or observations related to system function that are not related to personal injury.

DATE	PAGE	REV. NO.		DATE	PAGE	REV. NO.
2014-NOV-10	Complete manual has been reformatted along with several revised pages that contain updated technical information. For clarity, all pages have been changed to Revision 06, regardless of previous revision number. Technical information changes have been noted with a revision indicator (▶).					

▸ Indicates revised information.

■ Indicates change in page sequence.

DATE	PAGE	REV. NO.	DATE	PAGE	REV. NO.

▸ Indicates revised information.

■ Indicates change in page sequence.

INTRODUCTION

This manual is intended for use with PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems. Those who install, operate, recharge, or maintain these fire suppression systems should read this entire manual. Specific sections will be of particular interest depending upon one's responsibilities.

Design, installation, recharge, and maintenance of the system must conform to the limitations detailed in this manual and performed by an individual who attended a PYRO-CHEM training program and became trained to install, recharge, design, and maintain the PYRO-CHEM system.

Fire suppression systems are mechanical devices. They need periodic care. Maintenance is a vital step in the performance of your fire suppression system. As such, it must be performed in accordance with NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment) and NFPA 17A (Standard on Wet Chemical Extinguishing Systems) by an authorized PYRO-CHEM distributor. To provide maximum assurance that the fire suppression system will operate effectively and safely, maintenance must be conducted at six-month intervals, or earlier if the situation dictates. Twelve-year maintenance must include agent tank hydrostatic testing.

The PYRO-CHEM KITCHEN KNIGHT II Pre-Engineered System utilizes a wet chemical agent specifically designed to suppress restaurant cooking area fires. The system provides automatic actuation and can be manually actuated through a remote mechanical pull station. Upon actuation, the system discharges a pre-determined amount of agent to the duct, plenum, and cooking appliances. The agent acts to suppress fires in three ways:

1. The chemical chain reaction causing combustion is interrupted by both the agent itself and the resulting steam formation.
2. The agent cools the fire bringing it below auto-ignition temperature.
3. The agent reacts with hot grease forming a soap-like layer (saponification) that helps prevent the escape of combustible vapors, thus preventing re-ignition.

The shutdown of all sources of fuel and electric power that produce heat to all equipment protected by the system is required upon system actuation. Make up or supply air fans, integral to the exhaust hood(s) being protected, shall be shut down upon system actuation. Exhaust fan(s) in the ventilation system should remain on during system discharge as they assist the dispersion of chemical through the ventilating system. The system is UL Listed with or without exhaust fan shutdown.

The KITCHEN KNIGHT II and the KITCHEN KNIGHT Restaurant Fire Suppression System are compatible as long as separate installation guidelines are followed per each system design manual. Exception: The actuation limitations for the KITCHEN KNIGHT II system may be utilized for the KITCHEN KNIGHT system. Also, control heads, prior to Model No. 3, may be utilized on KITCHEN KNIGHT II systems, provided that the limitations used with those control heads are followed.

Temperature Limitations

The operating temperature range of the PYRO-CHEM KITCHEN KNIGHT II System is 32 °F (0 °C) minimum to 120 °F (49 °C) maximum.

UL Listing

The PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System has been tested to the UL Standard for Fire Extinguishing Systems For Protection of Restaurant Cooking Areas, UL300 and Listed by Underwriters Laboratories, Inc.

ULC Listing

The PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System is listed by Underwriters Laboratories of Canada (ULC). The ULC Listing No. is EX3830.

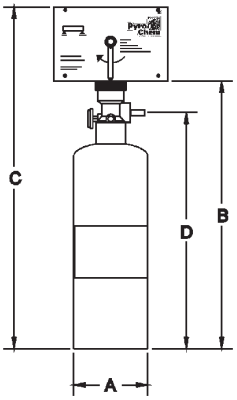
MEA Approval

The PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System has been approved for use by MEA (Material and Equipment Acceptance Division) for New York City. The MEA Certification No. is 249-03-E.

NOTES:

CYLINDERS & VALVE

The PYRO-CHEM KITCHEN KNIGHT II System has available four different size cylinders: Models PCL-160 (Part No. 553163), PCL-300 (Part No. 551194), PCL-460 (Part No. 551193), and PCL-600 (Part No. 551196). Cylinder sizes are expressed in terms of extinguishing agent capacity (i.e., the PCL-300 uses 3.0 gallons (11.4 L) of extinguishing agent). The cylinder is manufactured, tested, and meets DOT requirements. Cylinders come pre-filled with extinguishing agent and are charged with dry nitrogen to a pressure of 225 psig @ 70° F (15.5 bar @ 21 °C). Cylinder and valve assembly dimensions are shown in Figure 2-1.



Model No.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	Max. Flow Point Capacity	Weight lb (kg)	Mounting Bracket Used
PCL-160	8.00 (203)	17.75 (451)	23.50 (597)	15.44 (392)	5	34 (15.4)	MB-15
PCL-300	8.00 (203)	25.06 (637)	30.81 (783)	22.75 (578)	10	53 (24.0)	MB-15
PCL-460	10.00 (254)	25.06 (637)	30.81 (783)	22.75 (578)	15	83 (37.6)	MB-15
PCL-600	10.00 (254)	35.81 (910)	41.56 (1056)	33.50 (851)	20	108 (49.0)	MB-1

FIGURE 2-1
002841PC

All cylinders utilize the same Wet Valve Assembly (Part No. 551175). The wet valve assembly is a pressure sealed poppet type valve designed to provide rapid actuation and discharge of agent. See Figure 2-2.

Item	Part No.	Description
1		Valve Body
2	550705	Conical Spring
3	550707	Piston
4	550716	Neck O-Ring
5	551236	Pressure Gauge
6	550028	Stem O-Ring
7	550802	Wet Valve Adaptor

Item	Part No.	Description
8	550386	Shrader Valve Ass'y
9	550714	Valve Cap O-Ring
10	550715	Piston O-Ring
11	550989	Valve Stem
12	551256	Pressure Regulator
13	551261	Seal
14	17851	6-32x3/8 Screw

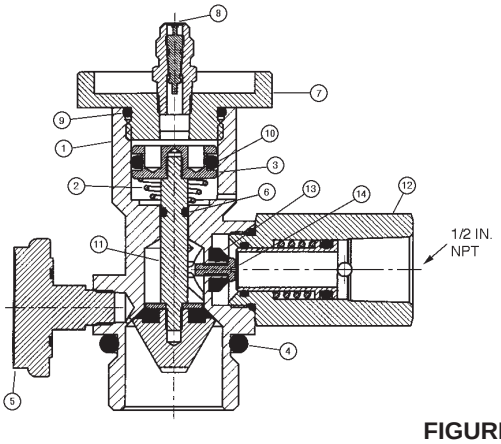


FIGURE 2-2
006212PC

WET VALVE REBUILDING EQUIPMENT

Wet Valve Seal Rebuilding Kit

After system discharge, the valve assembly must be rebuilt to ensure proper future operation. The Wet Valve Seal Rebuilding Kit (Part No. 550698) should be used. It includes all components necessary to properly rebuild the valve. See Figure 2-3.

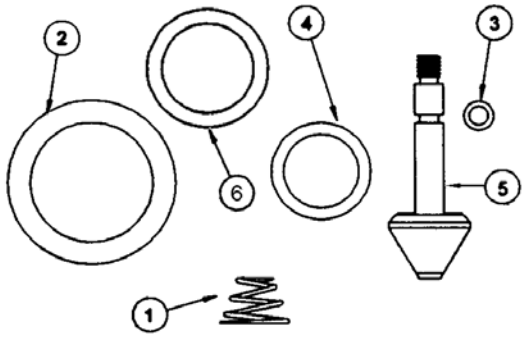


FIGURE 2-3
002906PC

Item	Part Number	Description
1	550705	Conical Spring
2	550716	Neck O-Ring
3	550028	Stem O-Ring
4	550715	Piston O-Ring
5	550989	Valve Stem
6	550714	Valve Cap O-Ring

Pressure Regulator Assembly

The pressure regulator assembly (Part No. 550985) is available if the complete regulator requires replacement (e.g. possible thread damage).

WET VALVE REBUILDING EQUIPMENT (Continued)

Pressure Regulator Rebuilding Kit

After system discharge and at hydrotest intervals, the pressure regulator must be rebuilt to ensure proper future operation. The Pressure Regulator Rebuilding Kit (Part No. 551061) should be used. It includes all components and instructions necessary to properly rebuild the regulator. See Figure 2-4.

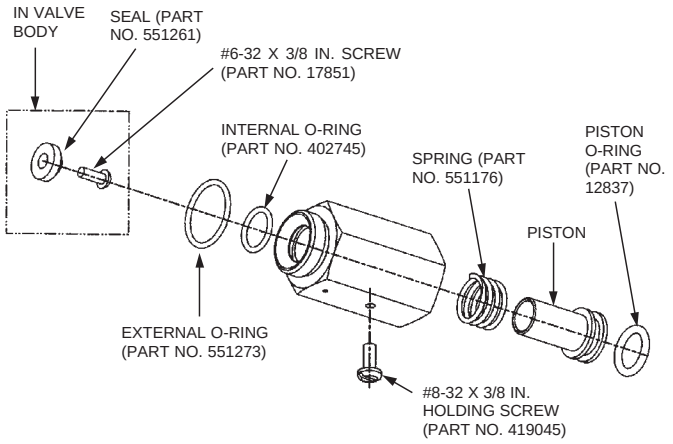


FIGURE 2-4
006103PC

Model VT-1 Wet Valve Tool

The Model VT-1 Wet Valve Tool (Part No. 550788) is designed to facilitate the rebuilding of the wet valve assembly. It should be used to hold the wet valve piston while unscrewing the cap and stem assembly. See Figure 2-5.

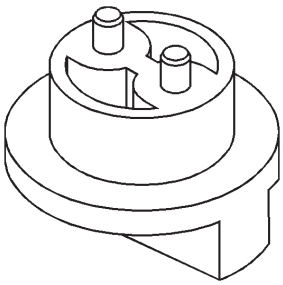
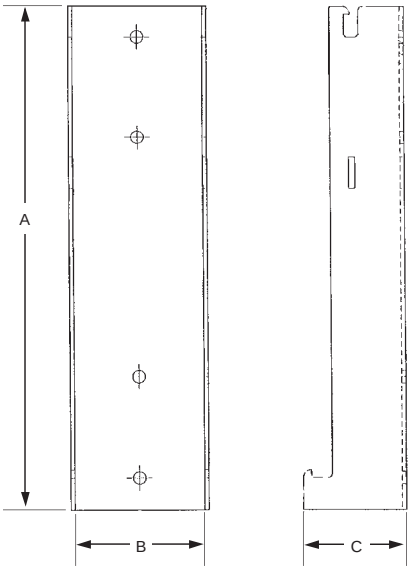


FIGURE 2-5
002907PC

CYLINDER BRACKETING

Vertical bracketing of the PCL-160, PCL-300 and PCL-460 is provided by the Model MB-15 Bracket Kit (Part No. 550054). Vertical bracketing of the PCL-600 is provided by the Model MB-1 Bracket Kit (Part No. 550053). See Figure 2-6. These kits must be ordered separately with each cylinder/valve assembly. Cylinder installation instructions are provided in the installation section of this manual.



Model No.	A	B	C
MB-15	15.69 in. (399 mm)	4.0 in. (102 mm)	3.13 in. (7.9 mm)
MB-1	20.44 in. (519 mm)	4.0 in. (10\2 mm)	2.13 in. (5.4 mm)

FIGURE 2-6
006842PC

EXTINGUISHING AGENT

The agent used in PYRO-CHEM KITCHEN KNIGHT II Systems is a potassium carbonate based solution that is extremely effective for grease-related kitchen fires. This agent is available for cylinder recharging in 1.6 Gallon and 3.0 Gallon containers. For MSDS information, contact Tyco Fire Protection Products or visit www.pyrochem.com.

1.6 Gallon Shipping Assembly – Part No. 553176

3.0 Gallon Shipping Assembly – Part No. 551188

⚠ CAUTION

Precautions must be taken when handling and transferring wet agents as they are caustic in nature. Goggles must be worn at all times. If any agent gets into the eyes, they should be flushed with clean water for 15 minutes and a physician contacted. If any agent contacts the skin, it should be flushed with cold water to prevent irritation. The agent is electrically conductive. Care must be taken to thoroughly clean up any agent discharged around electrical appliances before turning the power on.

After system discharge, agent must be cleaned up immediately with hot, soapy water to prevent corrosion of affected surfaces.

MODEL MCH3 – MECHANICAL CONTROL HEAD

The Model MCH3 Mechanical Control Head (Part No. 551200) is a fully mechanical control head which can be connected to the PCL-160/300/460/600 cylinder valve. This control head will support a fusible link detection system, a remote mechanical pull station (Model RPS-M), and a mechanical or electric gas shut-off valve. A micro electric switch (Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT) can be ordered separately and field installed. It is equipped with a local manual control handle that allows for mechanical system actuation. Operation of the local manual control requires removing the pull pin and rotating the handle clockwise. The Model MCH3 control head can actuate a maximum of five cylinders with the 16 gram CO_2 cartridge. See Figure 2-7.

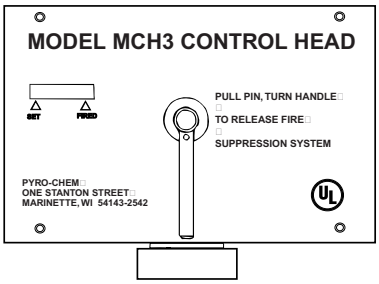


FIGURE 2-7
004790PC

MODEL ECH3 – ELECTRIC CONTROL HEAD

The Model ECH3 electric control head is an electrically operated control head which can be connected to the PCL-160/300/460/600 cylinder valve. This control head will support an electric thermal detection system, a remote mechanical pull station (Model RPS-M), and an electric gas shut-off valve. It will not support a fusible link detection system. An electric (snap-action) switch (Model MS-DPDT) is included.

The Model ECH3 control head is available in both 120VAC (Model ECH3-120 (Part No. 551202)) and 24VDC (Model ECH3-24 (Part No. 551201)). It is equipped with a local manual control handle that allows for mechanical system actuation. Operation of the local manual control requires removing the pull pin and rotating the handle clockwise. The Model ECH3 control head can actuate a maximum of five cylinders with the 16 gram CO_2 cartridge. See Figure 2-8.

Note: When utilizing electric detection, it is recommended that the Model ECH3-24 electric control head be used with either the AUTOPULSE 542R Control Panel (Part No. 433607) or the AUTOPULSE Z-10 Control Panel (Part No. 430525). If the ECH3-120 control head is to be utilized, it must be used with ▸ Solenoid Monitor, Model SM-120 (Part No. 550302), along with a UL Listed 1A, 120VAC power supply (by others), in accordance with NFPA 17A, NFPA 96, and the local authority having jurisdiction.

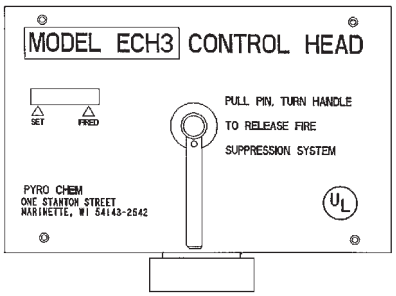


FIGURE 2-8
004789PC

MODEL NMCH3 – MECHANICAL CONTROL HEAD

The Model NMCH3 Mechanical Control Head (Part No. 551203) is a fully mechanical control head which can be connected to the PCL-160/300/460/600 cylinder valve. This control head will support a fusible link detection system, a remote mechanical pull station (Model RPS-M), and a mechanical or electric gas shut-off valve. An electrical (snap-action) switch (Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT) can be ordered separately and field installed. There is no local manual actuation for the Model NMCH. The Model NMCH3 control head can actuate a maximum of five cylinders with the 16 gram CO_2 cartridge.

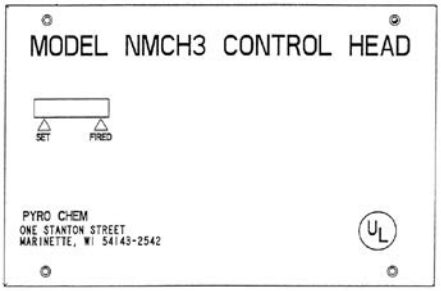


FIGURE 2-9
006843PC

MODEL EN-MCU3 ENCLOSURE

The Model EN-MCU3 Enclosure (Part No. 551208) is used for vertical mounting of a single PCL-160, PCL-300 or PCL-460. The EN-MCU3 also includes a mechanical control unit, eliminating the need for a Model MCH3 control head. See Figure 2-10.

Note: The PCL-600 cannot be mounted in an EN-MCU3.

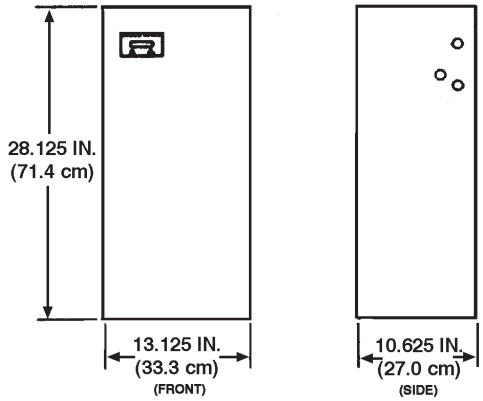


FIGURE 2-10
002845PC

MODEL EN-S ENCLOSURE

The Model EN-S Enclosure (Part No. 550966) is used for vertical mounting of a single PCL-160, PCL-300 or PCL-460 when it is used as a secondary agent cylinder in a system. Dimensions are the same as the Model EN-MCU3 enclosure (see Figure 2-10). The EN-S has no control mechanism, and must be used in conjunction with a Model EN-MCU3 enclosure or a Model MCH3/ECH3 control head. **Note**: The PCL-600 cannot be mounted in an EN-S enclosure.

16 GRAM CO_2 CARTRIDGE

The 16 Gram CO_2 Cartridge (Part No. 551059) is required to pneumatically actuate the tank valve. The cartridge is installed in the control head on top of the tank valves. The cartridge shipping assembly contains six cartridges.

MODEL MB-P2 – CONTROL HEAD MOUNTING BRACKET

The Model MB-P2 Mounting Bracket (Part No. 550853) must be used to mount the Model MCH3, NMCH3, or ECH3 control heads if the control head is not mounted directly on a cylinder valve. See Figure 2-11.

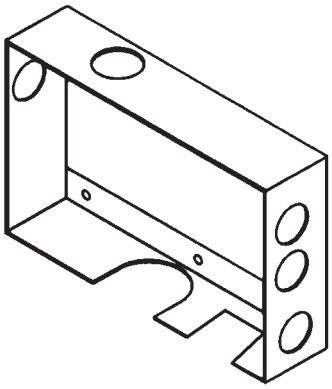


FIGURE 2-11
002846PC

PNEUMATIC ACTUATING CYLINDERS

Model PAC-10

The Model PAC-10 (Part No. 550104) is a pneumatic actuating cylinder that can actuate a maximum of ten agent cylinders simultaneously. The Model PAC-10 includes a DOT 4BA350 cylinder pressurized with dry nitrogen to 350 psig @ 70° F (24.1 bar @ 21 °C), a brass valve with pressure gauge, and a wall mounting bracket. A Model MCH3, NMCH3, or ECH3 control head must be purchased separately and connected to the PAC-10 to open the valve. See Figure 2-12.

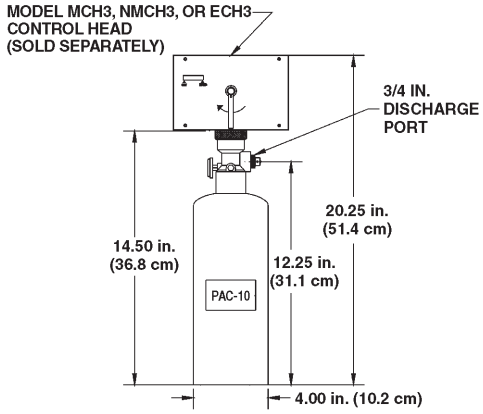


FIGURE 2-12
002847PC

DETECTION EQUIPMENT

Model FLK-1 Assembly

- The Model FLK-1 Assembly (Part No. 550131) includes a 10 in. (254 mm) steel bracket, two 1/2 in. EMT connectors, two cable crimps, and two “S” hooks. Fusible links must be ordered separately. See Figure 2-13.

Model FLK-1A Assembly

- The Model FLK-1A Assembly (Part No. 550132) includes an 8 in. (203 mm) steel bracket, two 1/2 in. EMT connectors, two cable crimps, and two “S” hooks. Fusible links must be ordered separately.

Model FLH-1 Assembly

- The Model FLH-1 Fusible Link Hanger Assembly (Part No. 550876) is an accessory designed to simplify the installation of fusible links in the fusible link line. It can be used with the Model FLK-1 fusible link kit (kits must be ordered separately). The fusible link hanger makes it possible to install fusible links without cutting and crimping loops in the fusible link line for each link. They are available in packages of 25 (FLH-25) only. See Figure 2-14.

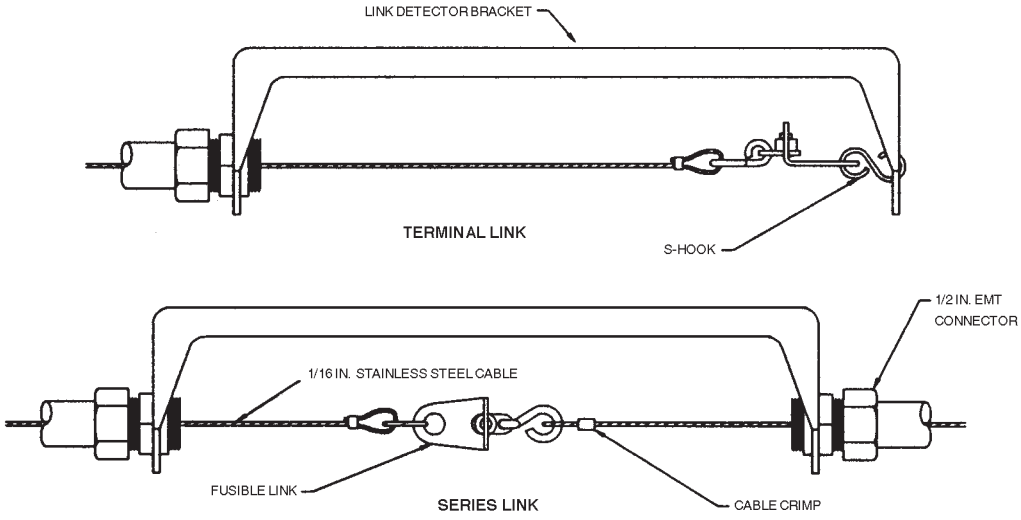


FIGURE 2-13
002849PC

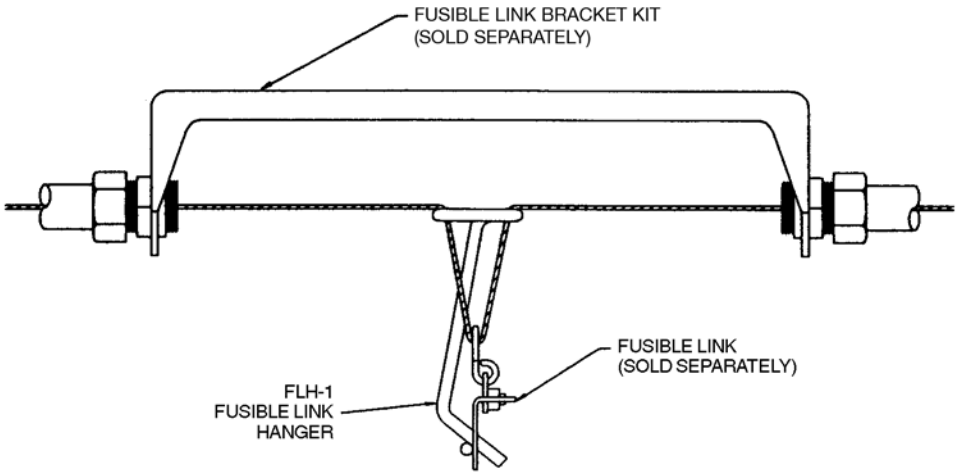


FIGURE 2-14
002850PC

A-PC Fusible Links

The A-PC fusible link is designed to separate at a specific temperature, releasing tension from the fusible link line, causing system actuation. See Figure 2-15.

Note: When possible, temperature readings should be taken at each detector location to determine optimum fusible link temperature ratings. Temperature can be recorded using either a Maximum Registering Thermometer (Part No. 15240) temperature tape (by others), or any other accurate thermometer that will record the maximum temperature experienced at the detector location.

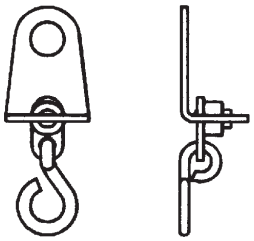


FIGURE 2-15
002851PC

After determining the maximum ambient temperature at the fusible link location, select the correct fusible link according to the temperature condition chart below:

Fusible Link Shipping Assembly Part No.	Temperature Rating	To Be Used Where Temperature Does Not Exceed
439227 (10)	165 °F (74 °C)	100 °F (38 °C)
439228 (10)	212 °F (100 °C)	150 °F (66 °C)
439229 (10)	280 °F (138 °C)	225 °F (107 °C)
439230 (10)	360 °F (182 °C)	290 °F (143 °C)
439231 (10)	450 °F (232 °C)	360 °F (182 °C)
439232 (25)	500 °F (260 °C)	400 °F (204 °C)

Thermal Detectors

Rate-compensating thermal detectors are normally open, mechanical contact closure switches designed to operate at a factory preset temperature. They are available in four preset temperatures which meet NFPA standards and are UL Listed and FM Approved. After determining the maximum ambient temperature at the thermal detector location, select the correct thermal detector according to the temperature condition chart below:

Thermal Detector Model No.	Maximum Ambient Temperature	Part Number
TD-225	155 °F (68 °C)	13976
TD-325	255 °F (124 °C)	13975
TD-450	380 °F (193 °C)	13974
TD-600	530 °F (277 °C)	13971

Note: A transient rush of warm air up to 40 °F (4 °C) per minute may expand the shell, but not enough to trigger the unit. Temperature increases over 40 °F (4 °C) per minute however, may initiate an alarm condition.

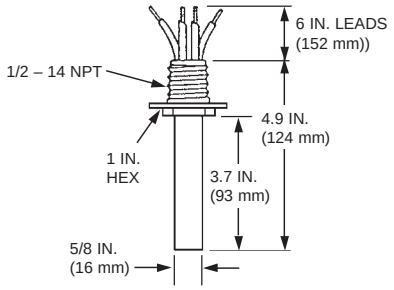


FIGURE 2-16
007354

Flexible Conduit

Flexible Conduit can be used with the Mechanical Pull Station Assemly (Part No. 551074) and Mechanical Gas Valves. Flexible Conduit eliminates the need for rigid EMT conduit in the mechanical pull station and gas valve lines, significantly reducing the overall installation time.

Part No.	Description
434525	Flexible Conduit – 500 ft (152.4 m)
435959	Flexible Conduit – 500 ft (152.4 m) and Wire Rope – 500 ft (152.4 m)
439104	Pre-Fed Flexible Conduit Assembly – 50 ft (15.2 m)
435979	Flexible Conduit Strain Relief (50-Pack)
434347	Flexible Conduit Insert (50-Pack)
436063	Conduit Offset (6-Pack)
436150	P-Clip (50-Pack)
79827	Compression Union, 1/2 in.
55813	1/2 in. Compression Connector

MODEL RPS-M – REMOTE MECHANICAL PULL STATION

Remote manual control for the Model MCH3, NMCH3, or ECH3 control head is provided by the Model RPS-M Remote Mechanical Pull Station (Part No. 551074). It is connected to the system control head by stainless steel cable. This cable is enclosed in 1/2 in. EMT conduit with corner pulleys or flexible conduit with bends and/or corner pulleys at each change in direction. The remote mechanical pull station shall be located at the point of egress. See Figure 2-17.

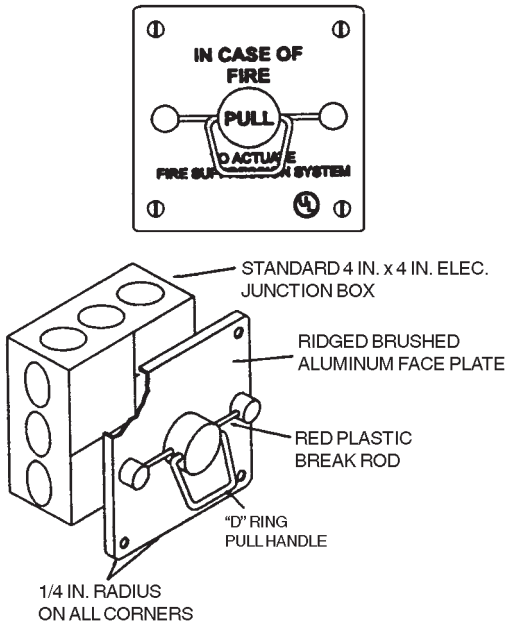


FIGURE 2-17
002852PC

"QUIK-SEAL" ADAPTOR

The "Quik-Seal" adaptor is a listed mechanical bulkhead fitting that produces a liquid-tight seal around both distribution piping and detection conduit which runs through restaurant hoods and ducts. The "Quik-Seal" adaptor accepts threaded pipe or conduit. The adaptor is available for 3/8 in. and 1/2 in. pipe or conduit sizes. When using with EMT conduit, a conduit connector must be installed in each end of the adaptor. The "Quik-Seal" Adaptor Shipping Assembly can be ordered in single or package ▸ of 24. See Figure 2-18.

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
3/8 in.	550857	1	1 1/8 in.
1/2 in.	550859	1	1 1/8 in.
3/8 in.	550858	24	1 1/8 in.
1/2 in.	550860	24	1 1/8 in.

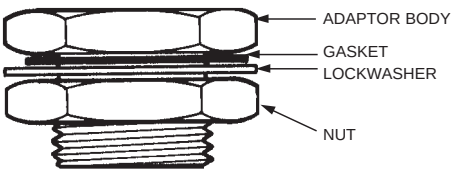


FIGURE 2-18
000154

"COMPRESSION-SEAL" ADAPTOR

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around pipe and conduit when installing distribution piping and detection conduit through restaurant hoods and ducts. The "Compression-Seal" Adaptor is a straight-through design requiring no cutting or threading of conduit or pipe. The adaptor is available for EMT conduit size of 1/2 in. (Part No. 79152). See Figure 2-19. "Compression-Seal" Adaptor Shipping Assembly must be ordered as stated below:

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/2 in. EMT Conduit	79153	24	1 1/8 in.

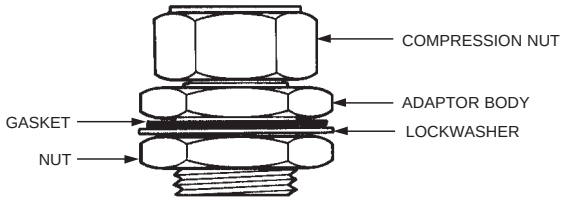
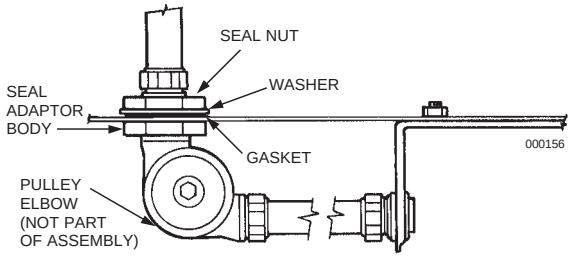


FIGURE 2-19

"HOOD SEAL" ADAPTOR ASSEMBLY

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around 1/2 in. EMT conduit when installing the detection line through restaurant hoods and duct. The adaptor accepts a high temperature pulley elbow and, when used, correctly positions the elbow or conduit in line with the conduit adaptor hole in the detector bracket. The "Hood Seal" eliminates the need for multiple elbows when penetrating the top of a hood when installing the detection line. "Hood Seal" Adaptors are available in quantities of six as Shipping Assembly Part No. ▸ 423253. See Figure 2-20.



USE ONLY PULLEY ELBOW (PART NO. 423250)

FIGURE 2-20
000156

GAS SHUT-OFF VALVES

Note: Gas valves are approved for indoor use only.

GV Mechanical Gas Shut-off Valve

A gas shut-off valve is required on all systems used to protect a gas fueled cooking appliance to stop gas flow in the event of system actuation. A mechanical gas valve can be used with the Model MCH3 and Model NMCH3 control heads. It is connected to the system control head by stainless steel cable. This cable is enclosed in 1/2 in. EMT conduit with a corner pulley at each change in direction. The valves are rated for natural and LP gas (see Figure 2-21). Mechanical gas valves are available in the following sizes:

Note: Maximum operating pressure for all sizes of GV Mechanical Gas Valve is 5 psi (0.4 bar).

Model No.	Valve Size	Dim. "A"	Part Number
GV-75	3/4 in.	3/8 in. (9.5 mm)	550593
GV-100	1 in.	3/8 in. (9.5 mm)	550594
GV-125	1-1/4 in.	15/32 in. (12 mm)	550595
GV-150	1-1/2 in.	15/32 in. (12 mm)	550596
GV-200	2 in.	15/32 in. (12 mm)	551049
GV-250	2-1/2 in.	29/32 in. (23 mm)	550185
GV-300	3 in.	29/32 in. (23 mm)	550186

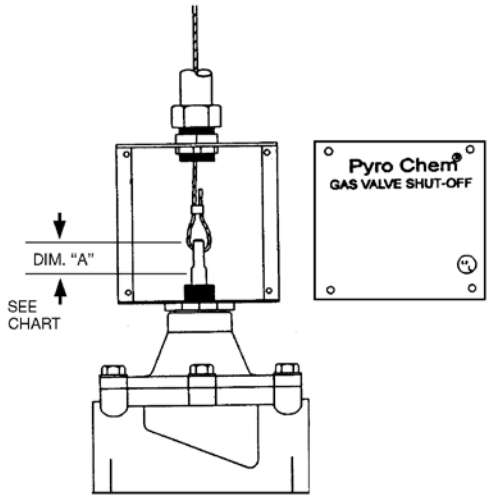


FIGURE 2-21
002853PC

EGVSO Electric Gas Shut-off Valve

A gas shut-off valve is required on all systems used to protect a gas fueled cooking appliance to stop gas flow in the event of system actuation. A UL Listed electric gas valve can be used with either the Model MCH3 or ECH3 control head. The valves are rated for natural and LP gas. Valves are available in 120VAC (see Figure 2-22). Electric gas valves are available in the following sizes:

Valve Model No.	Part Size	Dim. "A"	Number
EGVSO-75	3/4 in.	50 psi (3.5 bar)	13707
EGVSO-100	1 in.	25 psi (1.7 bar)	13708
EGVSO-125	1-1/4 in.	25 psi (1.7 bar)	550360
EGVSO-150	1-1/2 in.	25 psi (1.7 bar)	13709
EGVSO-200	2 in.	25 psi (1.7 bar)	13710
EGVSO-250	2-1/2 in.	5 psi (0.3 bar)	550363
EGVSO-300	3 in.	5 psi (0.3 bar)	17643

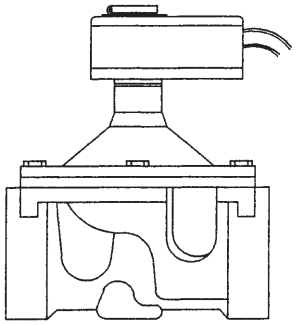


FIGURE 2-22
006844PC

Note: A UL Listed manual reset relay is required when using an electric gas valve. The PYRO-CHEM KITCHEN KNIGHT II Model SM-120 solenoid monitor must be used for this purpose.

CORNER PULLEYS

Model SBP-1

A corner pulley is used whenever a change in stainless steel cable direction is required. The Model SBP-1 Corner Pulley (Part No. 415670) is equipped with a set screw fitting for connection to 1/2 in. EMT conduit. See Figure 2-23.

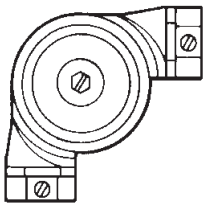


FIGURE 2-23
000160

Model CBP-1

A corner pulley is used whenever a change in stainless cable direction is required. The Model CBP-1 (Part No. 423250) is a grease-tight corner pulley designed for areas likely to experience excessive deposit build-up. It is equipped with a compression fitting for connection to 1/2 in. EMT conduit. See Figure 2-24.

Note: The Model CBP-1 is not a liquid tight seal for penetration of hoods and/or ducts.

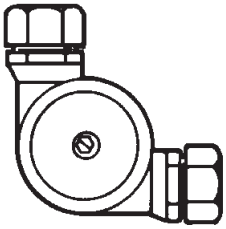


FIGURE 2-24
000161

Model WBP-1

A corner pulley is used whenever a change in stainless cable direction is required. The Model WBP-1 (Part No. 550982) is a weather-proof corner pulley designed for areas likely to be exposed to moisture. It is equipped with female pipe threads for connection to 1/2 in. rigid conduit. See Figure 2-25.

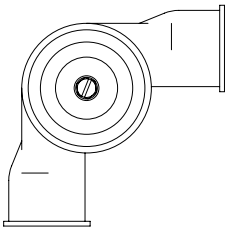


FIGURE 2-25
006194PC

TEE PULLEY

The Tee Pulley (Part No. 427929) is used to change the direction of two wire ropes by 90°. It must be used in areas where the temperatures are within the range of 32 °F to 130 °F (0 °C to 54 °C). Pulley tees can be used in mechanical gas valve actuation lines and remote manual pull station lines. Pulley tees cannot be used within a detection line. See Figure 2-26.

CAUTION

The Tee Pulley must never be used to connect multiple fusible link lines to a single control head.

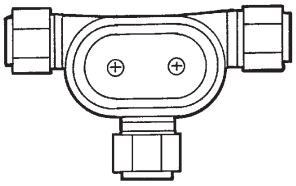


FIGURE 2-26
000447

WIRE ROPE

The 1/16 in. diameter stainless steel wire rope must be used with actuators, detectors and gas valve components requiring a wire rope connection. The stainless steel wire rope is supplied in ▸ 50 ft (15.2 m) lengths with Part No. 15821, and 500 ft (152.4 m) lengths with Part No. 79653. Refer to the Components List for part numbers on crimps, stop sleeves, and S-hooks.

ELECTRICAL SWITCHES

The electrical switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices and other electrical devices that are designed to shut-off or turn on when the system is actuated.

NOTE

No electrical connections shall be made inside the control head. All electrical wiring shall exit the control head through the knock-out on the side of the box. All electrical connections must be made in an approved electrical box.

Switches are available in kits: One Switch Kit (Part No. 551154); Two Switch Kit (Part No. 551155); Three Switch Kit (Part No. 551156), and Four Switch Kit (Part No. 551157). Mounting hardware and 12 in. wire assemblies are provided with each kit. Each switch has a set of single-pole, double-throw contacts rated:

UL/cUL/CSA Rating	ENEC Rating
250 VAC, 21A Resistive	IE4T105µ Approved
250 VAC, 2 HP	250V, 21A Resistive
125 VAC, 1 HP	8A Motor Load

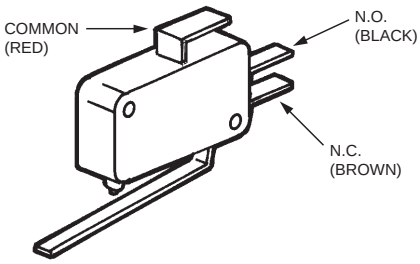


FIGURE 2-27
001612

The Alarm Initiating Switch Kit (Part No. 550077) can be field-mounted within the control head. This switch must be used to close a supervised circuit to the building main fire alarm panel when the control head actuates. This action will signal the fire alarm panel that there was a system actuation in the kitchen area. The switch kit contains all necessary mounting components along with a mounting instruction sheet. The switch is rated 50 mA, 28VDC. See Figure 2-28.

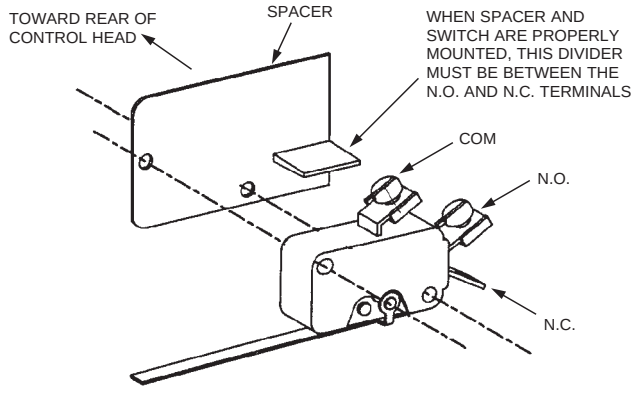


FIGURE 2-28
004890

See NFPA 72, "National Fire Alarm Code," Initiating Devices section, for the correct method of wiring connection to the fire alarm panel.

MODEL SM-120 SOLENOID MONITOR

The Model SM-120 Solenoid Monitor (Part No. 550302) is used in conjunction with the Model ECH3-120 control head to supervise the actuation and detection circuits. In the event of a problem in the circuit, a light on the monitor goes out. Two sets of NO/NC dry contacts are provided. The unit mounts directly to a three-gang wall outlet box. The Model SM-120 acts as a reset relay when used with an electric gas valve. Electric gas valve wiring instructions are provided in the installation section of this manual. See Figure 2-29.

Note: When utilizing electric detection, it is recommended that the Model ECH3-24 electric control head be used with either the AUTOPULSE 542R Control Panel (Part No. 433607) or the AUTOPULSE Z-10 Control Panel (Part No. 430525). If the ECH3-120 control head is to be utilized, it must be used with Solenoid Monitor Model SM-120 (Part No. 550302), along with a UL Listed 1A, 120VAC secondary power supply (by others) in accordance with NFPA 17A, NFPA 96, and the local Authority Having Jurisdiction (AHJ). When the Solenoid Monitor Model SM-120 (Part No. 550302) is used as a reset relay with an electric gas valve, a UL Listed 1A, 120VAC secondary power supply is not required.

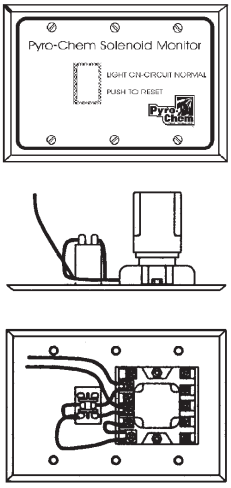


FIGURE 2-29
002860PC

PIPE AND FITTINGS

Pipe and fittings must be furnished by the installer. Schedule 40 stainless steel, chrome plated, or black pipe and fittings must be used. Galvanized pipe and fittings are not to be used.

AGENT DISTRIBUTION HOSE AND RESTRAINING CABLE KIT

The Agent Distribution Hose and Restraining Cable Kit (Part No. 435982) consists of a 5 ft (1.5 m) long Agent Distribution Hose, a 3 ft (0.9 m) long Restraining Cable, and a Restraining Cable Hardware Package. The Agent Distribution Hose can be utilized with castered appliances found in commercial kitchens. The hose allows for movement of the appliance for cleaning without having to disconnect any fire suppression system discharge piping.

STAINLESS STEEL ACTUATION HOSE

The Stainless Steel Actuation Hose is used to connect the actuation line compression tees and can also be connected end to end. The hose has the same thread, 7/16-20, as the fittings. See Figure 2-30.

Hose Part No.	Length
417582	8 in. (203 mm)
31809	16 in. (406 mm)
32336	24 in. (610 mm)
430815	42 in. (1067 mm)

Fitting Part No.	Description
31810	Male Elbow (7/16-20 x 1/4 in. NPT)
31811	Male Tee (7/16-20 x 7/16-20 x 1/4 in. NPT)
32338	Male Straight Connector (7/16-20 x 1/4 in. NPT)

FIGURE 2-30
000433

NOZZLES

Nozzles have been developed for appliance, plenum, and duct applications. All nozzles have a specific flow point value and are supplied with metal blow-off caps to prevent clogging. Each nozzle is stamped with the model number. See Figure 2-31. Application limitations are provided in the design section of this manual.

Part No.	Description	Flow No.
551029	1H Nozzles, 10-pack	1
551026	1L Nozzles, 10-pack	1
551028	2H Nozzles, 10-pack	2
551027	2L Nozzles, 10-pack	2
551038	2D Nozzles, 10-pack	2

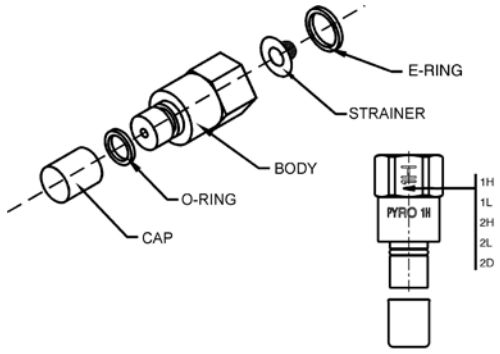


FIGURE 2-31
006171PC

RUBBER BLOW-OFF CAPS

The Rubber Blow-Off Cap helps keep the orifice of the nozzle free of grease or other substances that could interfere with agent distribution. A retaining strap attaches the blow-off cap to the nozzle. See Figure 2-32. Rubber Blow-Off Caps must be ordered as a Shipping Assembly (Part No. 550016) which contains 12 blow-off caps.

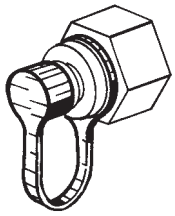


FIGURE 2-32
000009

SWIVEL ADAPTOR

The Swivel Adaptor (Part No. 418569) consists of a swivel nut, swivel body, and swivel ball. All are chrome-plated. The swivel adaptor allows the nozzle to be rotated approximately 30° in all directions. Swivel Adaptors can be ordered as a single Swivel Adaptor or Swivel Adaptor Shipping Assembly (Part No. 423572) which contains 25 swivel adaptors. See Figure 2-33.

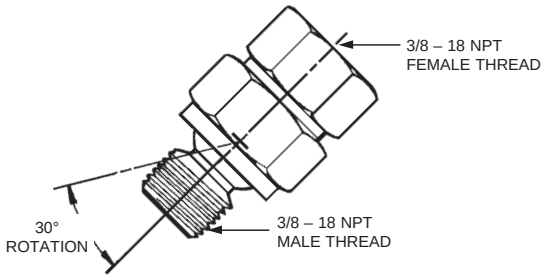


FIGURE 2-33
000003

NOZZLE AIMING DEVICE

The Nozzle Aiming Device (Part No. 551265) is required to properly aim each nozzle to the correct aiming point. The device clamps to the nozzle and emits a small laser light that reflects on the surface that it is aiming at. The nozzle can then be rotated to point at a predetermined aiming point and then tightened to hold that angle. The aiming device requires an adaptor (Part No. 550926) to attach it to the nozzle. The adaptor must be ordered separately. See Figure 2-34.

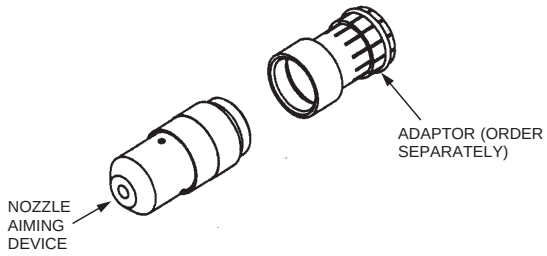


FIGURE 2-34
006520

HORN/STROBE ASSEMBLY

The Horn/Strobe Assembly (Part No. 434528) includes the following specifications:

			Strobe	
Regulated Voltage (VRMS)	Voltage Range (VRMS)	Maximum RMS Current (AMPS)	Candela Per UL 1638 —35C	25C
120	96-132	.070	7.5cd	15cd

MODEL NO.	DESCRIPTION	PART NO.
PCL-160	1.6 GALLON CYLINDER ASSEMBLY	553163
PCL-300	3.0 GALLON CYLINDER ASSEMBLY	551194
PCL-460	4.6 GALLON CYLINDER ASSEMBLY	551193
PCL-600	6.0 GALLON CYLINDER ASSEMBLY	551196
PAC-10	PNEUMATIC ACTUATING CYLINDER	550104
PCL-300	CANADIAN – 3.0 GALLON CYLINDER ASSEMBLY	551195
PCL-460	CANADIAN – 4.6 GALLON CYLINDER ASSEMBLY	551192
PCL-600	CANADIAN – 6.0 GALLON CYLINDER ASSEMBLY	551197
PAC-10	CANADIAN – PNEUMATIC ACTUATING CYLINDER	551125
MB-1	MOUNTING BRACKET (FOR PCL-600)	550053
MB-15	MOUNTING BRACKET (FOR PCL-160/300/460)	550054
MB-P2	MOUNTING BRACKET (FOR MCH3 ECH3-24/120)	550853
MCH3	MECHANICAL CONTROL HEAD	551200
NMCH3	MECHANICAL CONTROL HEAD (NO HANDLE)	551203
EN-MCU3	ENCLOSURE (FOR PRIMARY CYLINDER)	551208
EN-S	ENCLOSURE (FOR SECONDARY CYLINDER)	550966
ECH3-24	24VDC ELECTRICAL CONTROL HEAD	551201
ECH3-120	120VAC ELECTRICAL CONTROL HEAD	551202
– – –	8 IN. (203 mm) SS ACTUATION HOSE	417582
– – –	16 IN. (406 mm) SS ACTUATION HOSE	31809
– – –	24 IN. (610 mm) SS ACTUATION HOSE	32336
– – –	42 IN. (1067 mm) SS ACTUATION HOSE	430815
– – –	MALE ELBOW	31810
– – –	MALE TEE	31811
– – –	MALE STRAIGHT CONNECTOR	32338
1H	WET NOZZLE (PACK OF 10)	551029
1L	WET NOZZLE (PACK OF 10)	551026
2H	WET NOZZLE (PACK OF 10)	551028
2L	WET NOZZLE (PACK OF 10)	551027
2D	WET NOZZLE (PACK OF 10)	551038
– – –	SWIVEL ADAPTOR (PACK OF 25)	423572
– – –	RUBBER BLOW-OFF CAPS (PACK OF 12)	550016
RPS-M	REMOTE MECHANICAL PULL STATION	551074

MODEL NO.	DESCRIPTION	PART NO.
▸FLK-1	10 IN. (254 mm) FUSIBLE LINK BRACKET KIT	550131
▸FLK-1A	8 IN. (203 mm) FUSIBLE LINK BRACKET KIT	550132
FLH-25	25 x FUSIBLE LINK HANGER	550876
▸– – –	FUSIBLE LINK – 165 °F (74 °C) (10)	439227
– – –	FUSIBLE LINK – 212 °F (100 °C) (10)	439228
– – –	FUSIBLE LINK – 280 °F (138 °C) (10)	439229
– – –	FUSIBLE LINK – 360 °F (182 °C) (10)	439230
– – –	FUSIBLE LINK – 450 °F (232 °C) (10)	439231
▸– – –	FUSIBLE LINK – 500 °F (260 °C) (25)	439232
SM-120	120VAC SOLENOID MONITOR	550302
▸TD-225	THERMAL DETECTOR 225 °F (107 °C)	13976
TD-325	THERMAL DETECTOR 325 °F (163 °C)	13975
TD-450	THERMAL DETECTOR 450 °F (232 °C)	13974
▸TD-600	THERMAL DETECTOR 600 °F (316 °C)	13971
EGVSO-75	ELECTRIC GAS SHUT-OFF VALVE 3/4 IN.	13707
EGVSO-100	ELECTRIC GAS SHUT-OFF VALVE 1 IN.	13708
EGVSO-125	ELECTRIC GAS SHUT-OFF VALVE 1-1/4 IN.	550360
EGVSO-150	ELECTRIC GAS SHUT-OFF VALVE 1-1/2 IN.	13709
EGVSO-200	ELECTRIC GAS SHUT-OFF VALVE 2 IN.	13710
EGVSO-250	ELECTRIC GAS SHUT-OFF VALVE 2-1/2 IN.	550363
EGVSO-300	ELECTRIC GAS SHUT-OFF VALVE 3 IN.	17643
GV-75	MECHANICAL GAS SHUT-OFF VALVE 3/4 IN.	550593
GV-100	MECHANICAL GAS SHUT-OFF VALVE 1 IN.	550594
GV-125	MECHANICAL GAS SHUT-OFF VALVE 1-1/4 IN.	550595
GV-150	MECHANICAL GAS SHUT-OFF VALVE 1-1/2 IN.	550596
GV-200	MECHANICAL GAS SHUT-OFF VALVE 2 IN.	551049
GV-250	MECHANICAL GAS SHUT-OFF VALVE 2-1/2 IN.	550185
GV-300	MECHANICAL GAS SHUT-OFF VALVE 3 IN.	550186
MS-SPDT	ELECTRICAL SWITCH – SINGLE POLE DOUBLE THROW	551154
MS-DPDT	ELECTRICAL SWITCH – DOUBLE POLE DOUBLE THROW	551155

MODEL NO.	DESCRIPTION	PART NO.
MS-3PDT	ELECTRICAL SWITCH – 3 POLE DOUBLE THROW	551156
MS-4PDT	ELECTRICAL SWITCH – 4 POLE DOUBLE THROW	551157
– – –	ALARM INITIATING SWITCH	550077
CO_2-6	6 x CO_2 CARTRIDGE (16 GM)	551059
– – –	O-RING, ACTUATOR ASSEMBLY	55531
CBP-1	COMPRESSION BEARING CORNER PULLEY	423250
SBP- 1	SCREW BEARING CORNER PULLEY	415670
WBP-1	WEATHER PROOF BEARING CORNER PULLEY	550982
▸TP-1	TEE PULLEY	427929
– – –	WET VALVE CAP	550831
– – –	CONICAL SPRING (WET VALVE)	550705
– – –	PRESSURE GAUGE (WET VALVE)	551236
– – –	PRESSURE REGULATOR ASSEMBLY	550985
– – –	WET VALVE REBUILDING KIT	550698
– – –	PRESSURE REGULATOR REBUILD KIT	551061
VT-1	VALVE TOOL (WET VALVE)	550788
– – –	NECK O-RING (WET VALVE)	550716
– – –	PISTON (WET VALVE)	550707
– – –	PISTON O-RING (WET VALVE)	550715
– – –	VALVE CAP O-RING (WET VALVE)	550714
RL-160	1.6 GALLON RECHARGE	553176
RL-300	3.0 GALLON RECHARGE	551188
PCL-300T	TEST TANK	551024
PCL-460T	TEST TANK	550902
PCL-600T	TEST TANK	550901
– – –	RUBBER BLOW-OFF CAP	550016
– – –	10 x WET NOZZLE CAP	551528
– – –	10 x WET NOZZLE STRAINER	551529
– – –	10 x WET NOZZLE O-RING	551530
– – –	VALVE STEM O-RING	550028
– – –	COMPLETE WET VALVE ASSEMBLY	551175
PCL-AK	RECHARGE ADAPTOR KIT	551240
– – –	MEASURING STICK	551039
– – – ▸	STAINLESS STEEL WIRE ROPE, 50 FT (15.2 m)	15821
– – – ▸	STAINLESS STEEL WIRE ROPE, 500 FT (152.4 m)	79653
WC-100	OVAL SLEEVE CRIMPS (100 PER PACKAGE)	550122
– – –	STOP SLEEVES (PACK OF 10)	24919

MODEL NO.	DESCRIPTION	PART NO.
– – – ▸	FLUSHING CONCENTRATE (32 OZ (907.2 g))	553568
– – –	FLEXIBLE CONDUIT – 500 FT (152.4 m)	434525
– – –	FLEXIBLE CONDUIT – 500 FT (152.4 m) AND WIRE ROPE – 500 FT (152.4 m)	435959
– – – ▸	PRE-FED FLEXIBLE CONDUIT ASSEMBLY – 50 FT (15.2 m)	439104
– – –	FLEXIBLE CONDUIT STRAIN RELIEF (50 PACK)	435979
– – –	FLEXIBLE CONDUIT INSERT (50 PACK)	434347
– – –	CONDUIT OFFSET (6-PACK)	436063
– – –	P-CLIP (50-PACK)	436150
– – –	COMPRESSION UNION, 1/2 IN.	79827
– – –	COMPRESSION CONNECTOR, 1/2 IN.	55813
– – – ▸	HENNY PENNY NOZZLE KIT	553389
– – –	COMPRESSION-SEAL ADAPTOR	79153
– – –	AGENT DISTRIBUTION HOSE AND TETHER KIT	435982
▸– – –	HYDROTEST ADAPTOR	552181
▸– – –	HORN/STROBE ASSEMBLY	434528

GENERAL

The KITCHEN KNIGHT II Restaurant Fire Suppression System may be used on a number of different types of restaurant cooking appliances and hood and duct configurations. The design information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the design of the KITCHEN KNIGHT II system must be trained and hold a current PYRO-CHEM certificate in a KITCHEN KNIGHT II training program.

NOZZLE COVERAGE AND PLACEMENT

This section will provide guidelines for determining nozzle type, positioning, and quantity for duct, plenum, and appliance protection.

Duct Protection

It is not required that the fan be shut down or the exhaust duct be dampered for the system to operate properly.

All duct protection is UL Listed without limitation of maximum duct length (unlimited length). This includes all varieties of ductworks both horizontal and vertical including ducts that run at angles to the horizontal and ducts with directional bends.

Duct protection requires that a nozzle be positioned to discharge into the duct. Two nozzles are available for duct protection.

The Model IL Duct Nozzle (Part No. 551026) is a one flow nozzle. A single IL nozzle is capable of protecting square or rectangular ducts with a maximum perimeter of 50 in. (1270 mm) (maximum side of 16 3/4 in. (425 mm)), with the diagonal being a maximum of 18 3/4 in. (476 mm). It can also protect a round duct with a maximum diameter of 16 in. (406 mm).

The Model 2D Duct Nozzle (Part No. 551038) is a two flow nozzle. A single 2D nozzle is capable of protecting square or rectangular ducts with a maximum perimeter of 100 in. (2540 mm), with the diagonal being a maximum of 37 3/8 in. (949 mm). It can also protect a round duct with a maximum diameter of 31 7/8 in. (809 mm).

When two 2D duct nozzles are used to protect a single duct, the cross sectional area of the duct must be divided into two equal symmetrical areas. The nozzle must then be installed on the centerline of the area it protects and aimed directly into the duct opening.

The nozzle(s) must be installed on the centerline of the duct, with the tip located 0 to 6 in. (0 to 152 mm) into the opening, and aimed directly into the duct opening. See Figure 3-1.

In installations where a UL listed damper assembly is employed, the duct nozzle can be installed beyond the 6 in. (152 mm) maximum, to a point just beyond the damper assembly that will not interfere with the damper. Exceeding the maximum of 6 in. (152 mm) in this way will not void the UL listing of the system.

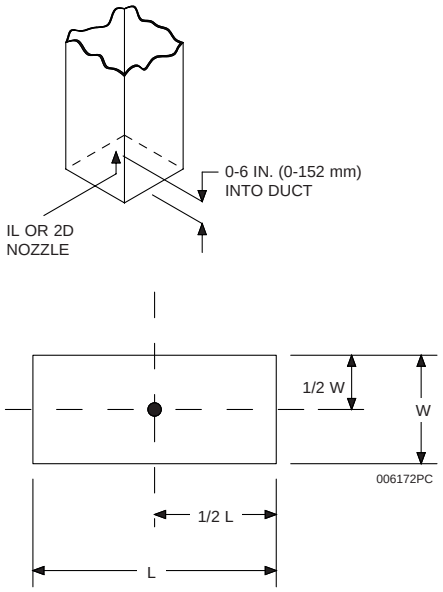


FIGURE 3-1

NOZZLE COVERAGE AND PLACEMENT (Continued)

Duct Protection (Continued)

Modularizing Ducts –

DUCT SIZES GREATER THAN 100 IN. (2540 mm) PERIMETER

- Ducts over 100 in. perimeter must be modularized using 2D nozzles (Part No. 551038)
- No round duct option available
- Follow the design chart to determine maximum module size for each 2D nozzle
- When determining number of nozzles required, it is sometimes an advantage to check the chart using the shortest side as Side “A” and then recheck it using the longest side as Side “A.” This comparison may reveal a need for a lesser quantity of nozzles one way versus the other way.

When working with Chart 3-1, the quantity of nozzles determined must be equally divided within the duct area.

When working with Chart 3-2, one half of the quantity of nozzles determined must be equally positioned in the top half of the area of the duct and the remaining half of the nozzles must be positioned in the bottom half of the duct area.

Example: The duct to be protected has a Side “A” of 40 in. (1016 mm) and a Side “B” of 60 in. (1524 mm). Referring to the design chart, this duct requires 4 nozzles. One half of 4 = 2. Therefore, 2 nozzles must be equally positioned in each of the two duct areas. See Figure 3-2.

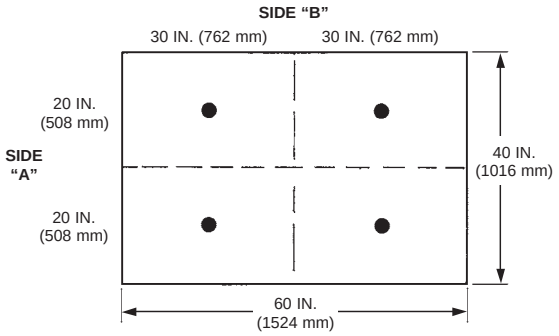


FIGURE 3-2

CHART 3-1

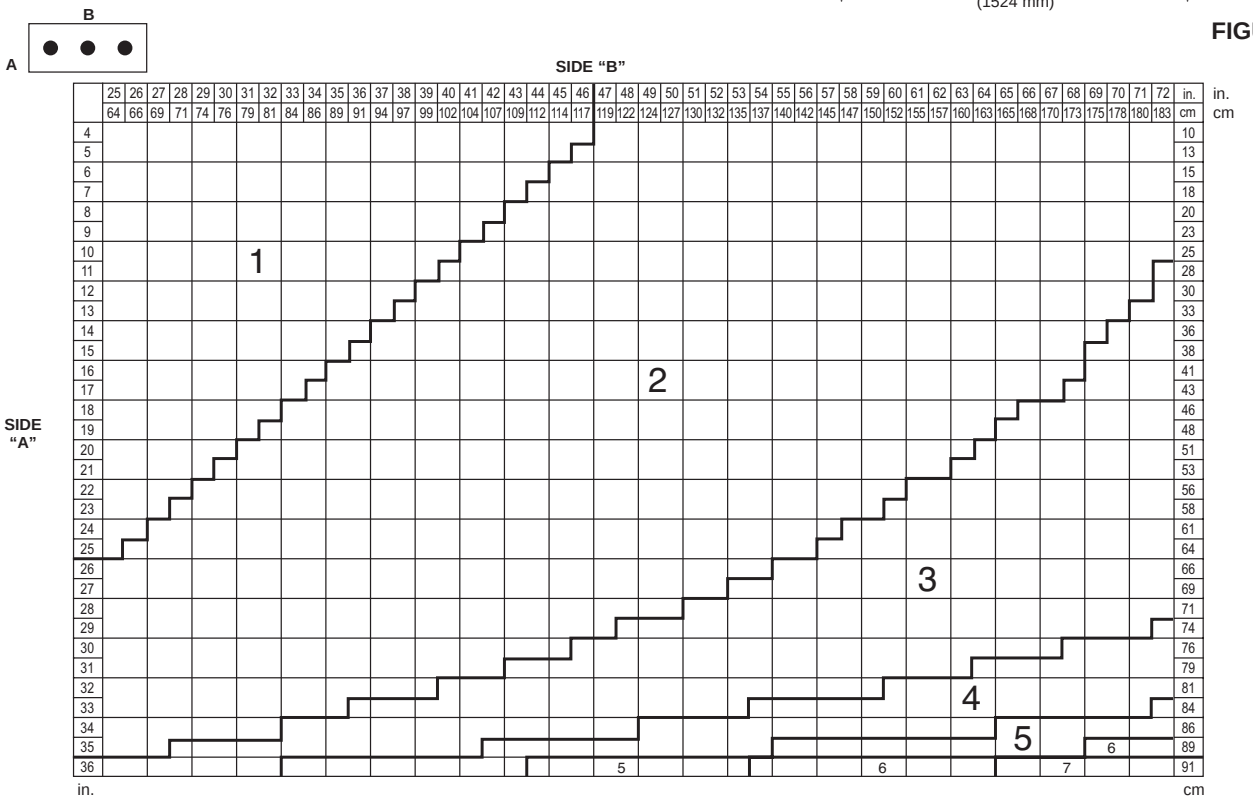
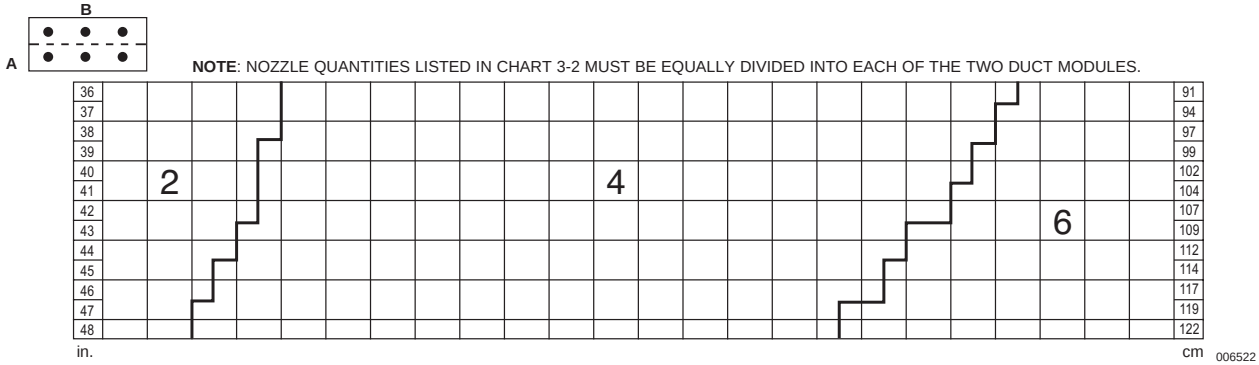


CHART 3-2



006522

NOZZLE COVERAGE AND PLACEMENT (Continued)

Duct Protection (Continued)

Transition Ducts – The protection of non-standard ducts should be reviewed by the authority having jurisdiction. PYRO-CHEM KITCHEN KNIGHT II recommends that transition ducts be protected as follows:

a. Transition ducts – larger to smaller

In cases where the duct/plenum interface opening is larger than the final exhaust duct, measure the perimeter/diameter of the duct halfway between the largest and smallest section (or the average perimeter/diameter). The nozzle is to be located within 0 to 6 in. (0 to 152 mm) of the duct/plenum interface (not at the point where the measurement was taken), centered under the final exhaust duct opening. See Figure 3-3.

Note: Nozzles to protect ducts with a transition that is more than 4 ft (1.2 m) in height, will be required to be positioned in the opening of the transition from the hood 2 in. to 8 in. (51 mm to 203 mm) into the opening using standard duct nozzle design parameters.

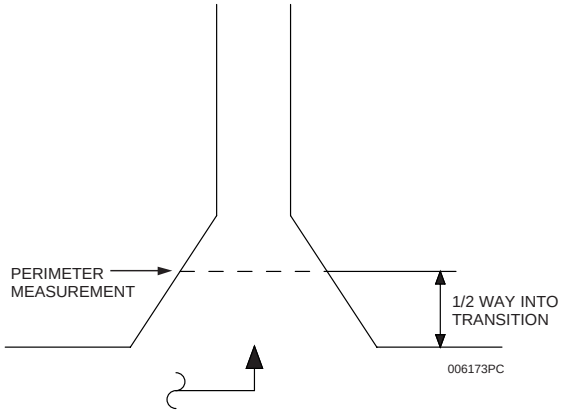


FIGURE 3-3

b. Transition ducts – smaller to larger

In cases where the duct/plenum interface opening is smaller than the final exhaust duct, measure the perimeter/diameter of the final exhaust duct. The nozzle(s) is to be located within 0 to 6 in. (0 to 152 mm) of the duct/plenum interface, centered in the opening. See Figure 3-4.

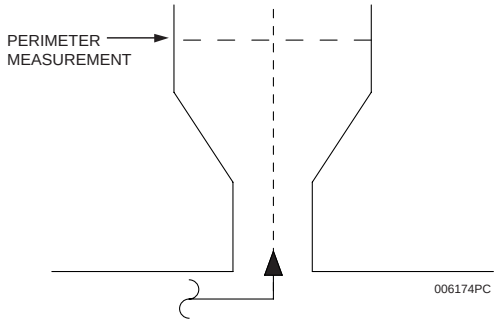


FIGURE 3-4

c. Multiple risers

In cases of multiple rises, each riser is protected as an individual duct. See Figure 3-5.

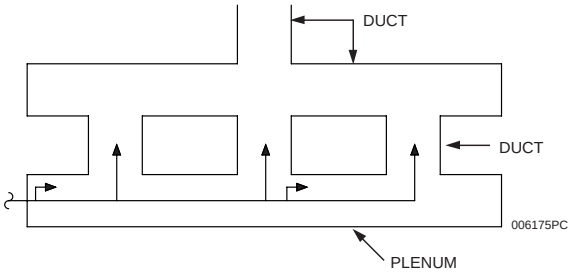


FIGURE 3-5

Electrostatic Precipitator – Ducts utilizing electrostatic precipitators must be protected above and below the unit. Standard duct nozzles are used in this application. See Figure 3-6.

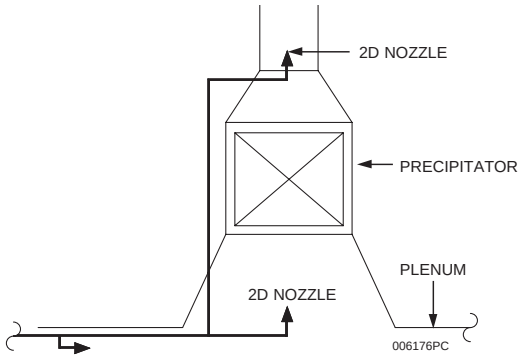


FIGURE 3-6

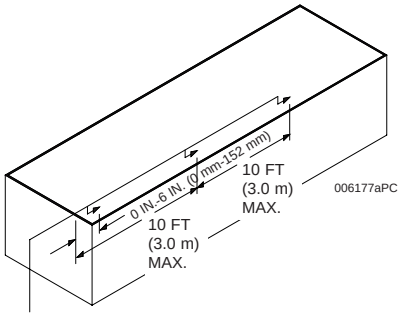
Plenum Protection

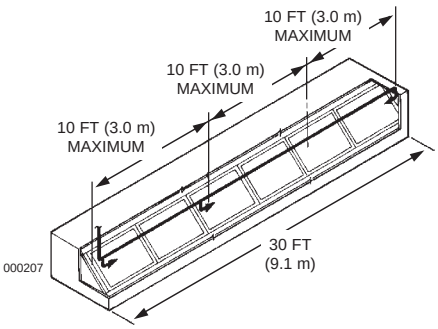
The Model 1H nozzle (Part No. 551029) is a one flow nozzle used for plenum protection. A single 1H nozzle can protect a plenum (with single or V-bank filters) 10 ft (3.0 m) long by 4 ft (1.2 m) wide. Dividing the length into sections equal to or less than 10 ft (3.0 m) in length and positioning a nozzle at the start of each section can be done to protect longer plenums.

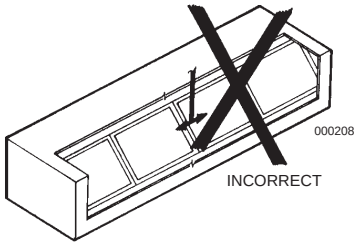
On V-bank plenums, the nozzle(s) must be located at the center of the V-bank width, 1/3 of the vertical height of the filters. On single filter bank plenums, the nozzle must be located 2 in. (50 mm) from the back edge of the filter, 1/3 down from the vertical height. For either application, the nozzle must be located within 6 in. (152 mm) of the end of the plenum (or module) and aimed directly down the length of the plenum. The nozzles may point in the opposite directions as long as the entire plenum area is protected, and the 10 ft (3.0 m) limitation is not exceeded. See Figure 3-7.

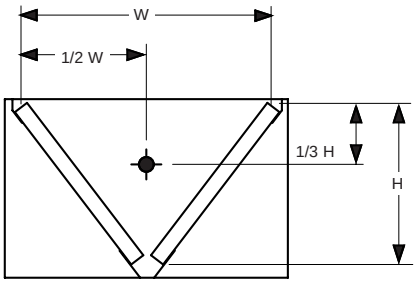
NOZZLE COVERAGE AND PLACEMENT (Continued)

Plenum Protection (Continued)

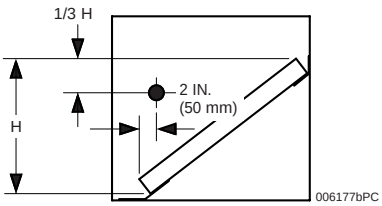








V BANK



SINGLE BANK

FIGURE 3-7

Appliance Protection

Note: When protecting appliances which are larger than single nozzle coverage, multiple nozzles can be used.

Larger appliances can be divided into several modules, each equal to or smaller than single nozzle coverage. Exception: Fryers must not exceed a maximum of 864 in.^{2} (55741 mm^2).

For modularizing fryers, refer to “FRYER – MULTIPLE NOZZLE PROTECTION.”

TABLE 3-1: APPLIANCE PROTECTION

Appliance Type	Maximum Cooking Hazard Area per Nozzle
Fryer Without Drip Board	19 in. x 19 1/2 in. maximum (482 mm x 495 mm)
Fryer With Drip Board	18 in. x 27 3/4 in. (457 mm x 704 mm) maximum; 19 1/2 in. x 25 3/8 in. (495 mm x 644 mm) maximum
Small Range	Maximum area of 336 in.^{2} (21677 mm^2) with the longest side to be a maximum of 28 in. (711 mm)
Large Range	Maximum area of 784 in.^{2} (50580 mm^2) with the longest side to be a maximum of 28 in. (711 mm)
Small Wok	24 in. (609 mm) diameter x 6 in. (152 mm) deep maximum
Large Wok	30 in. diameter x 8 in. deep (762 mm x 203 mm) maximum
Small Griddle	Maximum area of 1080 in. (69677 mm^2) with the longest side to be a maximum of 36 in. (914 mm)
Large Griddle	Maximum area of 1440 in.^{2} (92903 mm^2) with the longest side to be a maximum of 48 in. (1219 mm)
Gas Radiant/ Electric Char-Broiler	Maximum area of 624 in.^{2} (40257 mm^2) with the longest side to be a maximum of 26 in. (660 mm)
Gas Radiant/ Electric Char-Broiler	Maximum area of 864 in.^{2} (55741 mm^2) with the longest side to be a maximum of 36 in. (914 mm)
Lava Rock Char-Broiler	Maximum area of 624 in.^{2} (40257 mm^2) with the longest side to be a maximum of 26 in. (660 mm)
Natural Charcoal Broiler	Maximum area of 480 in.^{2} (30967 mm^2) with the longest side to be a maximum of 24 in. (609 mm)
Mesquite Char-Broiler	Maximum area of 480 in.^{2} (30967 mm^2) with the longest to be a maximum of 24 in. (609 mm)
Upright/ Salamander Broiler	Maximum area of 1064 in.^{2} (68645 mm^2) with the longest side to be a maximum of 36 in. (914 mm)
Chain Broiler	Maximum area of 1026 in.^{2} (66193 mm^2) with the longest side to be a maximum of 38 in. (965 mm)

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

1. Fryers without Drip Board (19 in. x 19 1/2 in. maximum) (482 mm x 495 mm)

Two nozzles are available for fryer protection: High proximity and low proximity.

The Model 2H nozzle is used for high proximity fryer protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 48 in. (610 mm to 1219 mm) above the cooking surface of the appliance and aimed at the center of the cooking area. See Figure 3-8.

The Model 2L nozzle is used for low proximity fryer protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard area, 13 in. to 24 in. (330 mm to 609 mm) above the cooking surface of the appliance and aimed at the center of the cooking area. See Figure 3-8.

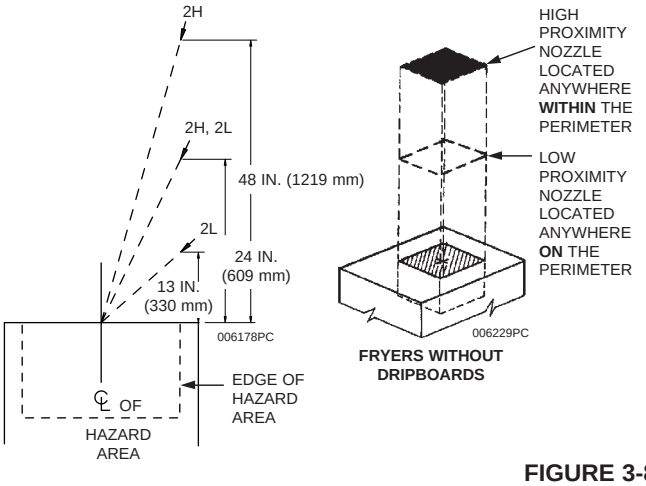


FIGURE 3-8

1a. Fryers with Drip Board

The maximum single nozzle protection dimensions depend on the dimensions of the fry pot only.

For fry pots with maximum dimensions of 18 in. (457 mm) on the longest side and 324 in.^{2} (20903 mm^2) max. area, use **overall** dimensions of 27 3/4 in. (704 mm) on the longest side and 500 in.^{2} (32258 mm^2) max. area.

For fry pots with maximum dimensions exceeding 18 in. x 324 in.^{2} (457 mm x 20903 mm^2), but no greater than 19 1/2 in. (495 mm) on the longest side and 371 in.^{2} (23935 mm^2) max area, use **overall** dimensions of 25 3/8 in. (644 mm) on the longest side and 495 in.^{2} (31935 mm^2) area.

Two nozzles are available for fryer protection: High proximity and low proximity.

The Model 2H Nozzle (Part No. 551028) is used for high proximity fryer protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 48 in. (610 mm to 1219 mm) above the cooking surface of the appliance and aimed at the center of the cooking area. See Figure 3-9.

The Model 2L nozzle is used for low proximity fryer protection. This nozzle is a two flow nozzle. The nozzle must be located anywhere on the perimeter of the hazard area, 13 in. to 24 in. (330 mm to 609 mm) above the cooking surface of the appliance and aimed at the center of the cooking area. See Figure 3-9.

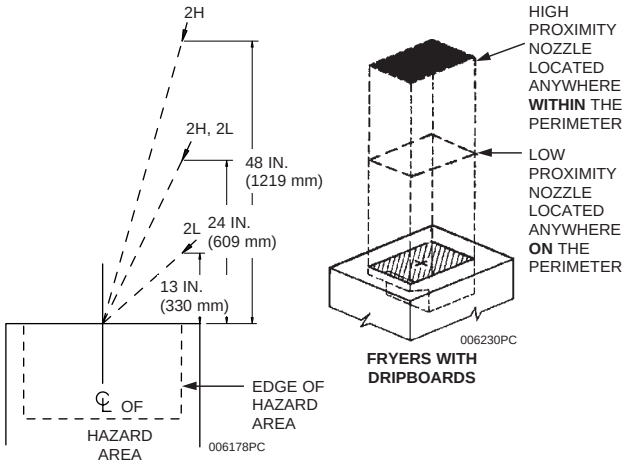


FIGURE 3-9

1.b Fryers – Multiple Nozzle Protection

Fryers exceeding the coverage of a single nozzle can be divided into modules. Each module must not exceed the maximum area allowed for a single nozzle. However, when utilizing multiple nozzle protection, the longest side allowed for a fryer with drip board can be used, regardless of whether the fryer has a drip board or not.

The maximum size fryer that can be modularized is 864 in.^{2} (55741 mm^2).

Design requirements for multiple nozzle fryers are broken down as follows:

1. If the fryer includes any dripboard areas, measure both the internal length (front to back) and width of the frypot portion. Then measure the internal length and width of the overall hazard area including any dripboard areas.

   Determine the area of both the frypot and the area of the overall vat by multiplying corresponding length and width dimensions.

2. Divide the frypot or overall vat into modules, each of which can be protected by a single nozzle, based on the maximum dimension and area coverage of the nozzle as specified in Table 3-2: Design.

   - If the module considered does not include any portion of the dripboard, use only the maximum frypot area and maximum dimension listed in Table 3-2: Design.
   - If the module considered includes any dripboard areas, use both the maximum frypot area and dimension listed in Table 3-2: Design, and the maximum overall area and dimension listed in Table 3-2: Design.

3. None of the maximum dimensions may be exceeded. If either the maximum frypot or the overall sizes are exceeded, the area divided into modules will need to be redefined with the possibility of an additional nozzle.

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

TABLE 3-2: DESIGN

	Longest Side	Vat Coverage	Coverage with Drip
Option 1	27 3/4 in. (704 mm)	324 in^2 (20903 mm^2)	500 in^2 (32258 mm^2)
Option 2	25 3/8 in. (644 mm)	371 in^2 (23935 mm^2)	495 in^2 (31935 mm^2)

2. Small Range (336 in.^{2} (21677 mm^2) maximum, 28 in. (711 mm) longest side maximum). Use this when nozzle is center located.

Two nozzles are available for small range protection: High proximity and low proximity.

The Model 1H Nozzle (Part No. 551029) is used for high proximity small range protection. This nozzle is a one flow nozzle. When using high proximity protection, the range cannot be under a backshelf. This nozzle must be located on the front/back centerline of the appliance, 40 in. to 50 in. (1016 mm to 1270 mm) above the cooking surface, and aimed directly down within the "Nozzle Location Area" depending on the size of the hazard area. See Table 3-3: Nozzle Flexibility Placement below. See Figure 3-10.

TABLE 3-3: NOZZLE FLEXIBILITY PLACEMENT (When using nozzle flexibility, the maximum width that can be protected is 12 in. (304 mm))

Length – L		Width – W		Front/Rear	
in.	(mm)	in.	(mm)	in.*	(mm)*
12	(304)	12	(304)	8	(203)
13	(330)	12	(304)	7 1/2	(190)
14	(355)	12	(304)	7	(177)
15	(381)	12	(304)	6 1/2	(165)
16	(406)	12	(304)	6	(152)
17	(431)	12	(304)	5 1/2	(139)
18	(457)	12	(304)	5	(127)
19	(482)	12	(304)	4 1/2	(114)
20	(508)	12	(304)	4	(101)
21	(533)	12	(304)	3 1/2	(88)
22	(558)	12	(304)	3	(76)
23	(584)	12	(304)	2 1/2	(63)
24	(609)	12	(304)	2	(50)
25	(635)	12	(304)	1 1/2	(38)
26	(660)	12	(304)	1	(25)
27	(685)	12	(304)	1/2	(12)
28	(711)	12	(304)	0	(0)

* Distance from centerline, either toward front or toward back, of hazard area, starting from the reference point.

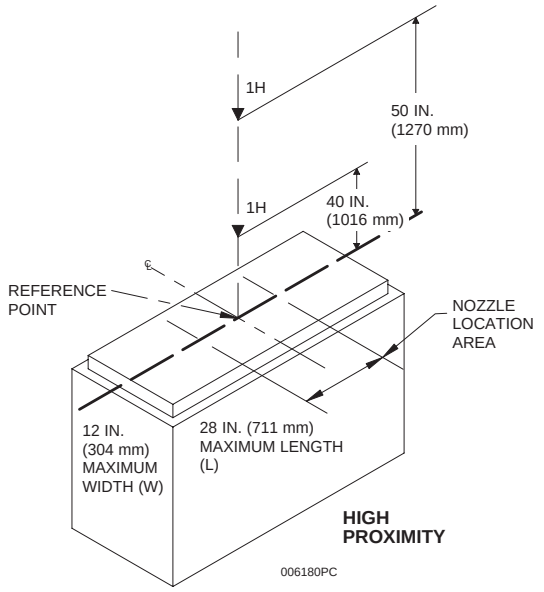


FIGURE 3-10

The Model 1L Nozzle (Part No. 551026) is used for low proximity small range protection. This nozzle is a one flow nozzle. **The range can be equipped either with or without a backshelf.** Either type requires the same nozzle requirements. The nozzle must be located 22 in. (558 mm) from either end of the hazard area centered from left to right. It must be 13 in. to 24 in. (331 mm to 609 mm) above cooking surface, and aimed at a point one half the distance of whatever the height dimension of the nozzle is. When determining nozzle and aim point locations, both measurements are to be taken from the **same** end of the hazard area. Example: The nozzle is mounted 20 in. (508 mm) above the cooking surface. The aim point from the edge of the hazard would then be 10 in. (254 mm) which is one half the nozzle mounting height dimension. See Figure 3-11. **Note:** Nozzles must be placed at or below the shelf, within the nozzle height limitations.

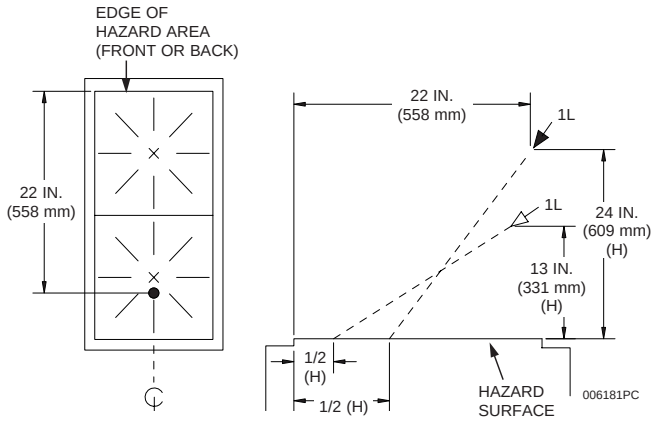


FIGURE 3-11

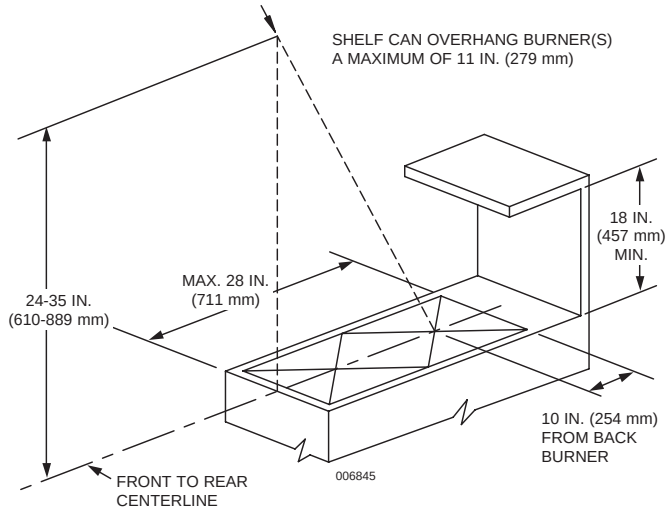
NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

2a. High-Proximity Backshelf Protection – When using the 2L nozzle for range protection with high-proximity backshelf, the maximum length of burners being protected must not exceed 28 in. (711 mm) and the maximum area of the burners must not exceed 336 in.2 (21677 mm2). The backshelf must be a minimum of 18 in. (458 mm) above the top of the range and may overhang the burner by a maximum of 11 in. (279 mm).

Note: Although most shelves exceed 11 in. (279 mm) in overall depth, make sure the shelf does not exceed 11 in. (279 mm) overhang of the burner.

Nozzle must be located on the front edge of the front burner and aimed at a point 10 in. (254 mm) forward from the back edge of the back burner on the front-to-rear centerline. Nozzle must be mounted 24 in. to 35 in. (610 mm to 889 mm) above the hazard surface. See Figure 3-12.



HIGH PROXIMITY BACK SHELF PROTECTION WITH THE 2L NOZZLE. AREA OF PROTECTION PER NOZZLE: MAX. LENGTH OF BURNER GRATES 28 IN. (711 mm) AND MAX. AREA OF BURNER GRATES NOT TO EXCEED 336 IN. (21677 mm)

FIGURE 3-12

3. Larger Burner Range (784 in.^{2} (50580 mm^2) maximum, 28 in. (711 mm) longest side maximum)

One nozzle is available for large range protection: High proximity.

The Model 2L Nozzle (Part No. 551027) is used for high proximity large range protection. This nozzle is a two flow nozzle. **When using high proximity protection, the range cannot be under a backshelf.** This nozzle must be located 34 in. to 48 in. (864 mm to 1219 mm) above the cooking surface, and aimed directly down within the mounting area, based on the hazard size, as described in the Nozzle Positioning Chart. See Figure 3-13.

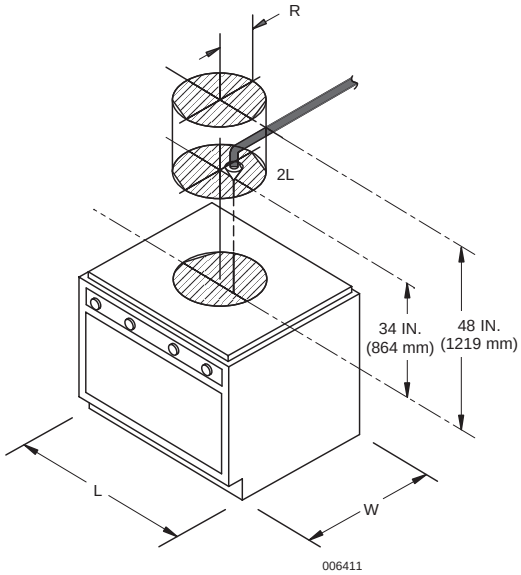


FIGURE 3-13

Example: A four burner range has a hazard size of 20 in. (508 mm) in length and 27 in. (685 mm) in width. Follow down the Range Length in Table 3-4: Nozzle Positioning until you come to 20 in. (508 mm). Continue down this column until the correct width appears in the width column. When the width of 27 in. (685 mm) is reached, read across to the radius column to determine the size of radius allowed, for positioning of the nozzle, from the hazard area centerline. In this example, the correct radius is 3 in. (76 mm). The nozzle can be aimed straight down anywhere within a 3 in. (76 mm) radius of the hazard area centerline.

TABLE 3-4: NOZZLE POSITIONING

Range Length - L		Range Width – W		Radius – R	
in.	(mm)	in.	(mm)	in.	(mm)
18	(457)	18	(457)	7 1/8	(180)
18	(457)	19	(482)	6 3/4	(171)
18	(457)	20	(508)	6 3/8	(161)
18	(457)	21	(533)	6	(152)
18	(457)	22	(558)	5 5/8	(142)
18	(457)	23	(584)	5 1/4	(133)
18	(457)	24	(609)	4 3/4	(120)
18	(457)	25	(635)	4 3/8	(111)
18	(457)	26	(660)	4	(101)
18	(457)	27	(685)	3 5/8	(92)
18	(457)	28	(711)	3 1/8	(79)

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

TABLE 3-4: NOZZLE POSITIONING (Continued)

Range Length - L		Range Width – W		Radius – R	
in.	(mm)	in.	(mm)	in.	(mm)
19	(482)	18	(457)	6 3/4	(171)
19	(482)	19	(482)	6 3/8	(161)
19	(482)	20	(508)	6	(152)
19	(482)	21	(533)	5 5/8	(142)
19	(482)	22	(558)	5 1/4	(133)
19	(482)	23	(584)	4 7/8	(123)
19	(482)	24	(609)	4 1/2	(114)
19	(482)	25	(635)	4 1/8	(104)
19	(482)	26	(660)	3 3/4	(95)
19	(482)	27	(685)	3 1/4	(82)
19	(482)	28	(711)	2 7/8	(73)
20	(508)	18	(457)	6 3/8	(161)
20	(508)	19	(482)	6	(152)
20	(508)	20	(508)	5 5/8	(142)
20	(508)	21	(533)	5 1/4	(133)
20	(508)	22	(558)	4 7/8	(123)
20	(508)	23	(584)	4 1/2	(114)
20	(508)	24	(609)	4 1/8	(104)
20	(508)	25	(635)	3 3/4	(95)
20	(508)	26	(660)	3 3/8	(85)
20	(508)	27	(685)	3	(76)
20	(508)	28	(711)	2 5/8	(66)
21	(533)	18	(457)	6	(152)
21	(533)	19	(482)	5 5/8	(142)
21	(533)	20	(508)	5 1/4	(133)
21	(533)	21	(533)	5	(127)
21	(533)	22	(558)	4 5/8	(117)
21	(533)	23	(584)	4 1/4	(107)
21	(533)	24	(609)	3 7/8	(98)
21	(533)	25	(635)	3 1/2	(88)
21	(533)	26	(660)	3 1/8	(79)
21	(533)	27	(685)	2 3/8	(60)
21	(533)	28	(711)	2 1/4	(57)
22	(558)	18	(457)	5 5/8	(142)
22	(558)	19	(482)	5 1/4	(133)
22	(558)	20	(508)	4 7/8	(123)
22	(558)	21	(533)	4 5/8	(117)
22	(558)	22	(558)	4 1/4	(107)
22	(558)	23	(584)	3 7/8	(98)
22	(558)	24	(609)	3 1/2	(88)
22	(558)	25	(635)	3 1/8	(79)
22	(558)	26	(660)	2 3/4	(69)
22	(558)	27	(685)	2 3/8	(60)
22	(558)	28	(711)	2	(50)
23	(584)	18	(457)	5 1/4	(133)
23	(584)	19	(482)	4 7/8	(123)
23	(584)	20	(508)	4 1/2	(114)
23	(584)	21	(533)	4 1/4	(107)
23	(584)	22	(558)	3 7/8	(98)
23	(584)	23	(584)	3 1/2	(88)
23	(584)	24	(609)	3 1/8	(79)
23	(584)	25	(635)	2 7/8	(73)
23	(584)	26	(660)	2 1/2	(63)
23	(584)	27	(685)	2 1/8	(53)
23	(584)	28	(711)	1 5/8	(41)
24	(609)	18	(457)	4 3/4	(120)
24	(609)	19	(482)	4 1/2	(114)
24	(609)	20	(508)	4 1/8	(104)
24	(609)	21	(533)	3 7/8	(98)
24	(609)	22	(558)	3 1/2	(88)
24	(609)	23	(584)	3 1/8	(79)
24	(609)	24	(609)	2 7/8	(73)
24	(609)	25	(635)	2 1/2	(63)
24	(609)	26	(660)	2 1/8	(53)
24	(609)	27	(685)	1 3/4	(44)
24	(609)	28	(711)	1 3/8	(34)
25	(635)	18	(457)	4 3/8	(111)
25	(635)	19	(482)	4 1/8	(104)
25	(635)	20	(508)	3 3/4	(95)
25	(635)	21	(533)	3 1/2	(88)
25	(635)	22	(558)	3 1/8	(79)
25	(635)	23	(584)	2 7/8	(73)
25	(635)	24	(609)	2 1/2	(63)
25	(635)	25	(635)	2 1/8	(53)
25	(635)	26	(660)	1 3/4	(44)
25	(635)	27	(685)	1 3/8	(34)
25	(635)	28	(711)	1	(25)
26	(660)	18	(457)	4	(101)
26	(660)	19	(482)	3 3/4	(95)
26	(660)	20	(508)	3 3/8	(85)
26	(660)	21	(533)	3 1/8	(79)
26	(660)	22	(558)	2 3/4	(69)
26	(660)	23	(584)	2 1/2	(63)
26	(660)	24	(609)	2 1/8	(53)
26	(660)	25	(635)	1 3/4	(44)
26	(660)	26	(660)	1 3/8	(34)
26	(660)	27	(685)	1	(25)
26	(660)	28	(711)	3/4	(19)
27	(685)	18	(457)	3 5/8	(92)
27	(685)	19	(482)	3 1/4	(82)
27	(685)	20	(508)	3	(76)
27	(685)	21	(533)	2 3/4	(69)
27	(685)	22	(558)	2 3/8	(60)
27	(685)	23	(584)	2 1/8	(53)
27	(685)	24	(609)	1 3/4	(44)
27	(685)	25	(635)	1 3/8	(34)
27	(685)	26	(660)	1	(25)
27	(685)	27	(685)	3/4	(19)
27	(685)	28	(711)	3/8	(9)

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

TABLE 3-4: NOZZLE POSITIONING (Continued)

Range Length - L		Range Width – W		Radius – R	
in.	(mm)	in.	(mm)	in.	(mm)
28	(711)	18	(457)	3 1/8	(79)
28	(711)	19	(482)	2 7/8	(73)
28	(711)	20	(508)	2 5/8	(66)
28	(711)	21	(533)	2 1/4	(57)
28	(711)	22	(558)	2	(50)
28	(711)	23	(584)	1 5/8	(41)
28	(711)	24	(609)	1 3/8	(34)
28	(711)	25	(635)	1	(25)
28	(711)	26	(660)	3/4	(19)
28	(711)	27	(685)	3/8	(9)
28	(711)	28	(711)	0	(0)

4. **Small Wok** (24 in. (609.6 mm) diameter x 6 in. (152 mm) depth maximum)

   Two nozzles are available for small wok protection: High proximity and low proximity.

   The 1H nozzle (Part No. 551029) is used for high proximity wok protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere on the perimeter** of the appliance, 24 in. to 48 in. (609.6 mm to 1219 mm) above the top edge of the wok and aimed at the center of the wok. See Figure 3-14.

   The 1L nozzle (Part No. 551026) is used for low proximity wok protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere on the perimeter** of the appliance, 13 in. to 24 in. (331 mm to 609.6 mm) above the top edge of the wok and aimed at the center of the wok. See Figure 3-14.

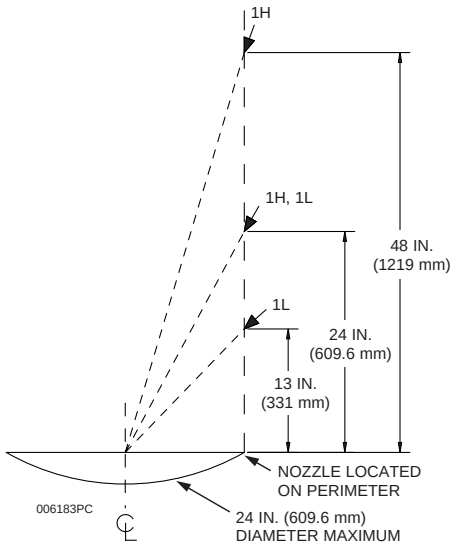


FIGURE 3-14

5. **Large Wok** (Greater than 24 in. to 30 in. (609.6 mm to 762 mm) diameter x 8 in. (203 mm) depth maximum)

   Two nozzles are available for large wok protection: High proximity and low proximity.

   The 2H nozzle (Part No. 551028) is used for high proximity wok protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere on the perimeter** of the appliance, 24 in. to 48 in. (609.6 mm to 1219 mm) above the top edge of the wok and aimed at the center of the wok. See Figure 3-15.

   The 2L nozzle (Part No. 551027) is used for low proximity wok protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere on the perimeter** of the appliance, 13 in. to 24 in. (331 mm to 609.6 mm) above the top edge of the wok and aimed at the center of the wok. See Figure 3-15.

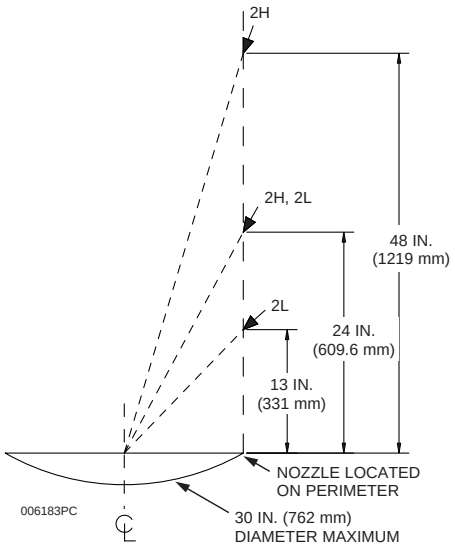


FIGURE 3-15

6. **Small Griddle** (1080 in.^{2} (69677 mm^2) x 36 in. (914 mm) longest side maximum)

   Two nozzles are available for small griddle protection: High proximity and low proximity.

   The 1H nozzle (Part No. 551029) is used for high proximity griddle protection. This nozzle is a one flow nozzle. The nozzle must be located **above any corner** of the hazard surface, 24 in. to 48 in. (609.6 mm to 1219 mm) above the cooking surface of the appliance and aimed at a point 12 in. (304 mm) over and 12 in. (304 mm) in from the corner below the nozzle. See Figure 3-16.

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

The 1L nozzle (Part No. 551026) is used for low proximity griddle protection. This nozzle is a one flow nozzle. The nozzle must be located **above any corner** of the hazard surface, 10 in. to 24 in. (254 mm to 609.6 mm) above the cooking surface of the appliance and aimed at a point 12 in. (304 mm) over and 12 in. (304 mm) in from the corner below the nozzle. See Figure 3-16.

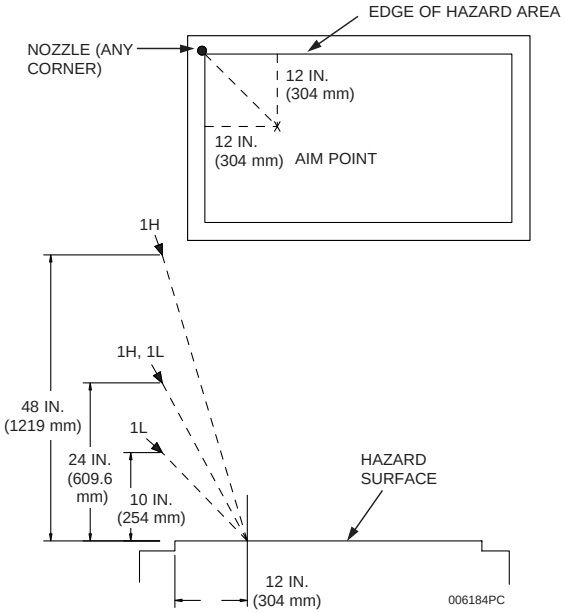


FIGURE 3-16

6a. Small Griddle (1080 in.2 (69677 mm2) x 36 in. (914 mm) longest side maximum) **Alternate Protection**

Two nozzles are available for small griddle **alternate protection:** High proximity and low proximity.

The 2H nozzle (Part No. 551028) is used for high proximity griddle protection. This nozzle is a two flow nozzle. The nozzle must be located 0 to 6 in. (0 to 152 mm) from short side of the hazard surface, 24 in. to 48 in. (609.6 mm to 1219 mm) above the cooking surface of the appliance and aimed at the center of the hazard area. See Figure 3-17.

The 2L nozzle (Part No. 551027) is used for low proximity griddle protection. This nozzle is a two flow nozzle. The nozzle must be located 0 to 6 in. (0 to 152 mm) from the short side of the hazard surface, 13 in. to 24 in. (331 mm to 609.6 mm) above the cooking surface of the appliance and aimed at the center of the hazard area. See Figure 3-17.

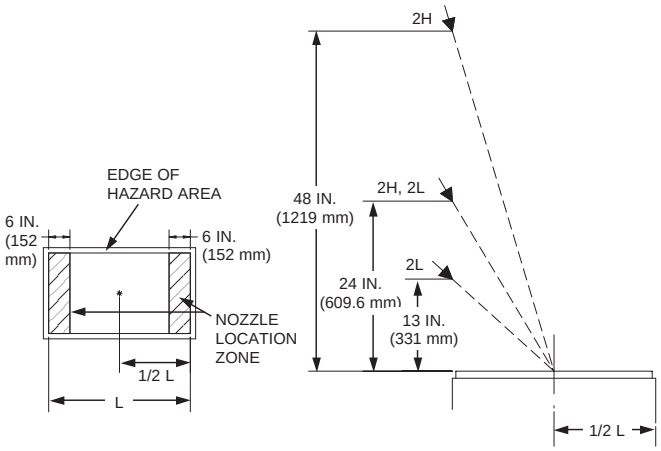


FIGURE 3-17

7. Large Griddle (1440 in.2 (92903 mm2) x 48 in. (1219 mm) longest side maximum)

Two nozzles are available for large griddle protection: High proximity and low proximity.

The 2H nozzle (Part No. 551028) is used for high proximity griddle protection. This nozzle is a two flow nozzle. The nozzle must be located **above any corner** of the hazard surface, 24 in. to 48 in. (609.6 mm to 1219 mm) above the cooking surface of the appliance and aimed at a point 12 in. (304 mm) over and 12 in. (304 mm) in from the corner below the nozzle. See Figure 3-18.

The 2L nozzle (Part No. 551027) is used for low proximity griddle protection. This nozzle is a two flow nozzle. The nozzle must be located **above any corner** of the hazard surface, 10 in. to 24 in. (254 mm to 609.6 mm) above the cooking surface of the appliance and aimed at a point 12 in. (304 mm) over and 12 in. (304 mm) in from the corner below the nozzle. See Figure 3-18.

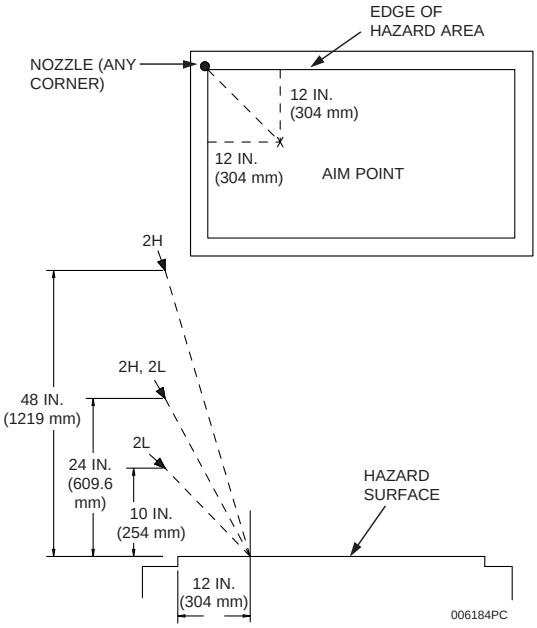


FIGURE 3-18

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

8. Radiant/Electric Char-Broiler (624 in.2 (40257 mm2) x 26 in. (660 mm) longest side maximum)

Note: Radiant charbroilers are distinguished by the use of heated metal strips (radiants) that are used for cooking.

Two nozzles are available for radiant char-broiler protection. High proximity and low proximity.

The 1H nozzle (Part No. 551029) is used for high proximity radiant char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 48 in. (609.6 mm to 1219 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-19.

The 1L nozzle (Part No. 551026) is used for low proximity radiant char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard surface, 13 in. to 24 in. (331 to 609.6 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-19.

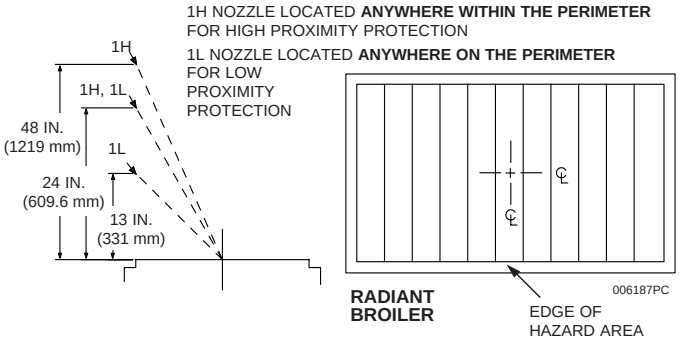


FIGURE 3-19

9. Radiant/Electric Char-Broiler (864 in.^{2} (55741 mm^2) x 36 in. (914 mm) longest side maximum)

Two nozzles are available for radiant char-broiler protection: High proximity and low proximity.

The 2H nozzle (Part No. 551028) is used for high proximity radiant char-broiler protection. This nozzle is a two flow nozzle. The nozzle must be located **above any corner** of the hazard surface, 36 in. to 48 in. (915 mm to 1219 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-20.

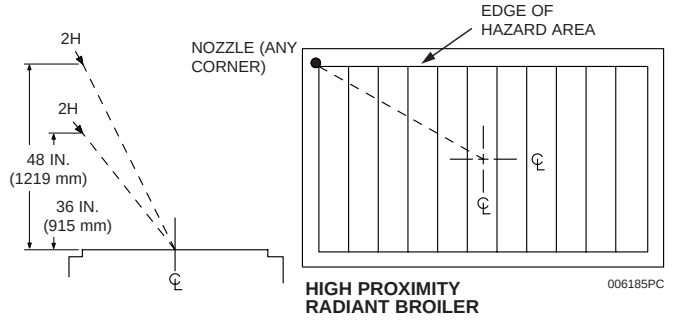


FIGURE 3-20

The 2L nozzle (Part No. 551027) is used for low proximity radiant char-broiler protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard surface, 13 in. to 36 in. (331 mm to 914 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-21.

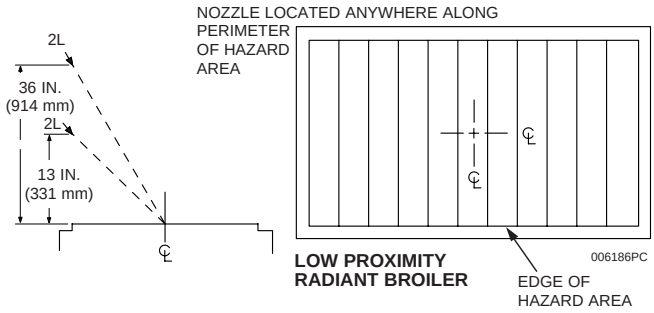


FIGURE 3-21

10. Lava Rock Char-Broiler (624 in. ^{2} (40257 mm ^{2}) x 26 in. (660 mm) longest side maximum)

Note: Synthetic rock charbroilers are distinguished by the use of lava, pumice, or synthetic rocks that are used for cooking.

One nozzle is available for lava rock char-broiler protection: High proximity and low proximity.

The 2L Nozzle (Part No. 551027) is used for high proximity lava rock char-broiler protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 35 in. (609.6 mm to 889 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-22.

The 2L nozzle (Part No. 551027) is used for low proximity lava rock char-broiler protection. This nozzle is a two flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard surface, 15 in. to 24 in. (381 mm to 609.6 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-22.

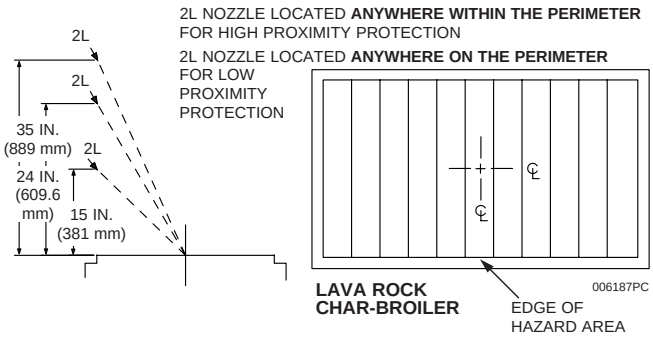


FIGURE 3-22

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

11. Natural Class "A" Charcoal Char-Broiler (480 in.^{2} (30967 mm^2) x 24 in. (609.6 mm) longest side maximum)

Note: Class "A" (natural) charbroilers are distinguished by the use of charcoal, mesquite chips, chunks, and/or logs that are used for cooking.

Two nozzles are available for natural charcoal char-broiler protection. High proximity and low proximity. The maximum depth of fuel (charcoal) must not exceed 6 in. (152 mm).

The 1H nozzle (Part No. 551029) is used for high proximity natural charcoal char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 35 in. (609.6 mm to 889 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-23.

The 1L nozzle (Part No. 551026) is used for low proximity natural charcoal char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard surface, 15 in. to 24 in. (381 mm to 609.6 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-23.

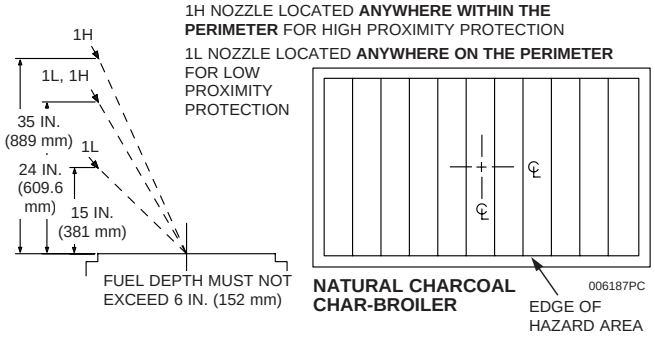


FIGURE 3-23

12. Mesquite Char-Broiler (480 in.2 x (30967 mm2) 24 in. (609.6 mm) longest side maximum)

Two nozzles are available for mesquite char-broiler protection. High proximity and low proximity. The maximum depth of fuel (wood) must not exceed 6 in. (152 mm).

The 1H nozzle (Part No. 551029) is used for high proximity mesquite char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere within the perimeter** of the hazard area, 24 in. to 35 in. (609.6 to 889 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-24.

The 1L nozzle (Part No. 551026) is used for low proximity mesquite charcoal char-broiler protection. This nozzle is a one flow nozzle. The nozzle must be located **anywhere on the perimeter** of the hazard surface, 15 in. to 24 in. (381 mm to 609.6 mm) above the cooking surface of the appliance and aimed at the center of the broiler surface. See Figure 3-24.

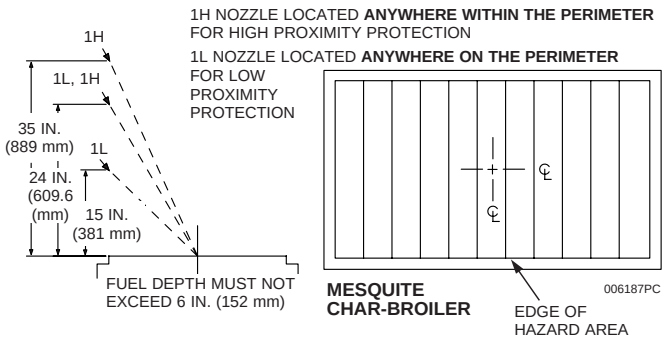


FIGURE 3-24

13. Salamander Broiler (internal broiler dimensions of 31 in. (787 mm) x 15.5 in. (393 mm) and a maximum grate opening of 31 in. (787 mm) x 7.75 in. (196 mm)

The 1H nozzle (Part No. 551029) is used for broiler protection. This is a one-flow nozzle. The nozzle must be centered 12 to 14 in. (305 mm to 355 mm) in front of the salamander and positioned 16 to 18 in. (407 mm to 457 mm) above the top of the salamander. The nozzle must be aimed to the center of the opening above the salamander cooking grate. See Figure 3-25.

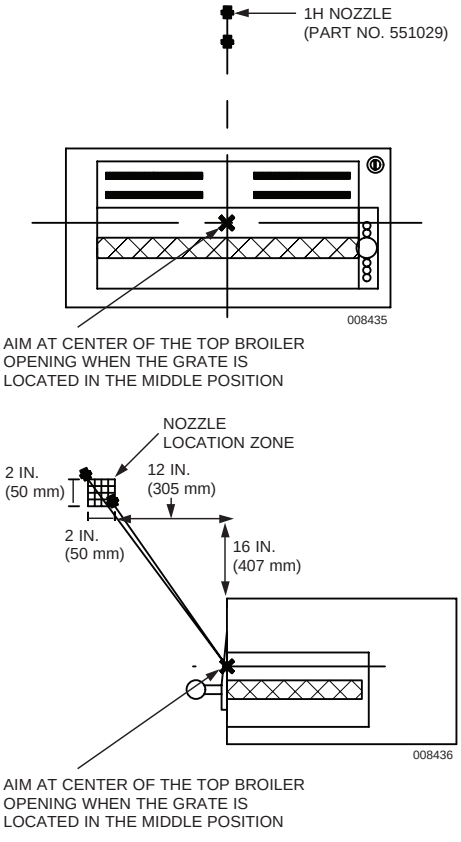


FIGURE 3-25

NOZZLE COVERAGE AND PLACEMENT (Continued)

Appliance Protection (Continued)

13a. Upright/Salamander Broiler (internal chamber 1064 in.^{2} x 36 in. (68645 mm^2 x 914 mm) longest side maximum)

One nozzle is available for upright/salamander broiler protection.

The 1L nozzle (Part No. 551026) is used for broiler protection. This nozzle is a one flow nozzle. The nozzle must be located above the grate, at the front edge of the appliance, outside the broiling chamber, and pointed at the back opposite corner of the broiler chamber. The nozzle must be aimed parallel to the broiler grate surface. See Figure 3-26.

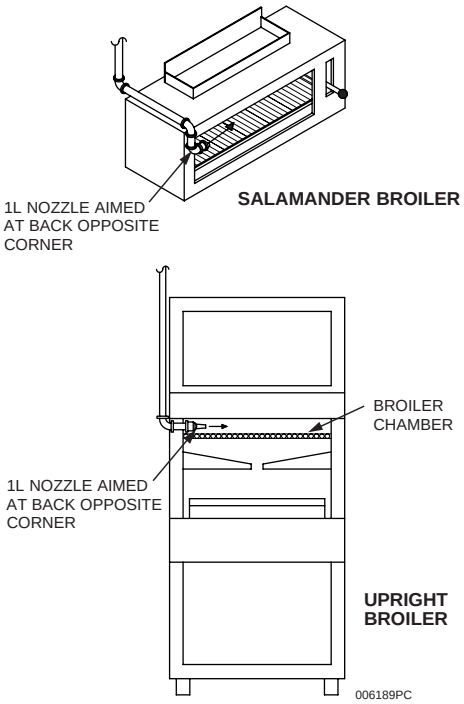


FIGURE 3-26

14. Chain Broiler (internal chamber 1026 in.^{2} (66193 mm^2) x 38 in. (965 mm) longest side maximum)

One nozzle is available for chain broiler protection.

The 1L nozzle (Part No. 551026) is used for broiler protection. This nozzle is a one flow nozzle. The nozzle must be located 1 in. to 3 in. (26 mm to 76 mm) above the surface of the chain, at the front edge of the appliance, and pointed at the opposite diagonal corner. The nozzle must be aimed parallel to the chain surface. See Figure 3-27.

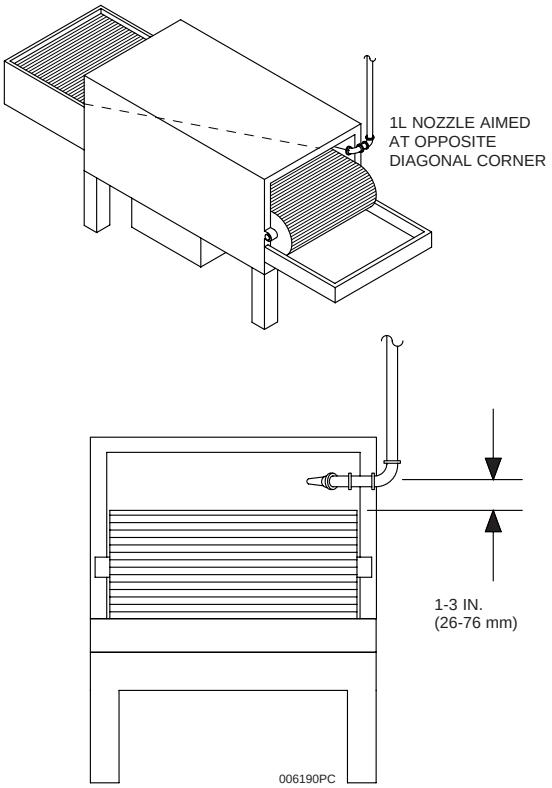


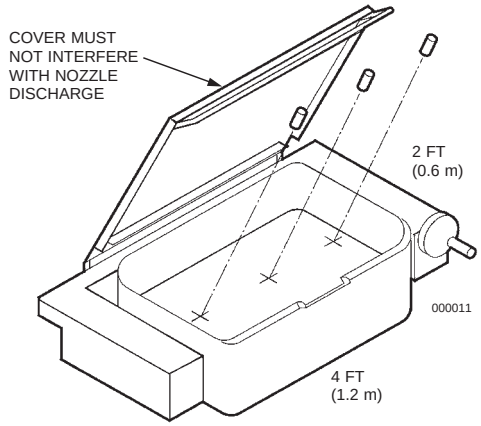
FIGURE 3-27

NOZZLE COVERAGE AND PLACEMENT (Continued)

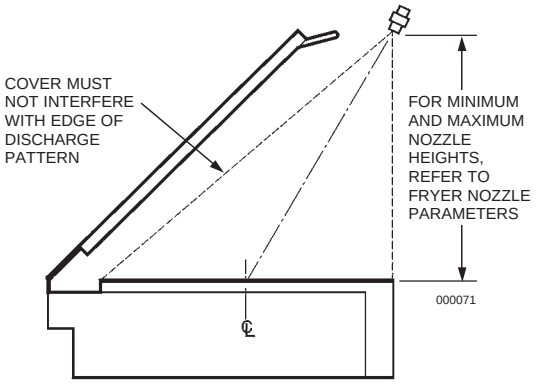
Appliance Protection (Continued)

15. Tilt Skillet/Braising Pan

Protection for tilt skillet or braising pans is to be based upon the coverage limitations provided for deep fat fryer protection. Coverage limitations are based on fryer sizes including drip boards. Exception: Tilt skillets and braising pans may exceed the maximum of 6 ft^2 (0.5 m^2) total when modularizing. Tilt skillets and braising pans generally utilize a hinged cover. Fryer protection nozzles are to be placed toward the front of the appliance to minimize the potential for the tilt skillet or braising pan cover to interfere with the nozzle discharge. See Figure 3-28.



THE NOZZLE IS TO BE PLACED TOWARD THE FRONT OF THE APPLIANCE TO MINIMIZE THE POTENTIAL FOR THE SKILLET OR BRAISING PAN COVER TO INTERFERE WITH THE NOZZLE DISCHARGE.



FRYER NOZZLE USED FOR TILT SKILLET OR BRAISING PAN PROTECTION MUST BE POSITIONED NEAR THE FRONT EDGE OF THE PAN AND AIMED AT THE FRONT TO BACK CENTERLINE OF THE PAN. THE DISCHARGE FROM THE NOZZLE(S) MUST COMPLETELY CLEAR THE PAN COVER WITH AN UNOBSTRUCTED VIEW TO THE BACK OF THE PAN.

FIGURE 3-28

SPECIFIC APPLICATION BY MODEL

Henny Penny Fryer – Mono Rail Center Lift System – Models 690, 691, 692

- **Nozzle Type:** One – 2H (upper position) and One – 2F (lower position)
- **Nozzle Location:**

  2H Nozzle (upper position): From the Tee Block; nozzle tip located 16 in. (406 mm) up from base of fryer surface and 5 in. (127 mm) in from **right side of appliance back shroud** – aimed to discharge at center point of fry vat. See Figure 3-29.

  2F Nozzle (lower position): Running down from the Tee Block to the base of the fryer, nozzle tip is located 2 in. (50 mm) from back side of fry vat, and 8 in. (203 mm) in from the **right side of appliance back shroud.** See Figure 3-29. **The 2F nozzle is a flat spray nozzle and the spray must be horizontal to that of the edge of the back lip of the fry vat.**

- **System Coverage:**

  Each fryer requires a minimum of one PCL 300 Agent Tank discharging through the two two-flow nozzles (2H and 2F).

- **Piping Limitations** – Follow the limitations for the PCL 300 Agent Tank.

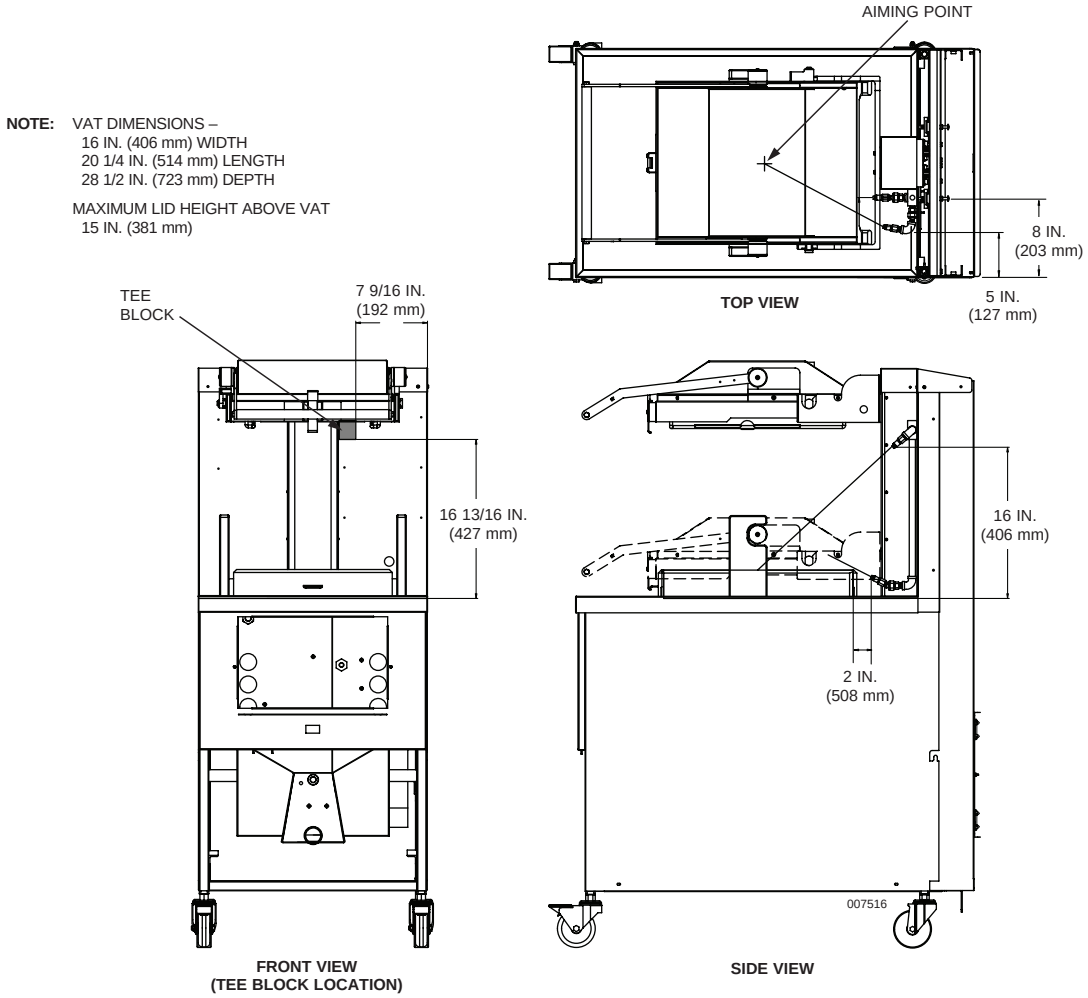


FIGURE 3-29

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Fryer – Dual Lift System – Models 580, 581, ▸ 582, 590, 591, 592, 680, 682, 691

- **Nozzle Type:** One – 2H (upper position) and One – 2F (lower position)
- **Nozzle Location:**

  2H Nozzle (upper position): From the Tee Block; nozzle tip located 16 in. (406 mm) up from base of fryer surface and 5 in. (127 mm) in from **left side of appliance back shroud** – aimed to discharge at center point of fry vat. See Figure 3-30.

  2F Nozzle (lower position): Running down from the Tee Block to the base of the fryer, nozzle tip is located 2 in. (50 mm) from back side of fry vat, and 8 in. (203 mm) in from the **left side of appliance back shroud.** See Figure 3-30. **The 2F nozzle is a flat spray nozzle and the spray must be horizontal to that of the edge of the back lip of the fry vat.**

- **System Coverage:**

  Each fryer requires a minimum of one PCL 300 Agent Tank discharging through the two two-flow nozzles (2H and 2F).

- **Piping Limitations** – Follow the limitations for the PCL 300 Agent Tank.

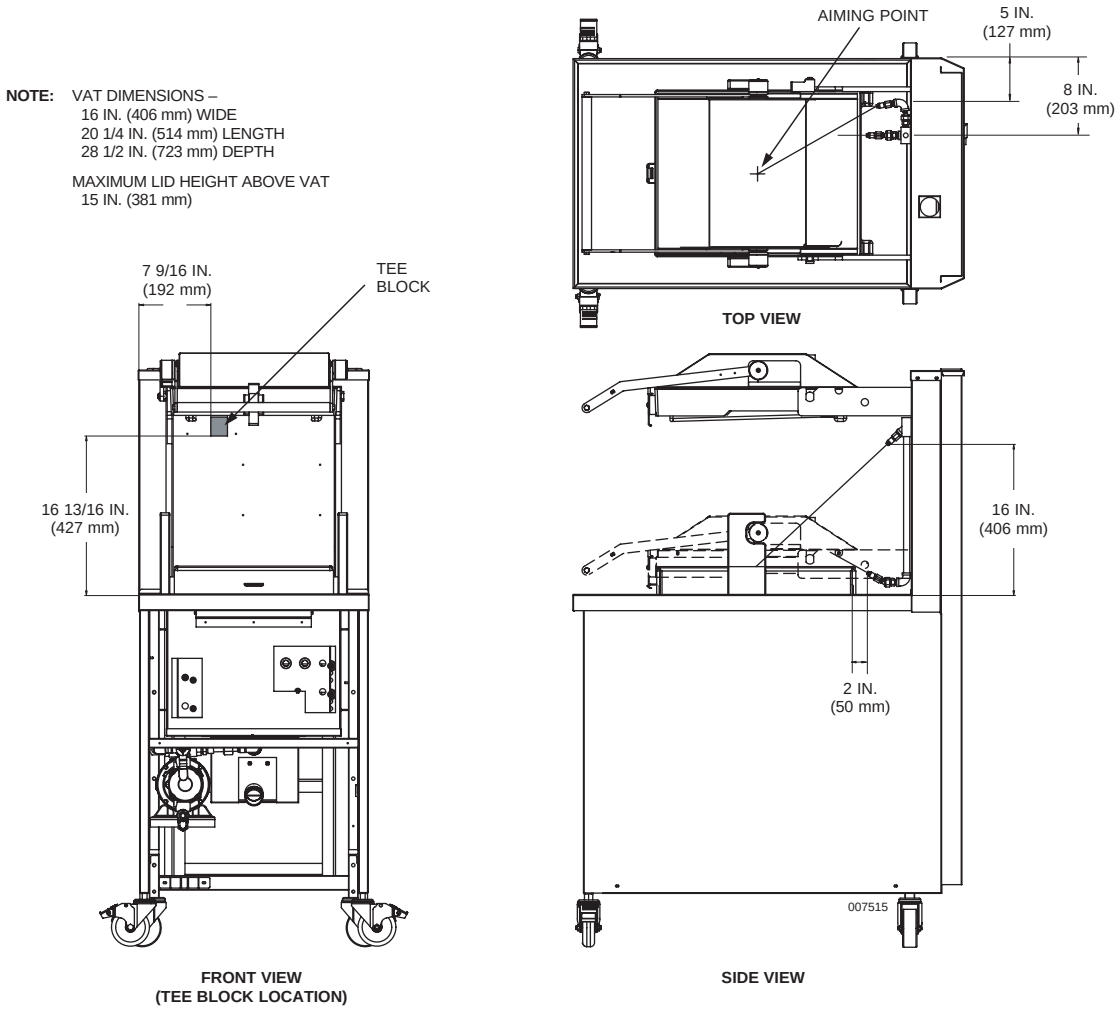


FIGURE 3-30

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model MPB 84 with Catalyst ONLY

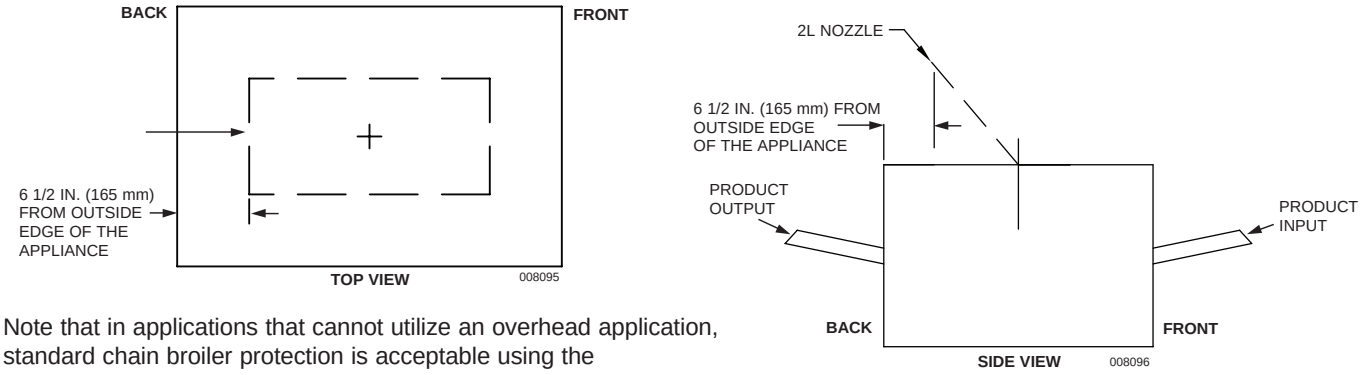
Nozzle Type: 2L

Nozzle Quantity: One

Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6.5 in (165 mm) from any edge of the appliance top

Nozzle Direction: Aim at center of opening (see Figure 3-31)



Note that in applications that cannot utilize an overhead application, standard chain broiler protection is acceptable using the 1L nozzle installed at the opening.

FIGURE 3-31

Nieco Broiler – Model JF94E Electric Broiler with Catalyst

High Proximity Protection (see Figure 3-32)

Nozzle Type: 2H

Nozzle Quantity: Two

Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6.5 in. (165 mm) from front or back edge of hazard
Nozzles positioned 15 in. (381 mm) apart

Nozzle Aim Point: Center of catalyst

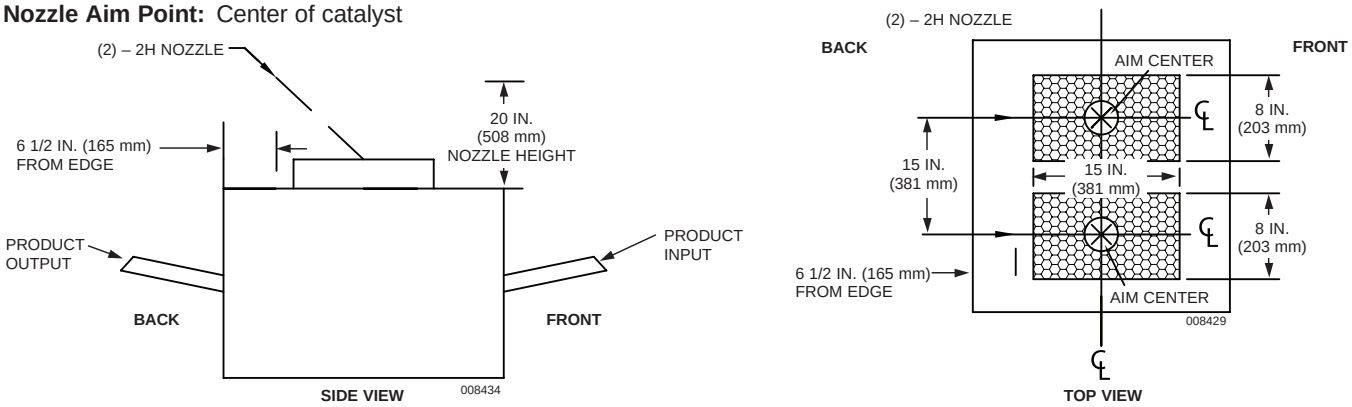


FIGURE 3-32

SPECIFIC APPLICATION BY MODEL (Continued)

Baker's Pride Broiler – Models CH6, CH8, CH10, XX6, XX8, XX10 (With Wood Smoker Box and Chip Holders)

Nozzle Type: 2H

Nozzle Quantity: Three

Nozzle Height: 33 in. (839 mm) to 35 in. (889 mm) above the hazard surface

Nozzle Location: Each nozzle is to protect 1/3 of the cooking area and located in the horizontal center of the respective cooking area; 1 in. (25 mm) forward of the longitudinal center line of the cooking area

See Figure 3-33

Nozzle Aiming Point: Horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area

See Figure 3-33

Note: Smoker Box and Chip Holders cannot exceed logs 4 in. (101 mm) in diameter and a maximum allowable wood depth of 4 in. (101 mm).

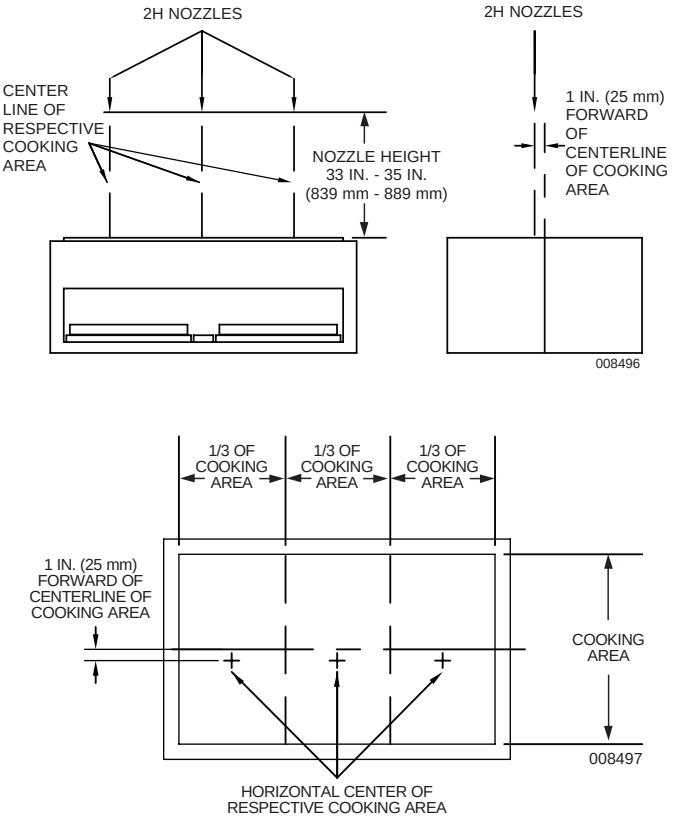


FIGURE 3-33

PIPING LIMITATIONS

Once the nozzle placement and quantity of tanks has been determined, it is necessary to determine the piping configurations between the tank and the nozzles. This section contains the guidelines and limitations for designing the distribution piping so that the wet chemical agent will discharge from the nozzles at a proper flow rate. These limitations must also be referred to when selecting the mounting location for the tanks.

The maximum pipe lengths are based on internal pipe volume. Each size tank is allowed a minimum and maximum total volume of piping, calculated in milliliters.

There is no need to distinguish between what portion of the piping is supply line and what portion is branch line. Only the total volume of the complete piping network has to be considered.

TABLE 3-5: VOLUME

1/4 in. pipe = 20.5 mls/ft
3/8 in. pipe = 37.5 mls/ft
1/2 in. pipe = 59.8 mls/ft
3/4 in. pipe = 105.0 mls/ft

Note: Agent Distribution hose equals 300 mls per hose.

TABLE 3-6: TANKS

Tank Size	Maximum Flow Numbers	Maximum Pipe Volume (milliliters)	Maximum Volume Allowed Between First Nozzle and Last Nozzle (milliliters)
1.6 Gallon PCL-160	5	1500	600
3.0 Gallon PCL-300	10	1910	1125
4.6 Gallon PCL-460	14	3400	3000
4.6 Gallon PCL-460	15	2600	2000
6.0 Gallon PCL-600	19	4215	1688 per side
6.0 Gallon PCL-600	20	3465	1313 per side

* All piping, including nozzle drops, must be included in the piping calculations.

Minimum Pipe Volumes for a Fryer, Range, and Wok		
Cylinder Size	Entire System	At or before appliance
PCL 160	239 ml - 1 Flow Pt	180 ml - 1 Flow Pt
PCL 300	300 ml - 4 Flow Pts	239 ml - 2 Flow Pts
PCL 460	660 ml - 10 Flow Pts	180 ml - 2 Flow Pts
PCL 600	960 ml - 14 Flow Pts	120 ml - 2 Flow Pts

General Piping Requirements

1. Split piping and straight piping are both allowed on a PCL-160, PCL-300 and PCL-460 system.
2. PCL-600 systems must use split piping only, with no nozzle located before the split, and with a maximum of 14 flow points per side. 1/2 in. minimum piping must be used up to the first split.
3. Maximum volume for 1/4 in. pipe between a nozzle and the preceding tee is 410 mls.
4. Maximum flow numbers for 1/4 in. pipe is six.
5. Maximum number of elbows between a nozzle and the preceding tee is five.
6. Maximum of 25 elbows are allowed in the total piping system.
7. Maximum difference in elevation between the tank outlet and any nozzle, or the tank outlet and the highest or lowest horizontal pipe run, is 10 ft (3.0 m).
8. No traps are allowed in the piping network.
9. Pipe lengths are measured from center to center of fittings.
10. The internal equivalent length volume of fittings does not have to be considered as part of the total pipe volume.
11. When utilizing different size pipe in the system, the largest size must start first and the additional pipe must decrease as it approaches the nozzle.
12. Elbow(s) or swivel adaptors located at the nozzles do not have to be counted in the 25 elbow maximum requirement.
13. Reducing bushings are allowed when reducing to a smaller pipe size.
14. Additional piping requirements when protecting a range, wok, or a fryer:
    - PCL-160 – Minimum of 239 ml and one flow number required in total system. Of that minimum, 180 ml must be utilized at or before the range, wok, or fryer.
    - PCL-300 - Minimum of 300 ml and four flow numbers required in total system. Of that minimum, 239 ml and two flow numbers must be utilized at or before the range, wok, or fryer.
    - PCL-460 – Minimum of 660 ml and ten flow numbers required in total system. Of that minimum, 180 ml and two flow numbers must be utilized at or before the range, wok, or fryer.
    - PCL-600 – Minimum of 960 ml and fourteen flow numbers required in total system. Of that minimum, 120 ml and two flow numbers must be utilized at or before the range, wok, or fryer.

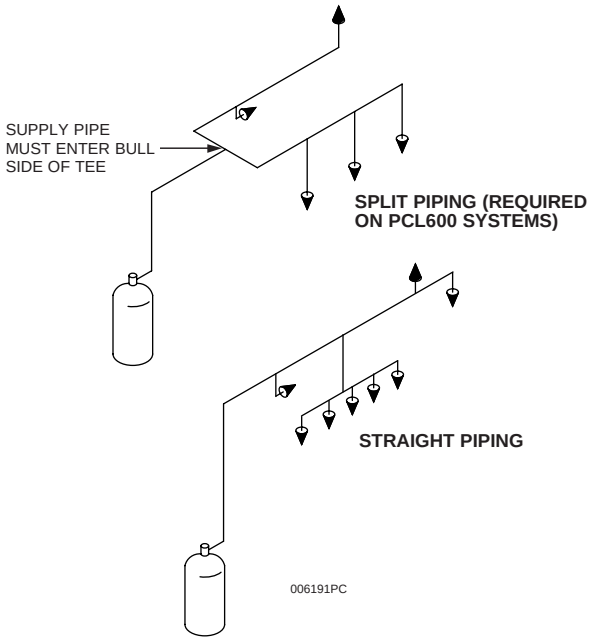


FIGURE 3-34

Design Steps

Step No. 1 Determine number of flow points required based on duct size, plenum size and type, and size of all appliances.

Step No. 2 Determine size and quantity of tanks required. Refer to Rule No. 14 in General Piping Requirements to determine the maximum amount of flow numbers allowed per each tank size.

Step No. 3 Layout nozzles, piping diagram, and tank location. Determine pipe lengths as accurate as possible. Make certain maximum number of elbows is not exceeded. **Note: Tanks cannot be manifolded together. Each tank must have a separate piping network.**

Step No. 4 Add all the lengths of each pipe run and multiply by the mls/ft listed in the Table 3-5: Volume. If the sum falls within the acceptable range noted in the General Piping Requirements, that pipe size is acceptable. If the calculated volume is too large, recalculate the volume using the ml per foot of a smaller pipe size. Pipe sizes can be mixed but Rule No. 11 of the General Piping Requirements must be followed.

Step No. 5 Check to make certain minimum volumes, maximum volumes and maximum volume allowed between first nozzle and last nozzle is not exceeded (Table 3-6: Tanks). Check each rule in General Piping Requirements to make certain none have been exceeded. If any requirement is exceeded, change to a different pipe size and recalculate.

Design Steps (Continued)

Example

The cooking area that requires protection consists of a single 56 in. (1422 mm) perimeter exhaust duct, a 10 ft (3.0 m) long "V" bank plenum, two 18 in. (457 mm) wide x 24 in. (609 mm) fryers, a 30 in. (762 mm) x 36 in. (914 mm) wide griddle, and a 24 in. (609 mm) diameter wok. See Figure 3-35.

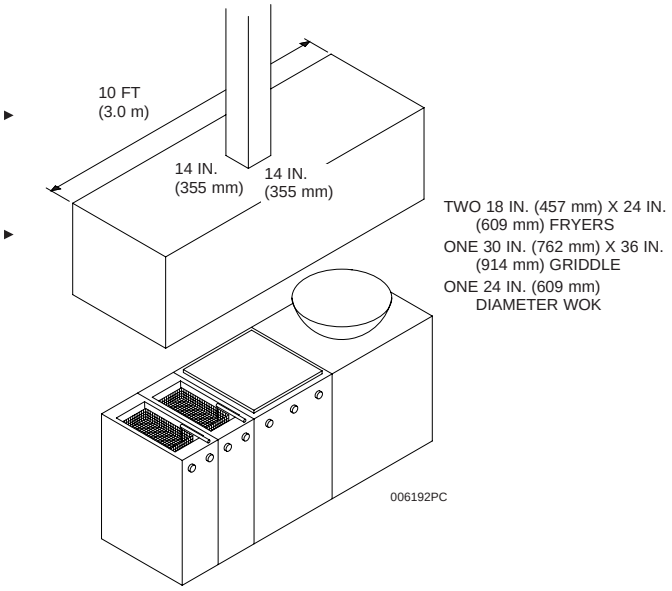


FIGURE 3-35

Step No. 1 Determine number of flow points required.

- 56 in. (1422 mm) perimeter duct requires one, **two flow** nozzle
- 10 ft (3.0 m) "V" bank hood requires one, **one flow** nozzle
- 18 in. x 24 in. (457 mm x 609 mm) fryer requires one, **two flow** nozzle
- 18 in. x 24 in. (457 mm x 609 mm) fryer requires one, **two flow** nozzle
- 30 in. x 36 in. (762 mm x 914 mm) griddle requires one, **one flow** nozzle
- 24 in. (609 mm) diameter wok requires one, **one flow** nozzle

TOTAL FLOW NUMBERS – NINE

Step No. 2 Determine size and quantity of tanks required. Referring to Rule No. 14 in General Piping Requirements (Page 3-19), a PCL-300 and a PCL-460 can supply ten flows, therefore, a PCL-300 can be utilized.

Step No. 3 Make an accurate sketch of the cooking lineup and the hood. Sketch in the tank location and all the piping required for the total system. Make certain all pipe lengths and number of elbows are as accurate as possible. Check the General Piping Requirements on Page 3-19 to determine that the minimum and maximum requirements are met. See Figure 3-36.

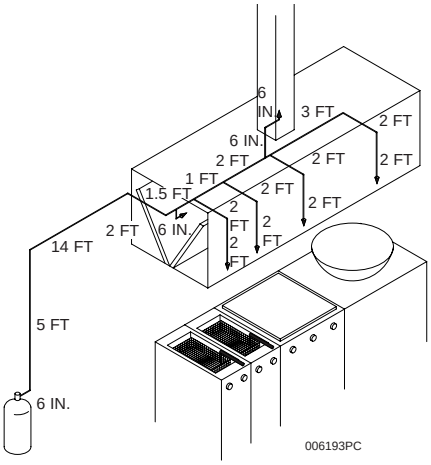


FIGURE 3-36

Design Steps (Continued)

Step No. 4 Total all pipe lengths. Refer to Table 3-5: Volume. Chose a given pipe size and multiply the ml per foot by the total length of all the pipe. If the sum falls within the acceptable range noted in Table 3-6: Tanks, that pipe size is acceptable. If the calculated volume is too large, recalculate the volume using the ml per foot of a smaller pipe size. See Figure 3-37.

Add section A-B = 0.5 ft + 5 ft + 14 ft + 2 ft + 0.5 ft = **22 ft** (0.2 m + 1.5 m + 4.3 m + 0.6 m + 0.2 m = **6.8 m**)

Add section B-C = **1.5 ft (0.5 m)**

Add section C-D = **1 ft (0.3 m)**

Add section D-E = **2 ft (0.6 m)**

Add section E-F = **0.5 ft (0.2 m)**

Add section F-L = 3 ft + 2 ft + 2 ft = 7 ft (0.9 m + 0.6 m + 0.6 m = **2.1 m**)

Add section B-G = **0.5 ft (0.2 m)**

Add section C-H = 2 ft + 2 ft = **4 ft** (0.6 + 0.6 = **1.2 m**)

Add section D-I = 2 ft + 2 ft = **4 ft** (0.6 + 0.6 = **1.2 m**)

Add section E-J = 0.5 ft + 0.5 ft = **1 ft** (0.15 m + 0.15 m = **0.3 m**)

Add section F-K = 2 ft + 2 ft = **4 ft** (0.6 m + 0.6 m = **1.2 m**)

Total length of all pipe = 47.5 ft (14.5 m)

Refer to Table 3-5: Volume. The pipe size chosen is 3/8 inch. The volume per foot of 3/8 in. pipe is 37.5 ml. Multiply 37.5 by the total pipe length of 47.5 ft.

37.5 ml x 47.5 ft = 1781 ml total volume

The maximum volume allowed for a PCL-300 is 1910 ml, therefore, 3/8 in. pipe is acceptable for this system.

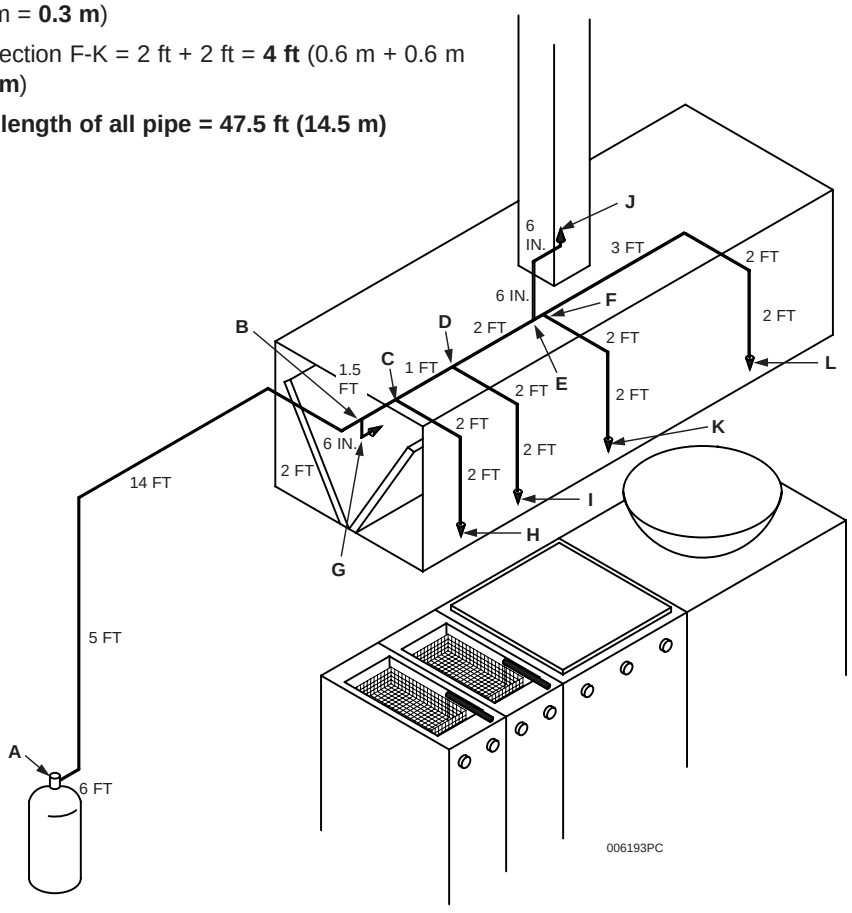


FIGURE 3-37

Design Steps (Continued)

Step No. 5 Check to make certain minimum volumes and maximum volume allowed between first nozzle and last nozzle are not exceeded (Table 3-6: Tanks). Check each rule in "General Piping Requirements" on Page 3-19 to make certain none have been exceeded. If any requirement is exceeded, change to a different pipe size and recalculate. See Figure 3-38.

Refer to Table 3-6: Tanks

Minimum Pipe Volume for PCL-300 is 300 milliliters protecting a fryer, wok, or range (Example system pipe volume is 1781 milliliters, therefore OK)

Maximum Pipe Volume for PCL-300 is 1910 milliliters (Example system pipe volume is 1781 milliliters, therefore OK)

Maximum Volume Allowed Between First Nozzle and Last Nozzle for PCL-300 is 1125 milliliters (Example system, the amount of 3/8 in. piping between G and L, is 25.5 ft. And 25.5 ft x 37.5 mls/ft = 956.3 ml, therefore, OK)

Refer to General Piping Requirements

1. **Split piping and straight piping are both allowed on PCL-300 and PCL-460 systems.** (Example system OK)
2. **PCL-600 systems must use split piping only, with no nozzle located before the split, and with a maximum of fourteen flow points per side. 1/2 in. minimum piping must be used up to the first split.** (Example system N/A)
3. **Maximum volume for 1/4 in. pipe between a nozzle and the preceding tee is 410 mls.** (Example system N/A)
4. **Maximum flow numbers for 1/4 in. pipe is six.** (Example system N/A)
5. **Maximum number of elbows between a nozzle and the preceding tee is five.** (Example system has a maximum number of two, therefore, OK)
6. **Maximum of 25 elbows are allowed in the total piping system.** (Example system has 11 elbows, therefore, OK)
7. **Maximum difference in elevation between the tank outlet and any nozzle, or the tank outlet and the highest or lowest horizontal pipe run, is 10 ft (3.0 m)** (Example system has 5.5 ft (1.6 m), therefore, OK)
8. **No traps are allowed in the piping network.** (Example system has no traps, therefore, OK)
9. **Pipe lengths are measured from center to center of fittings.** (Example system pipe lengths were measured from center to center of fittings, therefore, OK)
10. **The internal equivalent length volume of fittings does not have to be considered as part of the total pipe volume.** (Example system OK)
11. **When utilizing different size pipe in the total system, the largest size must start first and the additional pipe must decrease as it approaches the nozzle.** (Example system N/A)
12. **Elbow(s) or swivel adaptors located at the nozzles do not have to be counted in the 25 elbow maximum requirement.** (Example system OK)
13. **Additional piping requirements when protecting a range, wok, or a fryer:**
    - **PCL-300 - Minimum of 300 ml and four flow numbers required in total system. Of that minimum, 239 ml and two flow numbers must be utilized at or before the range, wok, or fryer.** (Example system has 1781 ml and ten flow numbers, therefore, OK. The example system has 1050 ml and three flows including the fryer, therefore, OK)
    - PCL-460 – Minimum of 660 ml and ten flow numbers required in total system. Of that minimum, 180 ml and two flow numbers must be utilized at or before the range, wok, or fryer.
    - PCL-600 – Minimum of 960 ml and fourteen flow numbers required in total system. Of that minimum, 120 ml and two flow numbers must be utilized at or before the range, wok, or fryer.

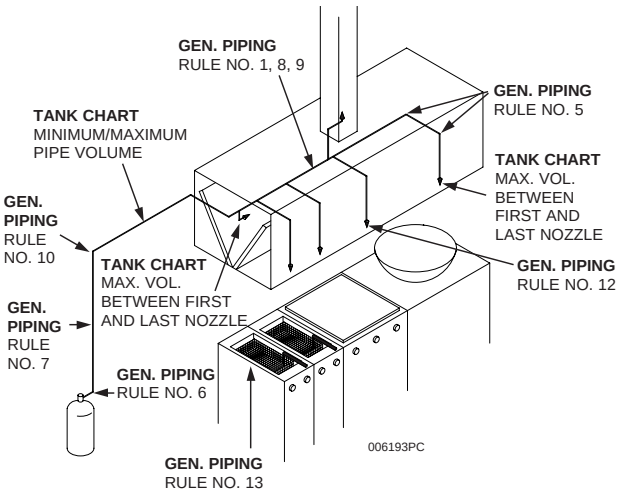


FIGURE 3-38

DETECTOR PLACEMENT

Detectors are required over cooking appliances and in the duct(s) of protected ventilation hoods.

Exhaust Duct(s)

Each exhaust duct must have at least one detector installed in the duct entrance, located in the air stream of the cooking vapors at a maximum of 12 ft (3.6 m) into the duct. See Figure 3-39.

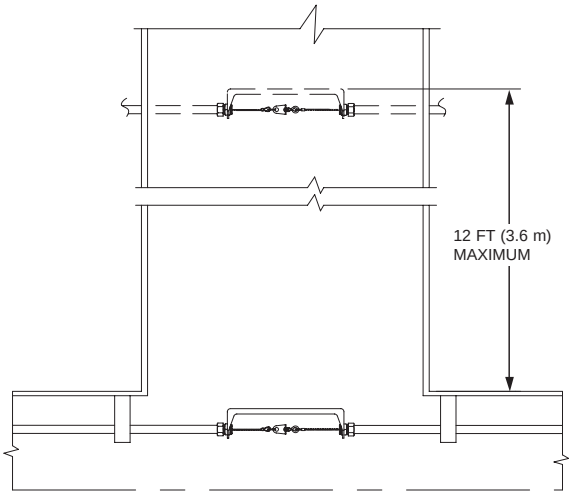


FIGURE 3-39
006884PC

NOTICE

When gas appliances are used and the flue gases from the burner are exhausted into the duct, the detector must be kept out of the air stream of these exhaust gases. These gases can be very hot and could actuate the system unnecessarily .

Duct openings that are long and narrow or large enough to require multiple duct nozzles may require additional detectors.

Electrostatic Precipitator

If an electrostatic precipitator is located at or near the base of the exhaust duct, it is necessary to locate a detector below the precipitator, at the base of the duct, and also locate one in the duct, just above the precipitator. See Figure 3-40.

When installing the detector bracket and system conduit, make certain they do not interfere with the operation of the precipitator.

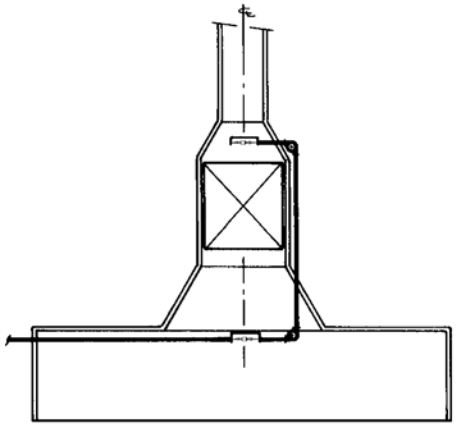


FIGURE 3-40
000268

DETECTOR PLACEMENT (Continued)

Cooking Appliance(s)

Each cooking appliance with a continuous cooking surface not exceeding 48 in. x 48 in. (1219 mm x 1219 mm) shall be protected by one detector. Cooking appliances with a continuous cooking surface exceeding 48 in. x 48 in. (1219 mm x 1219 mm) shall be protected by one detector per 48 in. x 48 in. (1219 mm x 1219 mm) cooking area. Detectors used for cooking appliances must be located above the protected appliance toward the exhaust duct side of the appliance. The detector should be located in the air stream of the appliance to enhance system response time.

If the cooking appliance is located under an exhaust duct where a detector has been mounted, it is normally not necessary to utilize another detector for that cooking appliance, provided the detector is not more than 12 in. (304 mm) into the duct and the appliance has no larger cooking surface than 48 in. x 48 in. (1219 mm x 1219 mm). See Figure 3-41.

Note: If two appliances are located under a duct opening where a detector has been mounted and both appliances together do not exceed a cooking surface of 48 in. x 48 in. (1219 mm x 1219 mm) and the detector is located above both the protected appliances, it is not necessary to utilize an additional detector provided the duct detector is not more than 12 in. (304 mm) into the duct opening.

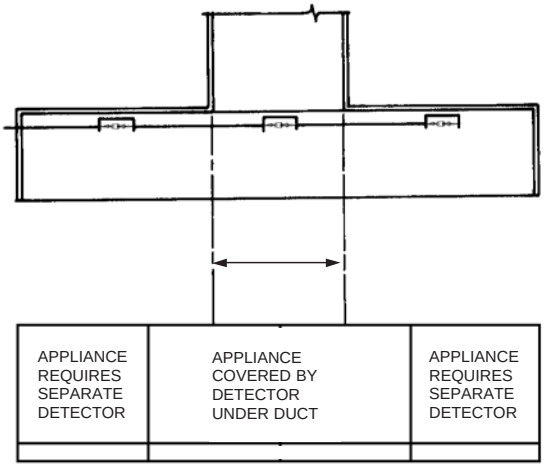


FIGURE 3-41
000269

Each cooking appliance with a continuous cooking surface not exceeding 48 in. x 48 in. (1219 mm x 1219 mm) can be protected by a minimum of one detector. Cooking appliances with a continuous cooking surface exceeding 48 in. x 48 in. (1219 mm x 1219 mm) must be protected by at least **one detector per 48 in. x 48 in. (1219 mm x 1219 mm) cooking area.** Detectors used for cooking appliances must be located above the protected appliance toward the exhaust duct side of the appliance. The detector should be located in the air stream of the appliance to enhance system response time.

GENERAL

The installation information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the installation of the KITCHEN KNIGHT II system must be trained and hold a current PYRO-CHEM certificate in a KITCHEN KNIGHT II training program.

Pipe and fittings for the discharge piping, conduit (EMT), pipe straps, pipe hangers, mounting bolts, and other miscellaneous equipment are not furnished as part of the PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System. These items must be furnished by the installer.

Before attempting any installation, unpack the entire system and check that all necessary parts are on hand. Inspect parts for damage. Verify that cylinder pressure is within the acceptable range as shown on the gauge.

CYLINDER INSTALLATION

The cylinder and valve assembly is shipped with an anti-recoil plug in the valve discharge port.

CAUTION

The anti-recoil plug must remain in the valve discharge port until the discharge piping is connected to the valve.

The cylinder must be mounted vertically. The Models PCL-300 and PCL-460 cylinders must be mounted using a Model MB-15 Mounting Bracket Kit. The Model PCL-600 cylinder must be mounted using a Model MB-1 Mounting Bracket Kit.

The bracket must be securely anchored to the wall using bolts or lag screws. The wall to which the bracket is attached must be sufficiently strong to support the cylinder. The bracket should never be fastened to dry wall or similar material. If this type of wall is encountered, studs must be located and the bracket fastened to them. See Figure 4-1.

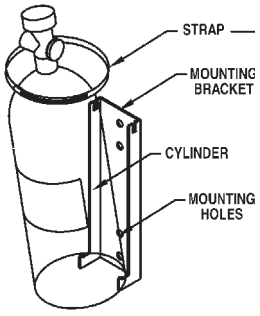


FIGURE 4-1
002945PC

CONTROL HEAD INSTALLATION

Single Cylinder Installation

For single cylinder system installations the Model MCH3/ECH3/NMCH3 Control Head can be installed directly onto the cylinder valve. When the control head is properly aligned in the desired position, tighten the knurled locking ring to secure the assembly. See Figure 4-2.

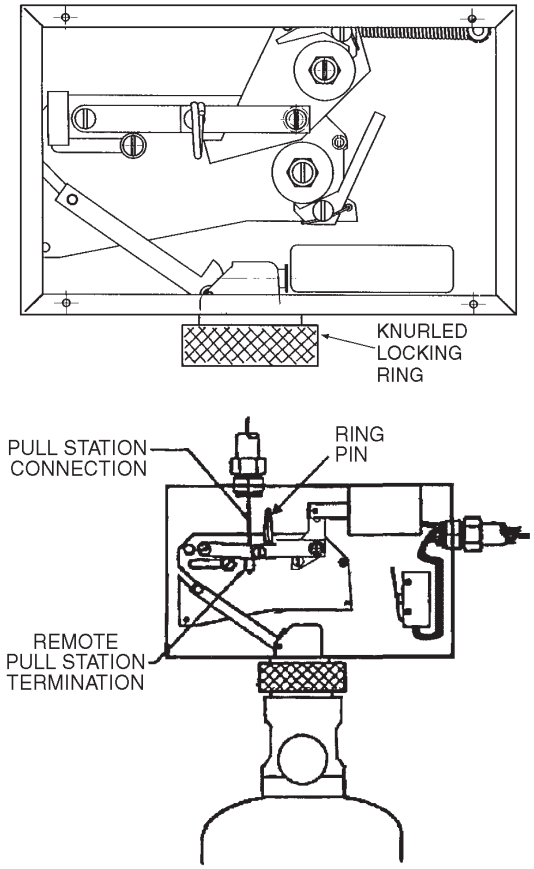


FIGURE 4-2
006214PC / 003647PC

CONTROL HEAD INSTALLATION (Continued)

Multiple Cylinder Installation

1. Multiple Cylinder Actuation Using MCH3/ECH3/NMCH3 Control Head

The Model MCH3/ECH3/NMCH3 Control Head can be used to pneumatically actuate a maximum of five agent cylinders with a 16 gram CO2 cartridge. When a control head is used for multiple cylinder actuation, it cannot be mounted directly onto a cylinder valve. The control head must be installed remotely using a Model MB-P2 Control Head Mounting Bracket. The bracket must be anchored to the wall using bolts or lag screws.

CAUTION

Do not screw the control head directly to a wall as this will warp the control head, not allowing the mechanism to actuate.

In order to actuate the agent cylinder(s) from a control head, a 1/4 in. NPT x 45° 1/4 in. flare type fitting (conforming to SAE J513c) or Male Straight Connector (Part No. 32338) must be screwed into the base of the control head actuator. Pneumatic tubing or stainless steel actuation hose is then used to connect the control head to the valve cap assembly of each agent cylinder valve. See Figure 4-3.

NOTICE

Pneumatic tubing (copper) used for remote cylinder actuation shall have an outside diameter of 1/4 in. with a minimum wall thickness of 1/32 in. (0.8 mm). This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4 in., 45° flare type conforming to SAE J513c.

Compression type fittings are not acceptable.

A single Model MCH3/ECH3/NMCH3 Control Head can actuate:

1. Up to four cylinders with a maximum of 25 ft (7.6 m) of copper or stainless steel pneumatic tubing or stainless steel actuation hose when using an o-ring (Part No. 55531) installed in place of the Teflon washer and the 16 gram CO2 cartridge.
2. Up to five cylinders with a maximum of 18 ft (5.4 m) of copper or stainless steel pneumatic tubing or stainless steel actuation hose when using an o-ring (Part No. 55531) installed in place of the Teflon washer and the 16 gram CO_2 cartridge.

CAUTION

Confirm the Teflon washer in the control head actuator assembly has been replaced with the o-ring (Part No. 55531) and the 16 gram CO_2 cartridge is installed for four and five cylinder single control head actuation.

The actuation line must be tested for any leaks by using a hand held or electric vacuum pump. The pump should be used to draw a vacuum on the actuation line at the fitting closest to the control head. A vacuum should be pulled to 20 in. (508 mm) of mercury. Leaks exceeding 5 in. (127 mm) of mercury within 30 seconds are not allowed. If the gauge on the vacuum pump indicates a leak in the line, examine the actuation line for loose fittings or damage. Correct any leaks and retest.

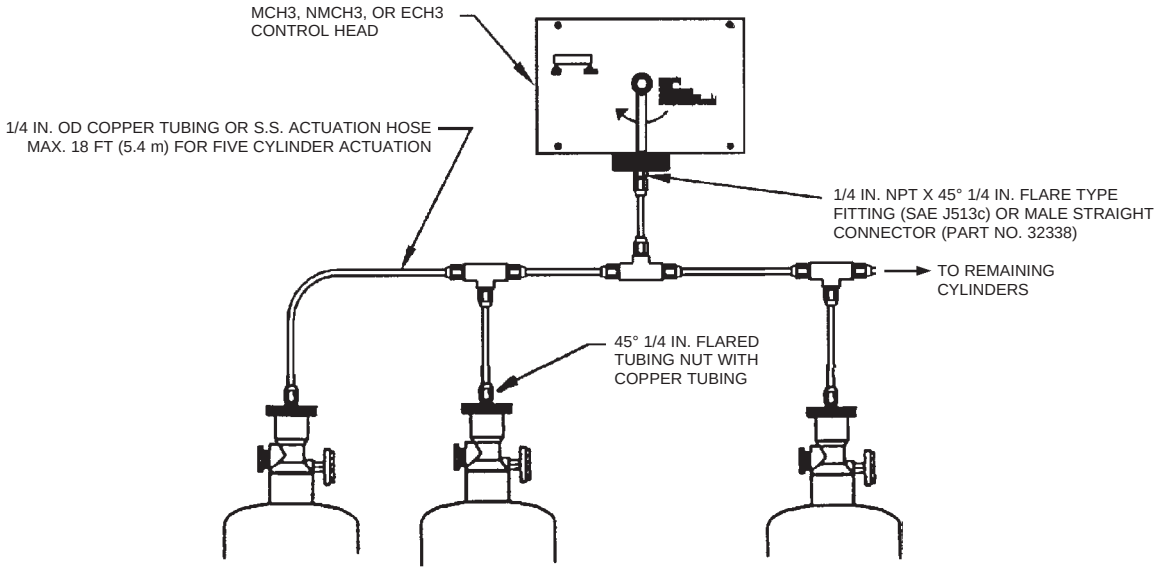


FIGURE 4-3
004428PC

CONTROL HEAD INSTALLATION (Continued)

2. Multiple Cylinder Actuation Using Model PAC-10 Pneumatic Actuation Cylinder

The Model PAC-10 Pneumatic Actuation Cylinder must be used if more than five agent cylinders require simultaneous actuation. The Model PAC-10 must be used in conjunction with a Model MCH3/ECH3/NMCH3 Control Head. The control head is mounted on the Model PAC-10 valve assembly.

The Model PAC-10 is shipped complete with a mounting bracket. The bracket must be securely anchored to the wall using bolts or lag screws. The wall to which the bracket is attached must be sufficiently strong to support the pneumatic cylinder. The bracket should never be fastened to dry wall or similar material. If this type of wall is encountered, studs must be located and the bracket fastened to them. See Figure 4-4.

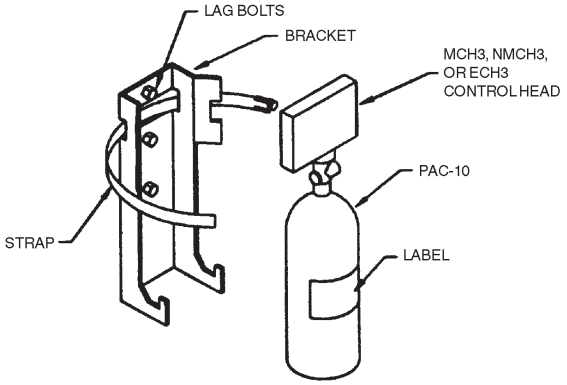


FIGURE 4-4
002874PC

In order to actuate the agent cylinders from a Model PAC-10 Pneumatic Actuation Cylinder, a 3/4 in. NPT x 1/4 in. NPT bushing must be screwed into the pneumatic cylinder's discharge port. A 1/4 in. NPT x 45° 1/4 in. flare type fitting (conforming to SAE J513c) must then be screwed into this bushing. The Male Straight Connector (Part No. 32338) is used with stainless steel actuation hose. Pneumatic tubing or stainless steel actuation hose is then used to connect the PAC-10 pneumatic cylinder to the valve cap assembly of each agent cylinder valve. See Figure 4-5.

NOTICE

Pneumatic tubing (copper) used for remote cylinder actuation shall have an outside diameter of 1/4 in. with a minimum wall thickness of 1/32 in. (0.8 mm). This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4 in., 45° flare type conforming to SAE J513c.

Compression type fittings are not acceptable.

The Model PAC-10 pneumatic cylinder can actuate a maximum ▸of ten agent cylinders with a maximum of 100 ft (30.4 m) of pneumatic tubing.

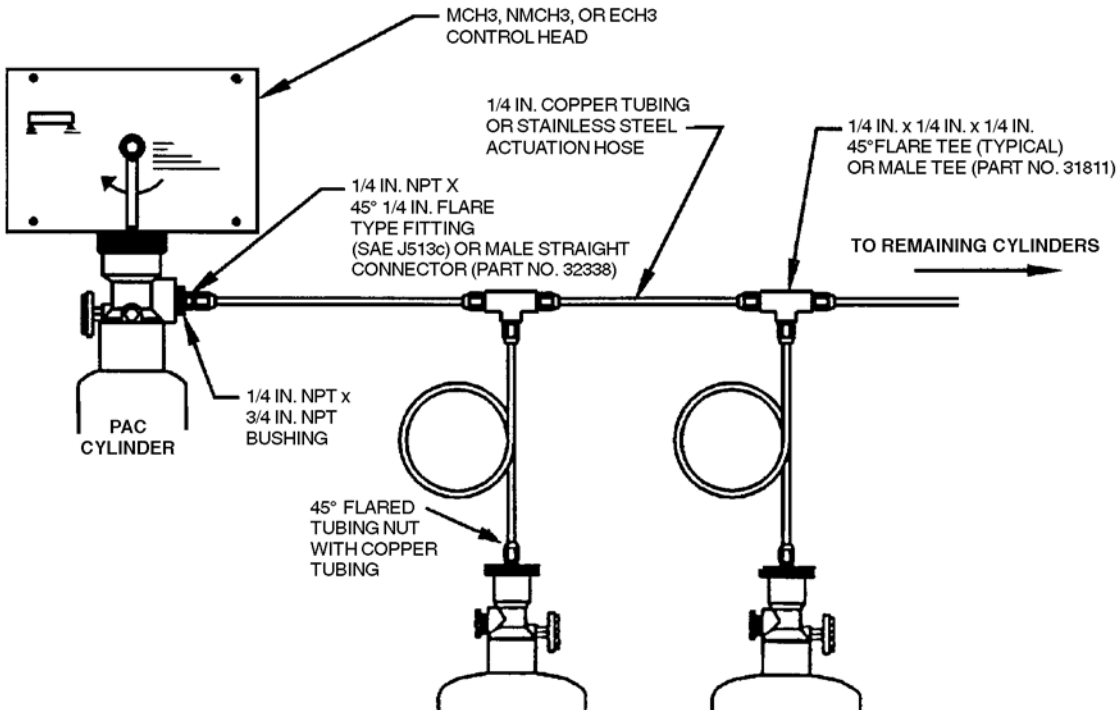


FIGURE 4-5
004427PC

CONTROL HEAD INSTALLATION (Continued)

2. Multiple Cylinder Actuation Using Model PAC-10 Pneumatic Actuation Cylinder (Continued)

If the system design requires the use of two control heads for multiple cylinder actuation, a maximum of 25 ft (7.6 m) of tubing is allowed between the two control heads and the PAC-10 cylinder. See Figure 4-6. If a PAC-10 cylinder is not utilized, there is a maximum of 25 ft (7.6 m) of tubing for the two control heads and up to four cylinders or a maximum of 18 ft (5.4 m) of tubing for the two control heads and five cylinders.

DETECTOR INSTALLATION

Fusible Link Detection

Fusible links are always used in conjunction with the Model MCH3 Mechanical Control Head. After mounting the cylinder and control head, the fusible link line can be installed. The first step to installing the fusible link line is to install the detector bracket(s) over all protected appliances and in each duct. See Section 3 – System Design for detector placement guidelines.

► **Note: Only A-PC-style Fusible Links can be used.**

Connect the fusible link brackets together using 1/2 in. conduit and the conduit connectors supplied in the detector kit (Model FLK-1). A PYRO-CHEM KITCHEN KNIGHT II corner pulley must be used whenever a change in conduit direction is necessary. The conduit is connected to the control head through a knockout in the upper left-side corner.

In general, fusible links centered in the detector brackets are connected in series using 1/16 in. (1.6 mm) diameter stainless steel cable. The spring plate in the control head maintains tension on this series of fusible links. If the tension is released for any reason (e.g. a fusible link separates), the control head will operate and actuate the system.

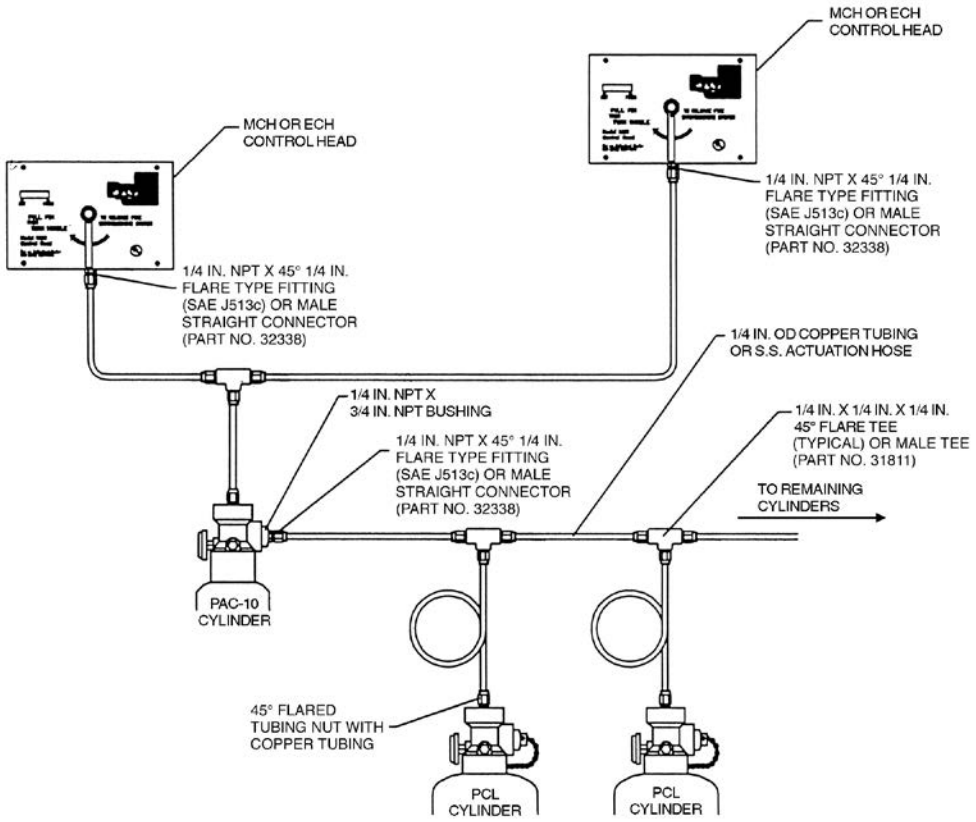


FIGURE 4-6
006858

DETECTOR INSTALLATION (Continued)

Fusible Link Detection (Continued)

Maximum limitations for the fusible link detection line are as follows:

Fusible links can be installed with or without fusible link hangers (see **Section 2 – Components** for description).

Fusible Link Line Limitations When Used with Model EN-MCU3, MCH3, and NMCH3 Control Heads and CBP-1, SBP-1, and WBP-1 Pulley Elbows

Maximum # of detectors: 20

Maximum length of cable: 150 ft (45.7 m)

Maximum # of pulleys: 40

Fusible Links Without Hangers

Begin installing links at the terminal bracket. The link is connected to the far side of the terminal bracket using an "S" hook. The "S" hook must be crimped closed after the link is installed. A tight loop is then made in the cable and secured by the crimp provided. This loop is connected to the other side of the terminal link (see Figure 4-7) and the cable fed through the conduit to the next bracket. The cable proceeding from the terminal link will be used to connect the series links (see Figure 4-8). Series links must be centered in their detector brackets.

After the last link in the series is connected, the cable should be fed through the conduit back to the control head. Thread the cable through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

NOTICE

Crimps must always be used in conjunction with two cable lengths. Loops are the accepted method of connecting the cable to mechanical components. **The crimp must never be used on a single cable.** Exception: Single cable crimp allowed in detection and gas valve ratchet wheel using Stop Sleeve (Part No. 26317) (Packages of 10: Part No. 24919).

The fusible link line can now be put into a set position by applying tension to the fusible link line. This is accomplished by using a 1/2 in. hex wrench on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box. The fusible link line is now in a set position. See Figure 4-9.

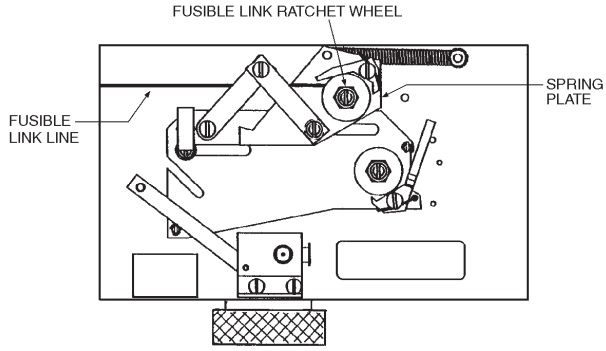


FIGURE 4-9
006215PC

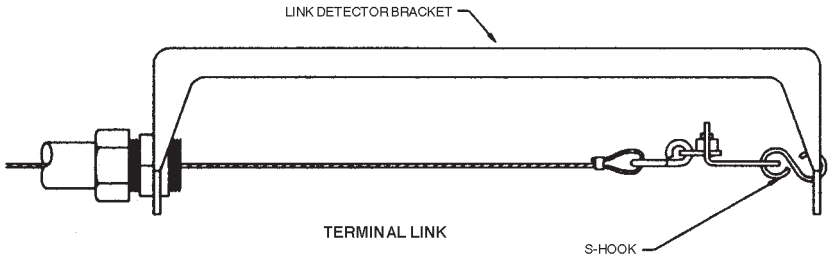


FIGURE 4-7
002849aPC

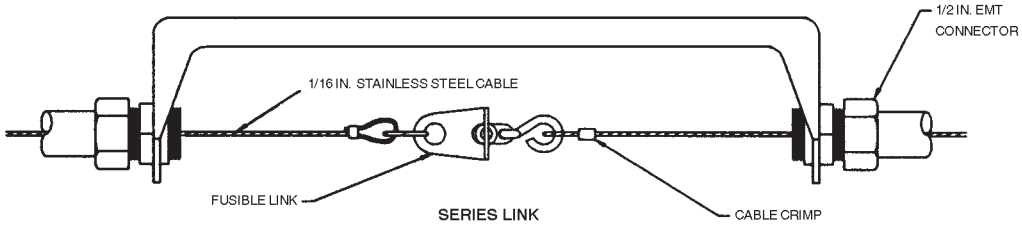


FIGURE 4-8
002849bPC

DETECTOR INSTALLATION (Continued)

Fusible Link Installation Using Model FLH-1 Fusible Link Hangers

Beginning at the control head, feed the stainless steel cable through the conduit and brackets to the terminal bracket in one continuous length. Allow approximately 2.5 in. (64 mm) of slack at each bracket for the installation of the fusible link hangers. At the terminal link, a tight loop is made in the cable and secured by the crimp provided. The cable is attached to the far side of the terminal bracket using an "S" hook. The "S" hook must be crimped closed after the cable is installed. See Figure 4-10.

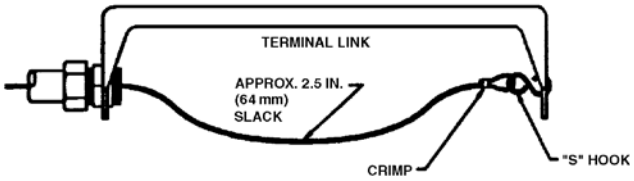


FIGURE 4-10
002877PC

Begin installing the fusible link hangers at the terminal bracket and work toward the control head. Loop the cable through the oval opening in the hanger and hook the fusible link on the loop. See Figure 4-11.

Note: Only A-PC-style Fusible Links can be used.

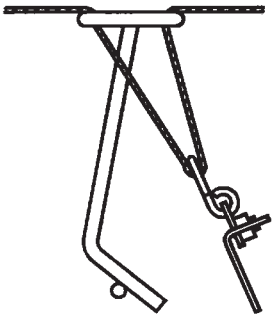


FIGURE 4-11
002878PC

Hook the bottom of the link onto the bottom leg of the hanger. See Figure 4-12.

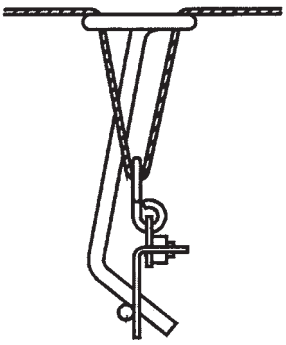


FIGURE 4-12
002879PC

Center the hanger/link in the fusible link bracket by sliding it along the link line. This is easily accomplished before any tension is applied to the link line. Repeat this procedure for all fusible links.

After the last hanger/link in the series is connected, the cable should be fed through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

NOTICE

Crimps must always be used in conjunction with two cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable. Exception: Single cable crimp allowed in detection and gas valve ratchet wheel using Stop Sleeve (Part No. 26317) (Packages of 10: Part No. 24919).

The fusible link line can now be put into a set position by applying tension to the fusible link line. This is accomplished by using a 1/2 in. hex wrench on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box. The fusible link line is now in a set position. See Figure 4-9.

Check to ensure that the fusible link hanger(s) remain centered in the bracket after the fusible link line is set. See Figure 4-13.

NOTICE

If wire rope requires splicing, a splice is to be a minimum of 12 in. (305 mm) from any pulley elbow or conduit adaptor to avoid interference.

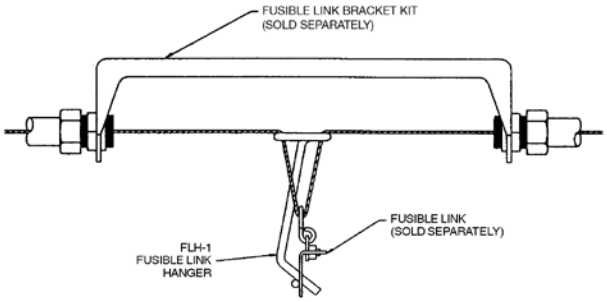


FIGURE 4-13
002849bPC

Thermal Detection

Thermal detectors are always used in conjunction with the Model ECH3 Electrical Control Head. After mounting the cylinder and control head, the thermal detector(s) can be installed. Install the thermal detector(s) in the plenum area of the ventilation hood over all protected appliances and in each duct. See Section 3 – System Design for detector placement guidelines. Follow the instructions included with the detector for proper detector mounting procedures.

SETTING THE CONTROL HEAD

Model MCH3/NMCH3 Mechanical Control Head

Once the fusible link line is set, the control head can be placed in the set position. Set the control head using the proper procedure of ratcheting the detection line to raise the spring plate parallel to the top of the control head box prior to placing the latching arm in the slide plate. The slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin into the hole in the slide plate above the latching arm. This will lock the control head in the set position, eliminating accidental actuation during the rest of the installation procedure. See Figure 4-14.

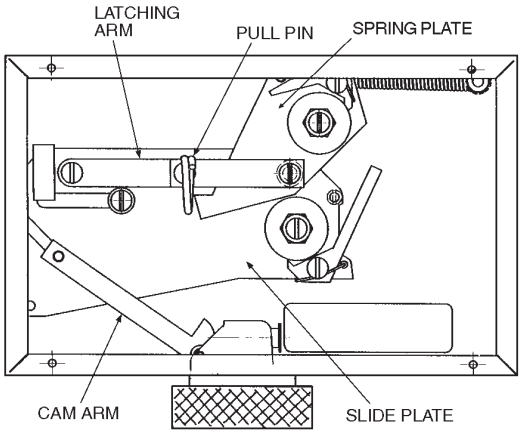


FIGURE 4-14
006219PC

Note: Tension must be set on fusible link detection line before control head can be set.

Model ECH3 Electrical Control Head

Once the thermal detectors have been installed, the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin into the hole in the slide plate above the latching arm. This will lock the control head in the set position, eliminating accidental actuation during the rest of the installation procedure.

Once the Model ECH3 Electrical Control Head is in the set position, it can be connected to the detection/actuation circuit.

⚠ WARNING

Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power could cause personal injury or death if contact is made with energized wires. All electrical wiring and connections to be made in accordance with the authority having jurisdiction and all local electrical codes.

NOTICE

No electrical connections shall be made inside the control head. All electrical wiring shall exit the control head through the knock-out on the side of the box. All electrical connections must be made in an approved electrical box.

Connect one of the black wires on the solenoid in the control head to the red wire of the Model MS-SPDT Electrical (snap-action) Switch. The brown wire from the electrical (snap-action) switch is then connected to one side of the first thermal detector in series. Connect the other side of the first thermal detector in series and the remaining black wire on the solenoid in the control head to the appropriate power source after installing the Model SM-120 Solenoid Monitor.

CAUTION

The solenoid must never be wired “hot” (not through the electrical (snap-action) switch). If wired this way, the non-field replaceable solenoid will be damaged and the complete control head will require replacement.

NOTICE

A Model SM-120 Solenoid Monitor must always be used with an Electrical Control Head to supervise the actuation/detection circuit.

Where electrical detection and/or actuation is provided, supervision shall be provided in accordance with NFPA-17A.

Alarms and indicators along with a supervised backup power source shall be provided in accordance with NFPA 72, The National Fire Alarm Code.

Electrical wiring and equipment shall be installed in accordance with NFPA 70, National Electric Code or the requirements of the authority having jurisdiction.

The Model ECH3-24 Electrical Control Head requires a 24VDC power supply with a minimum 2A rating. The Model ECH3-120 Electrical Control Head requires a 1A, 120VAC power supply.

SOLENOID MONITOR INSTALLATION

Solenoid Monitor Installation in Detection Circuit

After installing the thermal detectors and the control head, the Model SM-120 Solenoid Monitor can be installed. The Solenoid Monitor is connected to the wires leading from the last thermal detector. It should be mounted in a location where it can be readily observed.

The Solenoid Monitor is an end-of-line device that supervises the actuation/detection circuit. It is comprised of a push-type switch with a built-in indicator light, a plug-type relay, a relay socket, and a cover plate. The light, when illuminated, indicates that the detection/actuation circuit is in the normal condition. The Solenoid Monitor also provides two sets of dry contacts. The Solenoid Monitor's cover plate is used to mount the Solenoid Monitor in a standard 6 in. x 4 in. x 3 in. (152 mm x 102 mm x 76 mm) deep electrical box. See Figure 4-15.

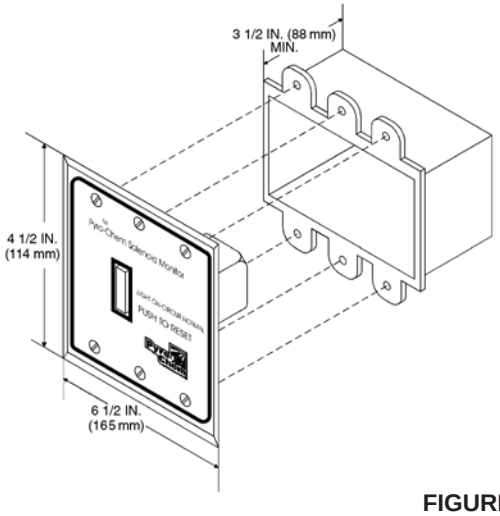


FIGURE 4-15
002881PC

All wire for circuits using the Model SM-120 shall be 14 gauge minimum, or as required by local code.

After the Solenoid Monitor has been installed, the detection/actuation circuit can be connected to the appropriate power source and energized. To energize the detector/actuation circuit, depress the switch on the Solenoid Monitor. The light will illuminate to indicate that the circuit is properly installed. If the light fails to illuminate, the wiring must be checked.

Solenoid Monitor When Used as a Reset Relay

The Model SM-120 can be used as a reset relay when required. A reset relay is required whenever an electrical gas shut-off valve is used in conjunction with the PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System. For typical wiring connections, see Figure 4-16.

REMOTE PULL STATION INSTALLATION

NOTICE

For flexible conduit/pull station installation instructions, refer to Pages 4-21 through 4-30.

The Model RPS-M Remote Mechanical Pull Station is used for remote mechanical actuation of all system releasing devices. It is to be located near an exit in the path of egress from the hazard area no more than 4 ft (1.2 m) above the floor.

NOTICE

A Model RPS-M Remote Mechanical Pull Station must be used for manual activation of a Model EN-MCU3 or a Model NMCH3 releasing device. If the PYRO-CHEM Releasing Panel is being utilized, then the RPS-E2 Electric Pull Station may be used for manual activation.

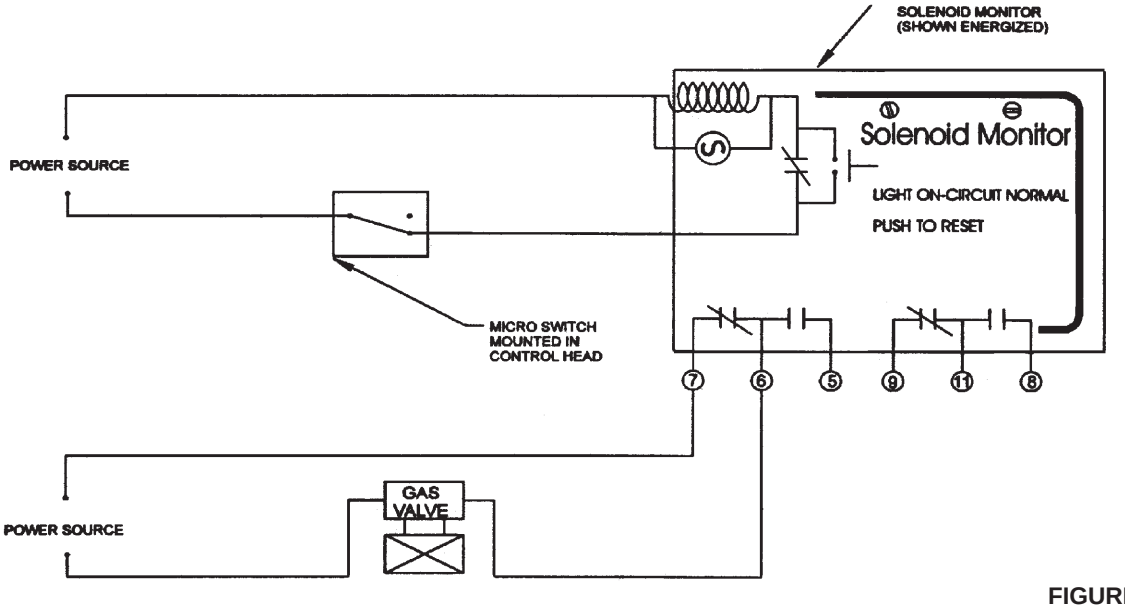


FIGURE 4-16
002882PC

REMOTE PULL STATION INSTALLATION (Continued)

The Pull Station can be surface mounted or flush mounted. For flush mounting a RACO #232 4 in. (102 mm) deep electrical box or equivalent must be used (dealer supplied). It is connected to the releasing device using 1/16 in. (1.6 mm) diameter stainless steel cable. The cable enters the pull station box through the center hole in the bottom, top, either side, or the center back hole. The cable enters the control head through the top-center knockout. The cable must be enclosed in 1/2 in. EMT conduit with a PYRO-CHEM KITCHEN KNIGHT II corner pulley at each change in conduit direction. Maximum limitations for the Model RPS-M Remote Mechanical Pull Station are as follows:

Model RPS-M Cable Run Limitations When Used with Model ECH3, MCH3, EN-MCU3, and NMCH3 Control Heads and CBP-1, SBP-1, and WBP-1 Pulley Elbows

Maximum length of cable: 150 ft (45.7 m)

Maximum # of pulleys: 40

After mounting the pull station box and conduit, feed the stainless steel cable from the releasing device, through the conduit, and into the pull station box. Feed the cable through the bushing and through the hole provided in the pull handle. Loop the cable through the pull handle and secure it with the crimp provided (see Figure 4-17).

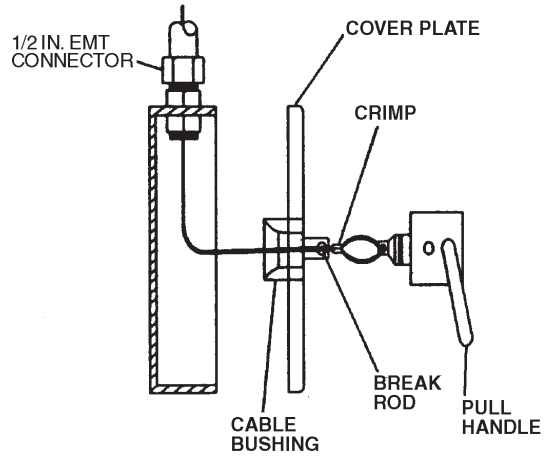


FIGURE 4-17
002884PC

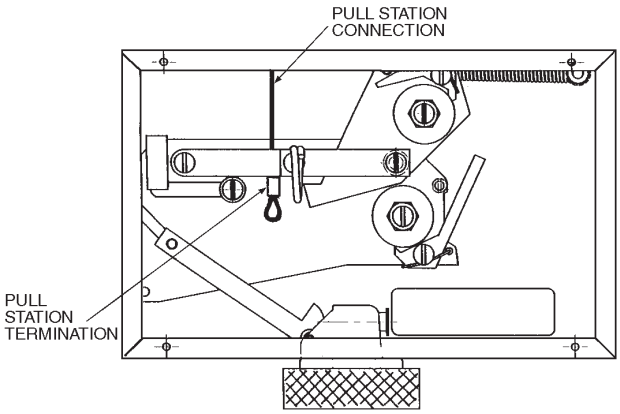
Cut and thread the cable through the hole in the latching arm of the control head and pull the cable tight. Crimp the cable approximately 6 in. to 8 in. (152 mm to 203 mm) below the latching arm. **Note:** NFPA-17A requires the pull length to be no more than 14 in. (355 mm).

NOTICE

Crimps must always be used in conjunction with two cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable. Exception: Single cable crimp allowed in detection and gas valve ratchet wheel using Stop Sleeve (Part No. 26317) (Packages of 10: Part No. 24919).

Pull the pull handle until the crimp touches the latching arm. See Figure 4-18. Coil the excess cable in the pull box and attach the cover plate with the four screws provided. Insert the pull handle into the cover plate and insert the plastic break rod.

►**Note:** Excess wire rope must be coiled in the pull station box, ►not in the control head.



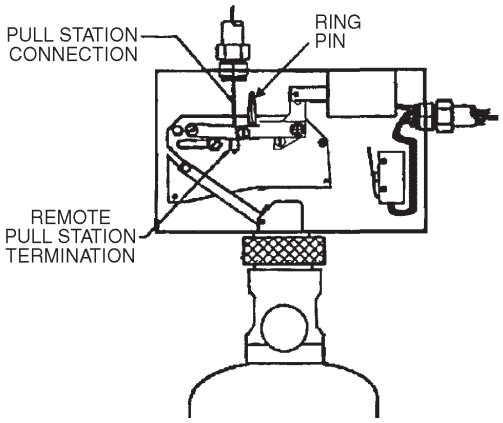


FIGURE 4-18
006216PC/003647PC

GAS SHUT-OFF VALVE INSTALLATION

All gas valves are designed for indoor installation only. All gas valve installation and testing shall be made in accordance with the authority having jurisdiction.

⚠ WARNING

To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve. Failure to comply could result in serious personal injury or death.

Mechanical Gas Shut-Off Valve Installation

TEMPERATURE LIMITATIONS: Maximum ambient and fluid temperature is 120 °F (49 °C).

POSITIONING: Valve may be mounted in any position.

PIPING:

CAUTION

To prevent damage to valve, DO NOT OVER-TIGHTEN PIPE CONNECTIONS. Connect piping to valve in accordance with markings on valve body. Pipe compound should be applied to male pipe threads only. When tightening pipe, do not use valve as a lever. To avoid strain on valve, assure all piping is aligned and supported properly.

STRAINER INSTALLATION: For the protection of the gas valve, install a strainer or suitable filter in the inlet piping, as close to the gas valve as possible. Periodic cleaning of strainers recommended.

PREVENTIVE MAINTENANCE:

1. Keep medium flowing through valve as free from foreign material as possible.
2. Keep valve filter/strainer clean.

IMPROPER OPERATION:

1. **Incorrect Pressure:** Pressure to valve must be within range specified on nameplate.
2. **Leakage:** If leakage is detected, contact an authorized PYRO-CHEM distributor immediately.

The Model MCH3/NMCH3 Control Head is used to operate the mechanical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. The gas shut-off valve is spring loaded and requires five pounds of force to hold it open. This force is supplied by a 1/16 in. (1.6 mm) diameter stainless steel cable that is connected to the control head.

After the valve is installed in the gas line, 1/2 in. conduit must be run from the top center knockout of the gas valve box to the middle right-hand knockout in the control head. A PYRO-CHEM KITCHEN KNIGHT II corner pulley is used wherever a change in conduit direction is required.

Gas Valve Cable Run Limitations When Used with Model MCH3, EN-MCU3, and NMCH3 Control Heads and CBP-1, SBP-1, and WBP-1 Pulley Elbows

Maximum length of cable: 100 ft (30.4 m)

Maximum # of pulleys: 30

Remove the gas valve cover and thread the stainless steel cable through the conduit back to the control head. Thread the cable through the hole in the gas valve ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

NOTICE

Crimps must always be used in conjunction with two cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable. Exception: Single cable crimp allowed in detection and gas valve ratchet wheel using Stop Sleeve (Part No. 26317) (Packages of 10: Part No. 24919).

At the gas valve, loop the cable through the valve stem and secure it with the crimp provided (see Figure 4-19).

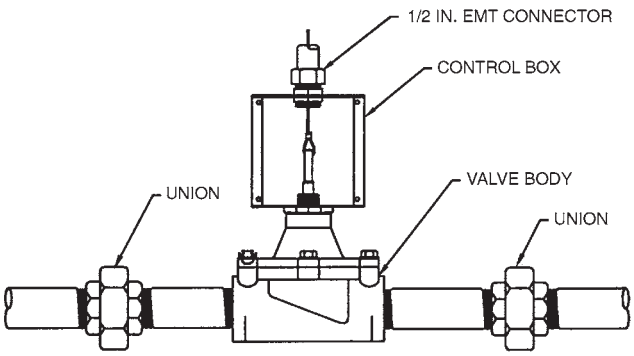


FIGURE 4-19
002886PC

CAUTION

Do not over-tension wire rope going from control head to gas valve at gas valve ratchet wheel. Over-tensioning may cause the valve to not close properly, resulting in the fuel supply not completely shutting off.

GAS SHUT-OFF VALVE INSTALLATION (Continued)

The gas valve line can now be put into a set position by applying tension to the gas valve line. This is accomplished by using a 1/2 in. hex wrench on the gas valve ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the gas valve is fully open. See Instruction Sheet (Part No. 550571) included in gas valve shipping assembly, for detailed information. Secure the gas valve cover plate to the gas valve box with the four screws provided. The gas valve line is now in a set position. See Figure 4-20.

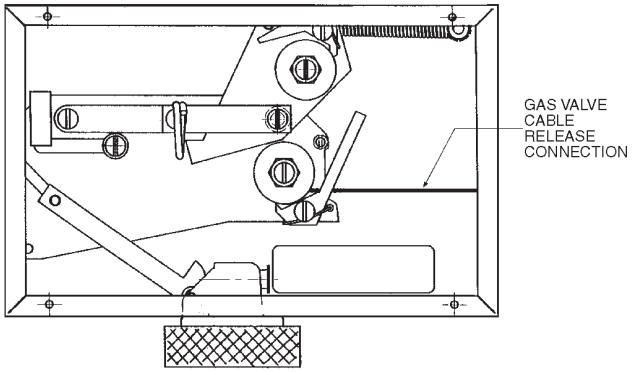


FIGURE 4-20
006217PC

Electrical Gas Shut-off Valve Installation

⚠ WARNING

Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power could cause personal injury or death if contact is made with energized wires. All electrical wiring and connections to be made in accordance with the authority having jurisdiction and all local electrical codes.

The Model MCH3/ECH3/NMCH3 Control Head is used to operate the electrical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. A reset relay (Solenoid Monitor, Model SM-120) must always be used with an electrical gas shut-off valve. For proper wiring of the electrical gas shut-off valve, see Figure 4-16.

Note: Valve must be installed so that the solenoid is above the horizontal pipe line with no more than a 5 degree lean either way.

PULLEY TEE INSTALLATION

The Pulley Tee is used to connect two mechanical gas valves or two remote mechanical pull stations to a single control head. The cable proceeding from the control head must always enter the branch of the pulley tee. See Figure 4-21.

A pulley tee that is used to close two gas valves can only be used to close gas valves with similar stem travel. Gas valves from 3/4 in. up to 1 1/2 in. can be used on the same pulley tee. A 2 in. gas valve can be used only with another 2 in. gas valve. Gas valves from 2 1/2 in. up to 3 in. can be used on the same pulley tee. As an example, using a 3/4 in. gas valve with a 3 in. gas valve will not allow the 3 in. valve to fully open.

CAUTION

The pulley tee must never be used to connect multiple fusible link lines to a single control head.

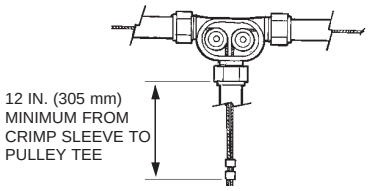


FIGURE 4-21
001091

ELECTRICAL (SNAP-ACTION) SWITCH INSTALLATION

See NFPA 72, “National Fire Alarm Code,” Initiating Devices section, for the correct method of wiring connection to the fire alarm panel.

The Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT Electrical (Snap-Action) Switch is available for use where an electrical output is required. These switches can be field installed in the control head. See Figure 4-22 and Figure 4-23 and refer to Instruction Sheet (Part No. 551159) included with switch shipping assembly, for detailed mounting instructions.

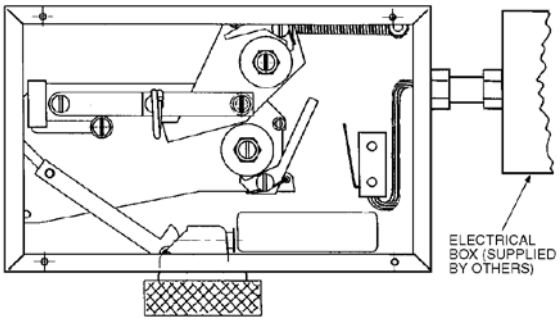


FIGURE 4-22
006218PC

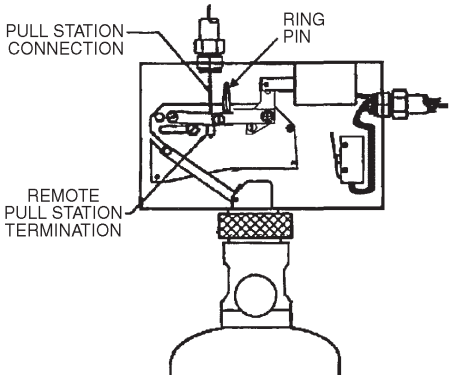


FIGURE 4-23
003647PC

ELECTRICAL (SNAP-ACTION) SWITCH INSTALLATION (Continued)

NOTICE

The Model ECH3 Control Head is supplied with a Model MS-DPDT Electrical (Snap-Action) Switch. The DPDT switch is a double switch with two sets of normally open (N.O.) and normally closed (N.C.) contacts. One set of contacts on the switch must be used in the actuation/detection circuit and cannot be used for electrical output.

NOTICE

No electrical connections shall be made inside the control head. All electrical wiring shall exit the control head through the knock-out on the side of the box. All electrical connections must be made in an approved electrical box.

These switches may be used to provide an electrical signal to the main breaker and/or operate electrical accessories provided the rating of the switch is not exceeded. Wiring connections are shown in Figure 4-24. The contact ratings for the switch are as follows:

Contact Ratings For Electrical (Snap-Action) Switches
21 amps 1 HP, 125, 250, 277 VAC
or 2 HP, 250, 277 VAC

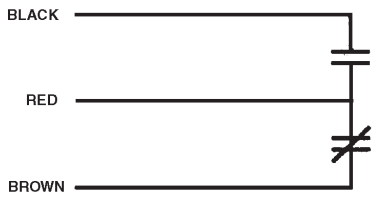


FIGURE 4-24
002903PC

The Alarm Initiating Switch (Part No. 550077) must be used to close a supervised circuit to the building main fire alarm panel when the control head actuates. This will signal the fire alarm panel that there was a system actuation in the kitchen area. This switch can be field installed in the control head. Refer to Instruction Sheet (Part No. 550081) included with the switch shipping assembly, for detailed mounting instructions. Wiring connections are shown in Figure 4-25. The switch is rated at 50mA, 28VDC.

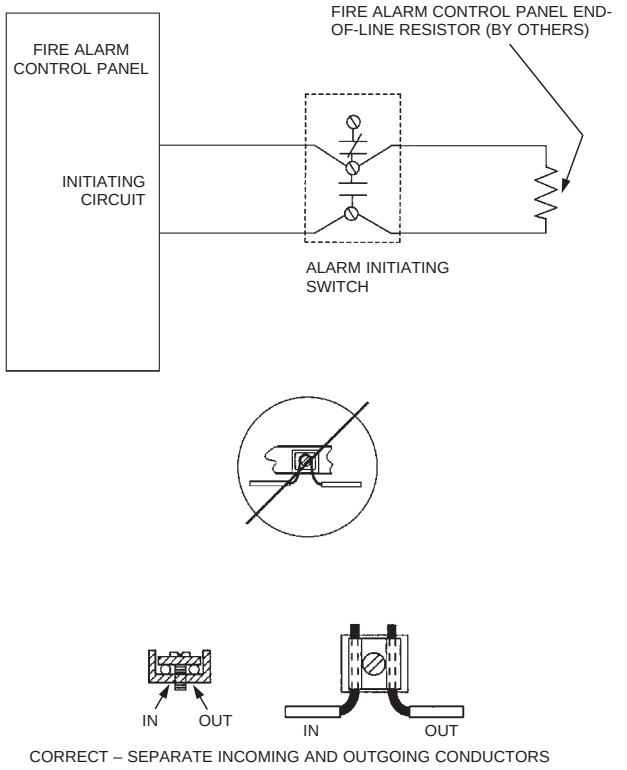


FIGURE 4-25
004891/004905

PIPE AND NOZZLE INSTALLATION

All pipe ends shall be thoroughly reamed after cutting and all oil and foreign matter removed from the pipe. The following procedures must be followed:

1. Use Schedule 40 black iron, chrome-plated, or stainless steel pipe and fittings. Do not use hot-dipped galvanized iron pipe or fittings in the agent distribution piping.
2. Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.
3. The distribution piping and fitting connections, located in the hood or the protected area, must be sealed with pipe tape. When applying pipe tape, start at the second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening.
4. Do not over-tighten, but be sure the pipe is snug. Do not back-off sections of pipe to make them fit better. If the pipe was cut too short, re-cut another pipe to the proper length.

CAUTION

Do not apply Teflon tape to cover or overlap the pipe opening, as the pipe and nozzles could become blocked and prevent the proper flow of agent.

Do not use thread sealant or pipe joint compound.

PIPE AND NOZZLE INSTALLATION (Continued)

All piping shall be securely fastened by means of pipe hangers and/or pipe straps. The spacing requirements for hangers/straps depend on the pipe size being utilized. Refer to the **Spacing Guidelines Chart** below.

Pipe Hanger Spacing Guidelines

Distribution Pipe Size	Maximum Spacing Distance Hanger to Hanger	
in.	ft	(m)
1/4	4	(1.2)
3/8	5	(1.5)
1/2	6	(1.8)
3/4	8	(2.4)

A union should be installed in the discharge piping, as close to the cylinder valve as possible, to permit disconnection and removal for inspection and service. Dry air or nitrogen should be blown through the discharge piping to remove chips and other debris prior to installation of nozzles.

Nozzles shall be installed in accordance with the limitations described in Section 3 – System Design. Blow-off caps are provided for each nozzle. These will prevent dirt and grease from clogging the nozzle.

INSTALLATION INSTRUCTIONS FOR CASTERED/ MOVEABLE EQUIPMENT USING PYRO-CHEM AGENT DISTRIBUTION HOSE

CAUTION

The following instructions must be followed in their entirety. Failure to do so may result in the KITCHEN KNIGHT II Fire Suppression System not functioning properly due to incorrect installation.

Critical Installation Requirements

1. Design and installation must be performed by qualified personnel.
2. The Agent Distribution Hose shall not be concealed within or run through any wall, floor, or partition, and shall not have any direct exposure to excessive heat or radiant flame from the cooking appliances.
3. Strong cleaning solutions or chemical substances must not come in contact with the Agent Distribution Hose. These may include acids, solvents, fluxes with zinc chloride, or other chlorinated chemicals. In case of contact, rinse down the Agent Distribution Hose with water and dry thoroughly.
4. Contact with foreign objects, sharp edges, wiring, or substances must be avoided.
5. Bending and flexing of Agent Distribution Hose on moveable appliances (e.g. those factory equipped with casters) should be limited to pulling and pushing the appliances in or out for cleaning or maintenance. The hose shall never be installed or bent tighter than a 3 in. (77 mm) radius (6 in. (152 mm) diameter) loop.
6. The Agent Distribution Hose must not be kinked, twisted, or have sharp bends when installed or when equipment is pulled away from the wall.
7. Make sure that all fittings are tightened properly.
8. Adequate means must be provided to limit the movement of castered appliances. A 36 in. (914 mm) long Restraining Cable supplied with the agent distribution hose is required to be used for all castered appliances using the Agent Distribution Hose. (Refer to Restraining Cable Installation Instructions.)
9. The Restraining Cable requires periodic maintenance to ensure proper operation.
10. The Restraining Cable must be attached to the wall and appliance anytime the distribution hose is connected to the appliance.
11. Do not over-extend the Agent Distribution Hose when moving equipment (for cleaning, maintenance, etc.).

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS

Before proceeding, **CAREFULLY** read all instructions, including all **CRITICAL INSTALLATION REQUIREMENTS.**

General Requirements

1. The Agent Distribution Hose (Part No. 434462) (which is part of Discharge Hose and Tether Kit (Part No. 435982)), is 1/2 in. (12.7 mm) diameter x 60 in. (1524 mm) long and is provided with two male NPT swivels for ease of installation.
2. Maximum of six Agent Distribution Hoses can be used in each agent distribution piping network on PCL-460 and PCL-600 systems and a maximum of three Agent Distribution Hoses can be used in each agent distribution piping network on PCL-160 and PCL-300 systems.
3. Agent Distribution Hose can only be used for castered appliances or appliances setting on castered supports.

Installation Requirements

1. Agent Distribution Hose must be connected to 3/8 in. NPT black iron, chrome-plated, or stainless steel fittings. The connection from hose to fitting requires a 1/2 in. x 3/8 in. reducing coupling. All Agent Distribution Hose connections must be sealed with pipe tape. When applying pipe tape, start at the second male thread on the swivel ends of the hose. Wrap the tape (two turns maximum) clockwise around the threads, away from the hose end fitting opening.
2. All connections of distribution piping to Agent Distribution Hose for castered appliances, with distribution nozzles installed/affixed to the appliance, must be located behind the cooking equipment in an area protected from obstructions and possible wear or damage.
3. 3/8 in. schedule 40 pipe will need to be run from the hose connection to the distribution nozzle(s) installed/affixed to the appliance. Pipe must be installed and adequately secured at a height at or below the cooking surface of the appliance. See Figure 4-31.

Installation Requirements (Continued)

4. All existing distribution pipe and fitting limitations must be observed and followed. Each flex distribution hose used is to be considered as 300 ml when calculating the milliliters per system.
5. All hose-to-pipe connection fittings are to be oriented in a vertical down position.
6. The hose connections must be positioned below an elevation where the hose could be exposed to the radiant or convected heat generated by normal cooking operations (such as the horizontal plane of appliance's cooking surface), or to heat from appliance exhaust. As a minimum height, the hose connection shall be no lower than 30 in. (762 mm) from the floor. The distribution piping shall be supported and secured per local plumbing practices.
7. Hose ends are to be offset 6-8 in. (152-203 mm) center to center of fittings (see Figure 4-26) to maximize hose life expectancy and facilitate appliance movement. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (76 mm) bend radius (6 in. (152 mm) diameter).

OVERHEAD VIEW

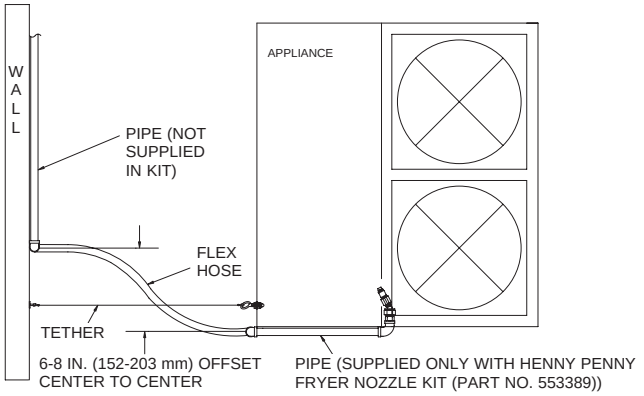


FIGURE 4-26
007828

Restraining Cable Installation

Important: A Restraining Cable shall always be permanently attached to the appliance and wall directly behind the appliance when the Agent Distribution Hose is installed. Removal of this cable shall only occur when the Agent Distribution Hose is not installed to the appliance.

See Figure 4-27 for mounting the Restraining Cable to the wall. See Figure 4-28 for mounting the Restraining Cable to the back of an appliance.

RESTRAINING CABLE – WALL-MOUNTED OPTION

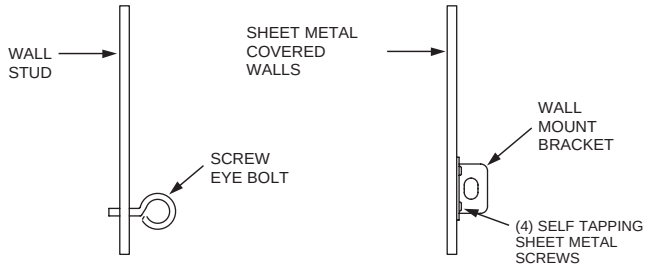


FIGURE 4-27
008088

RESTRAINING CABLE – APPLIANCE-MOUNTED OPTION

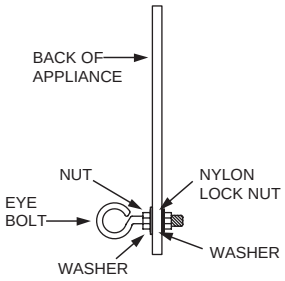


FIGURE 4-28
008089

RESTRAINING CABLE – HENNY PENNY-MOUNTED OPTION

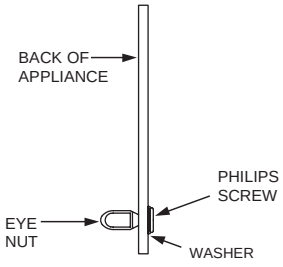


FIGURE 4-29
008090

1. The Restraining Cable must be connected from the appliance to the wall or some other structurally sound object capable of restraining the castered appliance from being able to be pulled or pushed out to a point that will result in strain or stress to the Agent Distribution Hose.
2. The Restraining Cable should be installed in line with the Agent Distribution Hose.

Restraining Cable Installation (Continued)

3. For sheet metal covered walls, the Restraining Cable Assembly includes four 3/4 in. x #8 self tapping sheet metal screws, and a Restraining Cable Bracket. Securely attach the Restraining Cable Bracket to the sheet metal covered wall using the 3/4 in. x #8 self tapping metal screws provided.
4. For mounting to wall studs, the Restraining Cable Assembly includes one screw eye lag bolt, 5/16 in. x 2.5 in. (64 mm) long.
5. Locate a structural area (frame) on the rear side of the equipment that is in line with the wall attachment. Note: It may be necessary to contact the appliance manufacturer for a suitable location. Drill a 5/16 in. (7.9 mm) diameter hole. Use caution when drilling hole, so that internal components are not damaged.
6. The Restraining Cable Assembly also includes a 5/16 in. threaded eye-bolt, 5/16 in. hex head nut, 5/16 in nylon lock nut, and two 5/16 in. flat washers. Thread the included hex nut onto the eye-bolt. Slide one washer onto the eye-bolt threads next to the nut. Then, slide the eye-bolt through the drilled hole and place a washer and nylon locknut onto the eye-bolt on the inside frame of the equipment. Tighten securely.
7. Attach one of the snap hooks (included in the Restraining Cable package) on the end of the Restraining Cable to the wall bracket and the other snap hook to the eye-bolt. See Figure 4-30. After snap-hooking the assembly, seal the Restraining Cable Loops to the wall bracketry and appliance connection hardware with Lead Wire Seal (Part No. 197).

   Note: For the Henny Penny Pressure Fryers that utilize the PYRO-CHEM Henny Penny Fryer Nozzle Kit (Part No. 553389) the 5/16 in. philips screw supplied in the Henny Penny Fryer Nozzle Kit, the 5/16 in. eye nut, and 5/16 in. washer included in the Restraining Cable Assembly Kit, must be used. See Figure 4-29.

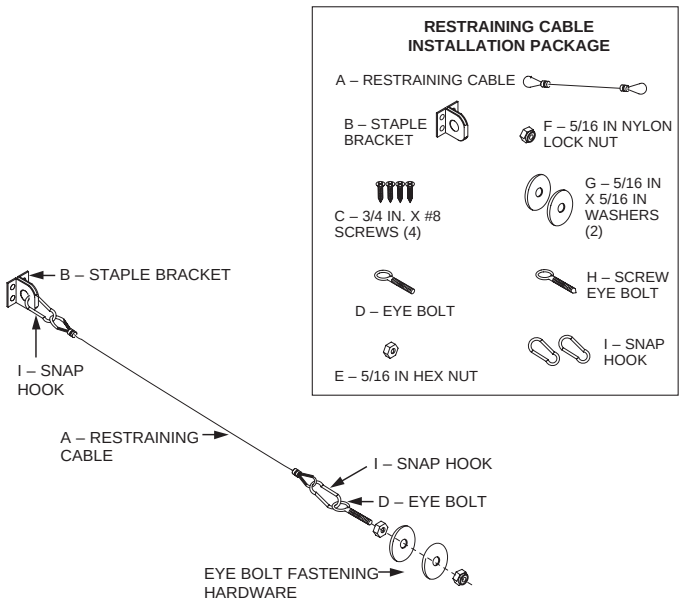


FIGURE 4-30
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Final Installation Guidelines and Checkout Procedures

After the Agent Distribution Hose and the Restraining Cable is properly installed, carefully push the appliance back to its normal operating position. Check that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance.

1. Verify the Restraining Cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the Agent Distribution Hose or hose-to-pipe connections.
2. Make certain there are no sharp bends and kinks in the hose when pulling out the cooking equipment.
3. The Agent Distribution Hose should always be in a vertical natural loop, never having any bends less than a 3 in. (77 mm) radius (6 in. (152 mm) diameter), hose twists, or sharp bends. See Figure 4-31. If any of these conditions exist, the hose and/or hose connections will require installation modifications.

SIDE VIEW

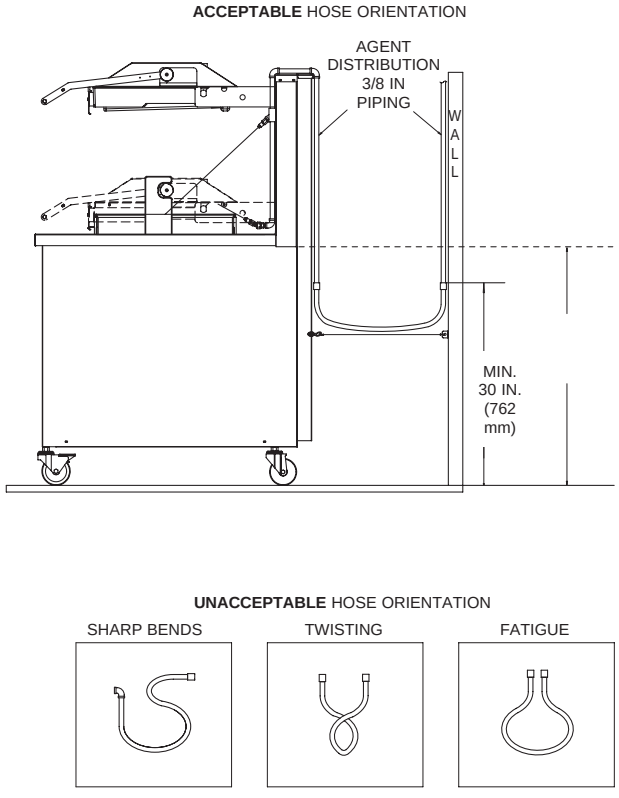

FIGURE 4-31
007830

4. Return the appliance to its normal operating position in accordance with NFPA 96. Means shall be provided to verify that the appliance returns to its original designed positioning. Failure to do so may result in undue stress and fatigue of the hose and hose connections.

Agent Distribution Hose/Restraining Cable Six Month Maintenance

1. Carefully pull or push out the appliance and verify that the Restraining Cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the Agent Distribution Hose or hose-to-pipe connections.
2. Check the Restraining Cable to verify it is not frayed and is securely fastened to the appliance and the wall or restraining location.
3. Check the hose and hose fittings and verify that the hose remains in a vertical natural loop with no noticeable fatigue at hose end couplings, no hose twists, no hose kinking or sharp bends. See Figure 4-31.
4. Check the outer hose covering for signs of damage, checking, tears, or wear. If any of these signs are observed, replace the hose.
5. Return the appliance to its normal operating position. Again, check the hose and hose fittings to verify that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance. If any of these conditions exist, the hose and/or hose connections will require installation modifications.
6. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (76 mm) bend radius (6 in. (152 mm) diameter). If less, replace hose.
7. Verify that the appliance is returned to its original desired location. Failure to do so may result in undue stress and fatigue of the hose and hose connections.
8. 12-Year Maintenance – Hydrostatic test required at 220 psi (15.2 bar) for hose assembly.

Note: Agent Distribution Hose patent pending.

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SYSTEM CHECKOUT AFTER INSTALLATION

1. Model MCH3/NMCH3 Mechanical Control Head

Before putting the system into service, all components must be checked for proper operation. During this checkout, assure that the carbon dioxide pilot cartridge is not installed in the control head actuator. Remove the pull pin from the hole in the slide plate.

To check satisfactory operation of the control head, cut the terminal link or the "S" hook holding the link. This will relieve all tension on the fusible link line and operate the control head. The slide plate will move fully to the right. The gas valve cable will be released, causing the gas valve to close. Any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the electrical (snap-action) switch in the control head will operate.

If any of these events fail to occur, the problem must be investigated and repaired.

Repair the terminal link and put the fusible link line back into the set position. This is accomplished by using a 1/2 in. hex wrench on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box.

► **Note:** Tension must be set on fusible link detection line before
► control head can be set.

Once the fusible link line is set (refer to Pages 4-4 through 4-6 for fusible link installation details), the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position.

Once the control head is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control head operates normally, the control head can be reset as described above. Insert the pull pin into the hole in the slide plate above the latching arm. Replace the pull station handle, pull pin, and nylon tie.

Ensure that the gas valve is fully open by ratcheting the gas valve ratchet wheel.

CAUTION

Before screwing the 16 gram carbon dioxide pilot cartridge into the actuator, ensure that the actuator has an o-ring washer installed.

Using a felt-tipped marker, write the date of installation on the carbon dioxide pilot cartridge. Screw the cartridge into the control head actuator until hand-tight. Never use a wrench to tighten the cartridge into the actuator.

Remove the pull pin from the hole in the slide plate and install the control head cover. Insert the pull pin through the local manual control handle and into the bushing. Secure the pull pin with the nylon tie provided.

2. Model ECH3-24/120 Electrical Control Head

Before putting the system into service, all components must be checked for proper operation. During this checkout, ensure that the CO_2 pilot cartridge is not installed in the control head actuator. Remove the pull pin from the hole in the slide plate.

CAUTION

Make certain to remove the CO_2 cartridge. Failure to do so during testing will result in system actuation.

Testing Thermal Detectors

1. Remove the electric control head cover.
2. Test each detector individually and reset control panel and recock release mechanism after each test. (Refer to proper AUTOPULSE control panel reset instructions).
3. Using a heat gun positioned approximately 12 in. (305 mm) from the detector, apply heat to the detector for about one minute. Overheating will cause damage to the detector. Applying heat to the detector will cause the control head to operate or will cause the AUTOPULSE control panel to go into an alarm condition, and activate the control head. When the control head operates, the following will take place: a) The slide plate will move fully to the right; b) The indicator light on the solenoid monitor will go out; and c) Any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the snap-action switch in the control head will operate. If any of these events fail to occur, the problem must be investigated and repaired.
4. After all the thermal detectors have cooled, the AUTOPULSE control panel can be reset (refer to proper AUTOPULSE control panel reset instructions) and the control head can be placed in the set position. To set the control head, the slide plate must be moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position.

Testing Remote Pull Station

1. Once the control head is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control head operates normally, the control head can be reset as described in Step 4 in the "Testing Thermal Detectors" section on this page.
2. Insert the pull pin into the hole in the slide plate above the latching arm.
3. Replace the pull station handle, pull pin, and break rod.

SYSTEM CHECKOUT AFTER INSTALLATION (Continued)

Completing System Checkout

1. Make certain the AUTOPULSE control panel is reset and the control head is re-cocked and set. If the Model SM-120 Solenoid Monitor is used instead of an AUTOPULSE control panel, energize the actuation/detection circuit by depressing the push button on the solenoid monitor.
2. Using a felt-tipped marker, write the date of installation on the CO_2 pilot cartridge. Ensure that the actuator has an o-ring installed, and screw the cartridge into the control head actuator until hand tight. Continue installation of cartridge by turning an additional 1/4 turn using a wrench or pliers. **Use caution not to damage cartridge.**

   Note 1: Four to five threads should be showing when the cartridge in engaged properly. It is important that no more than five threads be showing.

   Note 2: The cartridge and o-ring shall be replaced annually.

CAUTION

Do not over-tighten cartridge. Over-tightening can result in premature puncturing of the cartridge seal.

3. Remove the pull pin from the hole in the slide plate and install the control head cover. Insert the pull pin through the local manual control handle and into the bushing. Secure the pull pin with the tie provided.

NOTICE

Refer to NFPA-17A for additional inspection requirements.

ENCLOSURE INSTALLATION INSTRUCTIONS – MODEL EN-MCU3 AND MODEL EN-S

Enclosure Mounting

The Model EN-MCU3 and/or EN-S Enclosure must be securely anchored to the wall using bolts or lag screws. The wall to which the enclosure is attached must be sufficiently strong. The enclosure should never be fastened to drywall or similar material. If this type of wall is encountered, studs must be located and the enclosure fastened to them.

Three center mounting holes allow either enclosure to be mounted on a single stud. Four corner mounting holes are also available. See Figure 4-32.

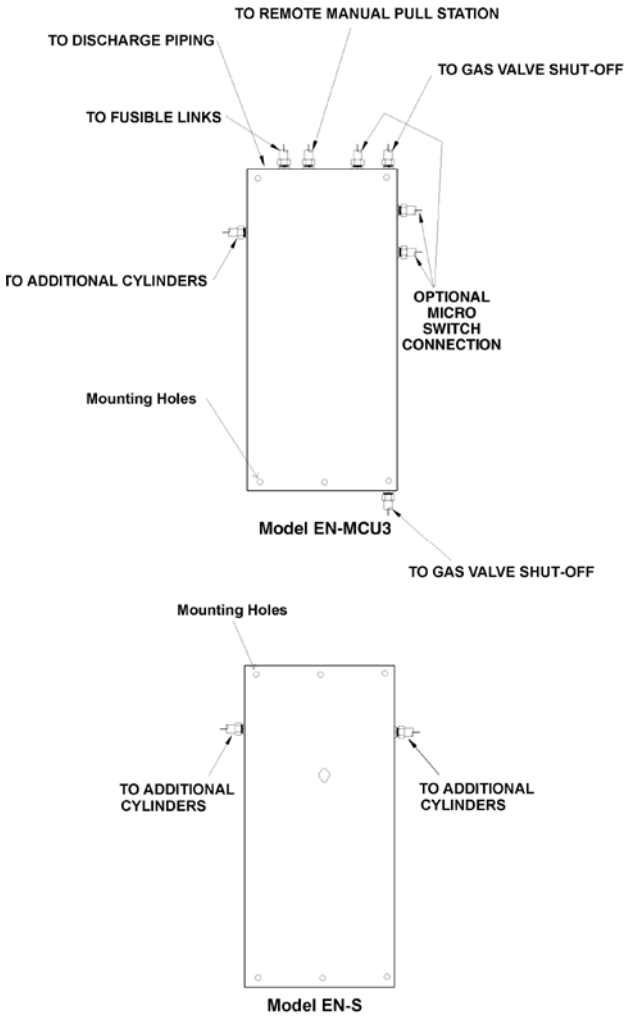

FIGURE 4-32
002946PC

Fusible Link Detector Installation

The Model EN-MCU3 Enclosure can support a fusible link detection system. The Model EN-S Enclosure cannot support a fusible link detection system and must be used in conjunction with the Model EN-MCU3 Enclosure or a Model MCH3/ECH3/NMCH3 Control Head.

After mounting the enclosure, the fusible link line can be installed. The first step to installing the fusible link line is to install the detector brackets. These brackets must be installed in the plenum area of the ventilation hood over all protected appliances and in each duct. See Section 3 – System Design for detector placement guidelines. Connect the fusible link brackets together using 1/2 in. EMT conduit and the conduit connectors supplied in the detector kit (Model FLK-1/1A). PYRO-CHEM KITCHEN KNIGHT II corner pulleys must be used whenever a change in conduit direction is necessary. The conduit is connected to the enclosure through a top knockout.

See "Fusible Link Detector Installation" section (Pages 4-4 – 4-7) for fusible link installation guidelines. Before attaching the stainless steel cable to the fusible link line ratchet wheel, it must be run below the fusible link line pulley in the enclosure. See Figure 4-33.

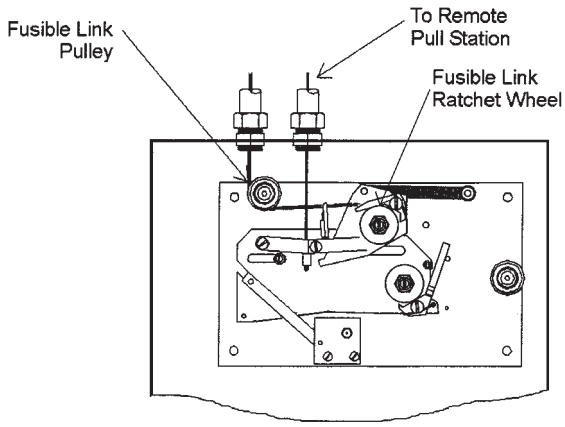

FIGURE 4-33
002947PC

Setting the Model EN-MCU3

After the last link in the series is connected, the cable should be fed through the conduit back to the Model EN-MCU3. It must be fed under the fusible link line pulley and through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the ratchet wheel.

NOTICE

Crimps must always be used in conjunction with two cable lengths. Loops are the accepted method of connecting the cable to mechanical components. **The crimp must never be used on a single cable.** Exception: Single cable crimp allowed in detection and gas valve ratchet wheel using Stop Sleeve (Part No. 26317) (Packages of 10: Part No. 24919).

The fusible link line can now be put into a set position by tensioning the fusible link line. This is accomplished by using a 1/2 in. hex wrench on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate is parallel to the top of the enclosure. The fusible link line is now in a set position.

▸ **Note:** Tension must be set on fusible link detection line before
▸ control head can be set.

Once the fusible link line is set, the Model EN-MCU3 Enclosure can be placed in the set position. To set the Model EN-MCU3, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin into the hole in the slide plate above the latching arm. This will lock the control mechanism in the set position, eliminating accidental actuation during the rest of the installation procedure. See Figure 4-33.

Remote Pull Station Installation

The Model RPS-M Remote Mechanical Pull Station is used for remote manual actuation of the Model EN-MCU3 It is to be located near an exit in the path of egress from the hazard. Height and location of pull station should be determined in accordance with the Authority Having Jurisdiction.

The Pull Station is connected to the Model EN-MCU3 using 1/16 in. (1.6 mm) diameter stainless steel cable. The cable enters the Model EN-MCU3 through a knockout in the top of the enclosure. See Figure 4-33.

See "Remote Pull Station Installation" section (Pages 4-8 – 4-9) for remote pull station installation guidelines.

Gas Shut-off Valve Installation

The Model EN-MCU3 can be used to operate a mechanical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. The gas shut-off valve is spring loaded and requires five pounds of force to hold it open. This force is supplied by a 1/16 in. diameter (1.6 mm) stainless steel cable that is connected to the Model EN-MCU3.

See "Gas Shut-off Valve Installation" section (Page 4-11 – 4-12) for gas valve shut-off installation guidelines.

After the valve is installed in the gas line, 1/2 in. conduit must be run from the top center knockout of the gas valve box to the top or bottom knockout in the enclosure. See Figure 4-32. A PYRO-CHEM KITCHEN KNIGHT II corner pulley is used wherever a change in conduit direction is required.

Remove the gas valve cover and thread the stainless steel cable through the conduit back to the Model EN-MCU3. If the cable enters the enclosure through the bottom knockout, the cable must be run over the gas valve line pulley (see Figure 4-34). If the cable enters the enclosure through the top knockout, the cable must be run under the gas valve line pulley (see Figure 4-35). Thread the cable through the hole in the gas valve ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

Gas Shut-off Valve Installation (Continued)

CAUTION

The gas valve cable must always utilize the gas valve pulley and exit the **top** or **bottom** of the enclosure. **The gas valve cable cannot exit the side of the enclosure.**

At the gas valve, loop the cable through the valve stem and secure it with the crimp provided (see Figure 4-19).

The gas valve line can now be put into a set position by applying tension to the gas valve line. This is accomplished by using a 1/2 in. hex wrench on the gas valve ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the gas valve is fully open. Secure the gas valve cover plate to the gas valve box with the four screws provided. The gas valve line is now in a set position. See Figure 4-34 and/or Figure 4-35.

CAUTION

Do not over-tension wire rope going from control head to gas valve at gas valve ratchet wheel. Over-tensioning may cause the valve to not close properly, resulting in the fuel supply not completely shutting off.

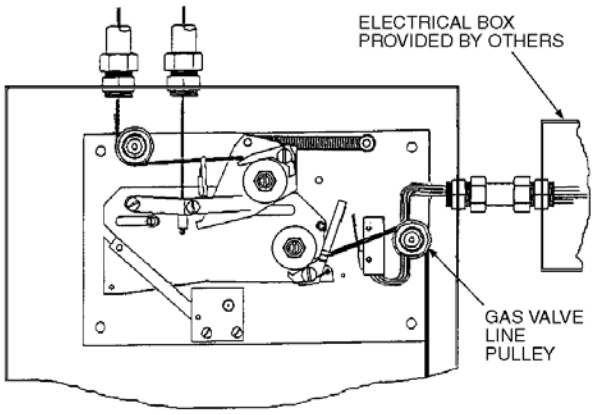

FIGURE 4-34
002948PC

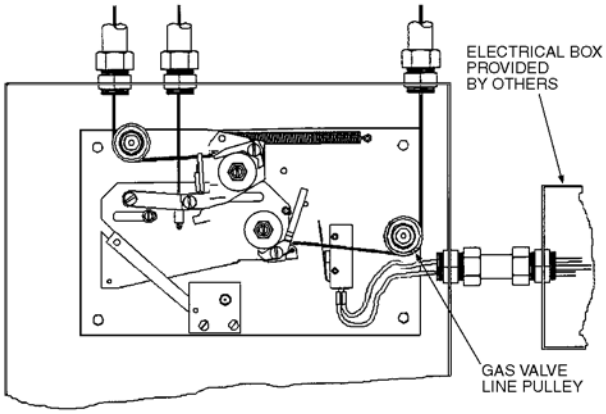

FIGURE 4-35
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Electrical (Snap-Action) Switch Installation

See NFPA 72, "National Fire Alarm Code," Initiating Devices section, for the correct method of wiring connection to the fire alarm panel.

The Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT Electrical (Snap-Action) Switch is available for use where an electrical output is required. These switches can be field installed in the Model EN-MCU3. See Figure 4-34 and/or Figure 4-35.

These switches may be used to provide an electrical signal to the main breaker and/or operate electrical accessories provided the rating of the switch is not exceeded. Wiring connections for the Model MS-SPDT are shown in Figure 4-24. The contact ratings for both switches are as follows:

Contact Ratings For Electrical (Snap-Action) Switches:
21 amps
1 HP, 125, 250, 277 VAC or 2 HP, 250, 277 VAC

Three knockouts are provided for electrical (snap-action) switch wiring. The upper right-side knockout must be used when the gas valve line exits the bottom of the enclosure (see Figure 4-34). The lower right-side knockout must be used when the gas valve line exits the top of the enclosure (see Figure 4-35). An additional knockout located on the top of the enclosure is also provided (see Figure 4-32) and may be used in either situation.

NOTICE

No electrical connections shall be made inside the control head. All electrical wiring shall exit the control head through the knockout on the side of the box. All electrical connections must be made in an approved electrical box.

Cylinder Installation

1. Single Cylinder Installation – PCL-300/460

The Model EN-MCU3 can be used for single cylinder installations. It can support either the Model PCL-300 or PCL-460 cylinder assemblies. The cylinder must be placed in the enclosure with the discharge port to the left. **No additional mounting bracket is required when the Model EN-MCU3 is used.**

In order to actuate the agent cylinder from the Model EN-MCU3s control mechanism, pneumatic tubing must be used to connect the actuator to the valve cap assembly of the agent cylinder valve. A 1/8 in. NPT x 1/4 in., 45° flare type elbow is included and must be installed in the actuator of the Model EN-MCU3 Enclosure. See Figure 4-36.

NOTICE

Pneumatic tubing (copper) used for cylinder actuation shall have an outside diameter of 1/4 in. (6.4 mm) with a minimum wall thickness of 1/32 in. (0.8 mm). This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4 in., 45° flare type conforming to SAE J513c. **Compression type fittings are not acceptable.**

Cylinder Installation (Continued)

2. Multiple Cylinder Installation – PCL-300/460

The Model EN-S can be used in conjunction with the Model EN-MCU3 Enclosure or Model MCH3/ECH3 Control Head for multiple cylinder installations. A single Model EN-MCU3 can be used to pneumatically actuate a maximum of five agent cylinders with the 16 gram CO_2 cartridge. One agent cylinder can be installed in the Model EN-MCU3 Enclosure; the additional agent cylinder(s) can either be mounted in a Model EN-S Enclosure or with a Model MB-15 Mounting Bracket. When an enclosure is used, the cylinders must be placed in the enclosure(s) with the discharge port to the left. **No additional mounting bracket is required when a cylinder is installed in the Model EN-MCU3 or EN-S Enclosure.**

In order to actuate the agent cylinders from the Model EN-MCU3, pneumatic tubing must be used to connect the EN-MCU3 actuator to the valve cap assembly of each agent cylinder valve. Pneumatic tubing or stainless steel actuation hose must be run from the actuator in the Model EN-MCU3 to the Model EN-S(s) through the side knockouts. A 1/4 in., 45° flare x 1/4 in., 45° flare x 1/8 in. NPT tee is included with the Model EN-S and must be installed in the Model EN-MCU3 actuator. See Figure 4-37.

NOTICE

Pneumatic tubing (copper) used for remote cylinder actuation shall have an outside diameter of 1/4 in. (6.4 mm) with a minimum wall thickness of 1/32 in. (0.8 mm). This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4 in., 45° flare type conforming to SAE J513c. **Compression type fittings are not acceptable.**

A single Model EN-MCU3 can actuate up to four cylinders with 25 ft (7.6 m) of pneumatic tubing or stainless steel actuation hose or a maximum of five cylinders with up to 18 ft (5.4 m) of pneumatic tubing or stainless steel actuation hose.

System Checkout After Installation

Before putting the system into service, all components must be checked for proper operation. During this checkout, ensure that the carbon dioxide pilot cartridge is not installed in the Model EN-MCU3 actuator. Remove the pull pin from the hole in the slide plate.

To check satisfactory operation of the control mechanism, cut the terminal link or the “S” hook holding the link. This will relieve all tension on the fusible link line and operate the control mechanism. The slide plate will move fully to the right. The gas valve cable will be released, causing the gas valve to close. Any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the electrical (snap-action) switch in the Model EN-MCU3 will operate.

If any of these events fail to occur, the problem must be investigated and repaired.

Repair the terminal link and put the fusible link line back into the set position. This is accomplished by using a 1/2 in. hex wrench on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate is parallel to the top of the enclosure.

▸ **Note:** Tension must be set on fusible link detection line before ▸ control head can be set.

Once the fusible link line is set, the control mechanism can be placed in the set position. To set the control mechanism, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Once the control mechanism is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control mechanism operates normally, the control mechanism can be reset as described above. Insert the pull pin into the hole in the slide plate above the latching arm. Replace the pull station handle, pull pin, and nylon tie.

To test the thermal detectors, use a heat gun. Hold the gun approximately 12 in. (305 mm) from the detector for about one minute. Do not overheat. Overheating can cause damage to detector. Allow detector to cool after testing.

Assure that the gas valve is fully open by ratcheting the gas valve ratchet wheel. Do not overtighten.

CAUTION

Before screwing the 16 gram carbon dioxide pilot cartridge into the actuator, ensure that the actuator has an o-ring washer installed.

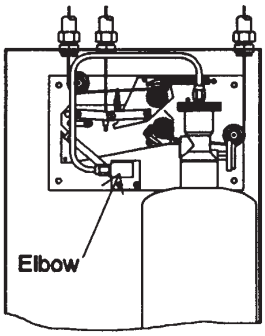


FIGURE 4-36

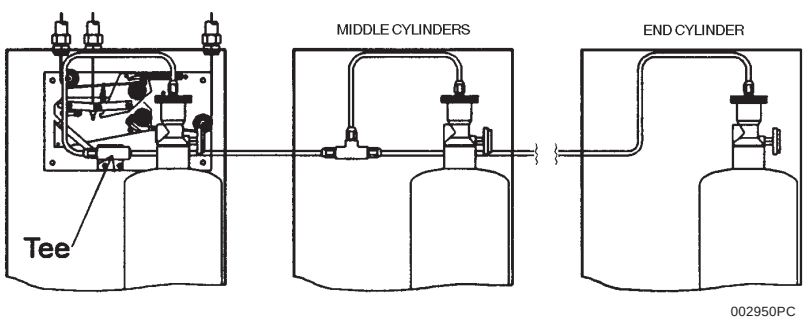


FIGURE 4-37

System Checkout After Installation (Continued)

Using a felt-tipped marker, write the date of installation on the carbon dioxide pilot cartridge. Screw the cartridge into the Model EN-MCU3 actuator until hand-tight.

Install cartridge per the following:

a. It is recommended that the cartridges first be fully hand tightened and then further tightened 1/4 to 3/4 turn using a needle-nose Vise-Grips. **Note: Use caution not to damage cartridge with Vise-Grips.**

Note 1: Four to five threads should be showing when the cartridge is engaged properly. It is important that no more than five threads be showing.

Note 2: The cartridge and o-ring shall be replaced annually.

CAUTION

Do not over-tighten cartridge. Over-tightening can result in premature puncturing of the cartridge seal.

Remove the pull pin from the hole in the slide plate. Secure the Model EN-MCU3 or EN-S cover with the screws provided.

FLEXIBLE CONDUIT INSTALLATION

Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under, and around obstacles.

Flexible conduit is designed for use with PYRO-CHEM® restaurant systems. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

NOTICE

Flexible conduit CANNOT be used in detection systems. Flexible conduit is intended for indoor use only.

Design Requirements

- Prior to starting the flexible conduit installation, the detection system must be complete and attached to the control head.
- Flexible conduit **cannot** be utilized in detection systems.
- Flexible Conduit Inserts (Part No. 434347) can ONLY be used with the flexible conduit system.
- The maximum distance from a PYRO-CHEM control head to a mechanical pull station is 140 ft (42.6 m) with a maximum of 360° (for example, 3-90° and 2-45° bends, 2-90° and 4-45° bends, etc.) bends in the flexible conduit, one pulley tee (refer to Design, Installation Manual for detailed splicing instructions), two splices, and 15 pulley tees. **Note:** When installing flexible conduit, make sure to feed wire rope through conduit directly from the spool of wire rope. DO NOT pre-cut wire rope. Feeding pre-cut rope through flexible conduit will cause excessive kinks in the rope, making it difficult to install.
- The maximum distance from a PYRO-CHEM control head to a mechanical gas valve is 75 ft (22.8 m) with a maximum of 4-90° bends in the flexible conduit and four pulley elbows.
- Any portion of the flexible conduit system can be substituted with EMT conduit provided the proper connections are used to join the two types of conduit.
- All bends in the flexible conduit system must have a minimum bend diameter of 6 in. (153 mm).
- When the flexible conduit is used to make 90° bends between a control head and a mechanical gas valve, the bends must start at the control head. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When the flexible conduit is used to make 90° bends between a control head and a pull station, the bends must start at the control head. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- Only PYRO-CHEM pull stations utilizing a composite (black) bushing on the back side of the pull station cover can be used with flexible conduit.
- When not utilizing a Conduit Offset (Part No. 436063) 2-45° bends in the flexible conduit are allowed between the strain relief on top of the control head and the location where the flexible conduit is supported. **Note: This is allowed on pull station installations only.**
- When installing flexible conduit, conduit should be secured at intervals not to exceed 5 ft (1.5 m) and before and after each bend. Flexible conduit CANNOT slide in the clamp(s) used for mounting. Make certain mounting clamp(s) do not pinch the flexible conduit. The following style clamp ('P' clip) (Part No. 436150) is a suitable type for use on flexible conduit.

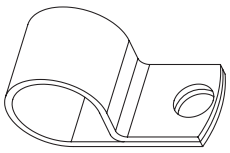


FIGURE 4-38
008141

TABLE 4-1

	Manual Pull	Mechanical Gas Valve	Detection
90° Cable Bends	4	4	N/A
Bend Diameter – in. (mm)	6 (152)	6 (152)	N/A
Mechanical Corner Pulley	15	4	N/A
Conduit Secured Max. ft (m)	5 (1.5)	5 (1.5)	N/A
Conduit Max. Length ft (m)	140 (42.6)	75 (22.8)	N/A
Conduit Offset or 2-45° Bends (Only between the strain relief fitting and support location)	1	0	N/A
Pulley Tees	1	0	N/A
Splices	2	0	N/A

FLEXIBLE CONDUIT INSTALLATION (Continued)

Installation Instructions

Note: Do not add any type of lubricants inside or on the flexible conduit. Make certain stainless steel wire rope is clean and debris-free.

The flexible conduit should be routed along the same path that EMT conduit would normally be run. Stainless steel wire rope should be routed through the flexible conduit as it is in EMT conduit.

CAUTION

Flexible conduit must not be located within 6 in. (152 mm) of the hood or in areas exceeding 130 °F (54 °C). Also, do not route flexible conduit in areas where conduit can be crushed, pinched, or broken.

Flexible conduit can be used to connect a PYRO-CHEM control head to a remote pull station or mechanical gas valves.

Before starting the system installation, take a few minutes to plan the layout of the system. This will minimize the amount of components needed to complete the installation. Once the path of the flexible conduit has been determined, verify that the layout does not exceed the design requirements.

Connecting the Flexible Conduit to the PYRO-CHEM Control Head, Electrical Box, Pull Station, or Mechanical Gas Valve

1. Layout the flexible conduit and secure it in place. **Note:** If inner liner is crimped, turn a drywall screw into the end to open it. See Figure 4-39.

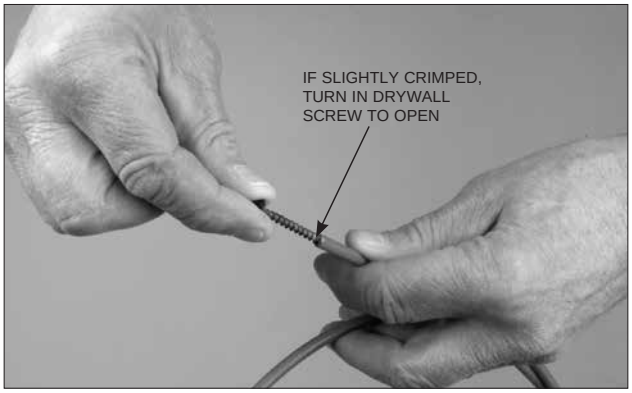


FIGURE 4-39
007985

2. Starting at the PYRO-CHEM control head, connect the conduit connector using the supplied nut. Use only PYRO-CHEM Conduit Fittings (Part No. 55813). See Figure 4-40.

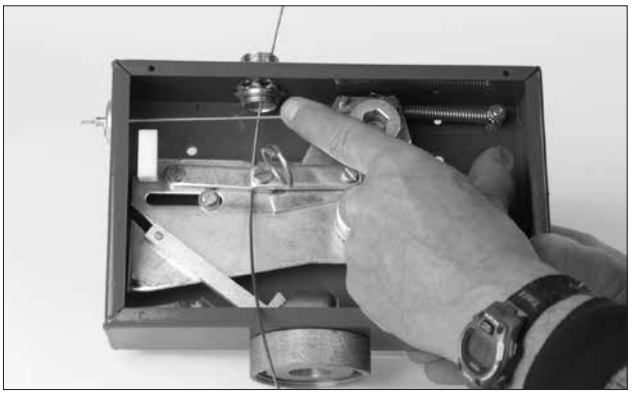


FIGURE 4-40
008068

3. Unscrew the nut from the EMT conduit connector and remove the compression ring. Discard ring. See Figure 4-41.

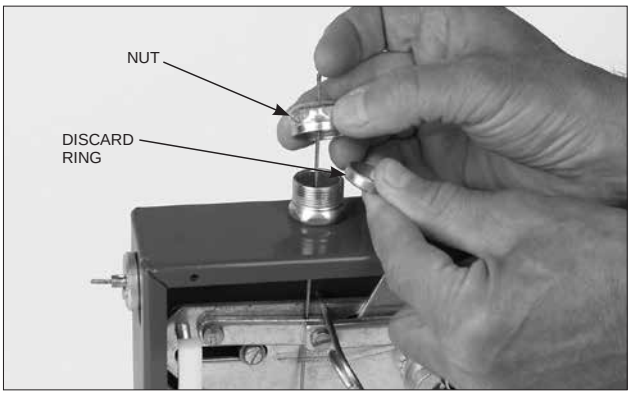


FIGURE 4-41
008070

4. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 4-42.

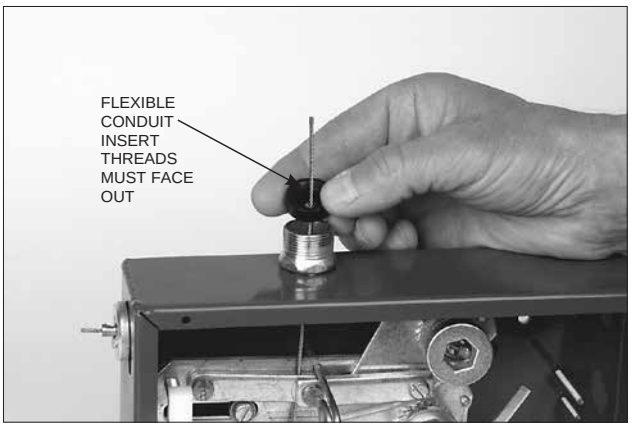


FIGURE 4-42
008071

Connecting the Flexible Conduit to the PYRO-CHEM Control Head, Electrical Box, Pull Station, or Mechanical Gas Valve (Continued)

5. Tighten the nut to the connector body, locking the flexible conduit insert in place. See Figure 4-43.

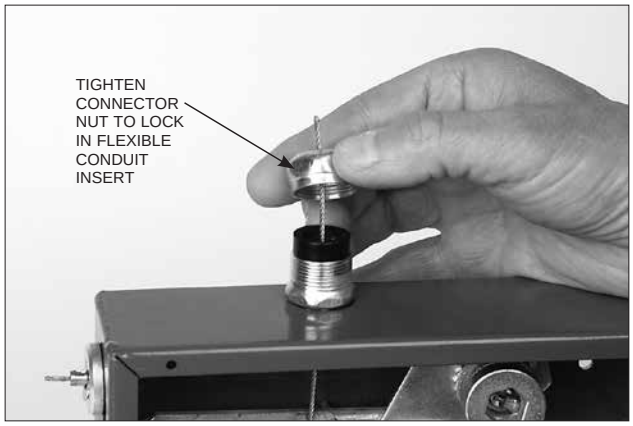


FIGURE 4-43
008072

6. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 4-44.

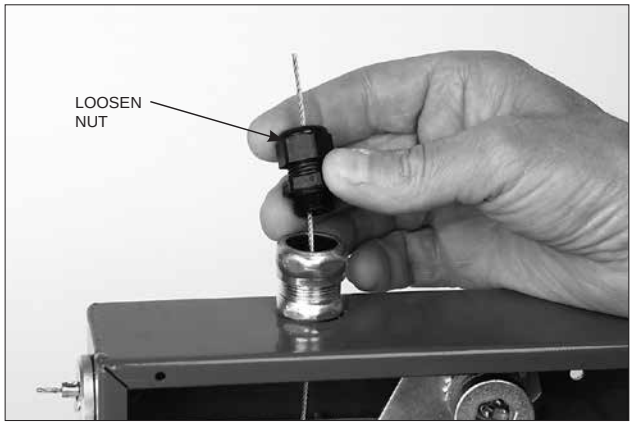


FIGURE 4-44
008073

7. Tighten the body of the strain relief to the conduit connector. See Figure 4-45.

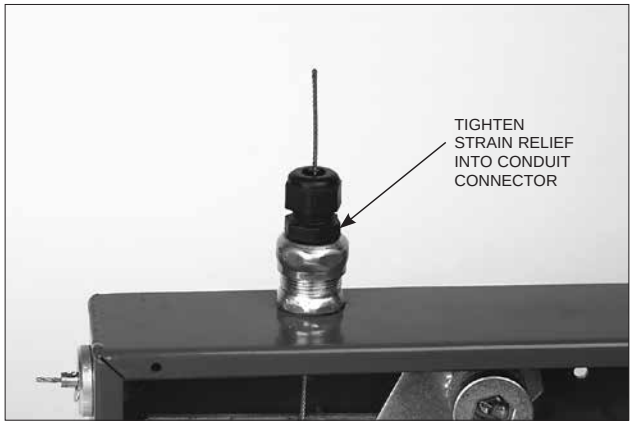


FIGURE 4-45
008074

8. Thread the wire rope through the flexible conduit. See Figure 4-46. (If a splice is required in the flexible conduit, proceed to “Splicing Installation Instructions.”)

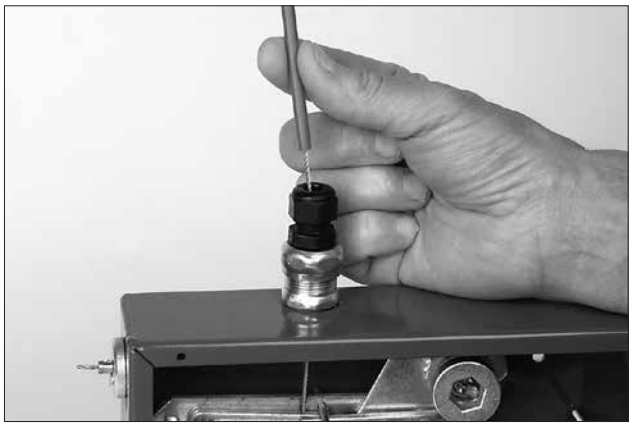


FIGURE 4-46
008075

9. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 4-47.

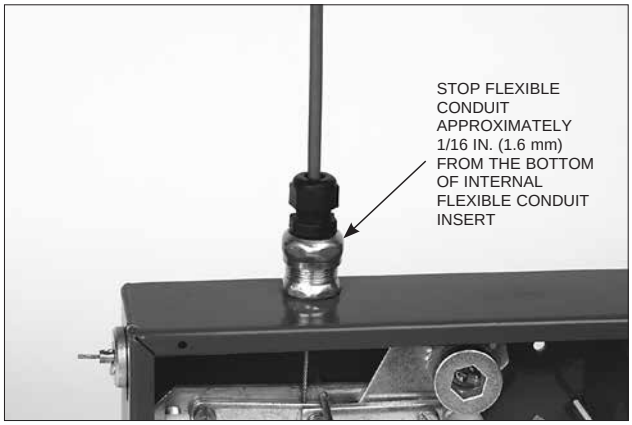


FIGURE 4-47
008076

10. Tighten the strain relief nut onto the strain relief. See Figure 4-48.

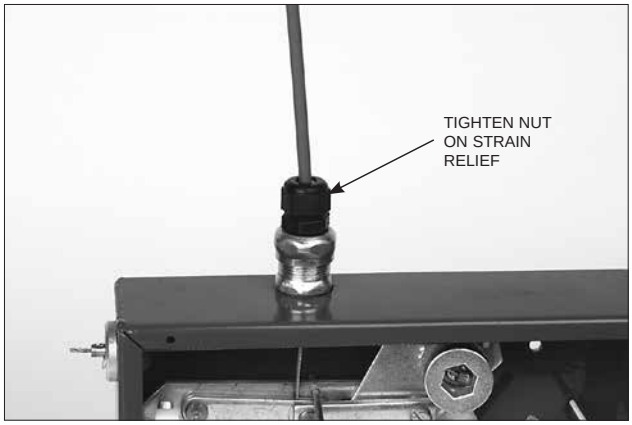


FIGURE 4-48
008077

Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings

1. Unscrew the nut from pulley elbow, pulley tee, or EMT conduit connector and remove the compression ring. Discard ring. See Figure 4-49.

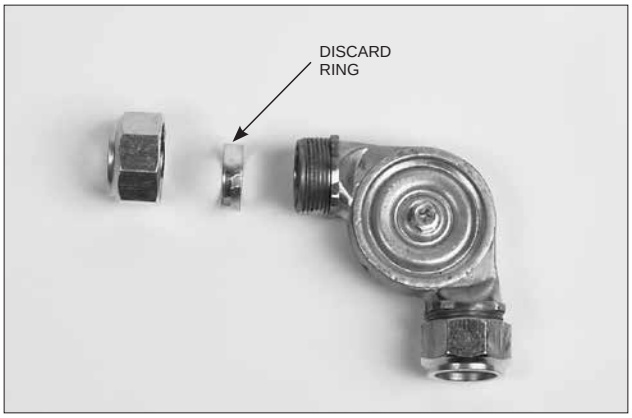


FIGURE 4-49
007995

2. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 4-50.

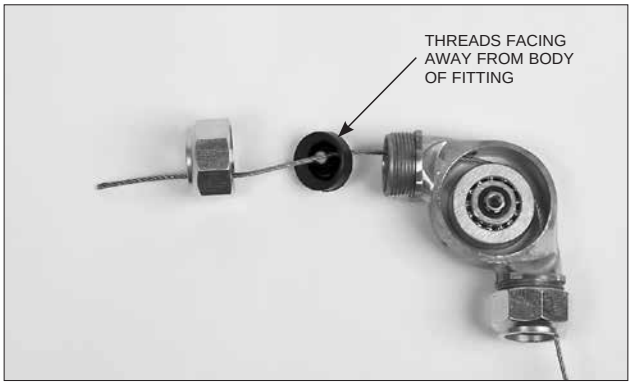


FIGURE 4-50
007996

3. Tighten the nut to the connector conduit body, locking the flexible conduit insert in place. See Figure 4-51.

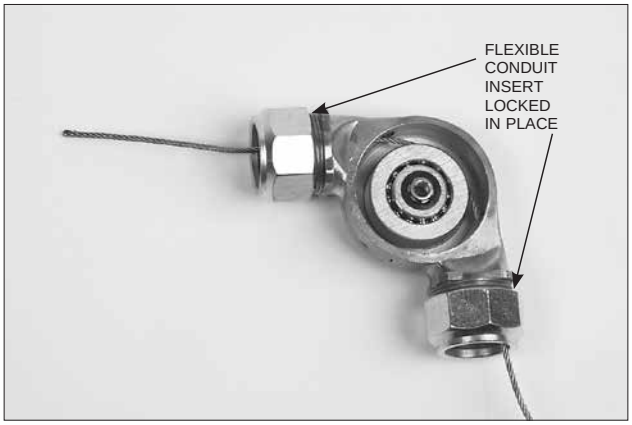


FIGURE 4-51
007997

4. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 4-52.

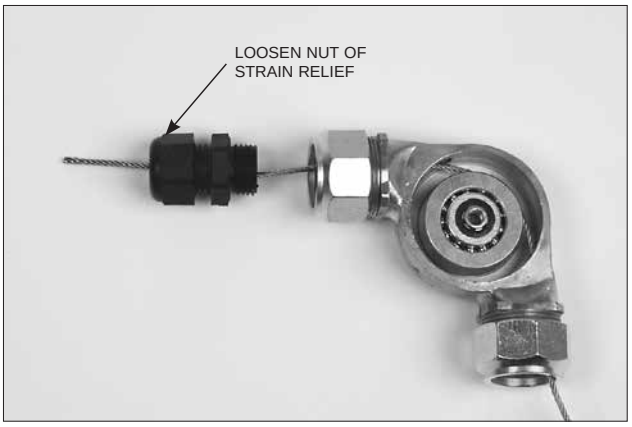


FIGURE 4-52
007998

5. Tighten the body of the strain relief to the conduit connector. See Figure 4-53.

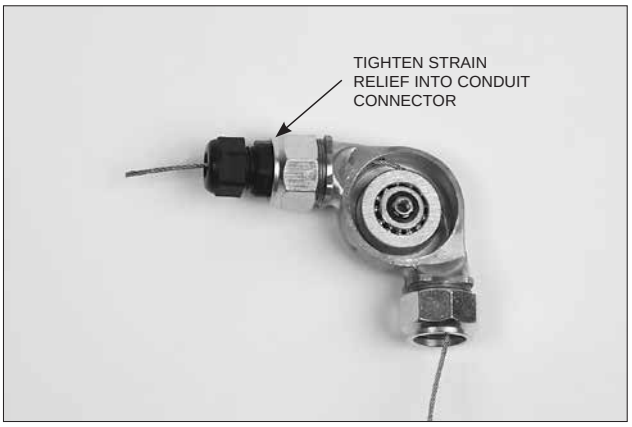


FIGURE 4-53
007999

6. Push the wire rope into the flexible conduit. See Figure 4-54.

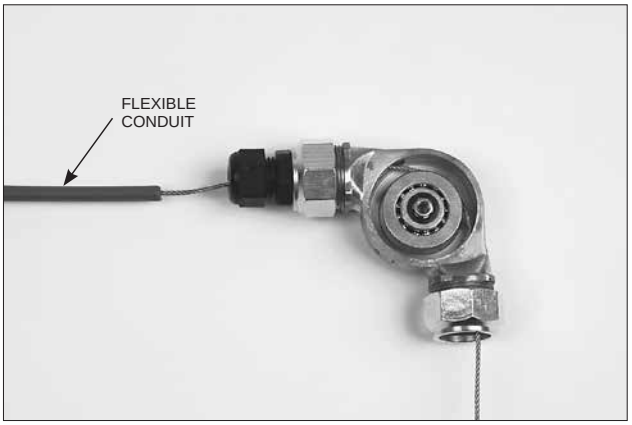


FIGURE 4-54
008000

Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings (Continued)

7. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 4-55.

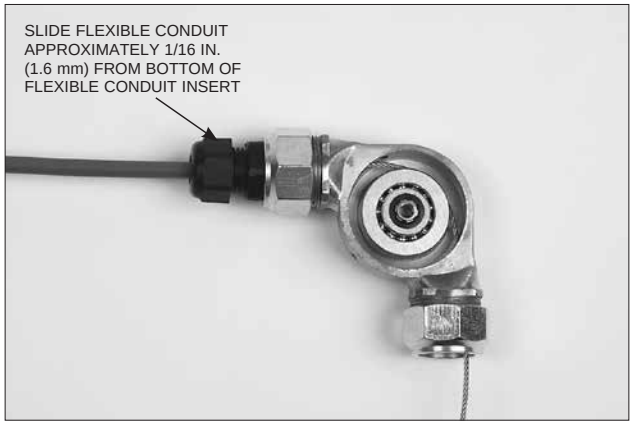


FIGURE 4-55
008001

8. Tighten the strain relief nut onto the strain relief. See Figure 4-56.

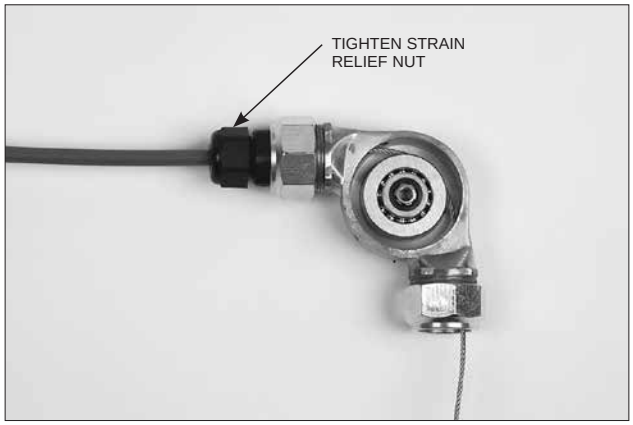


FIGURE 4-56
008002

9. Complete the same procedures on the other end of the conduit fitting as described in Step 1 through Step 8 above.

Installing Flexible Conduit Through a Conduit Offset

1. Starting at the PYRO-CHEM control head, connect the conduit connector using the supplied nut. Use only PYRO-CHEM Conduit Fittings (Part No. 55813). See Figure 4-57.

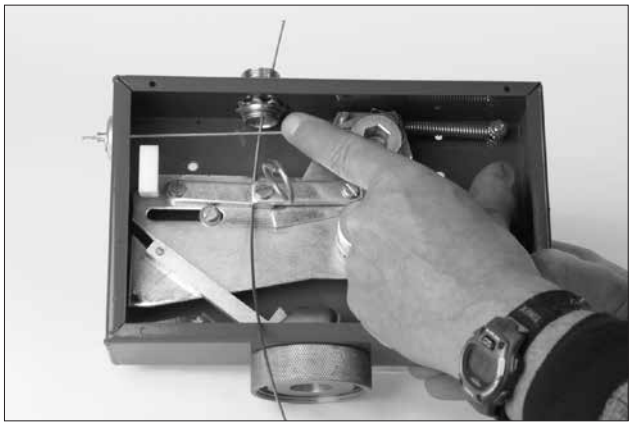


FIGURE 4-57
008068

2. Install Conduit Offset (Part No. 79825) into conduit connector and tighten nut. See Figure 4-58.

FIGURE 4-58
008069

3. Install compression union to opposite end of conduit offset. Tighten securely. See Figure 4-59.

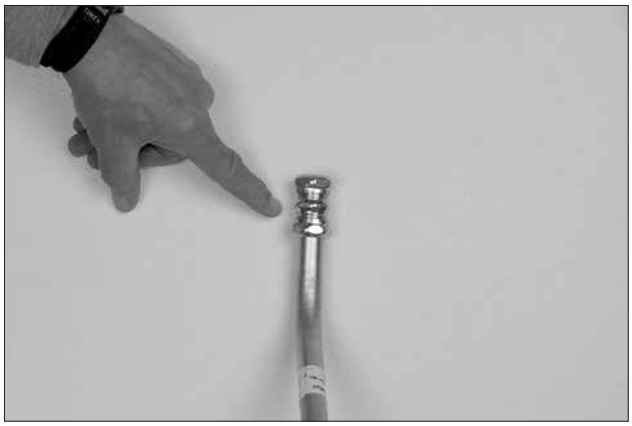


FIGURE 4-59
008040

Installing Flexible Conduit Through a Conduit Offset (Continued)

4. Install the conduit required to get above the ceiling. See Figure 4-60.

FIGURE 4-60
008041

5. Install compression union to top of conduit riser. See Figure 4-61.

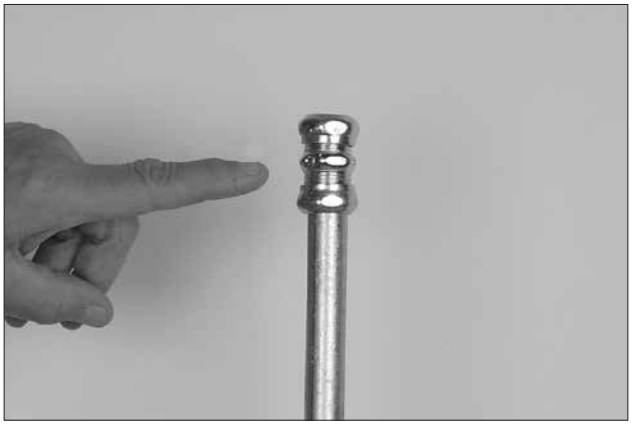


FIGURE 4-61
008042

6. Remove union nut and ring. Discard ring. Do not reinstall nut at this time. See Figure 4-62.

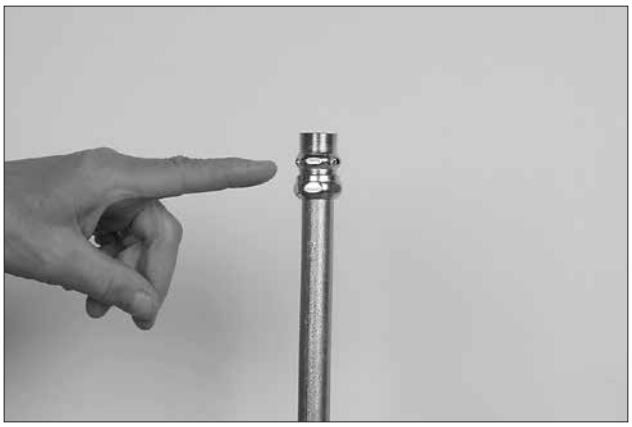


FIGURE 4-62
008043

7. Remove strain relief nut and install strain relief body into compression union. See Figure 4-63.

FIGURE 4-63
008044

8. Install union nut over strain relief body and tighten nut. See Figure 4-64.

FIGURE 4-64
008045

9. Install strain relief nut onto strain relief body. Do not tighten nut at this time. See Figure 4-65.

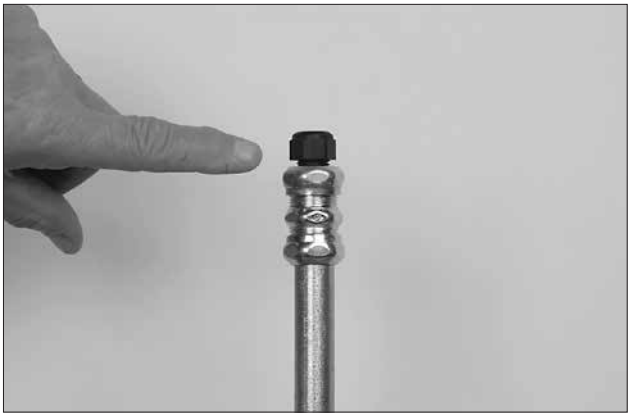


FIGURE 4-65
008046

Installing Flexible Conduit Through a Conduit Offset (Continued)

10. Push flexible conduit completely through conduit offset. Flexible conduit should stop flush or +/– 1/2 in. (12.7 mm) from bottom of conduit of conduit fitting in PYRO-CHEM control head. See Figure 4-66.

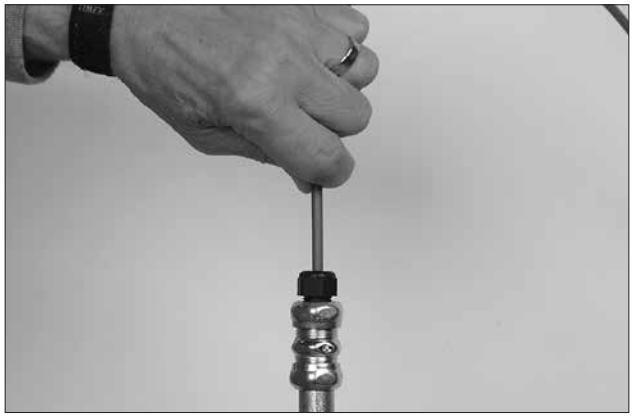


FIGURE 4-66
008047

11. Tighten nut on strain relief on top of conduit riser. See Figure 4-67.

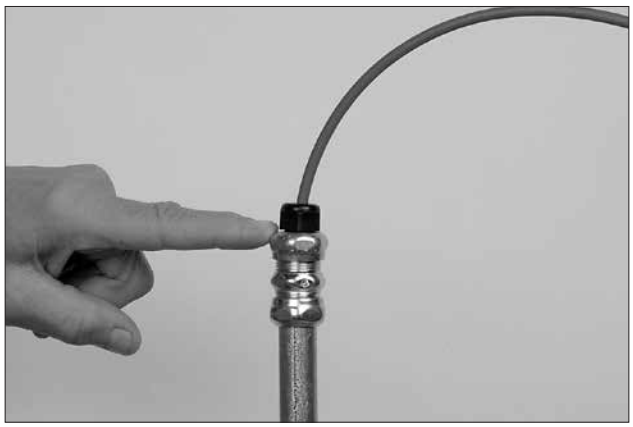


FIGURE 4-67
008048

12. Complete the remainder of the flexible conduit and wire rope installation to the pull station or the gas valve.

Flexible Conduit Splicing (Allowed on Pull Station Installations Only)

Note: Wire rope cannot be spliced together, only the flexible conduit.

Flexible conduit can be spliced together using EMT Compression Fitting Union (Part No. 79827) only for the pull connection.

1. Remove rings from both ends of compression union. See Figure 4-68.

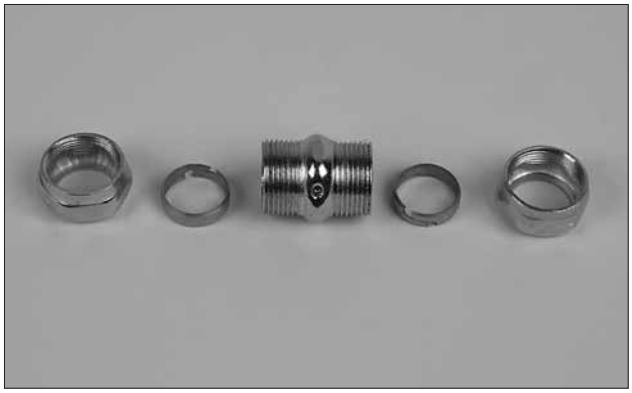


FIGURE 4-68
008061

2. Install strain relief nut, strain relief, compression union nut, flexible conduit insert and compression union over the flexible conduit with wire rope installed. See Figure 4-69.

FIGURE 4-69
008049

Flexible Conduit Splicing (Allowed on Pull Station Installations Only) (Continued)

3. Tighten compression union nut onto union body, locking flexible conduit insert in place. See Figure 4-70.

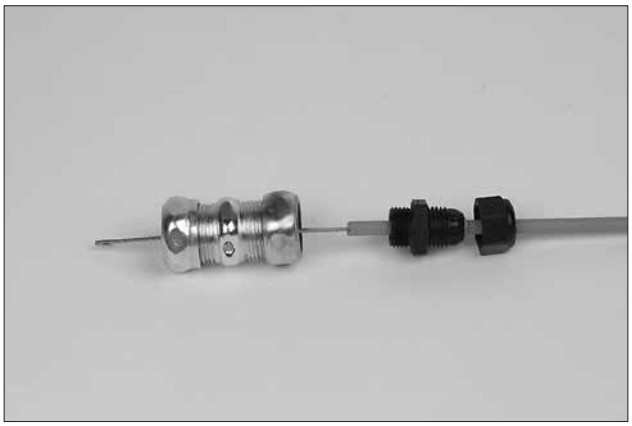


FIGURE 4-70
008050

4. Install strain relief body into compression union and tighten. See Figure 4-71.

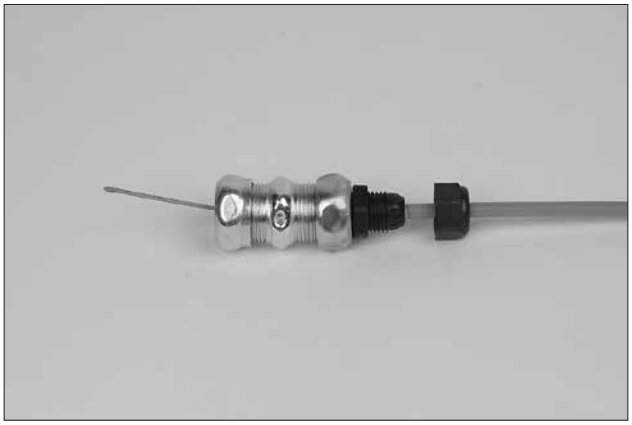


FIGURE 4-71
008051

5. Push flexible conduit into strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 4-72.

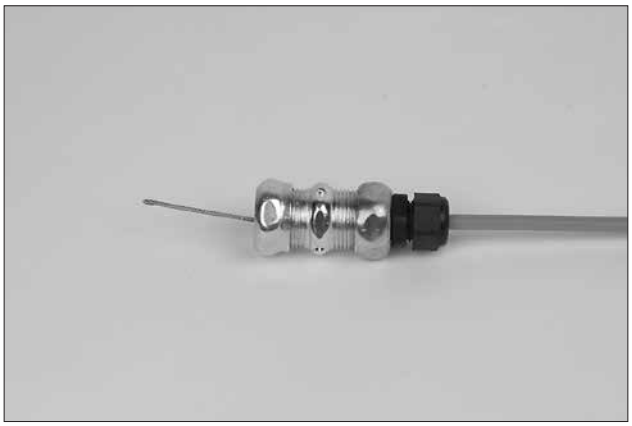


FIGURE 4-72
008052

6. Starting on the opposite end of the compression union, remove the nut. See Figure 4-73.

FIGURE 4-73
008053

7. Install strain relief nut, strain relief, and compression union nut on remaining section of flexible conduit and install flexible conduit insert on wire rope. See Figure 4-74.

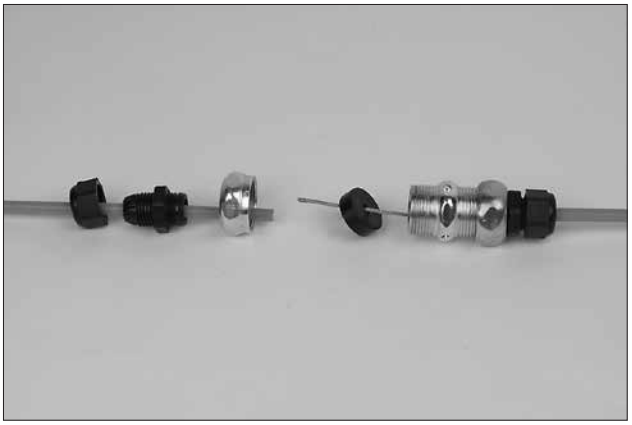


FIGURE 4-74
008054

8. Push wire rope completely through remaining section of flexible conduit. See Figure 4-75.

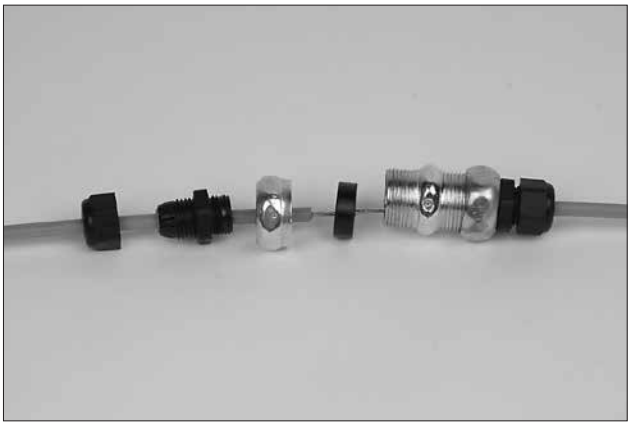


FIGURE 4-75
008055

Flexible Conduit Splicing (Allowed on Pull Station Installations Only) (Continued)

9. Tighten compression union nut onto union body, securing flexible conduit insert in place. See Figure 4-76.

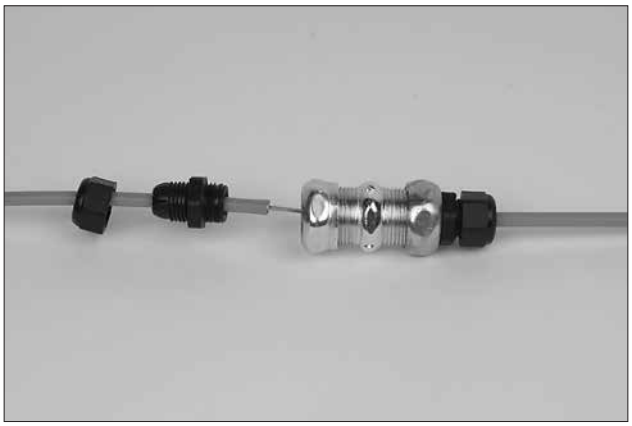


FIGURE 4-76
008056

10. Tighten strain relief body into compression union. See Figure 4-77.

FIGURE 4-77
008057

11. Push flexible conduit into strain relief until it is approximately 1/16 in. (1.6 mm) from bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 4-78.

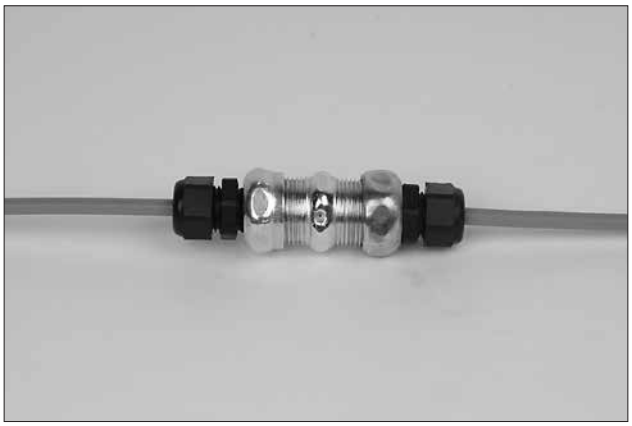


FIGURE 4-78
008058

12. Complete the remainder of the flexible conduit and wire rope installation.
13. To test all installations, refer to the proper sections in the KITCHEN KNIGHT II System Manual (Part No. 551274).

Testing Pull Station/Mechanical Gas Valve

To test all installations, refer to Page 4-18 for detailed testing information.

NOTES:

GENERAL

The maintenance information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the maintenance of the KITCHEN KNIGHT II system must be trained and hold a current PYRO-CHEM certificate in a KITCHEN KNIGHT II training program.

SEMI-ANNUAL MAINTENANCE

1. Check that the hazard area has not changed.
2. Check that the system has not been tampered with, i.e., nozzles removed, nozzles not aimed properly, piping not supported properly, blow off caps in place.
3. Check the entire system for mechanical damage.
4. Check all nozzle orifices to make certain they are not plugged. Apply a small amount of Dow Corning No. III silicone grease across the opening of the nozzle tip. Replace blow off caps or o-ring if necessary.

   Note: Rubber blow-off caps that have been installed in the system for one year or more must be replaced.
5. Check the solenoid monitor.

   CAUTION

   Before continuing, remove the cover from the control head and insert the safety pin in the hole in the slide plate above the latching arm. This will secure the system, preventing accidental discharge.

   If the control head cover requires replacement, it must only be replaced with the NMCH cover plate which does not have a handle on the control head cover for local actuation.
6. Disconnect the control head or pneumatic tubing from the valve cap assembly of each agent cylinder. Remove the carbon dioxide pilot cartridge in the control head. Remove the safety pin from the slide plate. Actuate the control head to ensure it is functioning properly. Make certain the gas shut-off valve and remote pull station are functioning properly.

   Test the functionality of the control head with the cover in place to verify there is no binding. If binding occurs, turn the indicator mounting bolt until there is 1/16 (1.6 mm) clearance between the front edge of the control head back box and white indicator surface.
7. Inspect the pulley elbows for excessive grease buildup. Clean elbows if necessary. Replace fusible links. (They must be replaced semi-annually per NFPA 96.) Visually inspect thermal detectors.

   Note: Refer to Section 4 – System Installation for control head assembly resetting procedures.

   NOTICE

   Methods and frequency of inspection, testing and maintenance of detectors should be in accordance with NFPA-72.
8. Reinstall the carbon dioxide pilot cartridge, reconnect the control head, and replace the control head cover and nylon tie. See detailed cartridge installation instructions listed on Page 4-20 (System Installation).

   CAUTION

   Before screwing the carbon dioxide pilot cartridge into the actuator, ensure that the actuator has an o-ring installed. If actuator is utilizing a Teflon washer, replace with o-ring (Part No. 55531).
9. Inspect the cylinder pressure. Tap the gauge lightly to ensure the needle is moving freely. If the gauge shows a loss in pressure indicated by the needle being below the green band, the tank should be removed and recharged per the SYSTEM RECHARGE section of Chapter VI (System Recharge) in this manual.

ANNUAL MAINTENANCE

1. Inspect as per semi-annual maintenance instructions. Do not reconnect control head at this time.
2. Disconnect the discharge piping from the valve outlet. Using air or nitrogen, blow out the piping. Replace all nozzle caps.
3. Fixed temperature sensing elements of the fusible alloy type must be replaced, at a maximum semi-annually, or more frequently if necessary, to assure proper operation of the system.
4. Test thermal detectors and remote pull stations per SYSTEM CHECKOUT AFTER INSTALLATION section located in Chapter IV (System Installation) of this manual. Per NFPA 72, two or more detectors per circuit should be tested. Note individual detector location and date of testing. Within five years, all detectors in system must be tested.
5. Replace the carbon dioxide pilot cartridge and o-ring (Part No. 55531).
6. Record the date of installation on the cartridge with a felt-tipped marker.
7. See detailed cartridge installation instructions listed on Page 4-20 (System Installation).

   CAUTION

   Before screwing the carbon dioxide pilot cartridge into the actuator, ensure that the actuator has an o-ring installed.
8. Reconnect the control head. Replace the control head cover and nylon tie.

12-YEAR MAINTENANCE

Along with the required annual maintenance requirements, the tanks must be removed from the system and properly discharged. All tank and hose assemblies must be hydrostatically tested per the requirements of NFPA-17A. The tank must be refilled with fresh agent. Refer to the PYRO-CHEM Hydrostatic Test Instructions Manual (Form No. PC2013008) for additional hydrostatic testing information.

NOTICE

Refer to the nameplate on tank for hydrostatic pressure requirements.

⚠ CAUTION

Precautions must be taken when handling and transferring wet agents as they are cautic in nature. Goggles must be worn at all tmes. If any agent gets into the eyes, they should be flushed with clean water for 15 minutes and a physician contacted. If any agent contacts the skin, it should be flushed with cold water to prevent irritation. The agent is electrically conductive. Care must be taken to thoroughly clean up any agent discharged around electrical appliances before turning the power on.

GENERAL

The recharge information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the recharge of the KITCHEN KNIGHT II system must be trained and hold a current PYRO-CHEM certificate in a KITCHEN KNIGHT II training program.

SYSTEM CLEANUP

⚠ CAUTION

Before attempting any cleanup, make certain that all fuel sources to the equipment to be cleaned have been shut off. Make certain that the exhaust hood and all appliance electrical controls have been de-energized to avoid any chance of electrical shock resulting from the cleaning process of electrically conductive alkaline liquid agent and/or its residue.

Make certain all surfaces to be cleaned have cooled down to room temperature.

Do not use water to clean any appliances that contain hot grease or cooking oils. Doing so may result in violent steaming and/or spattering.

SYSTEM RECHARGE

NOTICE

Determine the cause of system discharge and correct immediately before performing system recharge.

1. After discharge, inspect the entire system for mechanical damage. If the tank has sustained any mechanical damage, it must be hydrostatically tested before refilling.
2. Disconnect the 1/4 in. actuation tubing or the control head from the top of the tank valve.
3. Relieve the pressure from the top chamber of the tank valve by depressing the core of the valve in the valve cap assembly. By performing this operation, the valve will close.
4. Slowly remove the valve and siphon tube. If there is any residual pressure left in the tank, it will bleed out through the pressure relief slot in the valve threads.
5. **⚠ CAUTION**

   Precautions must be taken when handling and transferring wet agents as they are cautic in nature. Goggles must be worn at all tmes. If any agent gets into the eyes, they should be flushed with clean water for 15 minutes and a physician contacted. If any agent contacts the skin, it should be flushed with cold water to prevent irritation. The agent is electrically conductive. Care must be taken to thoroughly clean up any agent discharged around electrical appliances before turning the power on.

   The complete piping system must be flushed after a discharge. Flushing Concentrate (Part No. 79656) must be used when flushing the system. The concentrate is shipped in a 32 oz (0.95 L) container. A PCL-160 tank requires half of a container. A PCL-300 tank requires one container of concentrate. A PCL-460 requires one and a half containers, and a PCL-600 requires two containers. To prepare the system for flushing:

   a. Pour the required amount of flushing concentrate into the tank.
   b. Fill the tank approximately half full with warm, clear water. Agitate the tank for a few seconds and then add more warm water to bring the level to the required fill line using the Measuring Stick (Part No. 551039).
   c. Reinstall valve and pickup tube. Hand tighten to 12.5 ft-lb (16.9 Nm) maximum torque.

      CAUTION

      Do NOT use a wrench or other tool to tighten the valve. Do NOT use a pipe extension on the valve outlet for the purpose of providing additional torque.

   d. Pressurize tank to 225 psi (15.5 bar) at 70 °F (21 °C) and reinstall to piping network.
6. With nozzles in place, attach control head and manually actuate the tank. Allow the tank to completely discharge through the piping network.
7. After the discharge is completed, the entire piping network must be blown out with air or nitrogen until no more mist is visual coming out of the nozzles.
8. Remove, clean, and reinstall all nozzles.
9. Remove the tank from the system. Slowly remove the valve and siphon. If there is any residual pressure left in the tank, it will bleed out through the pressure relief slot in the valve threads. The valve and pressure regulator (located in outlet of valve) must be cleaned and rebuilt after each discharge. To rebuild the valve, use Rebuilding Kit (Part No. 550698). To rebuild the pressure regulator, use Rebuilding Kit (Part No. 551061). Each kit includes an instruction sheet listing detailed rebuilding instructions.

SYSTEM RECHARGE (Continued)

10. Fill tank with required amount of KITCHEN KNIGHT Agent – 3 gal (11.4 L) (Part No. 551188), or 1.6 gal (6.1 L) (Part No. 553176), using Measuring Stick (Part No. 551039). Tank should be filled to a tolerance of –0/+1/8 in. (–0/+3.1 mm) from the mark level on the measuring stick.

NOTICE

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C).

NOTICE

The pressure gauge attached to the tank valve should not be used to determine when the charging pressure has been reached. A calibrated external gauge must be used.

NOTICE

A pressure regulator must be used for charging the tank assembly when the pressure source is higher than the tank-rated operating pressure of 225 psi (15.5 bar).

The pressure regulator in the valve outlet must be removed before pressurizing.

11. Reinstall valve and pickup tube. Hand tighten to 12.5 ft-lb (16.9 Nm) maximum torque. Pressurize Shrader valve assembly with 150 psi (10.3 bar) of nitrogen. Install Recharge Adaptor (Part No. 551240), into the valve outlet and pressurize with nitrogen to 225 psi (15.5 bar) at 70 °F (21 °C). Wait 10 minutes and verify the pressure in the tank is at 225 psi (15.5 bar). Relieve the pressure from the Shrader valve assembly (this will cause the valve to close) and then disconnect the recharge adaptor. Reinstall pressure regulator into valve outlet.

⚠ CAUTION

If pressure is not relieved from Shrader valve assembly before the recharge adaptor is removed, the tank will discharge.

12. Replace all fusible links by following the instructions listed in the Installation Section.
13. Reset control head(s), accessories, pull stations and gas valves by following the instructions listed in the Installation Section.

INSTRUCTIONS FOR INSTALLING COLLAR CLAMP ON KITCHEN KNIGHT® TANK VALVES, DEPRESSURIZING TANK, AND INSTALLING NEW VALVE

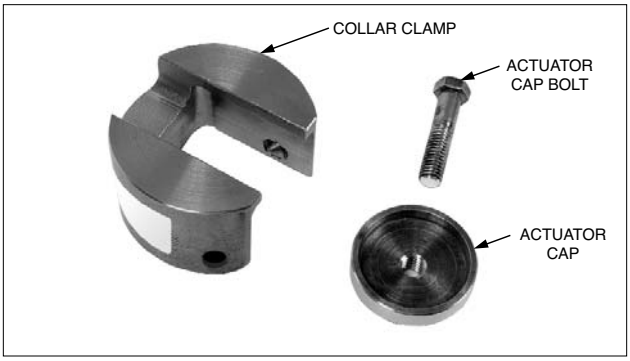
WARNING

FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN INJURY OR DEATH.

WEAR A PROTECTIVE FACE SHIELD AND DO NOT LEAN OVER THE VALVE WHEN PERFORMING THE FOLLOWING PROCEDURE.

DO NOT REMOVE TANK FROM INSTALLATION PRIOR TO ATTACHING COLLAR CLAMP.

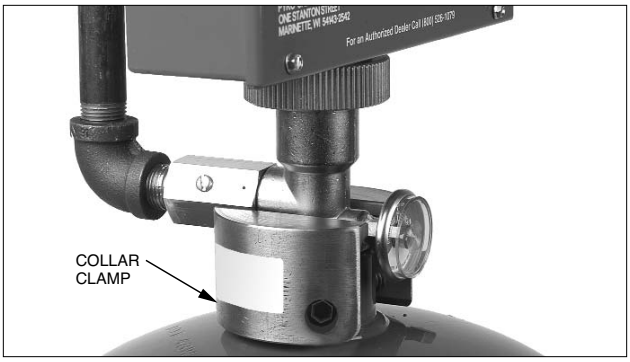
A VALVE SEPARATING UNDER PRESSURE COULD BECOME A PROJECTILE RESULTING IN INJURY DUE TO IMPACT. SEVERE IRRITATION TO THE SKIN OR EYES COULD OCCUR DUE TO CONTACT WITH ESCAPING EXTINGUISHING AGENT. IN THE EVENT OF CONTACT WITH THE EYES OR SKIN, FLUSH IMMEDIATELY WITH LARGE AMOUNTS OF CLEAR WATER AND SEEK IMMEDIATE MEDICAL ATTENTION.



006729

Kit Components

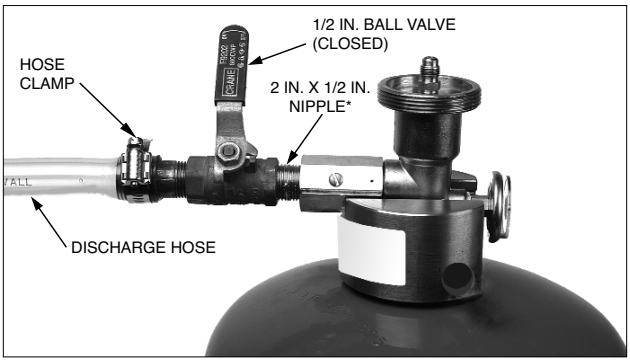
1. Slide collar clamp onto cylinder collar, from discharge outlet side. Then, first tighten the two locking bolts nearest the gauge to 150 in. lb. (16.9 Nm) of torque. Secondly, torque center back bolt to 150 in. lb. (16.9 Nm) also.



006731

Step 1. Install Collar Clamp.

2. Remove the control head cover plate and insert the safety ring pin to keep the control mechanism from operating.
3. Remove the control head or actuation tubing from the tank valve.
4. Remove CO_2 cartridge located inside control head.
5. Disconnect the agent discharge piping from the valve outlet.
6. Remove the cylinder from the mounting bracket.
7. Attach hose with ball valve (supplied by others) into valve outlet. Hose must be long enough to allow agent to flow into a container or pail.

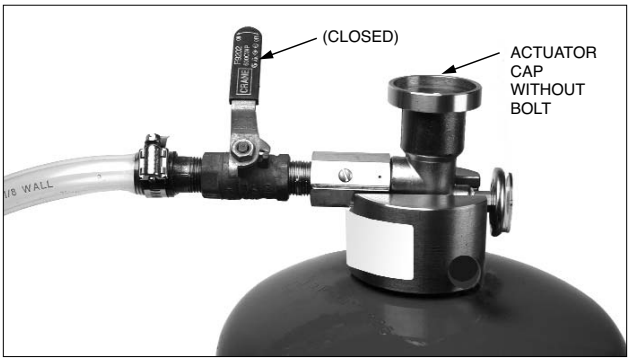


*Note: Longer pipe nipple required on KITCHEN KNIGHT I tanks because valve does not have a regulator.

006726

Step 7. Attach Hose with Ball Valve.

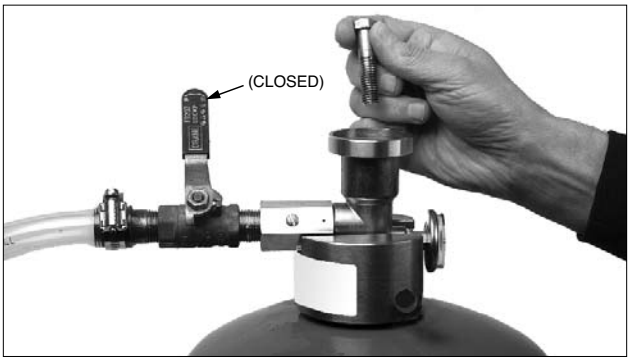
8. With ball valve in closed position, remove valve cap, Part No. 550802, from top of tank valve. Attach actuator cap **without** bolt in cap (included in kit). Hand tighten.



Step 8. Install Actuator Cap without Bolt.

006727

9. Once actuator cap is securely in place, install bolt in cap, and, using a wrench, turn bolt down to open valve.



Step 9. Install Bolt in Actuator Cap.

006728

10. With tank valve open, it will now be necessary to vent the nitrogen pressure within the tank. Invert 180° so valve is on the bottom. Make certain hose is positioned in container or pail. Slowly open the hose ball valve and vent pressure into container. Note: Small amount of agent will be temporarily discharged when first starting to vent. Use caution when venting pressure to avoid splashing.

11. When tank is completely vented of pressure, rotate tank back to the upright position and remove collar clamp, and actuator cap with bolt.
12. Remove old valve from tank.
13. Remove regulator (only on KKII tanks), valve gauge and pickup tube and reinstall on new valve. Use Teflon tape on gauge thread.
14. Refill tank and pressurize. Follow Steps Nos. 10 and 11 on Page 6-2 (Chapter 6 – System Recharge) in KITCHEN KNIGHT II RESTAURANT FIRE SUPPRESSION SYSTEM MANUAL, Part No. 551274.

INSTRUCTIONS FOR INSTALLING COLLAR CLAMP ON KITCHEN KNIGHT® II TANK VALVES AND DEPRESSURIZING TANK

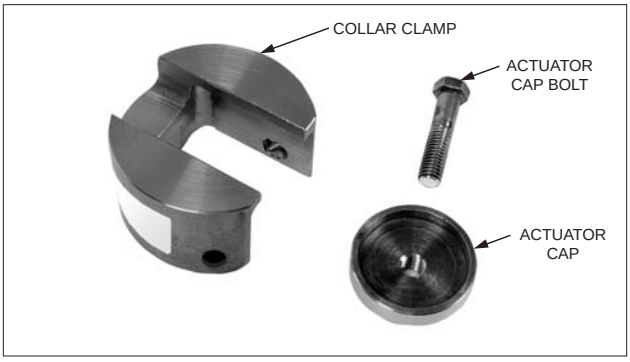
WARNING

FAILURE TO FOLLOW THESE SAFETY PRECAUTIONS AND INSTRUCTIONS COULD RESULT IN INJURY OR DEATH.

WEAR A PROTECTIVE FACE SHIELD AND DO NOT LEAN OVER THE VALVE WHEN PERFORMING THE FOLLOWING PROCEDURE.

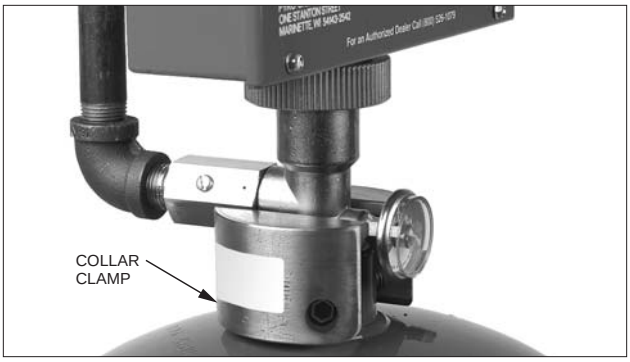
DO NOT REMOVE TANK FROM INSTALLATION PRIOR TO ATTACHING COLLAR CLAMP.

A VALVE SEPARATING UNDER PRESSURE COULD BECOME A PROJECTILE RESULTING IN INJURY DUE TO IMPACT. SEVERE IRRITATION TO THE SKIN OR EYES COULD OCCUR DUE TO CONTACT WITH ESCAPING EXTINGUISHING AGENT. IN THE EVENT OF CONTACT WITH THE EYES OR SKIN, FLUSH IMMEDIATELY WITH LARGE AMOUNTS OF CLEAR WATER AND SEEK IMMEDIATE MEDICAL ATTENTION.



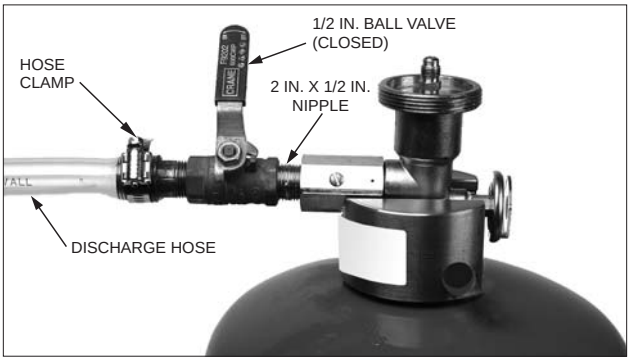
Kit Components 006729

1. Slide collar clamp onto cylinder collar, from discharge outlet side. Then, first tighten the two locking bolts nearest the gauge to 150 in. lb. (16.9 Nm) of torque. Secondly, torque center back bolt to 150 in. lb. (16.9 Nm) also.



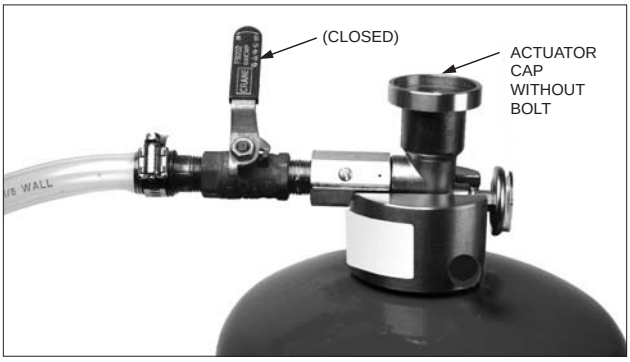
Step 1. Install Collar Clamp. 006731

2. Remove the control head cover plate and insert the safety ring pin to keep the control mechanism from operating.
3. Remove the control head or actuation tubing from the tank valve.
4. Remove CO_2 cartridge located inside control head.
5. Disconnect the agent discharge piping from the valve outlet.
6. Remove the cylinder from the mounting bracket.
7. Attach hose with ball valve (supplied by others) into valve outlet. Hose must be long enough to allow agent to flow into a container or pail.



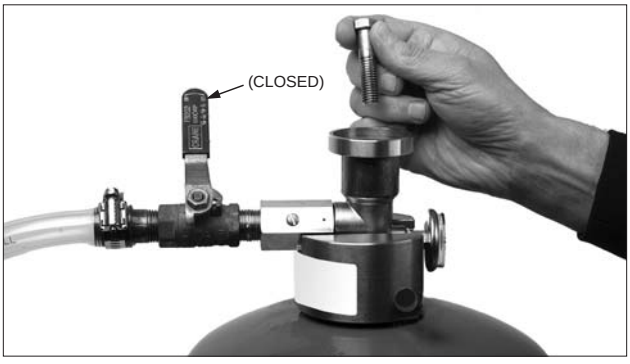
Step 7. Attach Hose with Ball Valve. 006726

8. With ball valve in closed position, remove valve cap, Part No. 550802, from top of tank valve. Attach actuator cap **without** bolt in cap (included in kit). Hand tighten.



Step 8. Install Actuator Cap without Bolt. 006727

9. Once actuator cap is securely in place, install bolt in cap, and, using a wrench, turn bolt down to open valve.



Step 9. Install Bolt in Actuator Cap. 006728

10. With tank valve open, it will now be necessary to vent the nitrogen pressure within the tank. Invert 180° so valve is on the bottom. Make certain hose is positioned in container or pail. Slowly open the hose ball valve and vent pressure into container. Note: Small amount of agent will be temporarily discharged when first starting to vent. Use caution when venting pressure to avoid splashing.
11. When tank is completely vented of pressure, rotate tank back to the upright position and remove collar clamp, and actuator cap with bolt.

KITCHEN KNIGHT™: RESTAURANT FIRE SUPPRESSION SYSTEM – PCL-240/350/550

TECHNICAL MANUAL

- COMPONENTS
- DESIGN
- INSTALLATION
- MAINTENANCE

Manual No. PN551738
Revised 9/1/00

TABLE OF CONTENTS

▸ Indicates Revision

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CHAPTER I
GENERAL INFORMATION

INTRODUCTION

The Pyro-Chem Restaurant Fire Suppression System is of the pre-engineered type as defined by NFPA-17A Standard for Wet Chemical Extinguishing Systems and is designed to provide fire protection for restaurant cooking appliances, hoods, and ducts. Installation and maintenance of the system must conform to the limitations detailed in this manual and be performed by an Authorized Pyro-Chem dealer.

The Pyro-Chem System utilizes a wet chemical agent specifically designed to suppress restaurant cooking area fires. The system provides automatic actuation and can be manually actuated through a remote mechanical pull station. Upon actuation, the system discharges a pre-determined amount of agent to the duct, plenum, and cooking appliances. The agent acts to suppress fires in three ways:

1.The chemical chain reaction causing combustion is interrupted by both the agent itself and the resulting steam formation.

2. The agent cools the fire bringing it below auto-ignition temperature.

3. The agent reacts with hot grease forming a soap-like layer (saponification) that helps prevent the escape of combustible vapors, thus preventing re-ignition.

The shutdown of fuel and power to all appliances under protected ventilation equipment is required upon system actuation. The shutdown of make-up or supply air is recommended upon system actuation but is not required. Exhaust fan(s) in the ventilation system should remain on during system discharge as they assist the dispersion of chemical through the ventilating system. The system is UL Listed with or without exhaust fan shutdown.

TEMPERATURE LIMITATIONS

The operating temperature range of the Pyro-Chem System is 32° F. (0° C.) minimum to 120° F. (49° C.) maximum.

UL LISTING

The Pyro-Chem Restaurant Fire Suppression System has been tested to the UL Standard for Fire Extinguishing Systems For Protection of Restaurant Cooking Areas, UL300 and Listed by Underwriters Laboratories, Inc. System agent cylinders bearing the Underwriters Laboratories of Canada, Inc. ULC mark also meet Underwriters Laboratories of Canada's Standard ULC/ORD-C1254.6-1995.

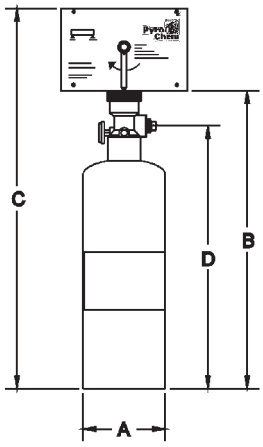
Note:

Components with like Model Numbers bearing the Wells Fargo Pyro Technologies Inc. name can be used as direct replacements for components bearing the Pyro-Chem name.

CHAPTER II
COMPONENTS

CYLINDERS & VALVE

The Pyro-Chem System has available three different size cylinders: the Models PCL-240, PCL-350, and PCL-550. Cylinder sizes are expressed in terms of extinguishing agent capacity (i.e., the PCL-240 uses 2.4 gallons of extinguishing agent). The cylinder is manufactured, tested, and marked in accordance with DOT 4BW175. Cylinders come pre-filled with extinguishing agent and are charged with dry nitrogen to a pressure of 175 psig @ 70° F. Cylinder and valve assembly dimensions are shown in **Figure 2-1.**



Model No.	A	B	C	D	Flow Point Capacity	Weight	Mounting Bracket Used
PCL-240	8.00	25.06	30.81	22.75	8	55 lbs.	MB-15
PCL-350	10.00	25.06	30.81	22.75	13	85 lbs.	MB-15
PCL-550	10.00	35.81	41.56	33.50	20	110 lbs.	MB-1

Figure 2-1. Cylinder and Valve Assemblies.

006241PC

All cylinders utilize the same valve assembly (P/N 550720). It is a pressure sealed poppet type valve designed to provide rapid actuation and discharge of agent. See **Figure 2-2.**

Item	Part Number	Description
1		Valve Body
2	550762	Cap & Seat Washer Sub-Assembly
3	550705	Conical Spring
4	550707	Piston
5	550716	Neck O-Ring
6	550713	Pressure Gage
7	550028	Stem O-Ring
8	550802	Valve Cap
9	550386	Shrader Valve
10	550714	Valve Cap O-Ring
11	550715	Piston O-Ring
12	550710	Valve Stem

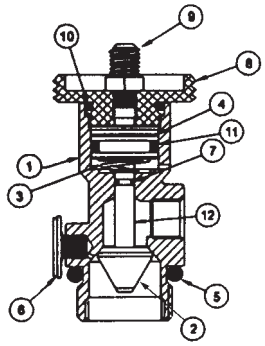


Figure 2-2. Valve Cross Section.

002905PC

VALVE REBUILDING EQUIPMENT

1. Wet Valve Seal Rebuilding Kit (P/N 550698).

After system discharge, the valve assembly must be carefully inspected to ensure no mechanical damage has occurred. If rebuilding is necessary, the Wet Valve Seal Rebuilding Kit (P/N 550698) should be used. It includes all system components necessary to properly rebuild the valve. See **Figure 2-3.**

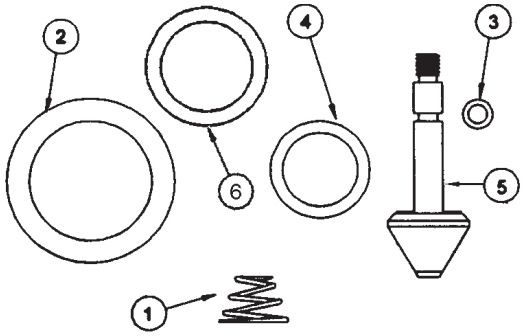


Figure 2-3. Wet Valve Seal Rebuilding Kit (P/N 550698).

002906PC

Item	Part Number	Description
1	550762	Cap & Seat Washer Sub-Assembly
2	550705	Conical Spring
3	550716	Neck O-Ring
4	550028	Stem O-Ring
5	550715	Piston O-Ring
6	550710	Valve Stem

2. Model VT-1.

The Model VT-1 wet valve tool is designed to facilitate the rebuilding of the wet valve assembly. It should be used to hold the wet valve piston while unscrewing the cap and stem assembly. See **Figure 2-3.1.**

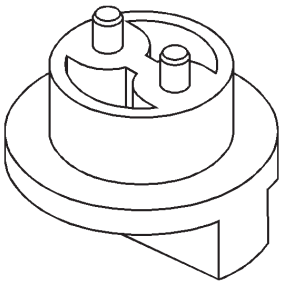


Figure 2-3.1. Model VT-1 Wet Valve Tool.

002907PC

CYLINDER BRACKETING

Vertical bracketing of the PCL-240 and PCL-350 is provided by the Model MB-15 bracket kit. Vertical bracketing of the PCL-550 is provided by the Model MB-1 bracket kit. These kits must be ordered separately with each cylinder/valve assembly. Cylinder installation instructions are provided in the installation section of this manual.

EXTINGUISHING AGENT

The agent used in Pyro-Chem Systems is a potassium carbonate based solution that is extremely effective for all types of kitchen fires. This agent is available for cylinder recharging in three size containers: 2.4 gallon (Model RL-240), 2.75 gallon (Model RL-275), and 3.5 gallon (Model RL-350). The agent is shipped in plastic containers. The RL-240 and RL-350 provide one complete tank charge for the PCL-240 and PCL-350 respectively. The PCL-550 requires two (2) RL-275 charges.

CAUTION

Precautions must be taken when handling and transferring wet agents as they are caustic in nature. Goggles must be worn at all times. If any agent gets into the eyes, they should be flushed with clean water for 15 minutes and a physician contacted. If any agent contacts the skin, it should be flushed with cold water to prevent irritation. The agent is electrically conductive. Care must be taken to thoroughly clean up any agent discharged around electrical appliances before turning the power on.

After system discharge, agent must be cleaned up immediately with hot, soapy water to prevent corrosion of effected surfaces.

MODEL MCH3 - MECHANICAL CONTROL HEAD

The Model MCH3 mechanical control head is a fully mechanical control head which can be connected to the PCL-240/350/550 cylinder valve. This control head will support a fusible link detection system, a remote mechanical pull station (Model RPS-M), and a mechanical or electric gas shutoff valve. A miniature electric switch (Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT) can be ordered separately and field installed. It is equipped with a local manual control handle that allows for mechanical system actuation. Operation of the local manual control requires removing the pull pin and rotating the handle clockwise. The Model MCH3 control head can actuate a maximum of three (3) cylinders. See **Figure 2-4.**

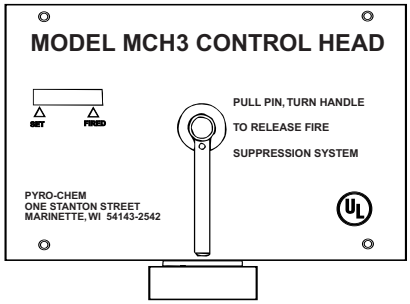


Figure 2-4. Mechanical Control Head.

004790PC

MODEL ECH3 – ELECTRIC CONTROL HEAD

The Model ECH3 electric control head is an electrically operated control head which can be connected to the PCL-240/350/550 cylinder valve. This control head will support an electric thermal detection system, a remote mechanical pull station (Model RPS-M), and a mechanical or electric gas shutoff valve. It will not support a fusible link detection system. A miniature electric switch (Model MS-DPDT) is included. The Model ECH3 control head is available in both 120 VAC (Model ECH3-120) and 24 VDC (Model ECH3-24). It is equipped with a local manual control handle that allows for mechanical system actuation. Operation of the local manual control requires removing the pull pin and rotating the handle clockwise. The Model ECH3 control head can actuate a maximum of three (3) cylinders. See **Figure 2-5.**

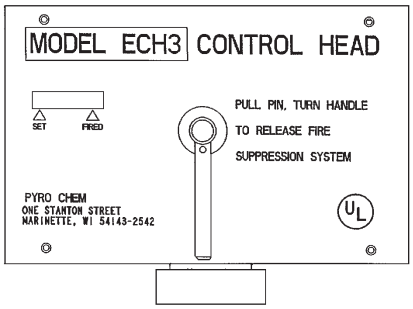


Figure 2-5. Electric Control Head.

004789PC

MODEL NMCH3 - MECHANICAL CONTROL HEAD

The Model NMCH3 Mechanical Control Head is a fully mechanical control head which can be connected to the PCL-240/350/550 cylinder valve. This control head will support a fusible link detection system, a remote mechanical pull station (Model RPS-M), and a mechanical or electric shut-off valve. A miniature electrical switch (Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT) can be ordered separately and field installed. There is no local manual actuation for the Model NMCH. The Model NMCH3 control head can actuate a maximum of three (3) cylinders. **The Model NMCH3 can be used as a direct replacement for the Model MCH3.**

MODEL EN-MCU3 ENCLOSURE

The Model EN-MCU3 Enclosure is used for vertical mounting of a single PCL-240 or PCL-350. The EN-MCU3 also includes a mechanical control unit, eliminating the need for a Model MCH3 Control Head. See **Figure 2-5.1.** *The PCL-550 cannot be mounted in an EN-MCU3.*

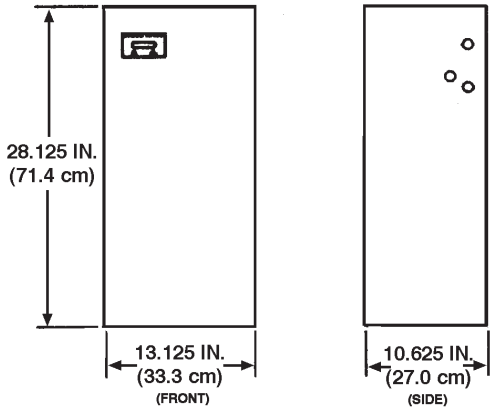


Figure 2-5.1. Model EN-MCU3 Enclosure.

002845PC

MODEL EN-S ENCLOSURE

The Model EN-S Enclosure is used for vertical mounting of a single PCL-240 or PCL-350 when it is used as a secondary agent cylinder in a system. The EN-S has no control mechanism, and must be used in conjunction with a Model EN-MCU3 Enclosure or a Model MCH3/ECH3 Control Head. *The PCL-550 cannot be mounted in an EN-S.*

MODEL MB-P2 – CONTROL HEAD MOUNTING BRACKET

The Model MB-P2 mounting bracket must be used to mount the Model MCH3, NMCH3, or ECH3 control heads if the control head is not mounted directly on a cylinder valve. See **Figure 2-6.**

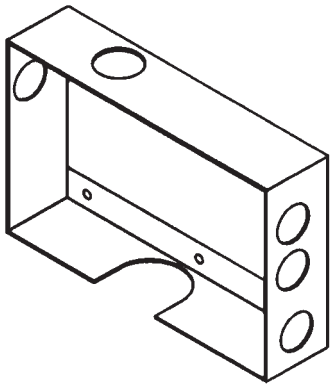


Figure 2-6. Model MB-P2 - Control Head Mounting Bracket.

002846PC

PNEUMATIC ACTUATING CYLINDERS

1. Model PAC-10.

The Model PAC-10 is a pneumatic actuating cylinder that can actuate a maximum of ten (10) agent cylinders simultaneously. The Model PAC-10 includes a DOT 4BA350 cylinder pressurized with dry nitrogen to 350 PSIG @ 70° F., a brass valve with pressure gauge, and a wall mounting bracket. A Model MCH3, NMCH3, or ECH3 control head must be purchased separately and connected to the PAC-10 to open the valve. See **Figure 2-7.**

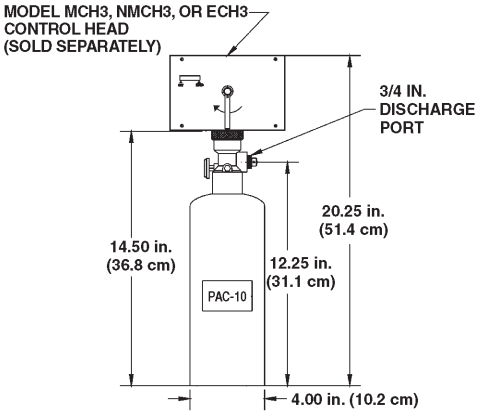


Figure 2.7. Model PAC-10 Pneumatic Actuating Cylinder.

002847PC

2. Model PAC-200.

The Model PAC-200 is a pneumatic actuating cylinder that can actuate a maximum of twenty (20) agent cylinders simultaneously. The Model PAC-200 includes a DOT 4BA350 cylinder pressurized with dry nitrogen to 350 PSIG @ 70° F., a brass valve with pressure gauge, and a wall mounting bracket. A Model MCH3, NMCH3, or ECH3 control head must be purchased separately and connected to the PAC-200 to open the valve. See **Figure 2-8.**

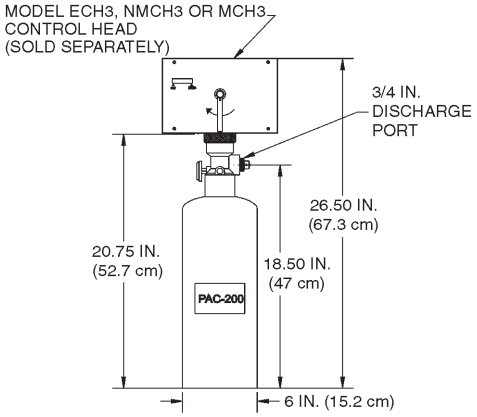


Figure 2-8. Model PAC-200 Pneumatic Actuating Cylinder.

002848PC

DETECTION EQUIPMENT

1. Model FLK-1.

The Model FLK-1 fusible link kit includes a 10” steel bracket, two (2) 1/2” EMT connectors, two (2) cable crimps, and two (2) “S” hooks. Fusible links must be ordered separately. See **Figure 2-9.**

2. Model FLK-1A.

The Model FLK-1A fusible link kit includes an 8” steel bracket, two (2) 1/2” EMT connectors, two (2) cable crimps, and two (2) “S” hooks. Fusible links must be ordered separately.

3. Model FLH-1.

The Model FLH-1 fusible link hanger is an accessory designed to simplify the installation of fusible links in the fusible link line. It can be used with the Model FLK-1/1A fusible link kit (kits must be ordered separately). The Fusible Link Hanger makes it possible to install fusible links without cutting and crimping loops in the fusible link line for each link. They are available in packages of 25 (FLH-25) only. See **Figure 2-10.**

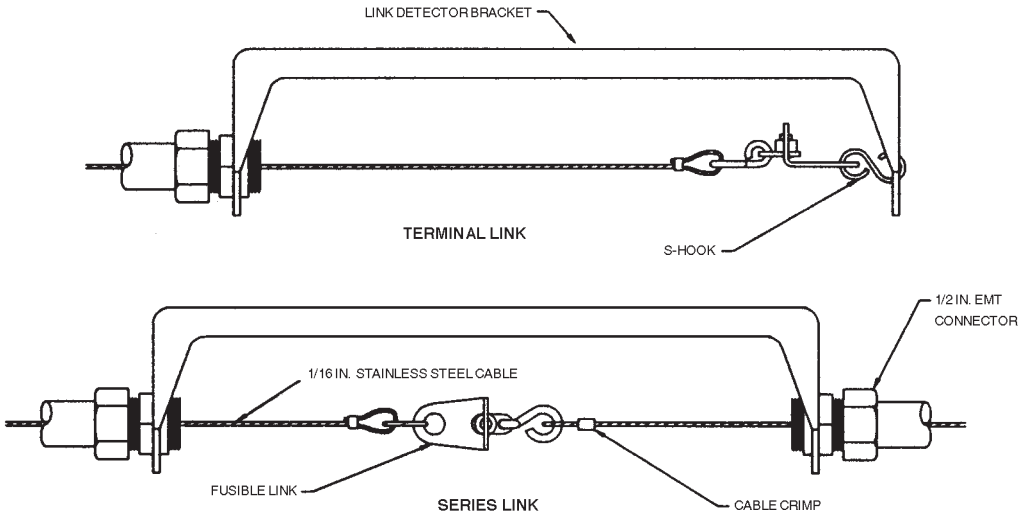


Figure 2-9. Model FLK-1 Fusible Link

002849PC

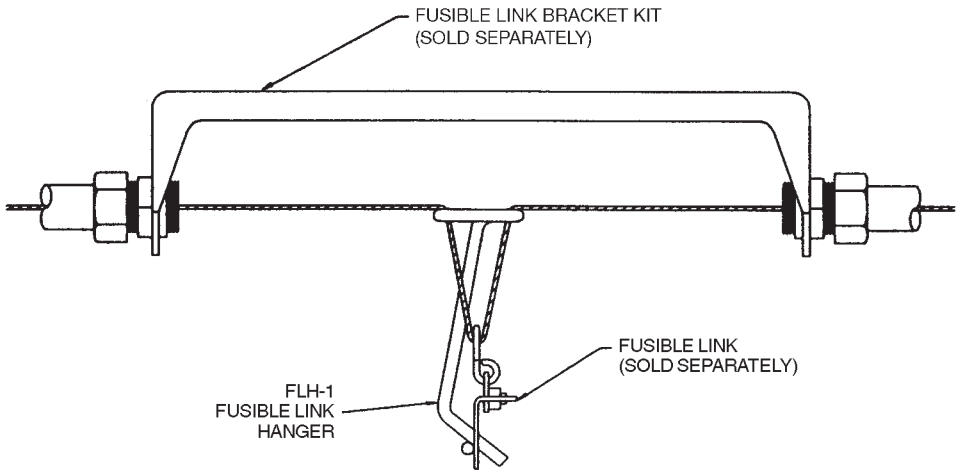


Figure 2-10. Model FLH-1 Fusible Link Hanger

002850PC

4. Fusible Links.

The fusible link is designed to separate at a specific temperature, releasing tension from the fusible link line, causing system actuation. See **Figure 2-11.**

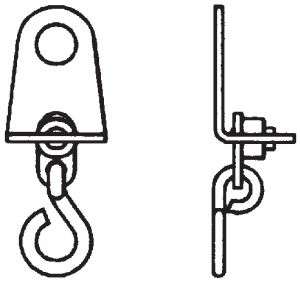


Figure 2-11. ML Style Fusible Link.
002851PC

After determining the maximum ambient temperature at the fusible link location, select the correct fusible link according to the temperature condition chart below:

Fusible Link Model No.	Maximum Ambient Temperature
FL-165	95° F. (35° C.)
FL-212	142° F. (61° C.)
FL-280	210° F. (99° C.)
FL-360	290° F. (143° C.)
FL-450	380° F. (193° C.)
FL-500	430° F. (221° C.)

5. Thermal Detectors.

Fixed temperature thermal detectors are normally open, mechanical contact closure switches designed to operate at a factory preset temperature. They are available in six preset temperatures which meet NFPA standards and are UL Listed and FM Approved. After determining the maximum ambient temperature at the thermal detector location, select the correct thermal detector according to the temperature condition chart below:

Thermal Detector Model No.	Maximum Ambient Temperature
TD-140	70° F. (21° C.)
TD-190	120° F. (49° C.)
TD-225	155° F. (68° C.)
TD-325	255° F. (124° C.)
TD-450	380° F. (193° C.)
TD-600	530° F. (277° C.)

MODEL RPS-M - REMOTE MECHANICAL PULL STATION

▸ Remote manual control for the Model MCH3 or ECH3 control head is provided by the Model RPS-M remote mechanical pull station. It is connected to the system control head by stainless steel cable. This cable is enclosed in 1/2" EMT with corner pulleys at each change in direction. The remote mechanical pull station shall be located at the point of egress. See **Figure 2-12.**

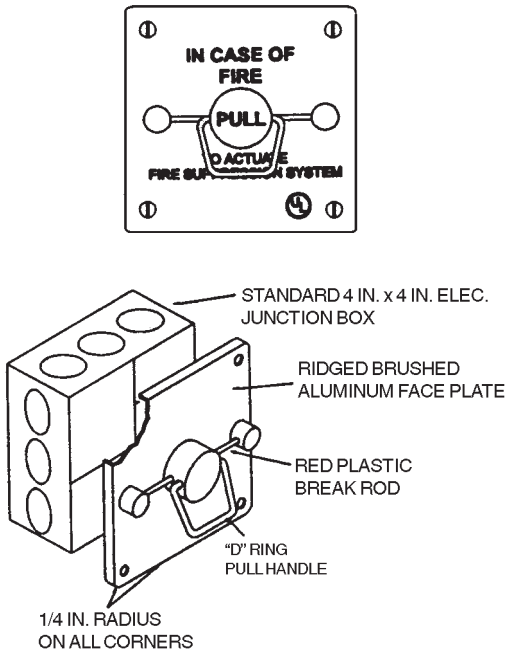


Figure 2-12. Model RPS-M Mechanical Pull Station.
002852PC

GAS SHUTOFF VALVES

1. Mechanical Gas Shutoff Valve.

A gas shutoff valve is required on all systems used to protect a gas fueled cooking appliance to stop gas flow in the event of system actuation. A mechanical gas valve can be ▸ used with either the Model MCH3 or ECH3 control head. It is connected to the system control head by stainless steel cable. This cable is enclosed in 1/2" EMT with a corner pulley at each change in direction. The valves are rated for natural and LP gas (see **Figure 2-13**). Mechanical gas valves are available in the following sizes:

Model No.	Valve Size	Maximum Operating Pressure
▸ GV-75	3/4"	5 psi
GV-100	1"	5 psi
GV-125	1-1/4"	5 psi
GV-150	1-1/2"	5 psi
GV-200	2"	5 psi
GV-250	2-1/2"	5 psi
▸ GV-300	3"	5 psi

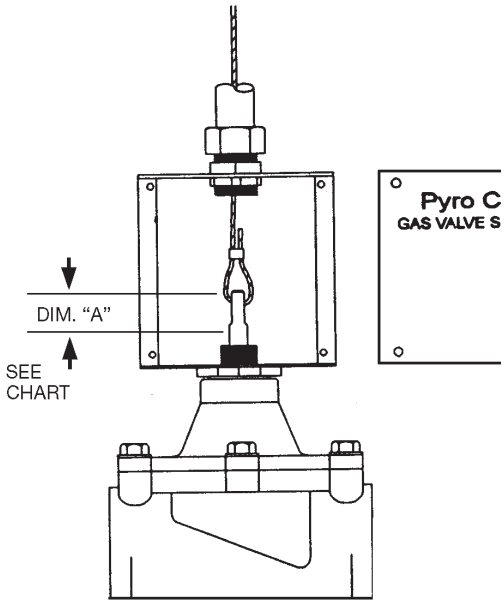


Figure 2-13. GV-Series Mechanical Gas Valve.

002853PC

2. Electric Gas Shutoff Valve.

A gas shutoff valve is required on all systems used to protect a gas fueled cooking appliance to stop gas flow in the event of system actuation. A UL Listed electric gas valve can be used with either the Model MCH3 or ECH3 control head. The valves are rated for natural and LP gas. Valves are available in 120 VAC. Electric gas valves are available in the following sizes:

Model No.	Valve Size	Maximum Operating Pressure
EGVSO-75	3/4"	50 psi
EGVSO-100	1"	25 psi
EGVSO-125	1-1/4"	25 psi
EGVSO-150	1-1/2"	25 psi
EGVSO-200	2"	25 psi
EGVSO-250	2-1/2"	25 psi
EGVSO-300	3"	25 psi

Note: A UL Listed manual reset relay is required when using an electric gas valve. The Pyro-Chem Model SM-120 solenoid monitor may be used for this purpose.

CORNER PULLEYS

1. Model SBP-1.

A corner pulley is used whenever a change in stainless steel cable direction is required. The Model SBP-1 corner pulley is equipped with a set screw fitting for connection to 1/2" EMT. See **Figure 2-14.**

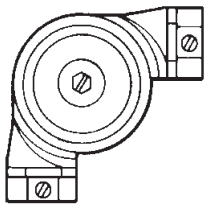


Figure 2-14. Model SBP-1 Corner Pulley.

000160

2. Model CBP-1.

A corner pulley is used whenever a change in stainless cable direction is required. The Model CBP-1 is a grease-tight corner pulley designed for areas likely to experience excessive deposit build-up. It is equipped with a compression fitting for connection to 1/2" EMT. See **Figure 2-15.**

Note: The Model CBP-1 is not a liquid tight seal for penetration of hoods and/or ducts.

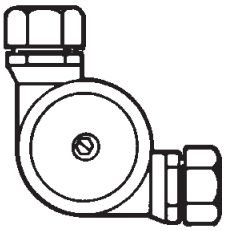


Figure 2-15. Model CBP-1 Corner Pulley.

000161

TEE PULLEY

The Model TP-1 tee pulley is used to connect two mechanical gas valves or two remote mechanical pull stations to a single control head. The tee pulley replaces two standard 90o corner pulleys. See **Figure 2-16.**

CAUTION

The Tee Pulley must never be used to connect multiple fusible link lines to a single control head.

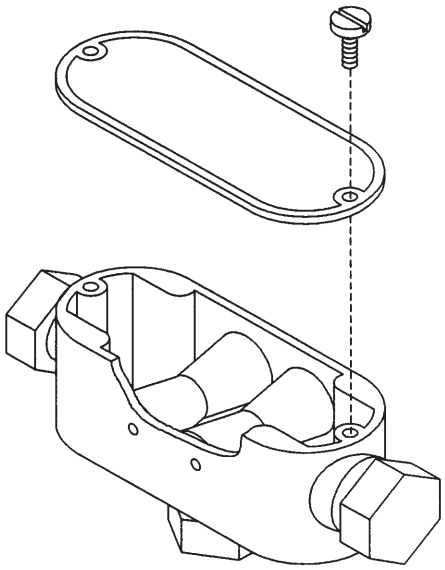


Figure 2-16. Model TP-1 Tee Pulley.

002857PC

ELECTRICAL SWITCHES

The electrical switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices and other electrical devices that are designed to shut off or turn on when the system is actuated.

Switches are available in kits: One Switch Kit, Part No. 551154; Two Switch Kit, Part No. 551155; Three Switch Kit, Part No. 551156, and Four Switch Kit, Part No. 551157. Each switch has a set of single-pole, double-throw contacts rated at 21 amp, 1 HP, 125, 250, 277 VAC or 2 HP, 250, 277 VAC. Mounting hardware and 12” wire assemblies are provided with each kit.

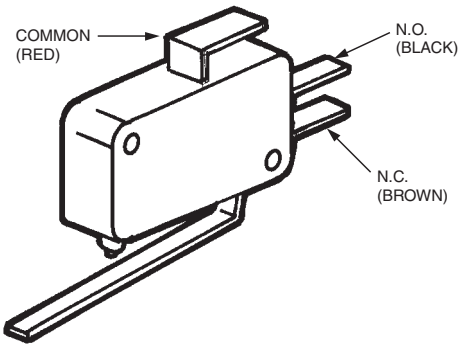


Figure 2-17. Model MS-SPDT Miniature Switch.

001612

MODEL SM-120/24 SOLENOID MONITOR

The Model SM-120/24 solenoid monitor is used in conjunction with the Model ECH3 control head to supervise the actuation and detection circuits. In the event of a problem in the circuit, a light on the monitor goes out. The Model SM-120 is used with the Model ECH3-120 control head. The Model SM-24 is used with the Model ECH3-24 control head. Two sets of NO/NC dry contacts are provided. The unit mounts directly to a three gang wall outlet box. The Model SM-120 acts as a reset relay when used with an electric gas valve. Electric gas valve wiring instructions are provided in the installation section of this manual. See **Figure 2-19.**

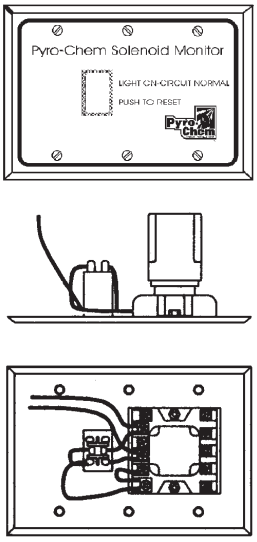


Figure 2-19. Model SM-24/120 Solenoid Monitor.
002860PC

PIPE AND FITTINGS

Pipe and fittings must be furnished by the installer. Schedule 40 stainless steel, chrome plated, or black pipe and fittings must be used. Galvanized pipe and fittings are not to be used.

NOZZLES

Nozzles have been developed for appliance, plenum, and duct applications. All nozzles have a specific flow point value and are supplied with covers to prevent clogging. Application limitations are provided in the design section of this manual.

1. Straight Nozzles.

The following nozzles are of a straight 3/8" female threaded design (see **Figure 2-20**):

Model	Flow Points
NL-A	1
NL-D1	1
NL-RH2	2
NL-R	1
NL-UB	1/2
NL-D1	1
NL-D2	2
NL-D3	3
NL-F1	1
NL-F1.25	1.25
NL-W	1
NL-F2	2
NL-FL2	2

Note: The Model NL-D1 Nozzle can be used as a direct replacement for the Model NL-P Nozzle.

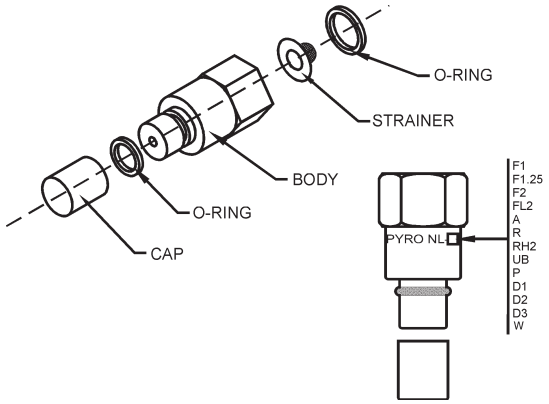


Figure 2-20. Straight Nozzle Design.
002909PC

2. Swivel Nozzles.

The Models NLS-A, NLS-UB, NLS-R, NLS-RH2, NLS-F1, NLS-W, and NLS-F2 swivel nozzles incorporate a swivel joint into the design of the nozzle body to simplify the aiming of the nozzle. These swivel nozzles have the same tip design and flow characteristics as their non-swivel equivalents, Models NL-A, NL-W, NL-UB, NL-R, NL-RH2, NL-F1 and NL-F2 respectively. A swivel nozzle can be used as a direct substitute for its non-swivel equivalent. They are of a 3/8" female threaded design (see **Figure 2-21**).

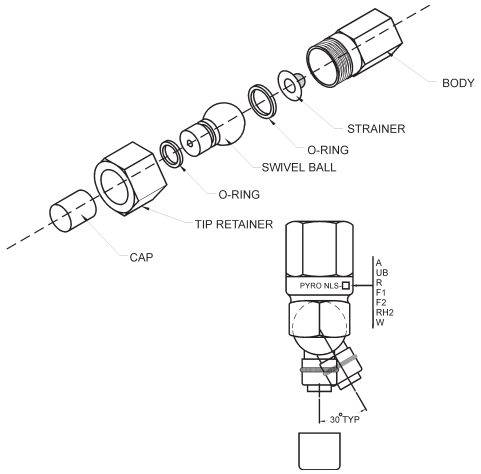


Figure 2-21. Swivel Nozzle Design.

COMPONENTS LIST

002910PC

MODEL NO.	DESCRIPTION	PART NO.
PCL-240	2.40 GALLON CYLINDER ASSEMBLY	550614
PCL-350	3.50 GALLON CYLINDER ASSEMBLY	550787
PCL-550	5.50 GALLON CYLINDER ASSEMBLY	550750
PAC-10	PNEUMATIC ACTUATING CYLINDER	550104
PAC-200	PNEUMATIC ACTUATING CYLINDER	550690
MB-1	MOUNTING BRACKET (FOR PCL-550)	550053
MB-15	MOUNTING BRACKET (FOR PCL-240/350)	550054
MB-P2	MOUNTING BRACKET (FOR MCH3 ECH3-24/120)	550853
MCH3	MECHANICAL CONTROL HEAD	551200
NMCH3	MECHANICAL CONTROL HEAD (NO HANDLE)	551203
EN-MCU3	ENCLOSURE (FOR PRIMARY CYLINDER)	551208
EN-S	ENCLOSURE (FOR SECONDARY CYLINDER)	550966
ECH3-24	24VDC ELECTRICAL CONTROL HEAD	551201
ECH3-120	120VAC ELECTRICAL CONTROL HEAD	551202
NL-A	10 x WET NOZZLE	551536
NLS-A	10 x WET SWIVEL NOZZLE	551544
NL-D2	10 x WET NOZZLE	551534
NL-D3	10 x WET NOZZLE	551535
NL-F1	10 x WET NOZZLE	551539
NLS-F1	10 x WET SWIVEL NOZZLE	551547
NL-F1.25	10 x WET NOZZLE	551540
NL-F2	10 x WET NOZZLE	551541
NLS-F2	10 x WET SWIVEL NOZZLE	551548
NL-FL2	10 x WET NOZZLE	551542
NL-D1	10 x WET NOZZLE	551533
NL-R	10 x WET NOZZLE	551537
NLS-R	10 x WET SWIVEL NOZZLE	551545
NL-RH2	10 x WET NOZZLE	551543
NLS-RH2	10 x WET SWIVEL NOZZLE	551549
NL-UB	10 x WET NOZZLE	551538
NLS-UB	10 x WET SWIVEL NOZZLE	551546
NL-W	10 x WET NOZZLE	551746
NLS-W	10 x WET SWIVEL NOZZLE	551747
RPS-M	REMOTE MECHANICAL PULL STATION	551074
FLK-1	10 FUSIBLE LINK BRACKET KIT	550131
FLK-1A	8 FUSIBLE LINK BRACKET KIT	550132
FLH-25	25 x FUSIBLE LINK HANGER	550876
FL-165	FUSIBLE LINK 165°F	550368
FL-212	FUSIBLE LINK 212°F	550365
FL-280	FUSIBLE LINK 280°F	550366
FL-360	FUSIBLE LINK 360°F	550009
FL-450	FUSIBLE LINK 450°F	550367
FL-500	FUSIBLE LINK 500°F	56816
SM-24	24VDC SOLENOID MONITOR	550303
SM-120	120VAC SOLENOID MONITOR	550302
TD-140	THERMAL DETECTOR 140°F	550351
TD-190	THERMAL DETECTOR 190°F	550352
TD-225	THERMAL DETECTOR 225*F	550353
TD-325	THERMAL DETECTOR 325°F	550354

MODEL NO.	DESCRIPTION	PART NO.
TD-450	THERMAL DETECTOR 450°F	550355
TD-600	THERMAL DETECTOR 600°F	550356
EGVSO-75	ELECTRIC GAS SHUT-OFF VALVE 3/4”	550358
EGVSO-100	ELECTRIC GAS SHUT-OFF VALVE 1”	550359
EGVSO-125	ELECTRIC GAS SHUT-OFF VALVE 1-1/4”	550360
EGVSO-150	ELECTRIC GAS SHUT-OFF VALVE 1-1/2”	550361
EGVSO-200	ELECTRIC GAS SHUT-OFF VALVE 2”	550362
EGVSO-250	ELECTRIC GAS SHUT-OFF VALVE 2-1/2”	550363
EGVSO-300	ELECTRIC GAS SHUT-OFF VALVE 3”	550385
GV-75	MECHANICAL GAS SHUT-OFF VALVE 3/4”	550593
GV-100	MECHANICAL GAS SHUT-OFF VALVE 1”	550594
GV-125	MECHANICAL GAS SHUT-OFF VALVE 1-1/4”	550595
GV-150	MECHANICAL GAS SHUT-OFF VALVE 1-1/2”	550596
GV-200	MECHANICAL GAS SHUT-OFF VALVE 2”	551049
GV-250	MECHANICAL GAS SHUT-OFF VALVE 2-1/2”	550185
GV-300	MECHANICAL GAS SHUT-OFF VALVE 3”	550186
MS-SPDT	MINI SWITCH - SINGLE POLE DOUBLE THROW	551154
MS-DPDT	MINI SWITCH - DOUBLE POLE DOUBLE THROW	551155
MS-3PDT	MINI SWITCH – 3 POLE DOUBLE THROW	551156
MS-4PDT	MINI SWITCH – 4 POLE DOUBLE THROW	551157
CO2-6	6 x CO2 CARTRIDGE	551059
CBP-1	COMPRESSION BEARING CORNER PULLEY	423250
SBP- 1	SCREW BEARING CORNER PULLEY	415670
TP-1	TEE PULLEY	550166
– – –	WET VALVE CAP	550831
– – –	CONICAL SPRING (WET VALVE)	550705
– – –	PRESSURE GAGE (WET VALVE)	550713
– – –	WET VALVE REBUILDING KIT	550698
VT-1	VALVE TOOL (WET VALVE)	550788
– – –	NECK O-RING (WET VALVE)	550716
– – –	PISTON (WET VALVE)	550707
– – –	PISTON O-RING (WET VALVE)	550715
– – –	VALVE CAP O-RING (WET VALVE)	550714
RL-165	1.65 GALLON RECHARGE	550694
RL-240	2.40 GALLON RECHARGE	550033
RL-275	2.75 GALLON RECHARGE	550693
RL-350	3.50 GALLON RECHARGE	550034
– – –	10 x WET NOZZLE CAP	551528
– – –	10 x WET NOZZLE STRAINER	551529
– – –	10 x WET NOZZLE O-RING	551530
– – –	VALVE STEM O-RING	550028
– – –	COMPLETE WET VALVE ASSEMBLY	550720
PCL-AK	RECHARGE ADAPTOR KIT	550735

CHAPTER III
SYSTEM DESIGN

This section will cover the proper design of the Pyro-Chem Restaurant Fire Suppression System. It is divided into four (4) sections:

1. Nozzle Coverage and Placement.
2. Cylinder Sizing.
3. Piping Limitations.
4. Detector Requirements.

Each of these sections must be completed before attempting any installation.

SECTION 1
Nozzle Coverage and Placement

This section will provide guidelines for determining nozzle type, positioning, and quantity for duct, plenum, and appliance protection.

A. Duct Protection

The following three (3) nozzles have been developed for the protection of exhaust ducts:

1. Model NL-D1.
2. Model NL-D2.
3. Model NL-D3.

Each nozzle is approved for use with the exhaust fan dampered, undampered with the fan on, or undampered with the fan off. It is not required that the fan be shut down or the exhaust duct be dampered for the system to operate properly. Each nozzle is approved to protect exhaust ducts of unlimited length.

1. Model NL-D1

The Model NL-D1 nozzle is a one (1) flow point nozzle designed for the protection of exhaust ducts. One (1) or two (2) Model NL-D1 nozzles can be used on a single duct branch.

A single Model NL-D1 exhaust duct nozzle can protect a square or rectangular duct with a maximum perimeter of 50 inches and a maximum one-side length of 17 inches. It can also protect a round duct with a maximum circumference of 50 inches and a maximum diameter of 16 inches (see **Figure 3-1**). The nozzle must be installed on the centerline of the duct and aimed directly into the duct opening (see **Figure 3-2**).

Two (2) Model NL-D1 exhaust duct nozzles can protect a square or rectangular duct with a maximum perimeter of 84 inches and a maximum one-side length of 34 inches. They can also protect a round duct with a maximum circumference of 84 inches and a maximum diameter of 26.5 inches. When two (2) Model NL-D1 nozzles are used to protect a single duct, the cross sectional area of the duct must be divided into two equal symmetrical areas. The nozzle must then be installed on the centerline of the area it protects and aimed directly into the duct opening (see **Figure 3-2.1**).

2. Model NL-D2.

The Model NL-D2 nozzle is a two (2) flow point nozzle designed for the protection of exhaust ducts. Only one (1) Model NL-D2 nozzle can be used on a single duct branch.

A single Model NL-D2 exhaust duct nozzle can protect a square or rectangular duct with a maximum perimeter of 75.5 inches and a maximum one-side length of 25 inches. It can also protect a round duct with a maximum circumference of 75.5 inches and a maximum diameter of 24 inches (see **Figure 3-1).** The nozzle must be installed on the centerline of the duct and aimed directly into the duct opening (see **Figure 3-2**).

3. Model NL-D3.

The Model NL-D3 nozzle is a three (3) flow point nozzle designed for the protection of exhaust ducts. One (1) or two (2) Model NL-D3 nozzles can be used on a single duct branch.

A single Model NL-D3 exhaust duct nozzle can protect a square or rectangular duct with a maximum perimeter of 100 inches and a maximum one-side length of 33 inches. It can also protect a round duct with a maximum circumference of 100 inches and a maximum diameter of 31.75 inches (see **Figure 3-1**). The nozzle must be installed on the centerline of the duct and aimed directly into the duct opening (see **Figure 3-2**).

Two (2) Model NL-D3 exhaust duct nozzles can protect a square or rectangular duct with a maximum perimeter of 150 inches and a maximum one-side length of 66 inches. They can also protect a round duct with a maximum circumference of 150 inches and a maximum diameter of 47.5 inches. When two (2) Model NL-D3 nozzles are used to protect a single duct, the cross sectional area of the duct must be divided into two equal symmetrical areas. The nozzle must then be installed on the centerline of the area it protects and aimed directly into the duct opening (see **Figure 3-2.1**).

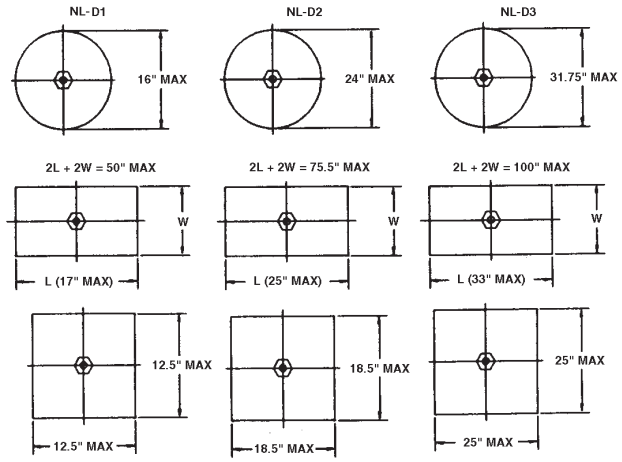


Figure 3-1. Duct Nozzle Coverage Limitations.

002911PC

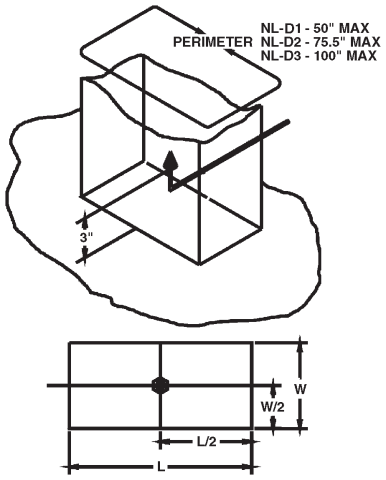


Figure 3-2. Single Nozzle Placement In Duct.

002912PC

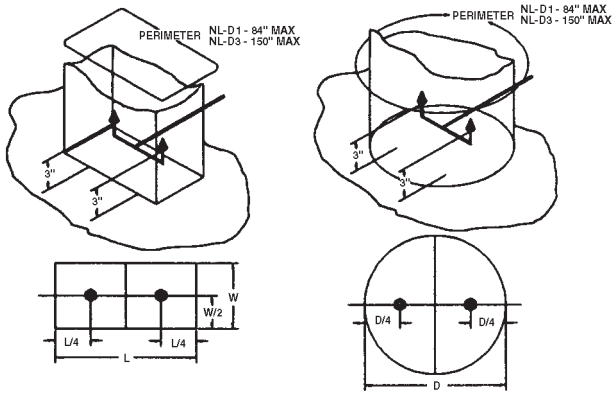


Figure 3-2.1. Dual Nozzle Placement In Duct.

002913PC

Duct Nozzle Coverage Chart

NOZZLE	MAXIMUM SIDE	MAXIMUM PERIMETER	FLOW POINTS
NL-D1	17”	50”	1
2 x NL-D1	34”	84”	2
NL-D2	25”	75”	2
NL-D3	33”	100”	3
2 x NL-D3	66”	150”	6

NOTE: A SINGLE DUCT BRANCH CAN ONLY SUPPORT:
1) A Single NL-D1
2) A Single NL-D2
3) A Single NL-D3
4) Two NL-D1’s
5) Two NL-D3’s

B. Plenum Protection

The Model NL-A nozzle is a one (1) flow point nozzle that has been developed to protect the plenum section of the exhaust hood. Only one (1) Model NL-A nozzle can be used on a single plenum branch. A single Model NL-A can protect a plenum (with single or V-Bank filters) with rectangular dimensions of 8' x 4' or less. Larger plenums can be protected by dividing the hazard area so that each nozzle protects an area of 8' x 4' or less (see **Figure 3-3**).

The nozzle(s) must be located at the center of the V-Bank width or centered between the filter width when used with a single bank filter plenum. It must be within 4” of the wall it is mounted against (see **Figure 3-4**).

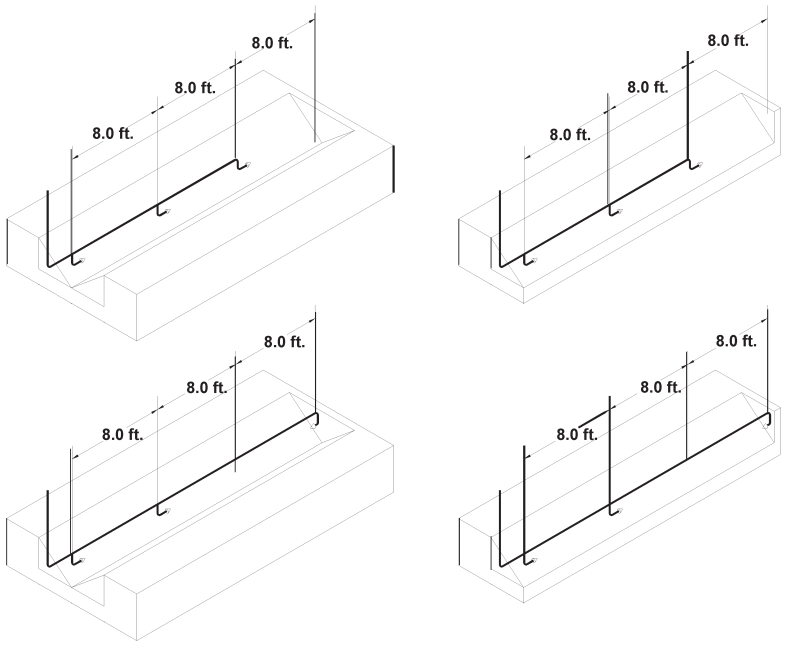


Figure 3.3 Plenum Coverage Limitations, Model NL-A Nozzle.

002914PC

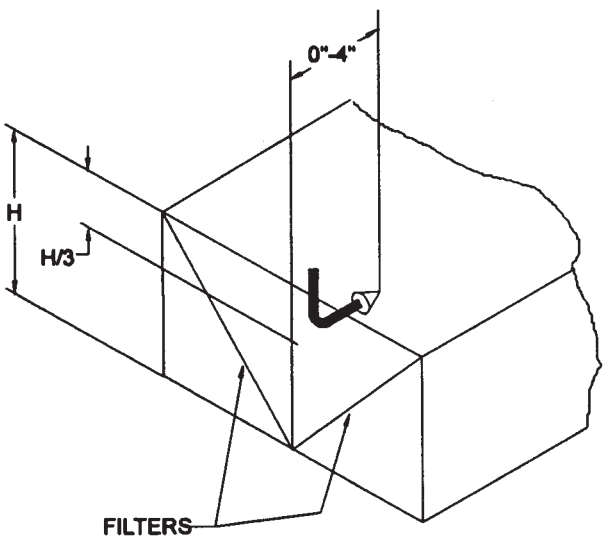


Figure 3-4. Model NL-A Plenum Nozzle Placement.
002915PC

C. Appliance Protection

1. Range Coverage.

The Model NL-F1.25 is a 1.25 flow point nozzle that is used for range top protection. The maximum range top area that can be protected by a single NL-F1.25 nozzle is 12" x 30". See **Figure 3-5.**

a. Nozzle Location.

Side To Side Nozzle Location:

The nozzle must be located on the longest centerline of the protected zone.

Front To Back Nozzle Location:

The nozzle must be located not more than 9" from the center of the protected zone.

Nozzle Height:

The nozzle must be mounted 40" to 50" above the cooking surface.

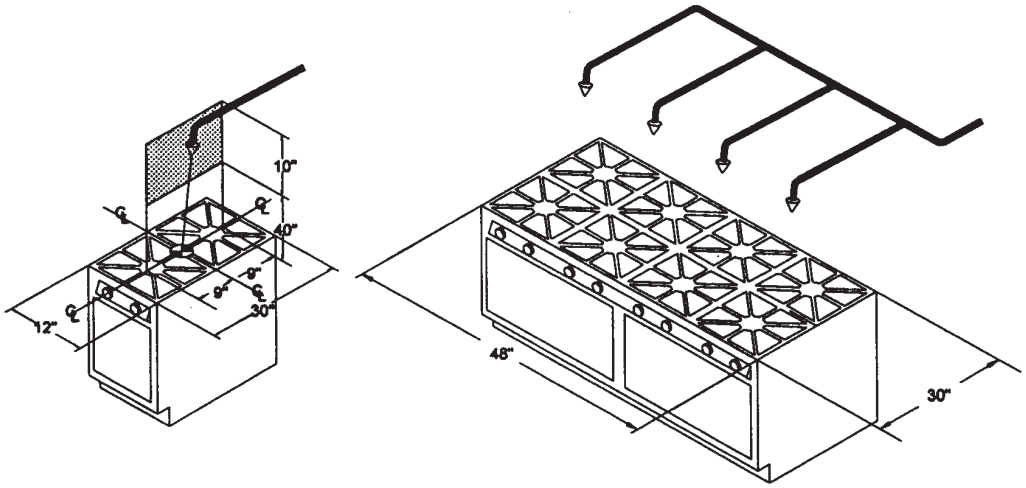


Figure 3.5. Model NL-F1.25 Range Nozzle Placement.
002916PC

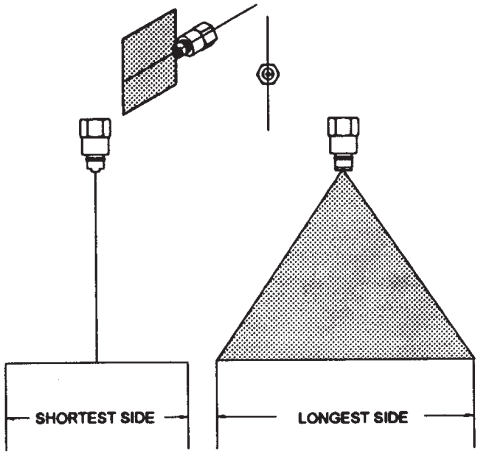


Figure 3.6. Model NL-F1.25 Range Nozzle Aiming.
002917PC

b. Nozzle Aiming.

The tip of the Model NL-F1.25 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-6.**

2. Griddle Coverage.

The Model NL-R nozzle is a one (1) flow point nozzle that is used for griddle protection. The maximum griddle area that can be protected by a single NL-R nozzle is 30” x 30”.

The nozzle must be located over the griddle cooking surface, no more than six (6) inches from the edge of the protected zone. The nozzle must be aimed at the center of the protected zone. The nozzle must be mounted 24” to 50” above the cooking surface. See **Figure 3-7.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

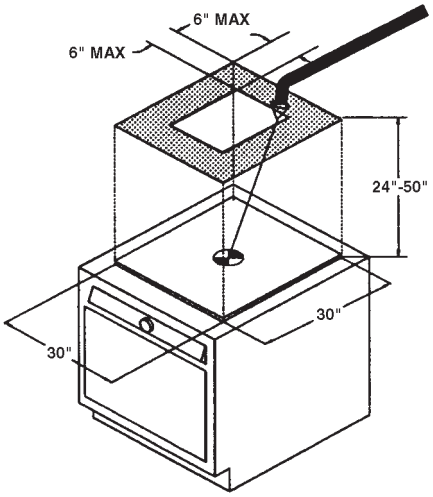


Figure 3-7. Model NL-R Nozzle Placement, Griddle.
002918PC

3. Deep Fat Fryer Coverage.

The Model NL-F2 nozzle is a two (2) flow point nozzle that is used for the protection of a single vat of a deep fat fryer. The maximum area that can be protected by a single NL-F2 nozzle is:

1. Cooking Area: 14.75” x 14”
2. Integral Drip Board: 14.75” x 7.5”

The nozzle must be located over the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 30” to 50” above the top surface of the deep fat fryer (see **Figure 3-8**).

The tip of the Model NL-F2 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-8.1.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

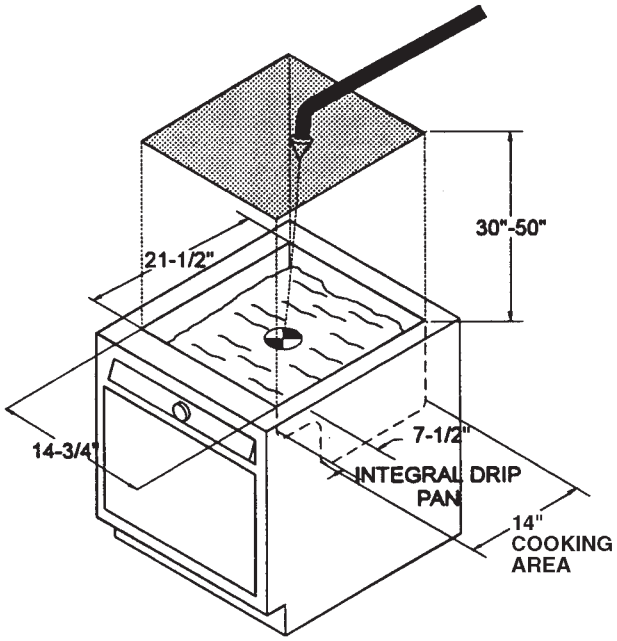


Figure 3-8. Model NL-F2 Nozzle Placement, Deep Fat Fryer.
002919PC

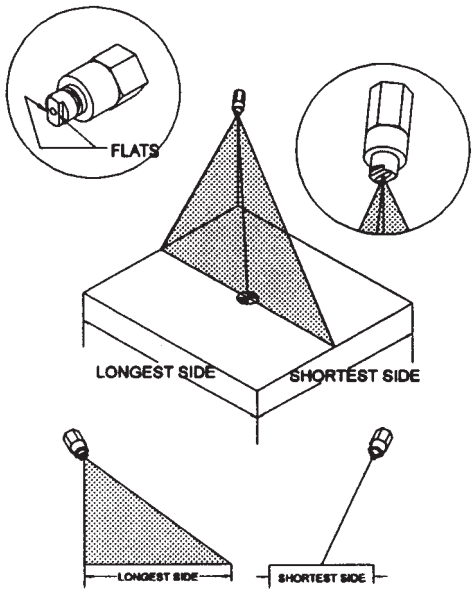


Figure 3-8.1. Model NL-F2 Nozzle Aiming.
002920PC

3.1. Deep Fat Fryer Coverage.

The Model NL-F2 nozzle is a two (2) flow point nozzle that is used for the protection of a single vat of a deep fat fryer. The maximum area that can be protected by a single NL-F2 nozzle is:

1. Cooking Area: 18” x 18”
2. Integral Drip Board: 18” x 9.75”

The nozzle must be located within 11.875” of the center of the longest side, and within 7” of the center of the shortest side of the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 30” to 42” above the top surface of the deep fat fryer (see **Figure 3-8.2**).

The tip of the Model NL-F2 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-8.1.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

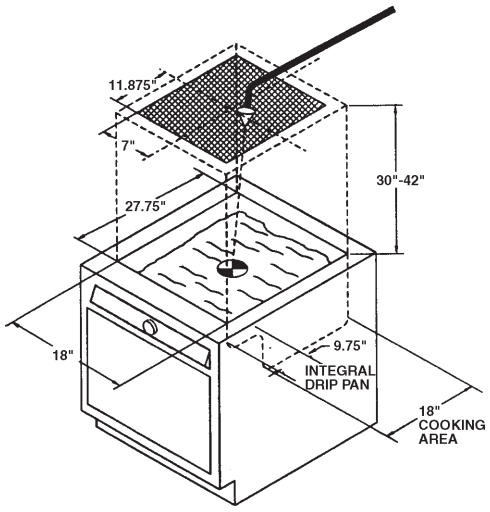


Figure 3-8.2. Model NL-F2 Nozzle Placement, Deep Fat Fryer.

002921PC

NOTE

For installations that require the use of the Model NL-F2 or the Model NL-FL2 nozzle to protect a deep fat fryer in accordance with Deep Fat Fryer Coverage 3.1 shown here (See **Figure 3-8.2** and **Figure 3-8.3**), the following additional restrictions apply to the main supply line piping:

1. Minimum length, linear: 8 feet
2. Minimum length, equivalent: 14.1 feet
3. Minimum system flow points: 4
4. Minimum branches (total): 3

3.2 Deep Fat Fryer Coverage.

The Model NL-FL2 nozzle is a two (2) flow point nozzle that is used for the protection of a single vat of a deep fat fryer. The maximum area that can be protected by a single NL-FL2 nozzle is:

1. Cooking Area: 18” x 18”
2. Integral Drip Board: 18” x 9.75”

The nozzle must be located within 11.875” of the center of the longest side, and within 3” of the center of the shortest side of the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 16” to 26” above the top surface of the deep fat fryer (see **Figure 3-8.3**).

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

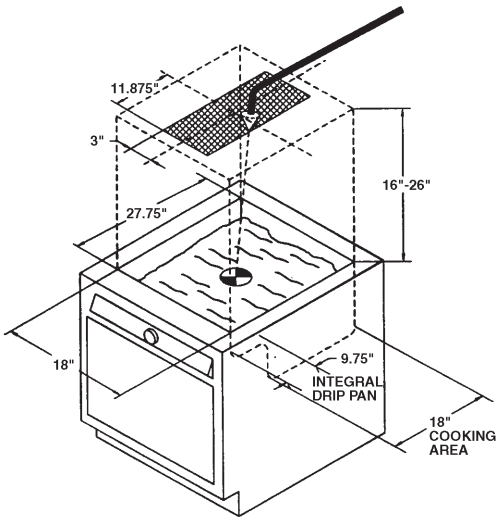


Figure 3-8.3. Model NL-FL2 Nozzle Placement, Deep Fat Fryer.

002922PC

1.1. Range Coverage.

The Model NL-RH2 is a 2 flow point nozzle that is used for range top protection. The maximum range top area that can be protected by a single NL-RH2 nozzle is 28” x 28”. The nozzle must be located within 5” of the center of the protected zone, and aimed at the center of the protected zone. The nozzle must be mounted 32” to 45” above the cooking surface. See **Figure 3-8.4.**

1.2. Range Coverage.

The Model NL-F1 is a 1 flow point nozzle that is used for range top protection. The maximum range top area that can be protected by a single NL-F1 nozzle is 12” x 28”. See **Figure 3-8.5.**

a. Nozzle Location.

Side To Side Nozzle Location:

The nozzle must be located on the longest centerline of the protected zone.

Front To Back Nozzle Location:

The nozzle must be located not more than 6” from the center of the protected zone.

Nozzle Height:

The nozzle must be mounted 15” to 30” above the cooking surface.

b. Nozzle Aiming.

The tip of the Model NL-F1 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-6**.

NOTE

Nozzle must be located anywhere within the shaded area and aimed at the center of the protected zone.

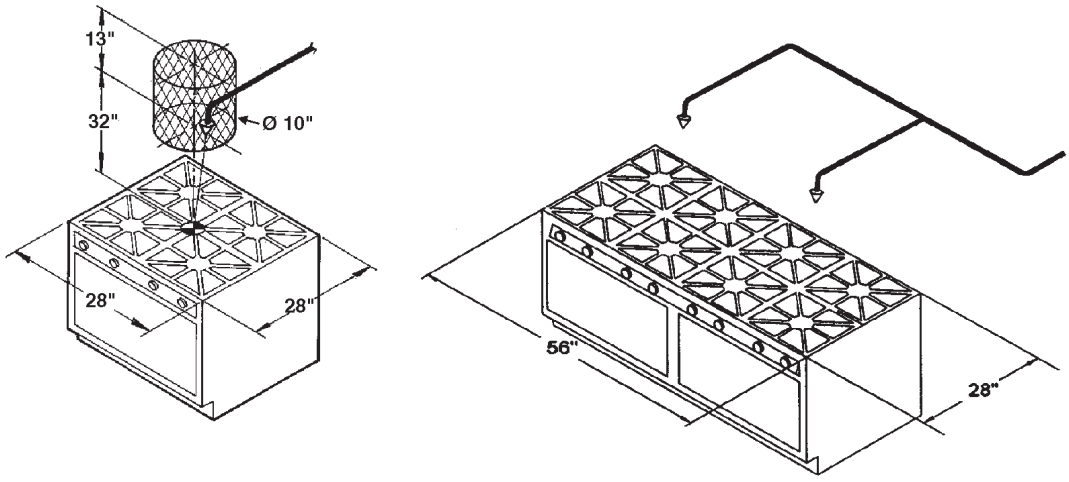


Figure 3-8.4. Model NL-RH2 Range Nozzle Placement

002923PC

NOTE

For installations that require the use of the Model NL-RH2 or NL-F1 nozzle to protect a range in accordance with Range Coverage 1.1 or 1.2 shown here (See **Figure 3-8.4** and **Figure 3-8.5**), the following additional restrictions apply to the main supply line piping:

1. Minimum length, linear: 8 feet
2. Minimum length, equivalent: 14.1 feet
3. Minimum system flow points: 4
4. Minimum branches (total): 3

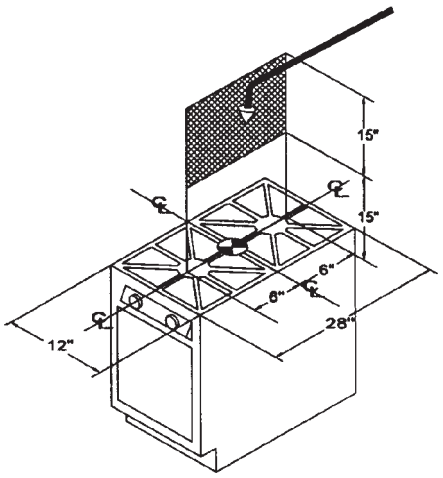


Figure 3-8.5. Model NL-F1 Range Nozzle Placement

002924PC

3.3. Modular Deep Fat Fryer Coverage.

The Model NL-F2 nozzle is a two (2) flow point nozzle that is used for the protection of a single vat of a deep fat fryer. The maximum area that can be protected by two (2) NL-F2 nozzles is:

1. Cooking Area: 22” x 22”
2. Integral Drip Board: 22” x 5.75”

To protect a fryer with the above maximum dimensions or smaller, the area is divided into two equal areas, with a single NL-F2 nozzle protecting each area. Each nozzle must be located within a section (as noted by the shaded area in Figure 3-8.6), that is not less than 2” from the fryer perimeter and not less than 1” from the fryer's shortest side centerline.

Each nozzle, regardless of its location within its section, must be aimed at a point located at the center of the longest side and 1” from the center of the shortest side. See **Figure 3-8.6.**

The nozzle must be mounted 30” to 42” above the top surface of the deep fat fryer (see **Figure 3-8.6**).

The tip of the Model NL-F2 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-8.1.**

NOTE

For installations that require the use of the Model NL-F2 nozzle to protect a deep fat fryer in accordance with the Modular Deep Fat Fryer Coverage 3.3 shown here, the following additional restrictions apply to the main supply line piping:

1. Minimum length, linear: 8 feet
2. Minimum length, equivalent: 14.1 feet
3. Minimum system flow points: 4
4. Minimum branches (total): 3

NOTE

Nozzle must be located anywhere within the shaded area and aimed at a point on the centerline of the longest side and 1” from the centerline of the shortest side.

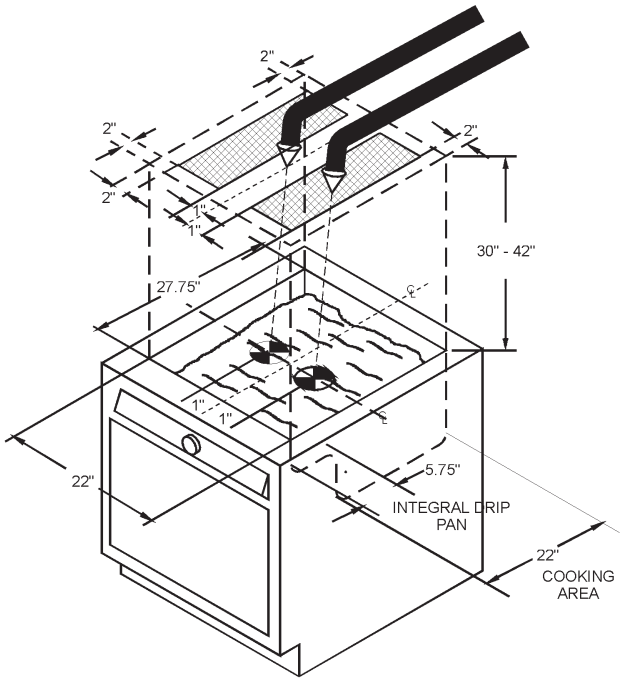


Figure 3-8.6. Model NL-F2 Nozzle Placement, Deep Fat Fryer.

002925PC

3.4. Modular Deep Fat Fryer Coverage.

The Model NL-FL2 nozzle is a two (2) flow point nozzle that is used for the protection of a single vat of a deep fat fryer. The maximum area that can be protected by two (2) NL-FL2 nozzles is:

1. Cooking Area: 22” x 22”
2. Integral Drip Board: 22” x 5.75”

To protect a fryer with the above maximum dimensions or smaller, the area is divided into two equal areas, with a single NL-FL2 nozzle protecting each area. Each nozzle must be located within a section (as noted by the shaded area in **Figure 3-8.7**), that is:

1. Not less than 6” from the fryer's longest side perimeter,
2. Not less than 2” from the fryer's shortest side perimeter, and
3. Not less than 1” from the fryer's shortest side centerline.

Each nozzle, regardless of its location within its section, must be aimed at a point located at the center of the longest side and 1” from the center of the shortest side. See **Figure 3-8.7.**

The nozzle must be mounted 16” to 26” above the top surface of the deep fat fryer (see **Figure 3-8.7**).

NOTE

For installations that require the use of the Model NL-FL2 nozzle to protect a deep fat fryer in accordance with the Modular Deep Fat Fryer Coverage 3.4 shown here, the following additional restrictions apply to the main supply line piping:

1. Minimum length, linear: 8 feet
2. Minimum length, equivalent: 14.1 feet
3. Minimum system flow points: 4
4. Minimum branches (total): 3

NOTE

Nozzle must be located anywhere within the shaded area and aimed at a point on the centerline of the longest side and 1” from the centerline of the shortest side.

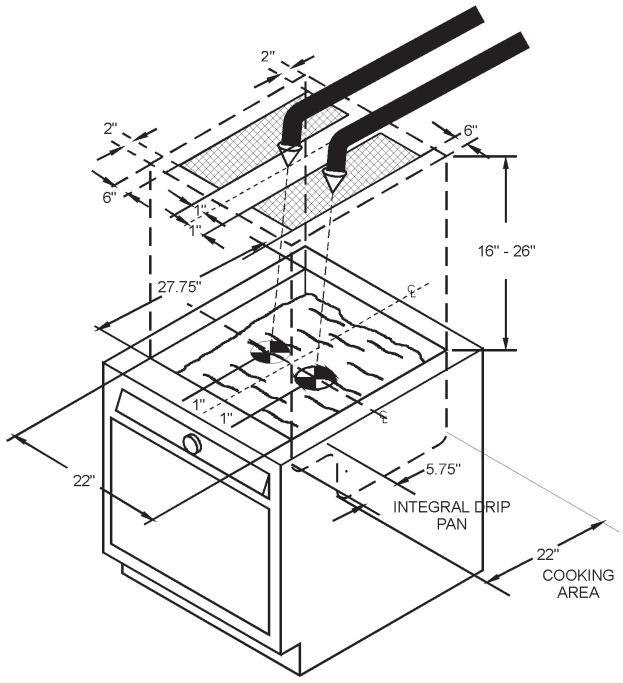


Figure 3-8.7. Model NL-FL2 Nozzle Placement, Deep Fat Fryer.

002925PC

2.1 Low Proximity Griddle Protection

The Model NL-D2 nozzle is a two (2) flow point nozzle that is used for griddle protection. The maximum griddle area that can be protected by a single NL-D2 nozzle is 48” x 30”.

Option 1

The nozzle must be located over the griddle cooking surface, within 12” of the center of the longest side and within 3” of the edge of the protected zone. The nozzle must be aimed at a point on the center line of the longest side and 10” from the edge of the longest side of the protected zone. The nozzle must be mounted 10” to 41” above the cooking surface. See **Figure 3-8.5.**

NOTE

Nozzles shall be located at the front or rear of the griddle, anywhere in the shaded area and aimed at the center of the protected zone.

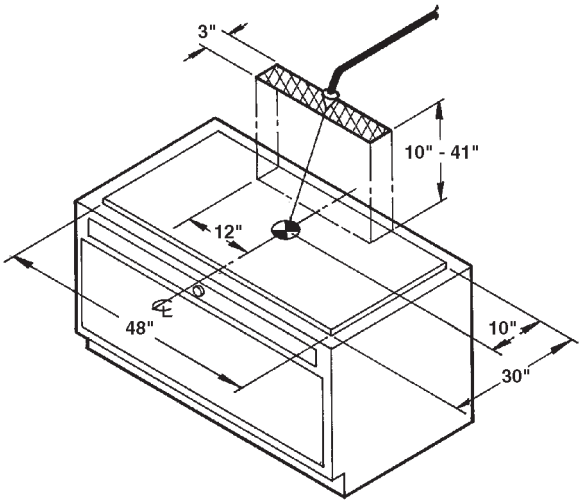


Figure 3-8.8. Option 1: Model NL-D2 Nozzle Placement, Griddle.

002926PC

Option 2

The nozzle must be located over the griddle cooking surface, within 6” of the center of the shortest side and within 3” of the edge of the protected zone. The nozzle must be aimed at a point on the center line of the shortest side and 16” from the edge of the shortest side of the protected zone. The nozzle must be mounted 10” to 41” above the cooking surface. See **Figure 3-8.4.**

NOTE

Nozzles shall be located on the left or right side of the griddle, anywhere in the shaded area and aimed at the center of the protected zone.

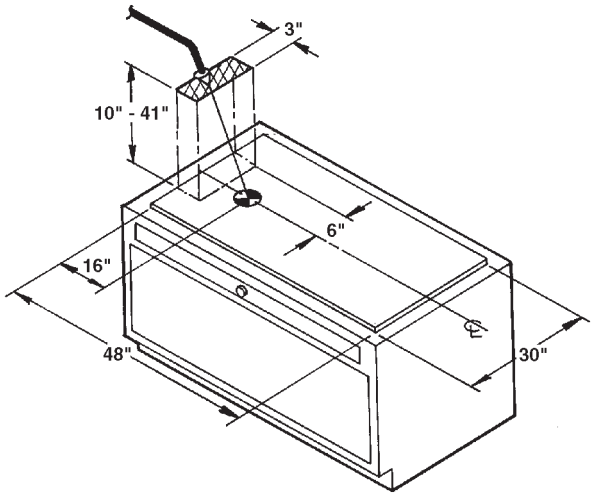


Figure 3-8.9. Option 2: Model NL-D2 Nozzle Placement, Griddle.

002927PC

NOTES:

4. Radiant Charbroiler Coverage.

NOTE

A radiant charbroiler is distinguished by the use of gas or electrically heated metal strips (radiants) that are used for cooking.

The Model NL-R nozzle is a one (1) flow point nozzle that is used to protect either gas or electrically fueled radiant charbroilers. The maximum area that can be protected by a single NL-R nozzle is 25” x 25”.

The nozzle must be located over the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 24” to 50” above the cooking surface. See **Figure 3-9.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

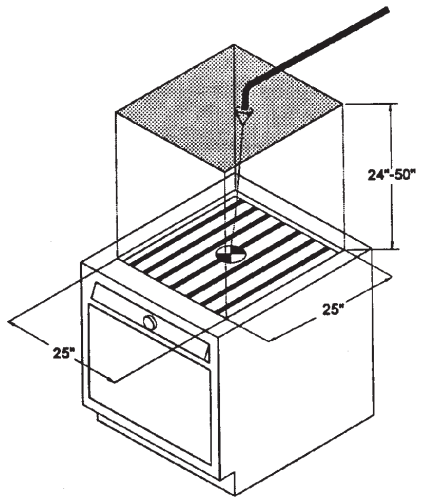


Figure 3-9. Model NL-R Nozzle Placement, Radiant Charbroiler.

002928PC

5. Synthetic Rock Charbroiler Coverage.

NOTE

A synthetic rock charbroiler is distinguished by the use of lava, pumice, or synthetic rocks that are used for cooking.

The Model NL-F2 nozzle is a two (2) flow point nozzle that is used for the protection of either gas or electrically fueled synthetic rock charbroiler. The maximum fuel depth shall not exceed two (2) layers of lava, pumice, or synthetic rocks. The maximum area that can be protected by a single NL-F2 nozzle is 25” x 25”.

The nozzle must be located over the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 30” to 50” above the cooking surface (see **Figure 3-10**).

The tip of the Model NL-F2 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-8.1.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

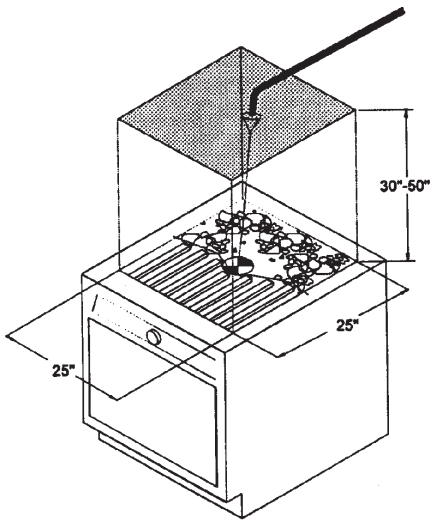


Figure 3-10. Model NL-F2 Nozzle Placement, Synthetic Rock Charbroiler.

002929PC

6. Natural Class “A” Charbroiler Coverage.

NOTE

A Class “A” charbroiler is distinguished by the use of charcoal, mesquite chips, chunks, and/or logs that are used for cooking.

The Model NL-A nozzle is a one (1) flow point nozzle that is used for the protection of Class “A” charbroilers with a maximum fuel depth of six (6) inches. The maximum area that can be protected by a single NL-A nozzle is 20” x 24”.

The nozzle must be located over the cooking surface and aimed at the center of the protected zone. The nozzle must be mounted 15” to 35” above the cooking surface. See **Figure 3-11.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

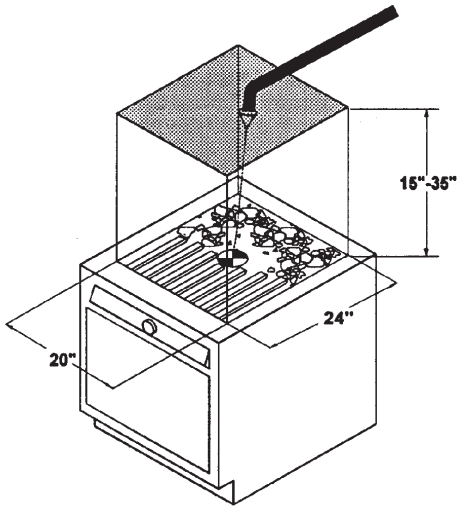


Figure 3-11. Model NL-A Nozzle Placement, Class "A" Charbroiler.

002930PC

7. Upright Broiler Coverage.

The Model NL-UB nozzle is a one-half (1/2) flow point nozzle that is used for upright broiler protection. Two (2) Model NL-UB nozzles are commonly used for this application. The purpose of using two nozzles is to distribute the chemical evenly between the cooking surface (on top) and the drip pan (below). For upright broilers that have no drip pan, a single Model NL-UB nozzle can be used. The maximum area that can be protected by a pair of NL-UB nozzles (or a single NL-UB nozzle when no drip pan is present) is 30" x 34".

One nozzle must be positioned in the front entrance of the broiling chamber and aimed at the diagonal corner. The nozzle will be positioned above the cooking surface. If necessary, the second nozzle must be installed above the front edge of the grease drip pan and aimed at its midpoint. See **Figure 3-12.**

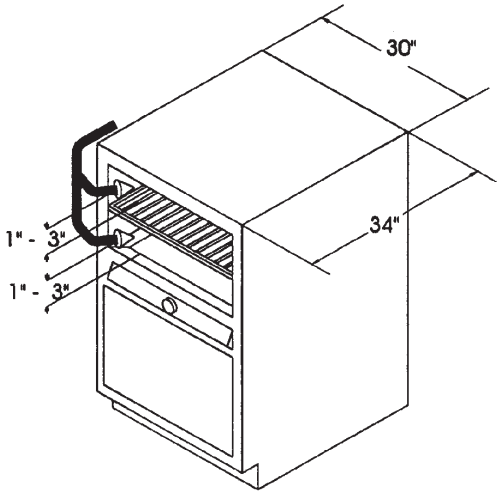


Figure 3-12. Model NL-UB Nozzle Placement, Upright Broiler.

002931PC

8. Chain Broiler Coverage.

Two types of chain broilers are commonly used; open and closed top. Each is protected in a different manner.

a. Close Top Chain Broiler Coverage.

The Model NL-UB nozzle is a one-half (1/2) flow point nozzle that is used for closed top chain broiler protection. Two (2) Model NL-UB nozzles are commonly used for this application. The purpose of using two nozzles is to distribute the chemical evenly between the cooking surface (on top) and the drip pan (below). For closed top chain broilers that have no drip pan, a single Model NL-UB nozzle can be used. The maximum area that can be protected by a pair of NL-UB nozzles (or a single NL-UB nozzle when no drip pan is present) is 30" x 34".

One nozzle must be positioned in the front entrance of the broiling chamber and aimed at the diagonal corner. The nozzle will be positioned above the cooking surface. The second nozzle (if necessary) must be installed above the front edge of the grease drip pan and aimed at its midpoint. See **Figure 3-13.**

8.1 Tilting Skillet/Braising Pan Coverage.

The Model NL-F2 nozzle is a two (2) flow point nozzle that is used for the protection of a tilting skillet/braising pan. The maximum area that can be protected by a single NL-F2 nozzle is 27.75” x 18”. The nozzle is located over the skillet cooking surface:

1. From the front edge (away from the lid): no less than 2” and no greater than 1/4 the distance of the appliance depth.

2. From the sides - no less than 2” from the edge of the appliance or the edge of the protected zone.

The nozzle must be mounted 30” to 36” inches above the top surface of the tilting skillet/braising pan, and aimed at the center of the protected zone. See **Figure 3-12.1.**

The tip of the Model NL-F2 nozzle has two flat areas designed to assist aiming. The nozzle must be positioned so that these flat areas are parallel to the longest side of the protected zone. See **Figure 3-8.1.**

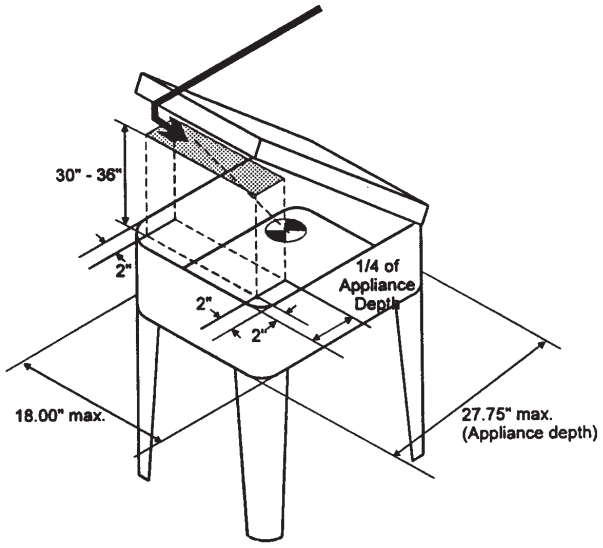


Figure 3-12.1. Model NL-F2 Nozzle Placement, Tilting Skillet/Braising Pan.

002932PC

NOTE

Nozzle shall be located anywhere within the shaded area and aimed at the center of the protected zone. The nozzle is to be located as to minimize the potential for the skillet cover to interfere with the nozzle discharge.

8.2 Tilting Skillet/Braising Pan Coverage.

The Model NL-FL2 nozzle is a two (2) flow point nozzle that is used for the protection of a tilting skillet/braising pan. The maximum area that can be protected by a single NL-FL2 nozzle is 27.75” x 18”. The nozzle is located over the skillet cooking surface:

1. From the front edge (away from the lid): no less than 2” and no greater than 1/4 the distance of the appliance depth.

2. From the sides - no greater than 3” from the centerline of the shortest side of the protected zone

The nozzle must be mounted 16” to 26” inches above the top surface of the tilting skillet/braising pan, and aimed at the center of the protected zone. See Figure **3-12.2.**

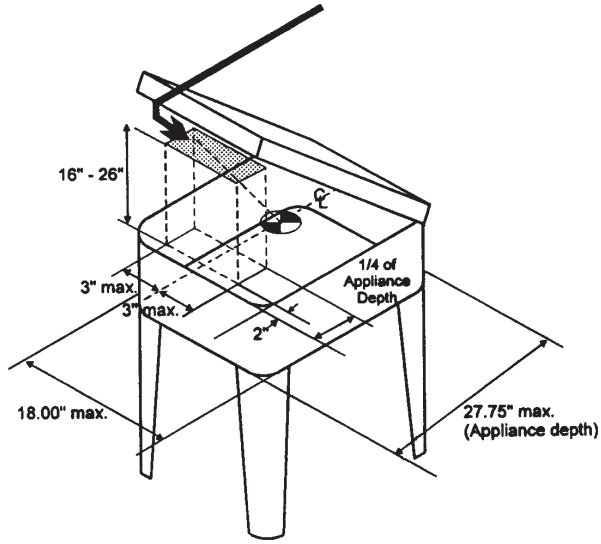


Figure 3-12.2. Model NL-FL2 Nozzle Placement, Tilting Skillet/Braising Pan.

002933PC

NOTE

Nozzle shall be located anywhere within the shaded area and aimed at the center of the protected zone. The nozzle is to be located as to minimize the potential for the skillet cover to interfere with the nozzle discharge.

8.3 Electrostatic Precipitator Coverage.

Some restaurant ventilating systems may utilize an electrostatic precipitator to facilitate the removal of grease laden vapor. These precipitators are typically located at or near the base of the exhaust duct. If protection for electrostatic precipitators is required by the local “authority having jurisdiction,” the following guidelines should be followed.

1) Nozzle Placement

Ducts having electrostatic precipitators are protected by using the appropriate duct nozzle(s) (as per Chapter 3, Section 1) above the precipitator and a Model NL-UB Nozzle for the precipitator itself.

The duct nozzle(s) must be installed above the precipitator and aimed in the direction of air flow. One (1) Model NL-UB nozzle must be used to protect the precipitator. The nozzle is to be centered 10 to 26 inches before the precipitator with its discharge point aimed at the center of the precipitator. See **Figure 3-12.3.**

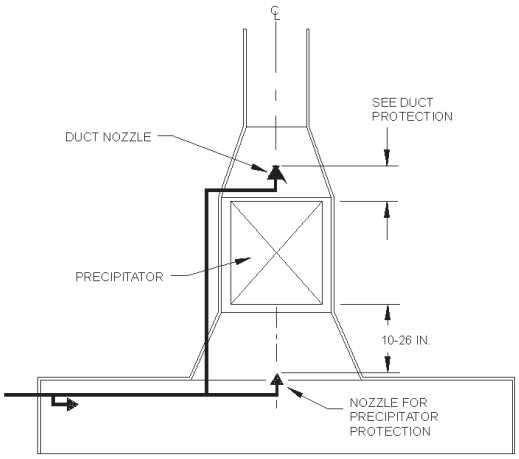


Figure 3-12.3. Nozzle Placement for Single Electrostatic Precipitator.

002934PC

2) Detector Placement

If an electrostatic precipitator is located at or near the base of an exhaust duct, one (1) detector must be located below the precipitator and an additional detector must be located above the precipitator in the duct opening. See **Figure 3-12.4.**

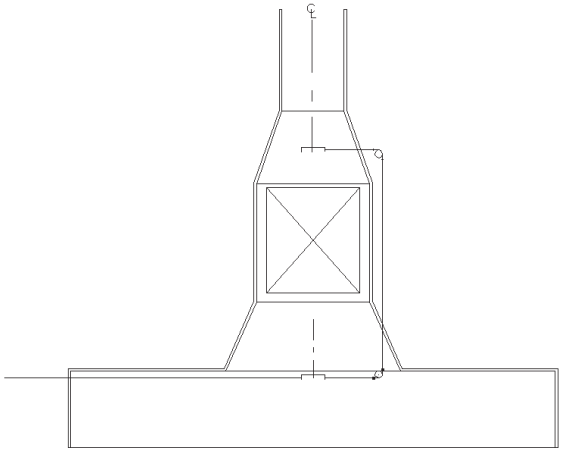


Figure 3-12.4. Detector Placement for Single Electrostatic Precipitator.

002935PC

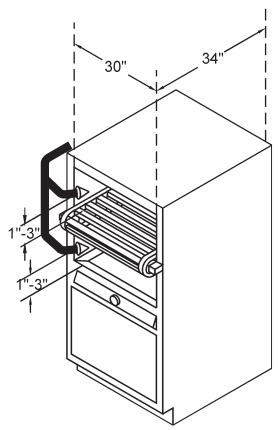


Figure 3-13. Model NL-UB Nozzle Placement, Closed Top Chain Broiler.
002936PC

b. Open Top Chain Broiler Coverage.

The Model NL-A nozzle is a one (1) flow point nozzle that is used for open top chain broiler protection. The maximum area that can be protected by an NL-A nozzles is 32” x 34”.

The nozzle must be located over the opening and aimed at the center of the protected zone. The nozzle must be mounted 10” to 22” above the cooking surface. See **Figure 3-14.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

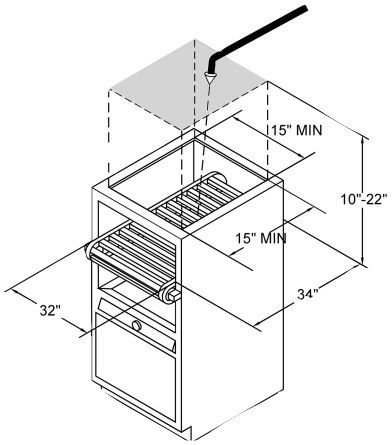


Figure 3-14. Model NL-A Nozzle Placement, Open Top Chain Broiler.
002937PC

9. Wok Coverage

The Model NL-R nozzle is a one (1) flow point nozzle that is used for wok protection. A single NL-R nozzle can cover a single wok of 14” to 24” in diameter, and 3.875” to 7.625” in depth.

The nozzle must be mounted 40” to 50” above the cooking surface at a radius of 12” from the center of the wok, regardless of wok diameter. The nozzle must be aimed at the center of the protected zone. See **Figure 3-14.1.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

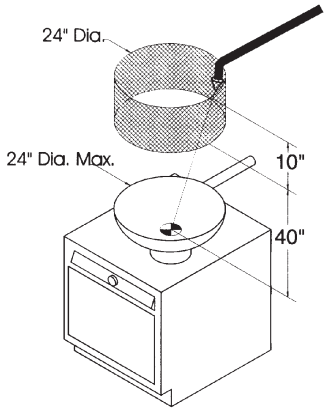


Figure 3-14.1. Model NL-R Placement, Wok.
004426PC

9.1. Wok Coverage

The Model NL-W nozzle is a one (1) flow point nozzle that is used for wok protection. A single NL-W nozzle can cover a single wok of 11” to 30” in diameter, and 3.00” to 8.00” in depth.

The nozzle must be mounted 32” to 50” above the cooking surface within a radius of 12” from the center of the wok, regardless of wok diameter. The nozzle must be aimed at the center of the protected zone. See **Figure 3-14.2.**

NOTE

Nozzle shall be located anywhere in the shaded area and aimed at the center of the protected zone.

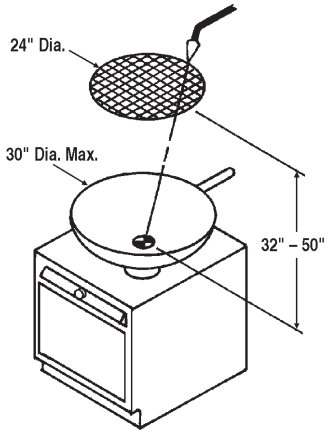


Figure 3-14.2. Model NL-W Placement, Wok.
002938PC

SECTION 2
CYLINDER SIZING

After determining the number and type of nozzles required to protect the duct, plenum, and cooking appliances, the total number of system flow points can be determined. The sum of all required nozzles' flow points is used to determine the size and quantity of cylinders required.

MAXIMUM CYLINDER FLOW POINTS

Flow Points	Cylinder
8	PCL-240
13	PCL-350
20	PCL-550

For systems requiring more than twenty (20) flow points, any combination of cylinders can be used provided the total flow point requirements are met.

EXAMPLE

If a system requires twenty-six (26) flow points, the following combinations of cylinders can be used:

1. 1 x PCL-550 and 1 x PCL-240 (28 FP total)
2. 2 x PCL-350 (26 FP total)

NOTE

Cylinders cannot be manifolded together. Each cylinder must be piped separately.

SECTION 3
PIPING LIMITATIONS

Pyro-Chem Restaurant Fire Suppression System piping limitations are divided into two categories; Main Supply Line Piping Limitations and Branch Line Piping Limitations.

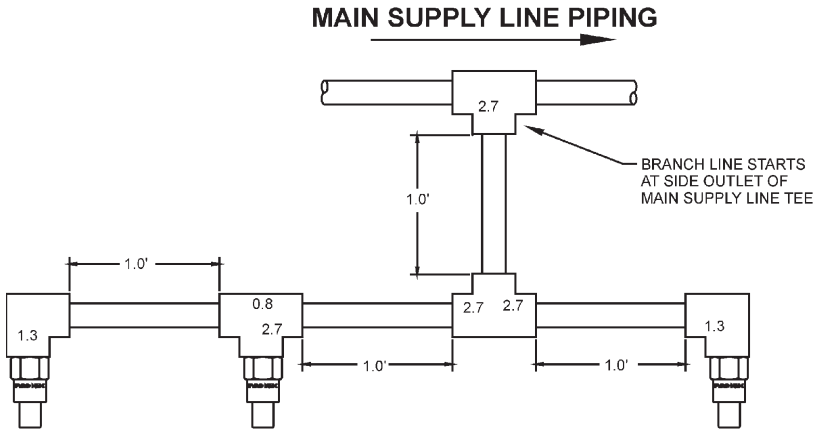
1. Main Supply Line Piping.

The main supply line is a run of pipe from the cylinder to the hazard area. In general, it is a straight run of pipe that runs through tees. Branch piping is connected to the side outlet of these tees.

The main supply line of the Pyro-Chem Restaurant Fire Suppression System utilizes either straight line or split piping to simplify system installation.

Straight line piping is distinguished by the fact that the main supply line is a straight run of pipe that flows through tees. When straight line piping is used, the main supply line cannot run into the branch of a tee.

Split piping is distinguished by the fact that the main supply line runs into the branch of the first tee, splitting the main supply line in two. When split piping is used, no branch piping can be connected to the main supply line before it is split. In split piping systems, the entire main supply line, including both sides of the split, cannot exceed the piping limitations outlined in this chapter. In addition, the equivalent lengths of the main supply line is not required to be balanced.



TOTAL LINEAR FEET = 4.0'
TOTAL FITTING EQUIVALENT = 14.2'

TOTAL EQUIVALENT FEET = 18.2'

Figure 3-15. Example of Equivalent Piping.

002939PC

2. Branch Line Piping.

Branch piping is used to connect the discharge nozzles to the main supply line. This piping is connected to the side outlet of main supply line tees. The last branch is connected to an elbow at the end of the main supply line. There are seven (7) types of branch piping:

1. One (1) Nozzle Duct Branch.
2. Two (2) Nozzle Duct Branch.
3. One (1) Nozzle Plenum Branch.
4. One (1) Nozzle Appliance Branch.
5. Two (2) Nozzle Appliance Branch.
6. Three (3) Nozzle Appliance Branch.
7. Four (4) Nozzle Range Branch.

UNDERSTANDING EQUIVALENT PIPING

Piping limitations in this chapter are given in both linear and equivalent lengths.

Linear piping is the actual length of straight pipe used on either the main supply line or a branch.

Equivalent piping is equal to the total linear pipe used on either the main supply line or a branch **plus** the equivalent length of any fittings used on either the main supply line or a branch. See **Figure 3-15.**

Equivalent Piping = (Linear Piping) + (Total Equivalent Length of Fittings Used)

All pipe fittings develop a pressure loss which can be equated to the loss through a specific length of straight pipe. This loss is the equivalent length of the fitting. See **Table 3-1.**

Pipe Size	45° Elbow	90° Elbow	Tee Flow Through	Tee Side Outlet	Union or Couplings
3/8”	0.6	1.3	0.8	2.7	0.3
1/2”	0.8	1.7	1.0	3.4	0.4

Table 3-1. Pipe Fitting Equivalent Lengths In Feet.

An example of the total equivalent piping calculation for a typical branch is illustrated by **Figure 3-15.**

NOTE

The only acceptable types of piping which can be used with the Pyro-Chem System are black pipe, stainless steel, or chrome plated pipe. Galvanized pipe cannot be used.

MAIN SUPPLY LINE PIPING LIMITATIONS

1. Model PCL-240.

Main supply line piping limitations for the PCL-240 are given by Table 3-2. The maximum length of main supply line between the first and last branch tee is 16 feet. Examples of acceptable piping configurations are shown in **Figure 3-16.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet		Min Lengths Feet		Max Vert. Rise
			Linear	Equiv	Linear	Equiv	
Main Supply Line	3/8”	8	21	36	3	7	8’

Table 3-2. Model PCL-240. Main Supply Line Piping Limitations.

NOTE

For installations that require the use of the Model NL-F1.25 nozzle, the following additional restrictions apply:
1. Minimum length, linear: 5 feet
2. Minimum length, equivalent: 12 feet
3. Minimum system flow points: 3
4. Minimum branches (total): 3

2. Model PCL-350.

Main supply line piping limitations for the PCL-350 are given by Table 3-3. The maximum length of main supply line between the first and last branch tee is 30 feet. Examples of acceptable piping configurations are shown in **Figure 3-17.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet		Min Lengths Feet		Max Vert. Rise
			Linear	Equiv	Linear	Equiv	
Main Supply Line	3/8” 1/2”	13	36	63	3	7	8’

Table 3-3. Model PCL-350. Main Supply Line Piping Limitations.

NOTE

For installations that require the use of the Model NL-F1.25 nozzle, the following additional restrictions apply:
1. Minimum length, linear: 5.5 feet
2. Minimum length, equivalent: 12 feet
3. Minimum system flow points: 3
4. Minimum branches (total): 3

3. Model PCL-550.

Main supply line piping limitations for the PCL-550 are given by Table 3-4. The maximum length of main supply line between the first and last branch tee is 35 feet. Examples of acceptable piping configurations are shown in **Figure 3-18.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet		Min Lengths Feet		Max Vert. Rise
			Linear	Equiv	Linear	Equiv	
Main Supply Line	1/2”	20	45	80	3	7	8’

Table 3-4. Model PCL-550. Main Supply Line Piping Limitations.

NOTE

For installations that require the use of the Model NL-F1.25 nozzle, the following additional restrictions apply:
1. Minimum length, linear: 5.5 feet
2. Minimum length, equivalent: 12 feet
3. Minimum system flow points: 3
4. Minimum branches (total): 3

BRANCH PIPING LIMITATIONS

There are seven (7) types of branches used on the Pyro-Chem Restaurant Fire Suppression System:

1. One (1) Nozzle Duct Branch.
2. Two (2) Nozzle Duct Branch.
3. One (1) Nozzle Plenum Branch.
4. One (1) Nozzle Appliance Branch.
5. Two (2) Nozzle Appliance Branch.
6. Three (3) Nozzle Appliance Branch.
7. Four (4) Nozzle Range Branch.

NOTE: A range branch is any branch that contains NL-F1.25 nozzles only. Any branch that contains NL-F1.25 nozzles in combination with any other nozzle(s) is considered an appliance branch.

When using the PCL-240, the total of all duct, plenum, appliance, and range branch piping cannot exceed 25 linear feet and 55 equivalent feet.

When using the PCL-350, the total of all duct, plenum, appliance, and range branch piping cannot exceed 35 linear feet and 100 equivalent feet.

When using the PCL-550, the total of all duct, plenum, appliance, and range branch piping cannot exceed 45 linear feet and 125 equivalent feet.

Branch piping limitations are applicable to all cylinder sizes (i.e., PCL-240, PCL-350, and PCL-550). All branch piping must be 3/8" diameter black, chrome plated, or stainless steel pipe.

1. One Nozzle Duct Branch Piping Limitations.

The one nozzle duct branch is a run of 3/8" pipe which connects the main supply line to a single duct nozzle. A one nozzle duct branch can support the following combinations of nozzles:

1. 1 x Model NL-D1 Nozzle.
2. 1 x Model NL-D2 Nozzle.
3. 1 x Model NL-D3 Nozzle.

One nozzle duct branch piping limitations are given by **Table 3-5.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
1 Nozzle Duct Branch	3/8"	3	6	12	0	0	4'

Table 3-5. Duct Branch Piping Limitations.

2. Two Nozzle Duct Branch Piping Limitations.

The two nozzle duct branch is a run of 3/8" pipe which connects the main supply line to two duct nozzles. A two nozzle duct branch can support the following combinations of nozzles:

1. 2 x Model NL-D1 Nozzle.
2. 2 x Model NL-D3 Nozzle.

Two nozzle duct branch piping limitations are given by **Table 3-5.1.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
2 Nozzle Duct Branch	3/8"	6	8	22	0	0	4'

Table 3-5.1. Duct Branch Piping Limitations.

3. One Nozzle Plenum Branch Piping Limitations.

The one nozzle plenum branch is a run of 3/8" pipe which connects the main supply line to a plenum nozzle. A single plenum branch can support only one flow point. Plenum branch piping limitations are given by **Table 3-6.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
1 Nozzle Plenum Branch	3/8"	1	4	10	0	0	2'

Table 3-6. Plenum Branch Piping Limitations.

4. One Nozzle Appliance Branch Piping Limitations.

The one nozzle appliance branch is a run of 3/8" pipe which connects the main supply line to a single appliance nozzle. A one nozzle appliance branch can support a maximum of two (2) flow points. One nozzle appliance branch piping limitations are given by **Table 3-7.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
1 Nozzle Appliance Branch	3/8"	2	6	12	0	0	0'

Table 3-7. One Nozzle Appliance Branch Piping Limitations.

5. Two Nozzle Appliance Branch Piping Limitations.

The two nozzle appliance branch is a run of 3/8" pipe which connects the main supply line to two appliance nozzles. A two nozzle appliance branch can support a maximum of four (4) flow points. Two nozzle appliance branch piping limitations are given by **Table 3-7.1.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
2 Nozzle Appliance Branch	3/8"	4	8	22	0	0	0'

Table 3-7.1. Two Nozzle Appliance Branch Piping Limitations

6. Three Nozzle Appliance Branch Piping Limitations

The three nozzle appliance branch is a run of 3/8" pipe which connects the main supply line to three appliance nozzles. A three nozzle appliance branch can support a maximum of five (5) flow points. Three nozzle appliance branch piping limitations are given by **Table 3-7.2.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
3 Nozzle Appliance Branch	3/8"	5	10	28	0	0	0'

Table 3-7.2. Three Nozzle Appliance Branch Piping Limitations

7. Four Nozzle Range Branch Piping Limitations

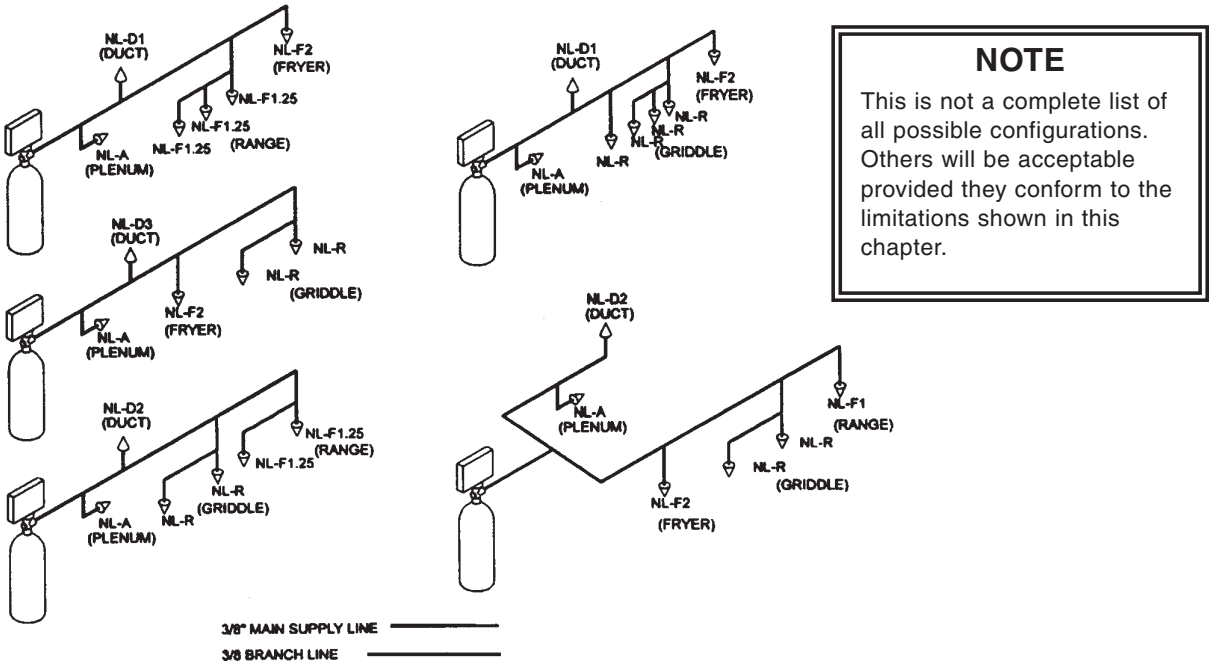
NOTE

These limitations apply to branches that utilize four (4) model NL-F1.25 nozzles. No other types of nozzles, or combinations of nozzles, may be used on a four nozzle branch.

The four nozzle range branch is a run of 3/8" pipe which connects the main supply line to four NL-F1.25 range nozzles. A four nozzle range branch can support a maximum of five (5) flow points. The four nozzle range branch piping limitations are given by **Table 3-8.**

Section	Pipe Dia.	Max Flow Points	Max Lengths Feet Linear	Max Lengths Feet Equiv	Min Lengths Feet Linear	Min Lengths Feet Equiv	Max Vert. Rise
4 Nozzle Range Branch	3/8"	5	10	31	0	0	0'

Table 3-8. Four Nozzle Range Branch Piping Limitations



NOTE

This is not a complete list of all possible configurations. Others will be acceptable provided they conform to the limitations shown in this chapter.

Figure 3-16. Model PCL-240. Examples Of Acceptable Piping Configurations.

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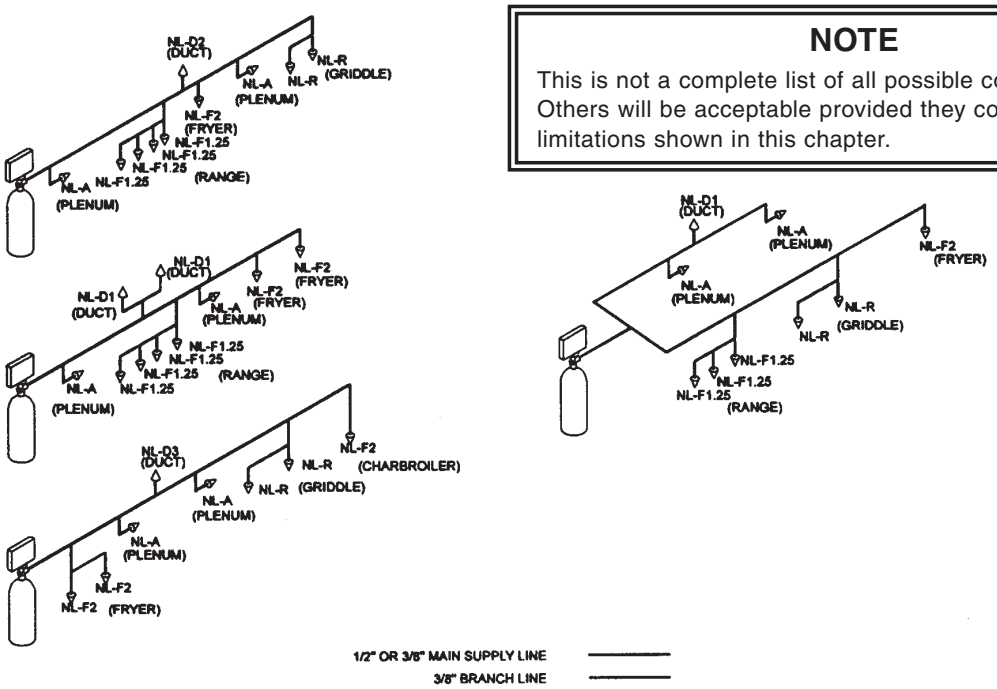

NOTE

This is not a complete list of all possible configurations. Others will be acceptable provided they conform to the limitations shown in this chapter.

Figure 3-17. Model PCL-350. Examples Of Acceptable Piping Configurations.

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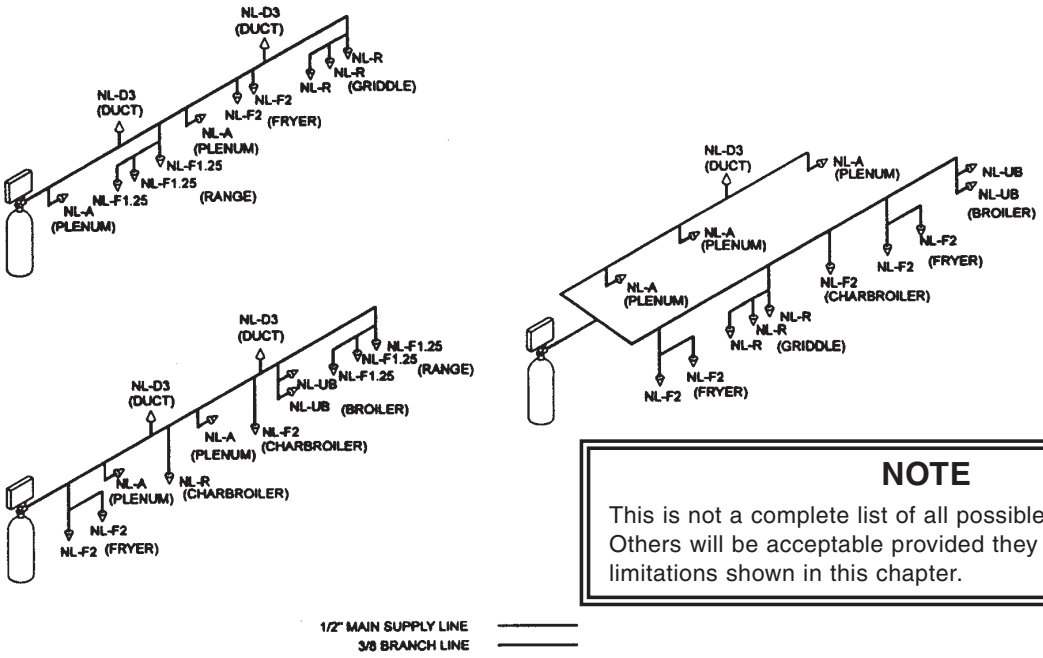

NOTE

This is not a complete list of all possible configurations. Others will be acceptable provided they conform to the limitations shown in this chapter.

Figure 3-18. Model PCL-550. Examples Of Acceptable Piping Configurations.

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SECTION 4
DETECTOR PLACEMENT

Detectors are required over cooking appliances and in the duct(s) of protected ventilation hoods. Detectors shall be located in the plenum area of the ventilation hood.

1. Exhaust Duct(s).

Each exhaust duct must have at least one (1) detector installed in the duct entrance, located in the air stream of the cooking vapors at a maximum of 12 feet into the duct, centered. See **Figure 3-19.**

2. Cooking Appliance(s).

Each cooking appliance with a continuous cooking surface not exceeding 48” x 48” shall be protected by one (1) detector. Cooking appliances with a continuous cooking surface exceeding 48” x 48” shall be protected by one (1) detector per 48” x 48” cooking area. Detectors used for cooking appliances must be located within the perimeter of the protected appliance toward the exhaust duct side of the appliance. The detector should be located in the air stream of the appliance to enhance system response time.

If a cooking appliance is located under a duct opening where a detector has been mounted, it is not necessary to utilize an additional detector provided the duct detector is not more than 12” into the duct opening. If two (2) appliances are located under a duct opening where a detector has been mounted, it is not necessary to utilize an additional detector provided the duct detector is not more than 12” into the duct opening. See **Figure 3-19.**

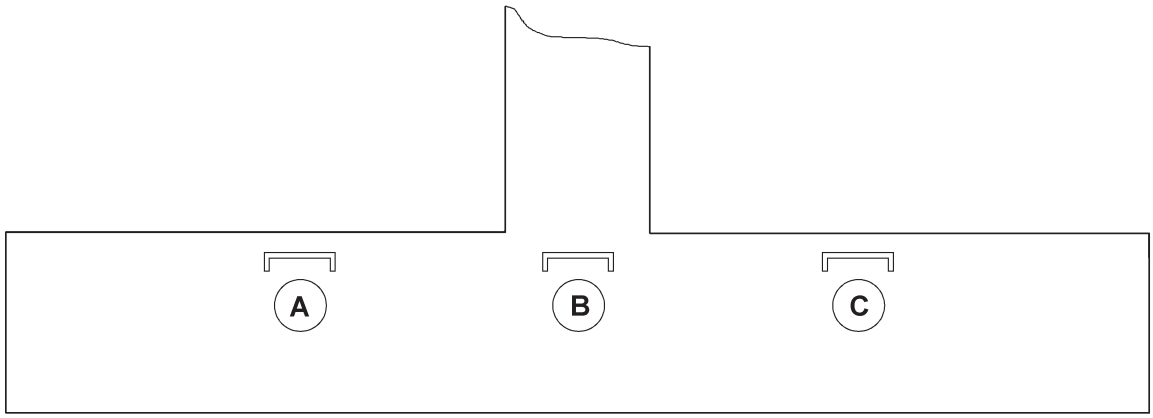

Figure 3-19. Proper Detector Placement.

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NOTES:

CHAPTER IV
SYSTEM INSTALLATION

GENERAL

This chapter will detail the basic information necessary for proper installation of the Pyro-Chem Restaurant Fire Suppression System. However, before attempting any installation it is necessary to attend a Factory Certification Training Class and become Certified to install the Pyro-Chem Restaurant Fire Suppression System. Because it is impossible to completely understand every aspect of an intricate pre-engineered system simply by reading the Technical Manual, Pyro-Chem will not be responsible for system installations or maintenance performed by any non-Certified person(s).

Pipe and fittings for the discharge piping, conduit (EMT), pipe straps, pipe hangers, mounting bolts, and other miscellaneous equipment are not furnished as part of the Pyro-Chem Restaurant Fire Suppression System. These items must be furnished by the installer.

Before attempting any installation, unpack the entire system and check that all necessary parts are on hand. Inspect parts for damage. Verify that cylinder pressure is within the acceptable range as shown on the gauge.

CYLINDER INSTALLATION

The cylinder and valve assembly is shipped with an anti-recoil plug in the valve discharge port.

CAUTION

The anti-recoil plug must remain in the valve discharge port until the discharge piping is connected to the valve.

The cylinder must be mounted vertically with the discharge port facing either left or right. The Models PCL-240 and PCL-350 cylinders must be mounted using a Model MB-15 Mounting Bracket Kit. The Model PCL-550 cylinder must be mounted using a Model MB-1 Mounting Bracket Kit.

The bracket must be securely anchored to the wall using bolts or lag screws. The wall to which the bracket is attached must be sufficiently strong to support the cylinder. The bracket should never be fastened to dry wall or similar material. If this type of wall is encountered, studs must be located and the bracket fastened to them. See **Figure 4-1.**

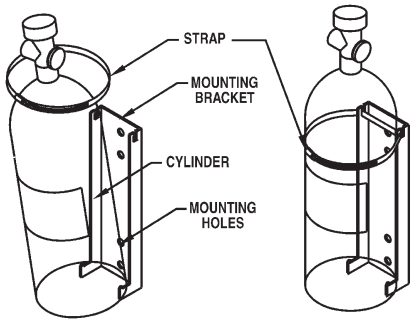

Figure 4-1. Cylinder and Mounting Bracket Installation.

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CONTROL HEAD INSTALLATION

1. Single Cylinder Installations.

For single cylinder system installations the Model MCH3/ECH3/NMCH3 Control Head can be installed directly onto the cylinder valve. When the control head is properly aligned in the desired position, tighten the knurled locking ring to secure the assembly. See **Figure 4-2.**

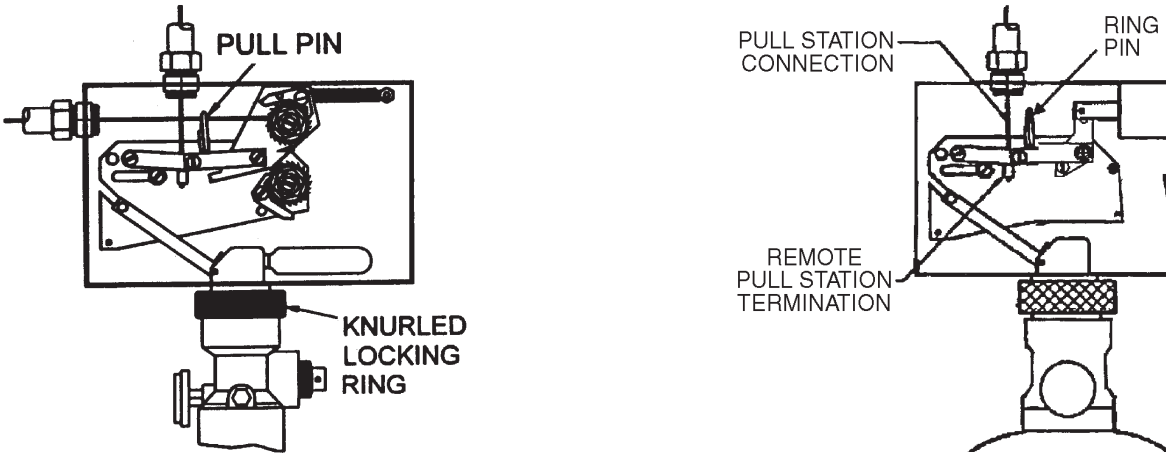

Figure 4-2. Single Cylinder Installation Using Model ECH3/MCH3/NMCH3 Control Head.

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2. Multiple Cylinder Installations.

A. Multiple Cylinder Actuation Using MCH3/ECH3/NMCH3 Control Head.

The Model MCH3/ECH3/NMCH3 Control Head can be used to pneumatically actuate a maximum of three (3) agent cylinders. When a control head is used for multiple cylinder actuation, it cannot be mounted directly onto a cylinder valve. The control head must be installed remotely using a Model MB-P2 Control Head Mounting Bracket. The bracket must be anchored to the wall using bolts or lag screws.

In order to actuate the agent cylinder(s) from a control head, a 1/4" NPT x 45° 1/4" flare type fitting (conforming to SAE J513c) must be screwed into the base of the control head actuator. Pneumatic tubing is then used to connect the control head to the valve cap assembly of each agent cylinder valve. See **Figure 4-3.**

NOTE

Pneumatic tubing used for remote cylinder actuation shall have an outside diameter of 1/4" with a minimum wall thickness of 1/32". This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4", 45° flare type conforming to SAE J513c.

Compression type fittings are not acceptable.

A single Model MCH3/ECH3/NMCH3 Control Head can actuate:

1. One (1) or two (2) agent cylinders with a maximum of eight (8) feet of pneumatic tubing.

2. Three (3) agent cylinders with a maximum of six (6) feet of pneumatic tubing.

B. Multiple Cylinder Actuation Using Model PAC-10 or PAC-200 Pneumatic Actuation Cylinder.

The Model PAC-10 or PAC-200 Pneumatic Actuation Cylinder must be used if more than three (3) agent cylinders require simultaneous actuation. The Model PAC-10/200 must be used in conjunction with a Model MCH3/ECH3/NMCH3 Control Head. The control head is mounted on the Model PAC-10/200 valve assembly.

The Model PAC-10/200 is shipped complete with a mounting bracket. The cylinder must be mounted vertically with the nameplate facing out. The bracket must be securely anchored to the wall using bolts or lag screws. The wall to which the bracket is attached must be sufficiently strong to support the pneumatic cylinder. The bracket should never be fastened to dry wall or similar material. If this type of wall is encountered, studs must be located and the bracket fastened to them. See **Figure 4-4.**

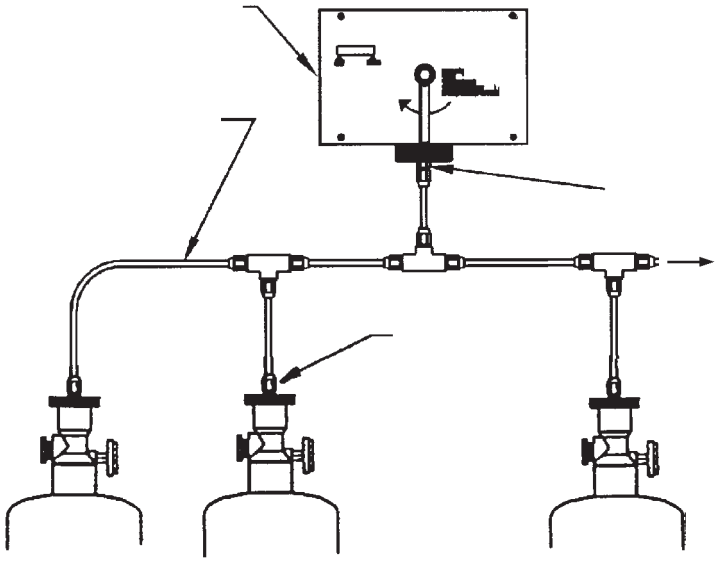


Figure 4-3. Multiple Cylinder Actuation Using Model MCH3/ECH3/NMCH3 Control Head.
004428PC

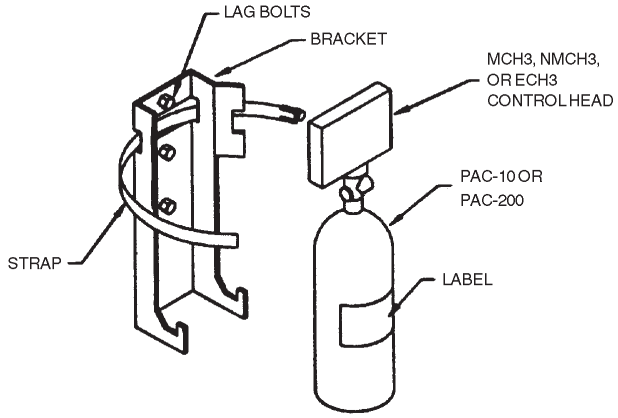


Figure 4-4. Model PAC-10/200 Pneumatic Cylinder Installation.

002874PC

In order to actuate the agent cylinders from a Model PAC-10/200 Pneumatic Actuation Cylinder, a 3/4" NPT x 1/4" NPT bushing must be screwed into the pneumatic cylinder's discharge port. A 1/4" NPT x 45° 1/4" flare type fitting (conforming to SAE J513c) must then be screwed into this bushing. Pneumatic tubing is then used to connect the PAC-10/200 pneumatic cylinder to the valve cap assembly of each agent cylinder valve. See **Figure 4-5.**

NOTE

Pneumatic tubing used for remote cylinder actuation shall have an outside diameter of 1/4" with a minimum wall thickness of 1/32". This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4", 45° flare type conforming to SAE J513c.

Compression type fittings are not acceptable.

The Model PAC-10 pneumatic cylinder can actuate a maximum of ten (10) agent cylinders with a maximum of 100 feet of pneumatic tubing.

The Model PAC-200 pneumatic cylinder can actuate a maximum of twenty (20) cylinders with a maximum of 200 feet of pneumatic tubing.

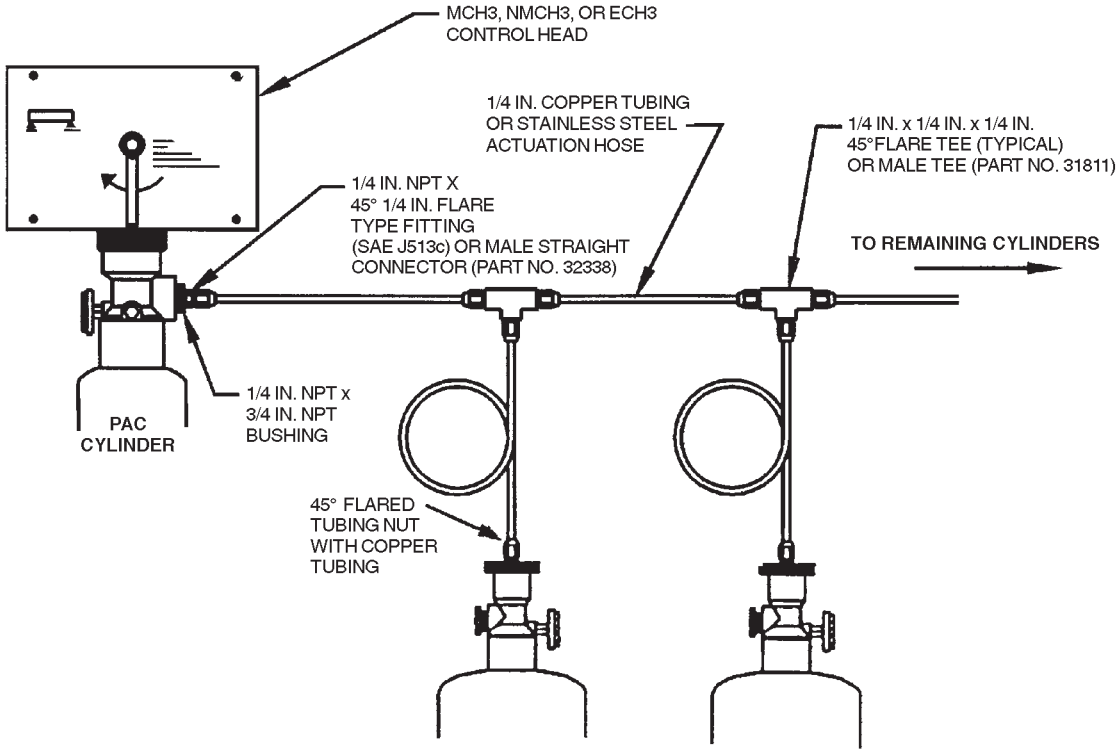


Figure 4-3. Multiple Cylinder Actuation Using Model MCH3/ECH3/NMCH3 Control Head.

004427PC

FUSIBLE LINK DETECTOR INSTALLATION

Fusible links are always used in conjunction with the Model MCH3 Mechanical Control Head. After mounting the cylinder and control head, the fusible link line can be installed. The first step to installing the fusible link line is to install the detector bracket(s). These brackets must be installed in the plenum area of the ventilation hood over all protected appliances and in each duct. See Chapter III for detector placement guidelines.

Note: Only ML-style Fusible Links can be used.

Connect the fusible link brackets together using 1/2" conduit and the conduit connectors supplied in the detector kit (Model FLK-1/1A). A Pyro-Chem corner pulley must be used whenever a change in conduit direction is necessary. The conduit is connected to the control head through a knockout in the upper left-side corner.

In general, fusible links centered in the detector brackets are connected in series using 1/16" diameter stainless steel cable. The spring plate in the control head maintains tension on this series of fusible links. If the tension is released for any reason (i.e., a fusible link separates), the control head will operate and actuate the system. Maximum limitations for the fusible link detection line are as follows:

Fusible links can be installed with or without fusible link hangers (see **Chapter II** for description).

Fusible Link Line Limitations When Used with Model EN-MCU3, MCH3, and NMCH3 Control Heads and Part No. 415670 and 423250 Pulley Elbows	
Maximum # of detectors:	20
Maximum length of cable:	150 feet
Maximum # of pulleys:	40

NOTE: Control head Models MCH2, ECH2, NMCH2, MCH, EN-MCU, EN-MCU3, and NMCH can use the MCP-1, CP-1, WCP-1, TP-1, SBP-1, and CBP-1 pulleys with the below limitations.

If the MCH3, EN-MCU3, and NMCH3 use any of the CP-1, WCP-1, TP-1, and MCP-1 pulleys within the system, then the below limitations must be used.

Fusible Link Line Limitations	
Maximum # of detectors:	15
Maximum length of cable:	100 feet
Maximum # of pulleys:	20

1. Fusible Link Installation Without Hangers.

Begin installing links at the terminal bracket. The link is connected to the far side of the terminal bracket using an "S" hook. The "S" hook must be crimped closed after the link is installed. A tight loop is then made in the cable and secured by the crimp provided. This loop is connected to the other side of the terminal link (see **Figure 4-6**) and the cable fed through the conduit to the next bracket. The cable proceeding from the terminal link will be used to connect the series links (see **Figure 4-7**). Series links must be centered in their detector brackets.

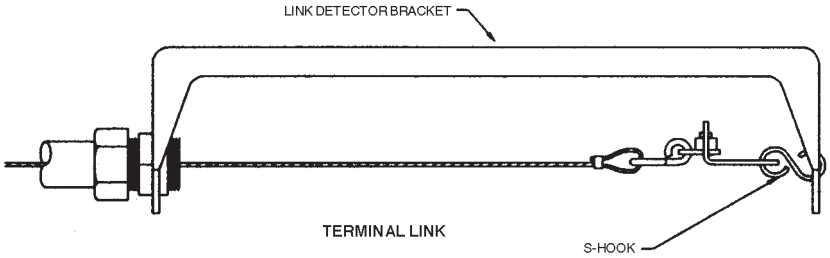


Figure 4-6. Terminal Link Installation.

002849aPC

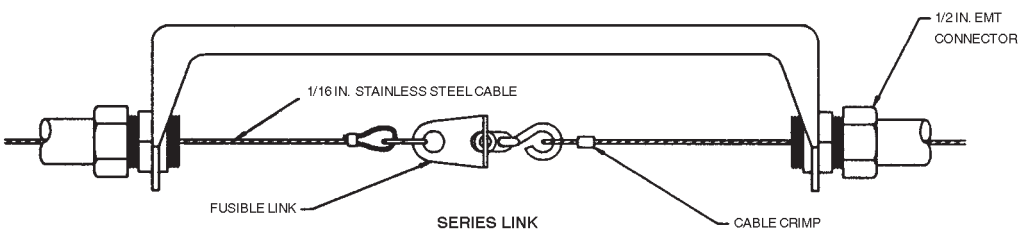


Figure 4-7. Series Link Installation.

002849bPC

After the last link in the series is connected, the cable should be fed through the conduit back to the control head. Thread the cable through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

> **NOTE**
>
> Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable.

The fusible link line can now be put into a set position by applying tension to the fusible link line. This is accomplished by using a 1" socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box. The fusible link line is now in a set position. See **Figure 4-8.**

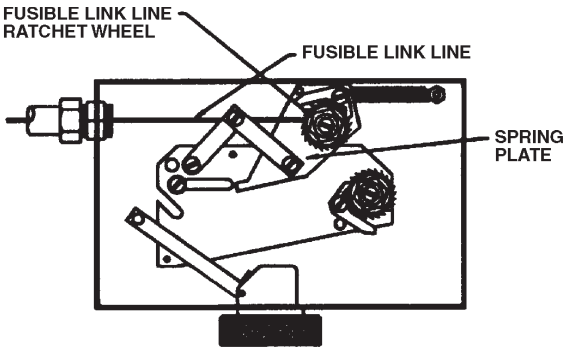


Figure 4-8. Fusible Link Line Termination.

002876PC

2. Fusible Link Installation Using Model FLH-1 Fusible Link Hangers.

Beginning at the control head, feed the stainless steel cable through the conduit and brackets to the terminal bracket in one continuous length. Allow approximately two and one-half (2.5) inches of slack at each bracket for the installation of the Fusible Link Hangers. At the terminal link, a tight loop is made in the cable and secured by the crimp provided. The cable is attached to the far side of the terminal bracket using an "S" hook. The "S" hook must be crimped closed after the cable is installed. See **Figure 4-9.**

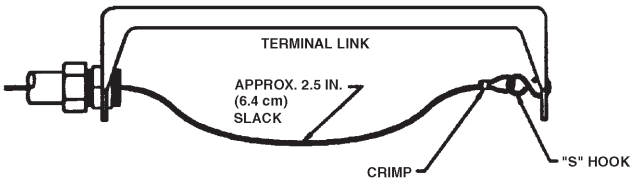


Figure 4.9. Terminal Bracket Connection.

002877PC

Begin installing the Fusible Link Hangers at the terminal bracket and work toward the control head. Loop the cable through the oval opening in the hanger and hook the fusible link on the loop. See **Figure 4-10.**

Note: Only ML-style Fusible Links can be used.

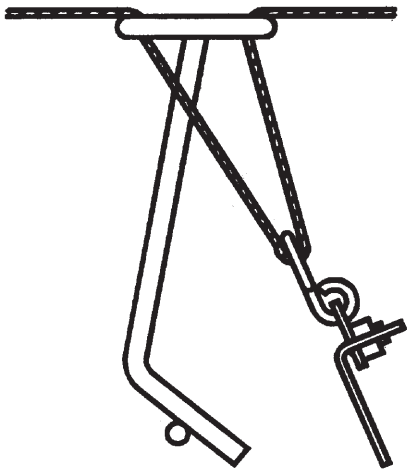


Figure 4-10. Fusible Link Connection.

002878PC

Hook the bottom of the link onto the bottom leg of the hanger. See **Figure 4-11.**

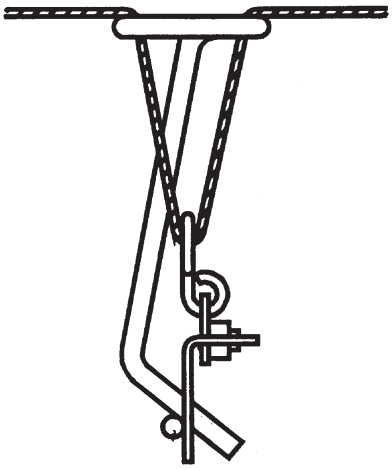


Figure 4-11. Fusible Link/Hanger Connection.

002879PC

Center the hanger/link in the fusible link bracket by sliding it along the link line. This is easily accomplished before any tension is applied to the link line. Repeat this procedure for all fusible links.

After the last hanger/link in the series is connected, the cable should be fed through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

NOTE

Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable.

The fusible link line can now be put into a set position by applying tension to the fusible link line. This is accomplished by using a 1" socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box. The fusible link line is now in a set position. See **Figure 4-8.** Check to ensure that the fusible link hanger(s) remain centered in the bracket after the fusible link line is set. See **Figure 4-12.**

THERMAL DETECTOR INSTALLATION

Thermal detectors are always used in conjunction with the Model ECH3 Electrical Control Head. After mounting the cylinder and control head, the thermal detector(s) can be installed. Install the thermal detector(s) in the plenum area of the ventilation hood over all protected appliances and in each duct. See **Chapter III** for detector placement guidelines. Follow the instructions included with the detector for proper detector mounting procedures.

SETTING THE CONTROL HEAD

1. Model MCH3/NMCH3 Mechanical Control Head.

Once the fusible link line is set, the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin into the hole in the slide plate above the latching arm. This will lock the control head in the set position, eliminating accidental actuation during the rest of the installation procedure. See **Figure 4-13.**

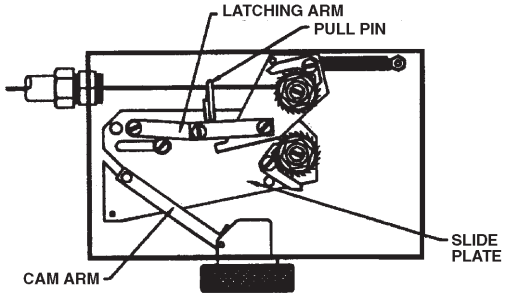


Figure 4-13. Control Head In Set Position.

002880PC

2. Model ECH3 Electrical Control Head.

Once the thermal detectors have been installed, the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin

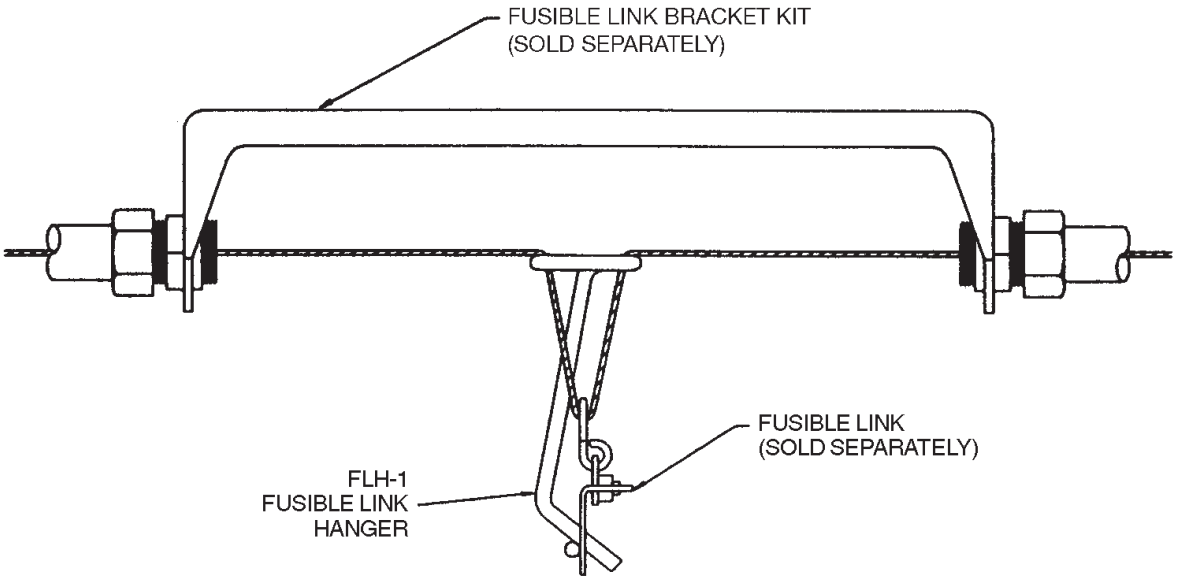


Figure 4-12. Fusible Link/Hanger In Set Position.

002849bPC

into the hole in the slide plate above the latching arm. This will lock the control head in the set position, eliminating accidental actuation during the rest of the installation procedure.

▸ Once the Model ECH3 Electrical Control Head is in the set position, it can be connected to the detection/actuation circuit.

NOTE

No electrical connections shall be made inside the control head. All electrical wiring shall exit the control head through the knock-out on the side of the box. All electrical connections must be made in an approved electrical box.

Connect one of the black wires on the solenoid in the control head to the red wire of the Model MS-SPDT Miniature Switch. The brown wire from the miniature switch is then connected to one side of the first thermal detector in series. Connect the other side of the first thermal detector in series and the remaining black wire on the solenoid in the control head to the appropriate power source after installing the Model SM-24/120 Solenoid Monitor.

NOTE

A Model SM-24/120 Solenoid Monitor must always be used with an Electrical Control Head to supervise the actuation/detection circuit.

Where electrical detection and/or actuation is provided, supervision shall be provided in accordance with NFPA-17A.

Alarms and indicators along with a supervised backup power source shall be provided in accordance with NFPA 72, The National Fire Alarm Code.

Electrical wiring and equipment shall be installed in accordance with NFPA 70, National Electric Code or the requirements of the authority having jurisdiction.

▸ The Model ECH3-24 Electrical Control Head requires a UL Listed 24VDC power supply with a minimum 2A rating. The Model ECH3-120 Electrical Control Head requires a 1A, 120VAC power supply.

SOLENOID MONITOR INSTALLATION

1. Solenoid Monitor Installation in Detection Circuit.

After installing the thermal detectors and the control head, the Model SM-120/24 Solenoid Monitor can be installed. The Solenoid Monitor is connected to the wires leading from the last thermal detector. It should be mounted in a location where it can be readily observed.

The Solenoid Monitor is an end-of-line device that supervises the actuation/detection circuit. It is comprised of a push-type switch with a built-in indicator light, a plug-type relay, a relay socket, and a cover plate. The light, when illuminated, indicates that the detection/actuation circuit is in the normal condition. The Solenoid Monitor also provides two sets of dry contacts. The Solenoid Monitor's cover plate is used to mount the Solenoid Monitor in a standard 6" x 4" x 3" deep electrical box. See **Figure 4-14.**

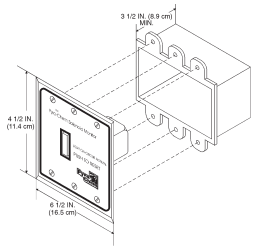


Figure 4-14. Solenoid Monitor Installation.
002881PC

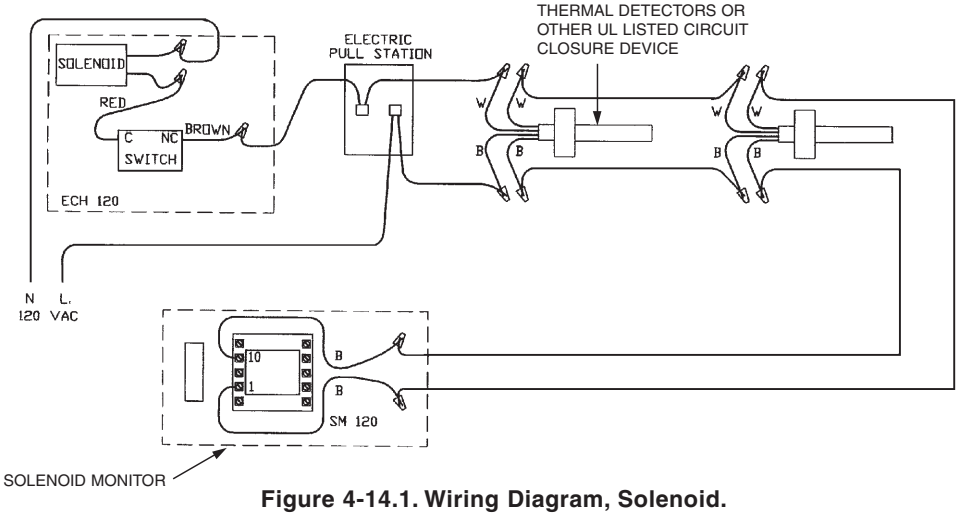


Figure 4-14.1. Wiring Diagram, Solenoid.
002882PC

All wire for circuits using the Model SM-24 shall be 18 gage minimum, or as required by local code. All wire for circuits using the Model SM-120 shall be 14 gage minimum, or as required by local code. The basic wiring diagram for both the Model SM-24 and Model SM-120 is shown in **Figure 4-14.1.**

After the Solenoid Monitor has been installed, the detection/actuation circuit can be connected to the appropriate power source and energized. To energize the detector/actuation circuit, depress the switch on the Solenoid Monitor. The light will illuminate to indicate that the circuit is properly installed. If the light fails to illuminate, the wiring must be checked.

2. Solenoid Monitor When Used As A Reset Relay

The Model SM-24/120 can be used as a reset relay when required. A reset relay is required whenever an electrical gas shut-off valve is used in conjunction with the Pyro-Chem Restaurant Fire Suppression System. For typical wiring connections, see **Figure 4-15.**

REMOTE PULL STATION INSTALLATION

The Model RPS-M Remote Mechanical Pull Station is used for remote mechanical actuation of all system releasing devices. It is to be located near an exit in the path of egress from the hazard area no more than five feet above the floor.

NOTE

A Model RPS-M Remote Mechanical Pull Station must be used for manual activation of a Model EN-MCU3 or a Model NMCH3 releasing device.

The Pull Station can be surface mounted or flush mounted. For flush mounting a RACO #232 4" deep electrical box or equivalent must be used (dealer supplied). It is connected to the releasing device using 1/16" diameter stainless steel cable. The cable enters the pull station box through the center hole in the bottom, top, either side, or the center back hole. The cable enters the control head through the

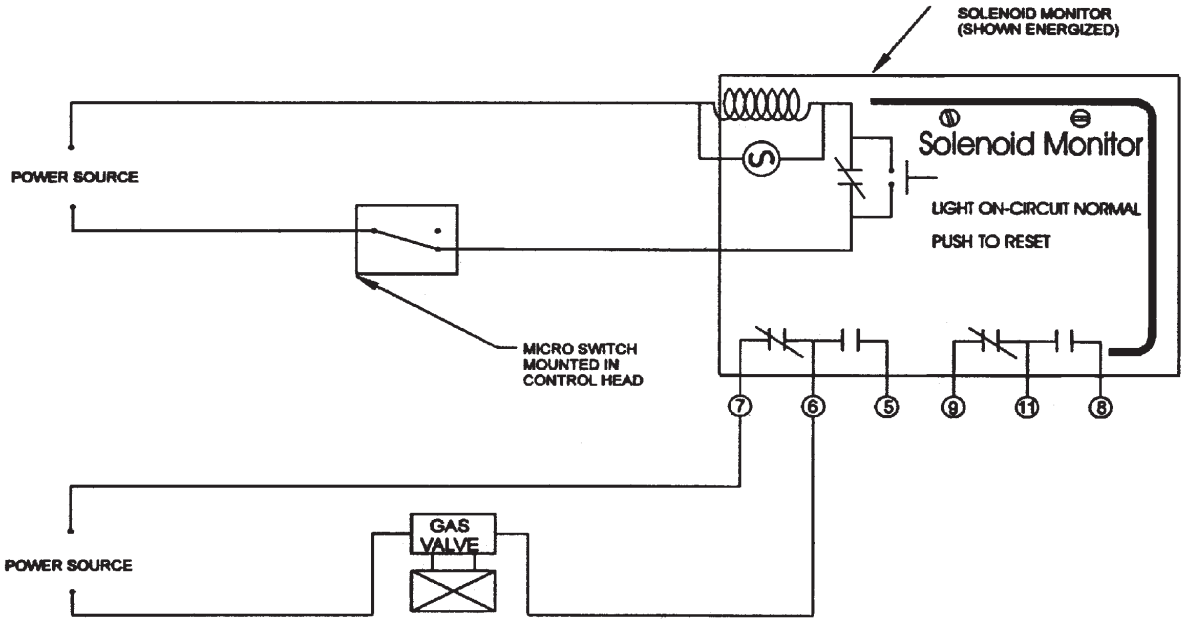


Figure 4-15. Solenoid Monitor Wiring With Electrical Gas Shutoff Valve.

002882PC

top-center knockout. The cable must be enclosed in 1/2" conduit with a Pyro-Chem corner pulley at each change in conduit direction. Maximum limitations for the Model RPS-M Remote Mechanical Pull Station are as follows:

Model RPS-M Cable Run Limitations When Used with Model ECH3, MCH3, EN-MCU3, and NMCH3 Control Heads and Part No. 415670 and 423250 Pulley Elbows	
Maximum length of cable:	150 feet
Maximum # of pulleys (1/16"):	40

NOTE: Control head Models MCH2, ECH2, NMCH2, MCH, EN-MCU2, EN-MCU, ECH, and NMCH can use the MCP-1, CP-1, WCP-1, TP-1, SBP-1, and CBP-1 pulleys with the below limitations.

If the MCH3, ECH3, EN-MCU3, and NMCH3 use any of the CP-1, WCP-1, TP-1, and MCP-1 pulleys within the system, then the below limitations must be used.

Model RPS-M Cable Run Limitations	
Maximum length of cable:	100 feet
Maximum # of pulleys (1/16"):	17

After mounting the pull station box and conduit, feed the stainless steel cable from the releasing device, through the conduit, and into the pull station box. Feed the cable through the bushing and through the hole provided in the pull handle. Loop the cable through the pull handle and secure it with the crimp provided (see **Figure 4-16**).

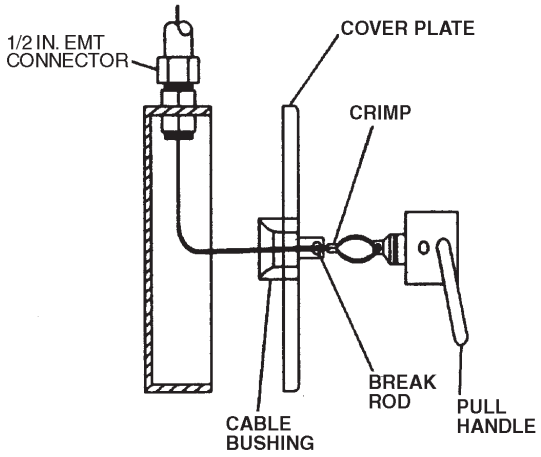


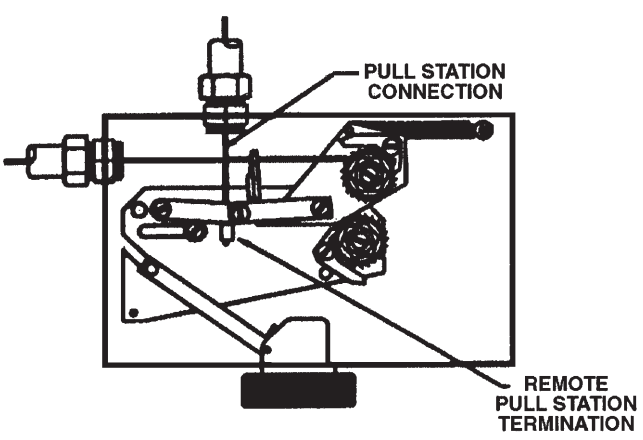
Figure 4-16. Model RPS-M Remote Pull Station Installation.

002884PC

Cut and thread the cable through the hole in the latching arm of the control head and pull the cable tight. Crimp the cable twelve (12) inches below the latching arm.

> **NOTE**
>
> Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. **The crimp must never be used on a single cable.**

Pull the pull handle until the crimp touches the latching arm. See **Figure 4-17.** Coil the excess cable in the pull box and attach the cover plate with the four screws provided. Insert the pull handle into the cover plate and insert the plastic break rod.



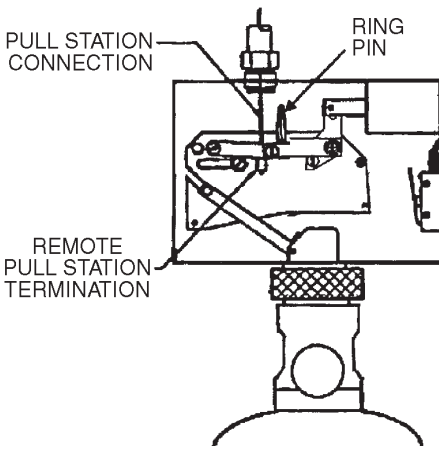


Figure 4-17. Model RPS-M Remote Pull Station.

002885PC/003647PC

GAS SHUT-OFF VALVE INSTALLATION

1. Mechanical Gas Shut-Off Valve Installation.

The Model MCH3/ECH3/NMCH3 Control Head is used to operate the mechanical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. The gas shut-off valve is spring loaded and requires five pounds of force to hold it open. This force is supplied by a 1/16" diameter stainless steel cable that is connected to the control head.

After the valve is installed in the gas line, 1/2" conduit must be run from the top center knockout of the gas valve box to the lower right-hand knockout in the control head. A Pyro-Chem corner pulley is used wherever a change in conduit direction is required.

Gas Valve Cable Run Limitations When Used with Model ECH3, MCH3, EN-MCU3, and NMCH3 Control Heads and Part No. 415670 and 423250 Pulley Elbows	
Maximum length of cable:	100 feet
Maximum # of pulleys:	30

NOTE: Control head Models MCH2, ECH2, NMCH2, MCH, EN-MCU, EN-MCU2, ECH, and NMCH can use the MCP-1, CP-1, WCP-1, TP-1, SBP-1, and CBP-1 pulleys with the below limitations.

If the MCH3, ECH3, ENMCU3, and NMCH3 use any of the CP-1, WCP-1, TP-1, and MCP-1 pulleys within the system, then the below limitations must be used.

Gas Valve Cable Run Limitations	
Maximum length of cable:	50 feet
Maximum # of pulleys (1/16"):	15

Remove the gas valve cover and thread the stainless steel cable through the conduit back to the control head. Thread the cable through the hole in the gas valve ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

NOTE

Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. **The crimp must never be used on a single cable.**

At the gas valve, loop the cable through the valve stem and secure it with the crimp provided (see **Figure 4-18**).

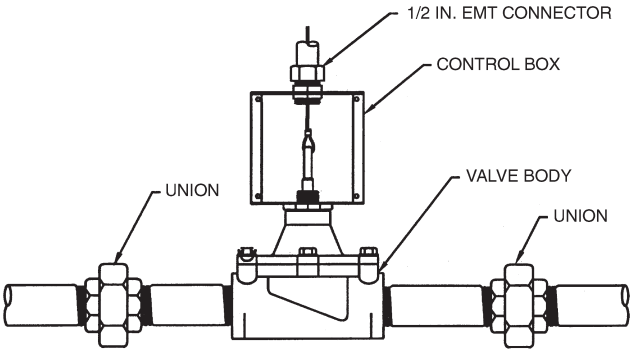


Figure 4-18. Gas Valve Installation.

002886PC

CAUTION

Do not overtighten gas valve. Overtightening the gas valve may cause the system not to actuate.

The gas valve line can now be put into a set position by applying tension to the gas valve line. This is accomplished by using a 1" socket on the gas valve ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the gas valve is fully open. See Instruction Sheet, Part No. 550571, included in gas valve shipping assembly, for detailed information. Secure the gas valve cover plate to the gas valve box with the four (4) screws provided. The gas valve line is now in a set position. See **Figure 4-19.**

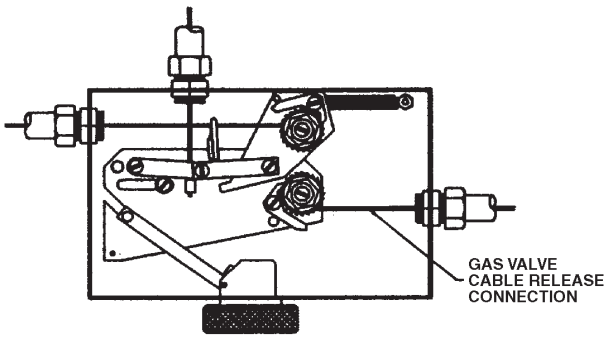


Figure 4-19. Gas Valve Line Termination.

002887PC

2. Electrical Gas Shut-Off Valve Installation.

The Model MCH3/ECH3/NMCH3 Control Head is used to operate the electrical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. A reset relay must always be used with an electrical gas shut-off valve. For proper wiring of the electrical gas shut-off valve, see **Figure 4-15.**

TEE PULLEY INSTALLATION

The Model TP-1 Tee Pulley is used to connect two (2) mechanical gas valves or two (2) remote mechanical pull stations to a single control head. The cable proceeding from the control head must always enter the branch of the tee pulley. See **Figure 4-20.**

A tee pulley that is used to close two (2) gas valves can only be used to close gas valves with similar stem travel. Gas valves from 3/4" up to 1 1/2" can be used on the same tee pulley. A 2" gas valve can be used only with another 2" gas valve. Gas valves from 2 1/2" up to 3" can be used on the same tee pulley. As an example, using a 3/4" gas valve with a 3" gas valve will not allow the 3" valve to fully open.

CAUTION

The tee pulley must never be used to connect multiple fusible link lines to a single control head.

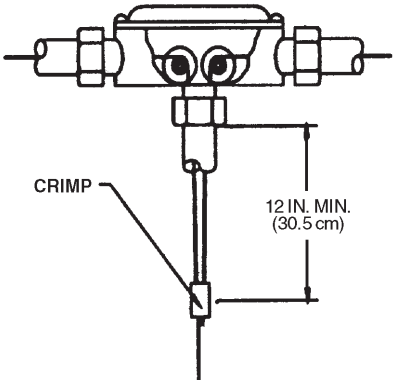


Figure 4-20. Tee Pulley Installation.
002888PC

MINIATURE SWITCH INSTALLATION

The Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT Miniature Switch is available for use where an electrical output is required. These switches can be field installed in the control head. See **Figure 4-21** and **Figure 4-22** and refer to Instruction Sheet, Part No. 551159, included with switch shipping assembly, for detailed mounting instructions.

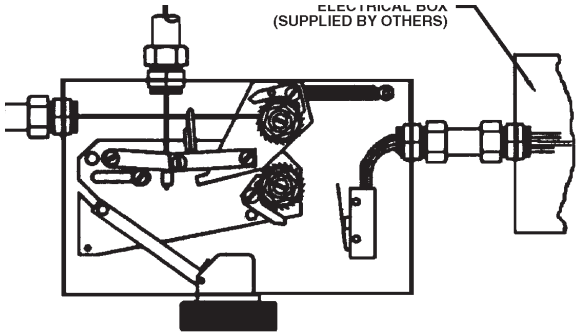


Figure 4-21. Miniature Switch Installation in Model MCH3 /NMCH3Control Head.
002889PC

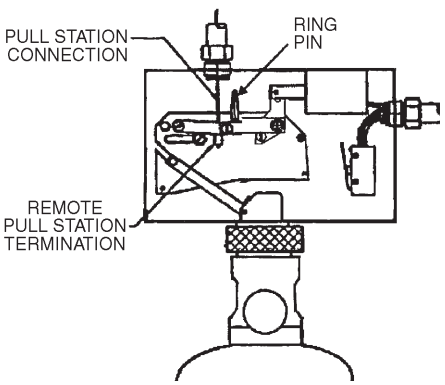


Figure 4-22. Miniature Switch Installation in Model ECH3 Control Head.
003647PC

NOTE

The Model ECH3 Control Head is supplied with a Model MS-DPDT Miniature Switch. However, one set of contacts on the switch must be used in the actuation/ detection circuit and cannot be used for electrical output.

These switches may be used to provide an electrical signal to the main breaker and/or operate electrical accessories provided the rating of the switch is not exceeded. Wiring connections are shown in **Figure 4-23.** The contact ratings for the switch is as follows:

Contact Ratings For Miniature Switches
21 amps 1 HP, 125, 250, 277 VAC
or 2 HP, 250, 277 VAC

Figure 4-23. Wiring Diagram For Model MS-SPDT Miniature Switch.
002903PC

PIPE AND NOZZLE INSTALLATION

All pipe ends shall be thoroughly reamed after cutting and all oil and foreign matter removed from the pipe. It is recommended that the following procedures be followed:

1. Periodically check the pipe threading dies to ensure that they are cutting properly.
2. Make certain that all threaded ends are reamed and the pipe is free of foreign matter and oil.
3. Apply Teflon tape on threaded ends. Start at the second male thread, wrapping the tape clockwise around the threads, away from the pipe opening.
4. Do not over-tighten, but be sure the pipe is snug. Do not back-off sections of pipe to make them fit better. If the pipe was cut too short, re-cut another pipe to the proper length.

CAUTION

Do not apply Teflon tape to cover or overlap the pipe opening, as the pipe and nozzles could become blocked and prevent the proper flow of agent.

Do not use thread sealant or pipe joint compound.

All piping shall be securely fastened by means of pipe hangers and/or pipe straps. A union should be installed in the discharge piping, as close to the cylinder valve as possible, to permit disconnection and removal for inspection and service. Dry air or nitrogen should be blown through the discharge piping to remove chips and other debris prior to installation of nozzles.

Nozzles shall be installed in accordance with the limitations described in **Chapter III** of this manual. Blow-off caps are provided for each nozzle. These will prevent dirt and grease from clogging the nozzle.

SYSTEM CHECKOUT AFTER INSTALLATION

▸ 1. Model MCH3/NMCH3 Mechanical Control Head.

Before putting the system into service, all components must be checked for proper operation. During this checkout, assure that the carbon dioxide pilot cartridge is not installed in the control head actuator. Remove the pull pin from the hole in the slide plate.

To check satisfactory operation of the control head, cut the terminal link or the “S” hook holding the link. This will relieve all tension on the fusible link line and operate the control head. The slide plate will have moved fully to the right. The gas valve cable will have been released, causing the gas valve to close. Any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the Miniature Switch in the control head will have operated.

If any of these events fail to occur, the problem must be investigated and repaired.

Repair the terminal link and put the fusible link line back into the set position. This is accomplished by using a 1” socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box.

Once the fusible link line is set, the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position.

Once the control head is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control head operates normally, the control head can be reset as described above. Insert the pull pin into the hole in the slide plate above the latching arm. Replace the pull station handle, pull pin, and nylon tie.

Assure that the gas valve is fully open by ratcheting the gas valve ratchet wheel.

CAUTION

Before screwing the carbon dioxide pilot cartridge into the actuator, ensure that the actuator has a Teflon O-ring installed.

Using a felt-tipped marker, write the date of installation in the gray area of the carbon dioxide pilot cartridge. Screw the cartridge into the control head actuator until hand-tight. Never use a wrench to tighten the cartridge into the actuator.

Remove the pull pin from the hole in the slide plate and install the control head cover. Insert the pull pin through the local manual control handle and into the bushing. Secure the pull pin with the nylon tie provided.

▸2. Model ECH3-24/120 Electrical Control Head.

Before putting the system into service, all components must be checked for proper operation. During this checkout, assure that the carbon dioxide pilot cartridge is not installed in the control head actuator. Remove the pull pin from the hole in the slide plate.

To check satisfactory operation of the control head, apply heat to the last thermal detector in series. This will operate the control head. The slide plate will have moved fully to the right. The gas valve cable will have been released, causing the gas valve to close. The indicator light on the solenoid monitor will go out. Any auxiliary equipment connected to the dry contacts of the solenoid monitor and/or the Miniature Switch in the control head will have operated.

If any of these events fail to occur, the problem must be investigated and repaired.

Once the thermal detector has cooled, the control head can be placed in the set position. To set the control head, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position.

Once the control head is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control head operates normally, the control head can be reset as described above. Insert the pull pin into the hole in the slide plate above the latching arm. Replace the pull station handle, pull pin, and nylon tie.

Assure that the gas valve is fully open by ratcheting the gas valve ratchet wheel.

Energize the actuation/detection circuit by depressing the push button on the solenoid monitor.

CAUTION

Before screwing the carbon dioxide pilot cartridge into the actuator, ensure that the actuator has a Teflon O-ring installed.

▸Using a felt-tipped marker, write the date of installation on
▸the carbon dioxide pilot cartridge. Screw the cartridge into the control head actuator until hand-tight. Never use a wrench to tighten the cartridge into the actuator.

Remove the pull pin from the hole in the slide plate and install the control head cover. Insert the pull pin through the local manual control handle and into the bushing. Secure the pull pin with the nylon tie provided.

NOTES:

ENCLOSURE INSTALLATION INSTRUCTIONS MODEL EN-MCU3 (P/N 551208) AND MODEL EN-S (P/N 550966)

MOUNTING

The Model EN-MCU3 and/or EN-S Enclosure must be securely anchored to the wall using bolts or lag screws. The wall to which the enclosure is attached must be sufficiently strong. The enclosure should never be fastened to dry wall or similar material. If this type of wall is encountered, studs must be located and the enclosure fastened to them.

Three (3) center mounting holes allow either enclosure to be mounted on a single stud. Four (4) corner mounting holes are also available. See **Figure 4-24.**

FUSIBLE LINK DETECTOR INSTALLATION

The Model EN-MCU3 Enclosure can support a fusible link detection system. The Model EN-S Enclosure cannot support a fusible link detection system and must be used in conjunction with the Model EN-MCU3 Enclosure or a Model MCH3/ECH3/NMCH3 Control Head.

After mounting the enclosure, the fusible link line can be installed. The first step to installing the fusible link line is to install the detector brackets. These brackets must be installed in the plenum area of the ventilation hood over all protected appliances and in each duct. See **Chapter III** for detector placement guidelines. Connect the fusible link brackets together using 1/2" EMT conduit and the conduit connectors supplied in the detector kit (Model FLK-1/1A). Pyro-Chem corner pulleys must be used whenever a change in conduit direction is necessary. The conduit is connected to the enclosure through a top knockout.

See Fusible Link Detector Installation Section of this chapter (pages 4-4 - 4-6) for fusible link installation guidelines. Before attaching the stainless steel cable to the fusible link line ratchet wheel, it must be run below the fusible link line pulley in the enclosure. See **Figure 4-25.**

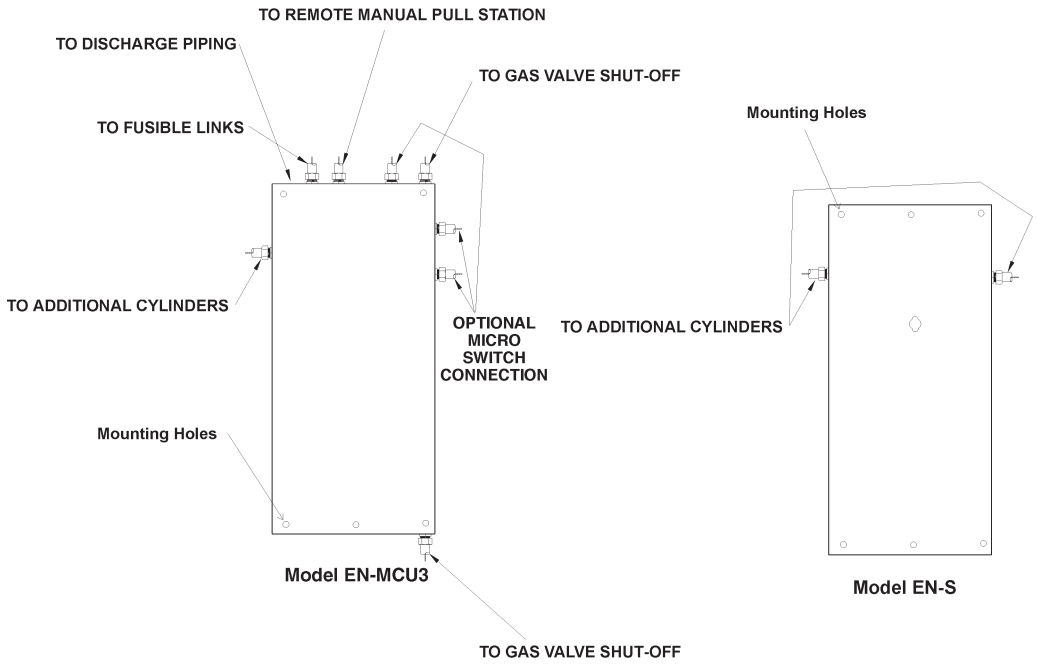


Figure 4-24. Models EN-MCU3 and EN-S Enclosures.

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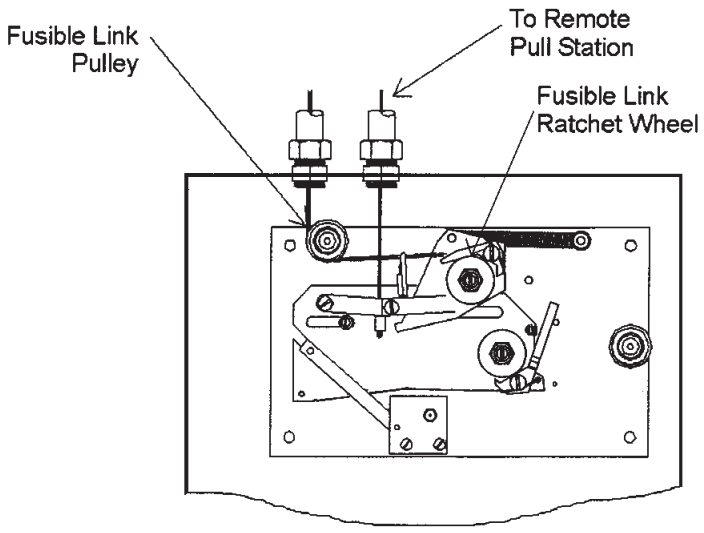

Figure 4-25. Model EN-MCU3 Fusible Link Line and Remote Pull Station Termination.

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SETTING THE MODEL EN-MCU3

After the last link in the series is connected, the cable should be fed through the conduit back to the Model EN-MCU3. It must be fed under the fusible link line pulley and through the hole in the fusible link ratchet wheel. The line must then be crimped, and the crimp positioned inside the ratchet wheel.

> **NOTE**
>
> Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. **The crimp must never be used on a single cable.**

Crimps must always be used in conjunction with two (2) cable lengths. Loops are the accepted method of connecting the cable to mechanical components. The crimp must never be used on a single cable.

The fusible link line can now be put into a set position by tensioning the fusible link line. This is accomplished by using a 1" socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate is parallel to the top of the enclosure. The fusible link line is now in a set position.

Once the fusible link line is set, the Model EN-MCU3 Enclosure can be placed in the set position. To set the Model EN-MCU3, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Insert the pull pin into the hole in the slide plate above the latching arm. This will lock the control mechanism in the set position, eliminating accidental actuation during the rest of the installation procedure. See **Figure 4-25.**

REMOTE PULL STATION INSTALLATION

The Model RPS-M Remote Mechanical Pull Station is used for remote manual actuation of the Model EN-MCU3 It is to be located near an exit in the path of egress from the hazard area no more than five feet above the floor.

The Pull Station is connected to the Model EN-MCU3 using 1/16" diameter stainless steel cable. The cable enters the Model EN-MCU3 through a knockout in the top of the enclosure. See **Figure 4-25.**

See Remote Pull Station Installation Section of this chapter (pages 4-8/9) for remote pull station installation guidelines.

GAS SHUT-OFF VALVE INSTALLATION

The Model EN-MCU3 can be used to operate a mechanical gas shut-off valve. This valve is located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates direction of gas flow through the valve. The gas shut-off valve is spring loaded and requires five pounds of force to hold it open. This force is supplies by a 1/16" diameter stainless steel cable that is connected to the Model EN-MCU3.

See "Gas Shut-Off Valve Installation" section on Page 4-10 of this chapter for gas valve shut-off installation guidelines.

After the valve is installed in the gas line, 1/2" conduit must be run from the top center knockout of the gas valve box to the top or bottom knockout in the enclosure. See **Figure 4-24**. A Pyro-Chem corner pulley is used wherever a change in conduit direction is required.

Remove the gas valve cover and thread the stainless steel cable through the conduit back to the Model EN-MCU3. If the cable enters the enclosure through the bottom knockout, the cable must be run over the gas valve line pulley (see **Figure 4-26**). If the cable enters the enclosure through the top knockout, the cable must be run under the gas valve line pulley (see **Figure 4-27**). Thread the cable through the hole in the gas valve ratchet wheel. The line must then be crimped, and the crimp positioned inside the center of the ratchet wheel.

CAUTION

The gas valve cable must always utilize the gas valve pulley and exit the top or bottom or the enclosure. **The gas valve cable cannot exit the side of the enclosure.**

At the gas valve, loop the cable through the valve stem and secure it with the crimp provided (see **Figure 4-18**, page 4-10).

The gas valve line can now be put into a set position by applying tension to the gas valve line. This is accomplished by using a 1" socket on the gas valve ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the gas valve is fully open. Secure the gas valve cover plate to the gas valve box with the four (4) screws provided. The gas valve line is now in a set position. See **Figure 4-26** and/or **Figure 4-27**.

CAUTION

Overtightening the gas valve may cause the system not to actuate.

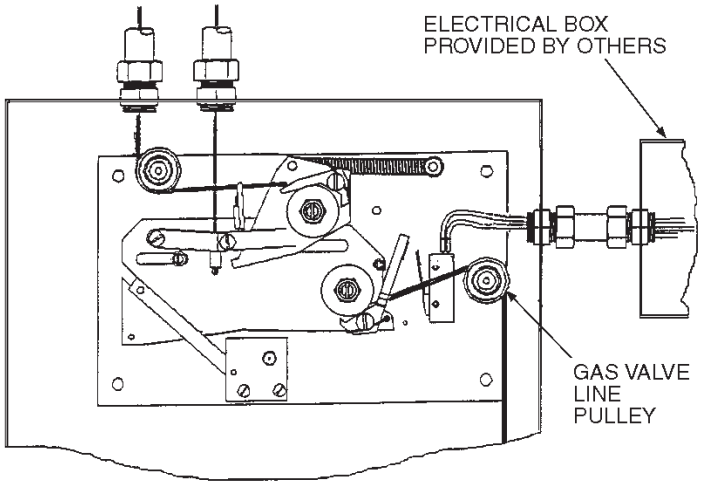

Figure 4-26. Gas Valve / Miniature Switch Installation.

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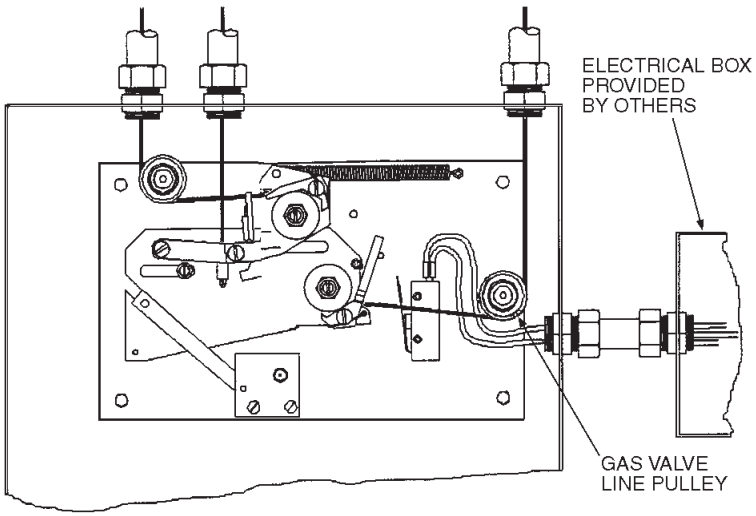

Figure 4-27. Gas Valve / Miniature Switch Installation.

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MINIATURE SWITCH INSTALLATION

The Model MS-SPDT, MS-DPDT, MS-3PDT, or MS-4PDT-EN Miniature Switch is available for use where an electrical output is required. These switches can be field installed in the Model EN-MCU3. See **Figure 4-26** and/or **Figure 4-27.**

These switches may be used to provide an electrical signal to the main breaker and/or operate electrical accessories provided the rating of the switch is not exceeded. Wiring connections for the Model MS-SPDT are shown in **Figure 4-23** (page 4-11). The contact ratings for both switches are as follows:

Contact Ratings For Miniature Switches
21 amps 1 HP, 125, 250, 277 VAC
or 2 HP, 250, 277 VAC

Three (3) knockouts are provided for Miniature Switch wiring. The upper right-side knockout must be used when the gas valve line exits the bottom of the enclosure (see **Figure 4-26**). The lower right-side knockout must be used when the gas valve line exits the top of the enclosure (see **Figure 4-27**). An additional knockout located on the top of the enclosure is also provided (see **Figure 4-24**) and may be used in either situation.

CYLINDER INSTALLATION

1. Single Cylinder Installation - PCL-240/350.

▸ The Model EN-MCU3 can be used for single cylinder installations. It can support either the Model PCL-240 or PCL-350 cylinder assemblies. The cylinder must be placed in the enclosure with the discharge port to the left. **No additional mounting**
▸ **bracket is required when the Model EN-MCU3 is used.**

▸ In order to actuate the agent cylinder from the Model EN-MCU3's control mechanism, pneumatic tubing must be used to connect the actuator to the valve cap assembly of the agent cylinder valve. A 1/4" NPT x 1/4", 45° flare type elbow is includ-
▸ ed and must be installed in the actuator of the Model EN-MCU3 Enclosure. See **Figure 4-28.**

NOTE

Pneumatic tubing used for cylinder actuation shall have an outside diameter of 1/4" with a minimum wall thickness of 1/32". This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4", 45° flare type conforming to SAE J513c. **Compression type fittings are not acceptable.**

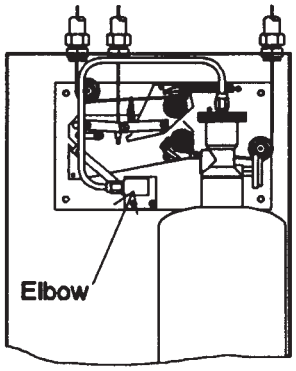

Figure 4-28. Single Cylinder Installation with
▸ **Model EN-MCU3 Mechanical Control Unit.**

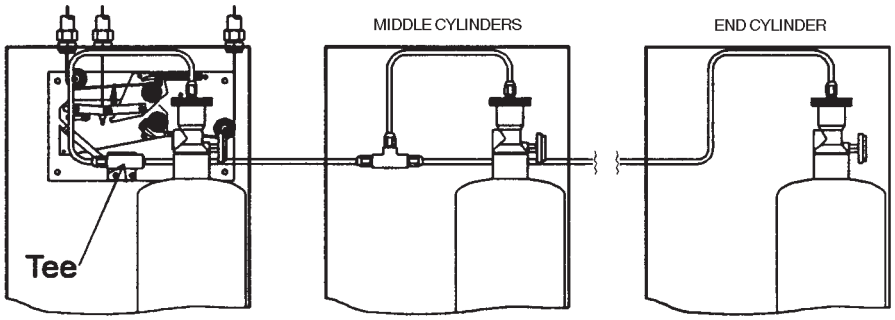

Figure 4-29. Multiple Cylinder Installation with Model EN-MCU3 Enclosure and Model EN-S Enclosure.

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2. Multiple Cylinder Installation - PCL-240/350.

▸ The Model EN-S can be used in conjunction with the Model EN-MCU3 Enclosure or Model MCH3/ECH3 Control Head for
▸ multiple cylinder installations. A single Model EN-MCU3 can be used to pneumatically actuate a maximum of three (3) agent
▸ cylinders. One (1) agent cylinder can be installed in the Model EN-MCU3 Enclosure; the additional agent cylinder(s) can either be mounted in a Model EN-S Enclosure or with a Model MB-15 Mounting Bracket. When an enclosure is used, the cylinders must be placed in the enclosure(s) with the discharge port to the left. **No additional mounting bracket is**
▸ **required when a cylinder is installed in the Model EN-MCU3 or EN-S Enclosure.**

▸ In order to actuate the agent cylinders from the Model EN-MCU3, pneumatic tubing must be used to connect the EN-MCU3 actuator to the valve cap assembly of each agent cylinder valve. Pneumatic tubing must be run from the actuator in the
▸ Model EN-MCU3 to the Model EN-S(s) through the side knockout. A 1/4", 45° flare x 1/4", 45° flare x 1/4" NPT tee is includ-
▸ ed with the Model EN-S and must be installed in the Model EN-MCU3 actuator. See **Figure 4-29.**

NOTE

Pneumatic tubing used for remote cylinder actuation shall have an outside diameter of 1/4" with a minimum wall thickness of 1/32". This is commonly known as refrigeration-type copper tubing. All tubing fittings shall be of the 1/4", 45° flare type conforming to SAE J513c. **Compression type fittings are not acceptable.**

▸ A single Model EN-MCU3 can actuate a maximum of three (3) cylinders with up to 6' of copper tubing. A single Model
▸ EN-MCU3 can actuate a maximum of two (2) cylinders with up to 8' of copper tubing.

SYSTEM CHECKOUT AFTER INSTALLATION

Before putting the system into service, all components must be checked for proper operation. During this checkout, assure ▸ that the carbon dioxide pilot cartridge is not installed in the Model EN-MCU3 actuator. Remove the pull pin from the hole in the slide plate.

To check satisfactory operation of the control mechanism, cut the terminal link or the “S” hook holding the link. This will relieve all tension on the fusible link line and operate the control mechanism. The slide plate will have moved fully to the right. The gas valve cable will have been released, causing the gas valve to close. Any auxiliary equipment connected to the ▸ dry contacts of the solenoid monitor and/or the Miniature Switch in the Model EN-MCU3 will have operated.

If any of these events fail to occur, the problem must be investigated and repaired.

▸ Repair the terminal link and put the fusible link line back into the set position. This is accomplished by using a 1” socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate is parallel to the top of the enclosure.

Once the fusible link line is set, the control mechanism can be placed in the set position. To set the control mechanism, the slide plate is moved from right to left, ensuring the bolt extending from the cam arm is in the slot provided in the slide plate. Continue moving the slide plate to the left until the latching arm is in the locked position. Once the control mechanism is set, pull the pull handle on the remote pull station to assure that the control head operates. If the control mechanism operates normally, the control mechanism can be reset as described above. Insert the pull pin into the hole in the slide plate above the latching arm. Replace the pull station handle, pull pin, and nylon tie.

Assure that the gas valve is fully open by ratcheting the gas valve ratchet wheel.

CAUTION

Before screwing the carbon dioxide pilot cartridge into the actuator, ensure that the actuator has a Teflon O-ring installed.

▸ Using a felt-tipped marker, write the date of installation on the carbon dioxide pilot cartridge. Screw the cartridge into the
▸ Model EN-MCU3 actuator until hand-tight. **Never use a wrench to tighten the cartridge into the actuator.**

▸ Remove the pull pin from the hole in the slide plate. Secure the Model EN-MCU3 or EN-S cover with the screws provided.

CHAPTER V
SYSTEM MAINTENANCE

GENERAL

This chapter will detail the basic information necessary for proper maintenance of the Pyro-Chem Restaurant Fire Suppression System. However, before attempting any system maintenance, it is necessary to attend a Factory Certification Training Class and become Certified to install and maintain the Pyro-Chem Restaurant Fire Suppression System. Because it is impossible to completely understand every aspect of an intricate pre-engineered system simply by reading the Technical Manual, Pyro-Chem will not be responsible for system maintenance performed by any non-Certified person(s).

MAINTENANCE AFTER SYSTEM DISCHARGE

1. System Cleanup.

The hazard area cleanup after a system discharge is very basic. The wet chemical agent reacts with grease to form a foam which can be easily cleaned up with hot, soapy water. Agent that has not combined with grease can also be cleaned up with hot, soapy water. The extinguishing agent is non-toxic; however, its alkaline nature will cause food to become inedible.

CAUTION

No cleanup should be attempted until the hazard area is cool. Water should never be used to clean hot grease.

Due to the alkaline nature of the extinguishing agent, it should not be allowed to remain on kitchen surfaces for an extended period of time. Although it will have a minimal effect on stainless steel, it could cause deterioration of non-ferrous metals like copper or aluminum.

CAUTION

This extinguishing agent is electrically conductive. All electrical equipment must be completely de-energized prior to cleanup to avoid electric shock.

2. System Recharge.

After discharge, inspect the entire system for mechanical damage. If the cylinder has sustained any mechanical damage, it must be hydrostatically tested before refilling. Disconnect the control head or pneumatic tubing from the valve cap assembly.

Relieve the pressure from the top chamber of the cylinder valve by depressing the core of the schrader valve in the valve cap assembly. By performing this operation, the valve will close and return to working status.

Verify that the cylinder has fully discharged by depressing the valve stem. This will expel any residual pressure in the cylinder. If the cylinder has residual pressure that cannot be relieved by depressing the valve stem, use the following procedure:

CAUTION

Rubber gloves and goggles must be worn during this procedure.

1. Place the anti-recoil plug in the cylinder discharge port.

2. Remove the cylinder from the system and bring it outside. Once outside, the cylinder must be fastened to a secure object.

3. Slowly remove the valve by turning it in a counterclockwise direction.

4. When the valve has been unscrewed approximately halfway, the pressure will bleed out through the pressure relief slot in the valve threads.

Remove the valve and siphon tube. After system discharge, the valve assembly must be carefully inspected to ensure no mechanical damage has occurred. If rebuilding is necessary, the Wet Valve Seal Rebuilding Kit (P/N 550698) should be used. It includes all system components necessary to properly rebuild the valve (see Chapter II for description).

Discard any remaining extinguishing agent in tank and refill the cylinder with wet chemical extinguishing agent. This agent is available in three size containers: 2.4 gallon (Model RL-240), 2.75 gallon (Model RL-275), and 3.5 gallon (Model RL-350). The RL-240 and RL-350 provide one complete tank charge for the PCL-240 and PCL-350 respectively. The PCL-550 requires two (2) RL-275 charges.

NOTE

The pressure gauge attached to the extinguishing system should not be used to determine when the charging pressure has been reached. A pressure regulator should be used.

Install the valve assembly and siphon tube in the cylinder hand tight. Using the Pyro-Chem Recharge Adapter Kit (P/N 550698), the cylinder can be re-pressurized to 175 psig @ 70° F. Invert the cylinder after pressurizing to clean any air trapped in the siphon tube. Using a soap solution, check for leaks.

3. Piping and Nozzles.

All nozzles must be removed and disassembled. The strainers and the nozzle orifices must be cleaned in warm water. Reassemble the nozzles and replace the nozzle caps.

Piping should be flushed with warm water and blown out with air or nitrogen.

After cleaning the piping, replace all nozzles in their proper location.

4. System Reset.

All fusible links should be replaced. The fusible link line can now be put into a set position by applying tension to the ▸ fusible link line. This is accomplished by using a 1" socket on the fusible link line ratchet wheel. The ratchet wheel will be ratcheted in a clockwise direction until the spring plate makes contact with the top of the control head box. The fusible link line is now in a set position.

After setting the fusible link line, the system can be put back into service by following the SYSTEM CHECKOUT AFTER INSTALLATION Section of **Chapter IV.**

REGULAR SYSTEM MAINTENANCE

1. Six (6) Month Maintenance.

1. Check that the hazard has not changed.

2. Check that all nylon ties are in place and the system has not been tampered with.

3. Check the entire system for mechanical damage.

> **NOTE**
> Before continuing, remove the cover from the control head and insert the pull pin in the hole in the slide plate above the latching arm. This will secure the system, preventing accidental discharge.

4. Disconnect the control head or pneumatic tubing from the valve cap assembly of each agent cylinder. Remove the carbon dioxide pilot cartridge and exercise the control head to ensure it is functioning properly. Make sure the gas shut-off valve and the remote pull station are functioning properly.

5. Inspect fusible link detectors for excessive grease buildup. Clean or replace links if necessary.

6. Reinstall the carbon dioxide pilot cartridge and replace the control head cover and nylon tie.

7. Inspect the cylinder pressure, tap the gauge lightly to ensure the needle is moving freely.

2. Annual Maintenance.

1. Inspect as per six (6) month maintenance instructions.

2. Disconnect and remove the discharge piping from the system. Using air or nitrogen, blow out the discharge piping. Replace all nozzle caps.

3. Remove the cylinder to verify fill weight.

4. Replace the carbon dioxide pilot cartridge.

5. Fixed temperature sensing elements of the fusible alloy type shall be replaced at least annually or more frequently, if necessary, to assure proper operation of the system.

4. Hydrostatic Testing.

▸ The wet chemical agent cylinder(s) and pneumatic cylinder(s) shall be hydrostatically tested at least every twelve (12) years as per NFPA-17A.

Bulletin No. 2462

DATE: May 16, 2014

TO: All Authorized PYRO-CHEM Restaurant System Distributors and OEMs

FROM: Product Management – Pre-Engineered Systems

RE: Hinged-Style Fusible Links

The use of authorized components in PYRO-CHEM Restaurant and Industrial Fire Suppression Systems maintains full system integrity, including the UL 300 System listings recognized in many countries.

The UL 300 listing for pre-engineered systems includes a prescribed set of components that make up a complete system. Components are identified by Part Number and are included in our current Design, Installation, and Maintenance manuals. These components are integral parts of the system and help ensure successful performance.

Fusible links that are approved for PYRO-CHEM Restaurant and Industrial Fire Suppression Systems are so noted in their respective product manuals. However you will soon see a change in the hinged link listing.

We are phasing out the "HL" Style stamped hinged link and replacing it with either model **Tyco® A-PC™ G™** manufactured by Tyco Fire Protection Products or **Globe® A-PC™ T™** manufactured by Globe Technologies Corporation. The model numbers will be stamped on the links. Only these two specific models of hinged links, as well as remaining inventory of HL links, will meet PYRO-CHEM warranty requirements.

The fusible links that display the 'Tyco® A-PC™ G™' and 'Globe® A-PC™ T™' marks are a configuration of heat-activated fusible links that replicate a registered trademark/trade dress owned by Globe Technologies Corporation, and are both approved replacement links that will meet Tyco warranty requirements. No other hinged links are approved for use with PYRO-CHEM Restaurant and Industrial Fire Suppression Systems.

Our manuals will be updated to reflect the contents of this bulletin.

If you have questions with the content of this bulletin, please contact Technical Services as noted below or your Territory Manager.

tyco Fire Protection Products

One Stanton Street
Marinette, WI 54143-2542

www.pyrochem.com

Main Telephone Numbers: +1-800-526-1079 or +1-715-732-3465

Customer Services..... Press 2
Technical Services ..... Press 4
Training Services ..... Press 6
Quality Assurance ..... Press 8

Bulletin No. 2457

DATE: March 14, 2014

TO: Authorized PYRO-CHEM KITCHEN KNIGHT II System Distributors and OEMs

FROM: Product Management, Restaurant Systems

SUBJECT: Agent Distribution Hose – Proper Usage/Installation Practices

Tyco Fire Protection Products continues to offer the latest in specialized restaurant system fire protection options and installation enhancements. The offering of the Agent Distribution Hose, listed with PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems, has allowed access for cleaning and servicing of mobile cooking equipment requiring affixed fire suppression nozzles without compromising the agent distribution network.

The agent distribution hose is currently found in applications that commonly protect cooking equipment such as specialized pressure fryers, mobile chain pizza ovens, certain rotisseries, and range/salamander combinations. Utilizing the agent distribution hose is an effective way to offer restaurants the flexibility needed to meet various code and servicing requirements.

When installing the agent distribution hose, the following requirements must be met:

1. The Agent Distribution Hose shall not be concealed within or run through any wall, floor, or partition, and shall not have any direct exposure to excessive heat or radiant flame from the cooking appliances.
2. The hose connections must be positioned below an elevation where the hose could be exposed to radiant or convected heat generated by normal cooking operations (such as the horizontal plane of appliance's cooking surface), and/or heat from gas operated equipment exhaust flues, or the exhausted flue gas itself.
3. The Restraining Cable must be connected from the appliance to the wall or some other structurally sound object capable of restraining the castered appliance from being pulled or pushed out to a point that will result in strain or stress to the Agent Distribution Hose.

tyco Fire Protection Products

One Stanton Street
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Training Services ..... Press 6
Technical Services ..... Press 4
Quality Assurance ..... Press 8

Correct Installation

Incorrect Installation

For questions pertaining to proper installation procedures, please reference applicable guidelines found in the KITCHEN KNIGHT II restaurant system manual. You may also contact your Territory Sales Manager or Technical Services as noted below.

Thank you for your continued support of KITCHEN KNIGHT II restaurant systems.

A Tyco International Company

One Stanton Street
Marinette, WI 54143-2542
www.pyrochem.com

BULLETIN

Bulletin No. 2431

DATE: March 22, 2012

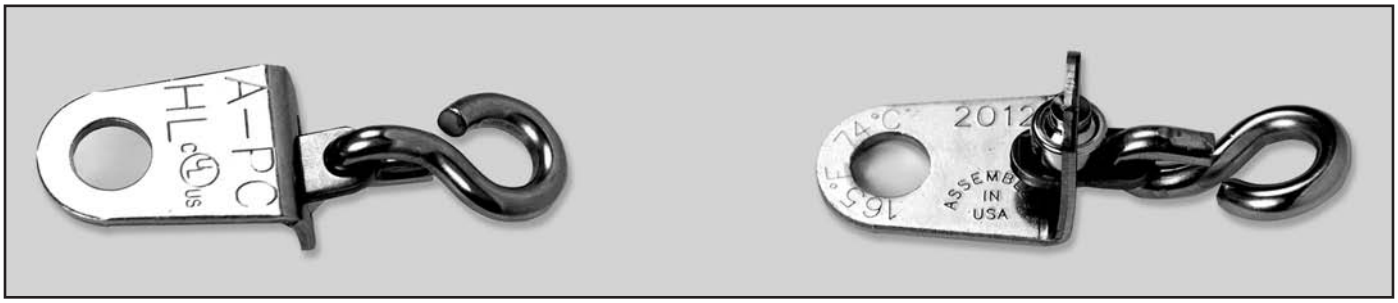
TO: All Authorized PYRO-CHEM Restaurant and Industrial System Distributors and OEMs

FROM: Product Management, Standard Products

Introducing PYRO-CHEM Model HL Fusible Links for…

KITCHEN KNIGHT II and MONARCH Fire Suppression Systems

We are pleased to introduce the new HL Model Fusible Links. The HL links are manufactured to high quality standards and have passed all UL test criteria and are listed for use with the PYRO-CHEM Pre-Engineered Systems.



The new **HL links** are stamped with **"A-PC"** and are direct replacements for the FL Model links currently used in PYRO-CHEM Restaurant and Industrial Fire Suppression Systems. We will phase-in the new HL Model links as our current FL Model link is depleted. Updates to the KITCHEN KNIGHT II Fire Suppression and MONARCH Industrial Fire Suppression manuals will include the new HL Model links in the next revision.

Part No.	Description
439227	HL Fusible Link, 165 °F (74 °C), Package of 10
439228	HL Fusible Link, 212 °F (100 °C), Package of 10
439229	HL Fusible Link, 280 °F (138 °C), Package of 10
439230	HL Fusible Link, 360 °F (182 °C), Package of 10
439231	HL Fusible Link, 450 °F (232 °C), Package of 10
439233	HL Fusible Link, 500 °F (260 °C), Package of 10

Pricing for the new PYRO-CHEM HL Fusible Links can be found on the PYRO-CHEM Extranet under View/Price List.

Accompanying this bulletin is the PYRO-CHEM Fusible Link Data/Specifications Sheet (Form No. PC2012016). Copies can be ordered through Customer Services as noted below or found on www.pyrochem.com.

Thank you for your continued support of PYRO-CHEM Brand Products.

Data/ Specification Sheet

Model HL Fusible Links

FEATURES

- Tested and Listed for use with the PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System, and the MONARCH Industrial Fire Suppression System through Underwriters Laboratories (UL/ULC)
- Manufactured and tested in accordance with the applicable standards of Underwriters Laboratories
- Designed for straight pull load applications
- Fixed temperature releasing device
- Maximum continuous load of 40 lb (18.1 kg)
- Minimum continuous load of 5 lb (2.3 kg)

DESCRIPTION

The Model HL Fusible Links are fixed temperature releasing devices that are thermally actuated. They are tested and listed for use with PYRO-CHEM restaurant and industrial fire suppression systems through Underwriters Laboratories (UL/ULC).

The HL link is designed for straight pull load applications and can withstand a maximum continuous load of 40 lb (18.1 kg) and a minimum continuous load of 5 lb (2.3 kg).

When the fusible alloy melts due to exposure to heat, the fusible assembly compresses, allowing the assembly to release from between the two halves of the fusible link. The two halves of the link are then separated by the tension force exerted by the continuous duty load.

APPLICATION

The fusible links are installed over cooking appliances and in the ducts of kitchen cooking equipment in restaurant fire suppression systems. They are also installed in vehicle and open face paint spray booths, and in total flooding/local applications in industrial fire suppression systems.

The links must be installed and maintained in compliance with the applicable standards of the National Fire Protection Association (NFPA), in addition to any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

Fusible links installed per NFPA 96, “Standard for Ventilation Control Fire Protection of Commercial Cooking Operations,” are to be inspected and replaced in accordance with NFPA 96. For installations other than per NFPA 96, the applicable NFPA Standard and supporting technical manual recommendations must be followed.

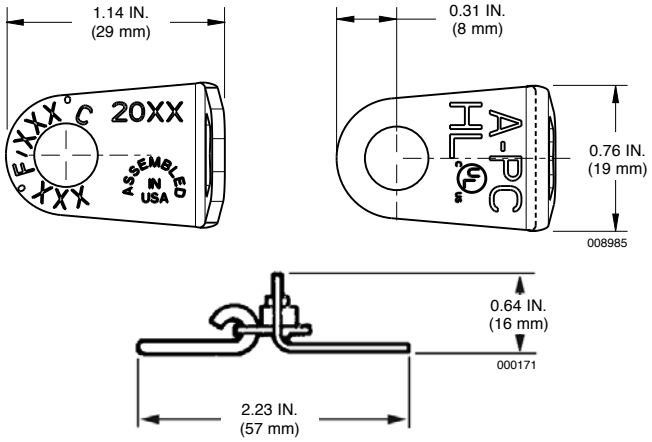
MODEL HL FUSIBLE LINKS

008983

Note: No attempt is to be made to disassemble, repair, or clean a Model HL fusible link. The complete assembly must be replaced if there is any indication of potential malfunction.

MODEL HL FUSIBLE LINK

Part No.	Link Temperature Rating °F	(°C)	Maximum Allowable Temperature Exposure °F	(°C)
439234	165	(74)	100	(38)
439235	212	(100)	150	(66)
439236	280	(138)	225	(107)
439237	360	(182)	290	(143)
439238	450	(232)	360	(182)
439239	500	(260)	400	(204)



Pyro-Chem

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BULLETIN

Bulletin Number: 2270 **Date:** January 12, 2007

TO: All Authorized PYRO-CHEM® KITCHEN KNIGHT® II Distributors and OEM's

FROM: Product Management, Restaurant Systems

SUBJECT: Original KITCHEN KNIGHT Restaurant Fire Suppression System

Since the introduction of the KITCHEN KNIGHT II System in October 2001, PYRO-CHEM has continued to provide the supporting parts to maintain the original KITCHEN KNIGHT System. With the passage of time, the demand for replacement parts has severely declined. As a result, PYRO-CHEM will discontinue product support for the KITCHEN KNIGHT Fire Suppression System.

We will continue to supply Individual Nozzles and Stainless Steel Valve Kits for the KITCHEN KNIGHT System until April 1, 2007 or until inventory of these items has been depleted, whichever comes first. Below is a list of these components:

Part No.	Description	Part No.	Description
550722	NL-D1 Nozzle	550771	NL-F2 Nozzle
550620	NL-D2 Nozzle	550773	NL-FL2 Nozzle
550765	NL-D3 Nozzle	550772	NL-RH2 Nozzle
550621	NL-A Nozzle	550753	NLS-A Nozzle
550725	NL-R Nozzle	550754	NLS-R Nozzle
550724	NL-UB Nozzle	550755	NLS-UB Nozzle
550277	NL-F1 Nozzle	550278	NLS-F2 Nozzle
550770	NL-F1.25 Nozzle	550752	NLS-RH2 Nozzle
552195	SS Valve Replacement Kit		

The KITCHEN KNIGHT System will maintain a UL 300 Listing as long as the system is installed in accordance with the KITCHEN KNIGHT UL 300 Technical Manual (P/N 315-420904 or 551738).

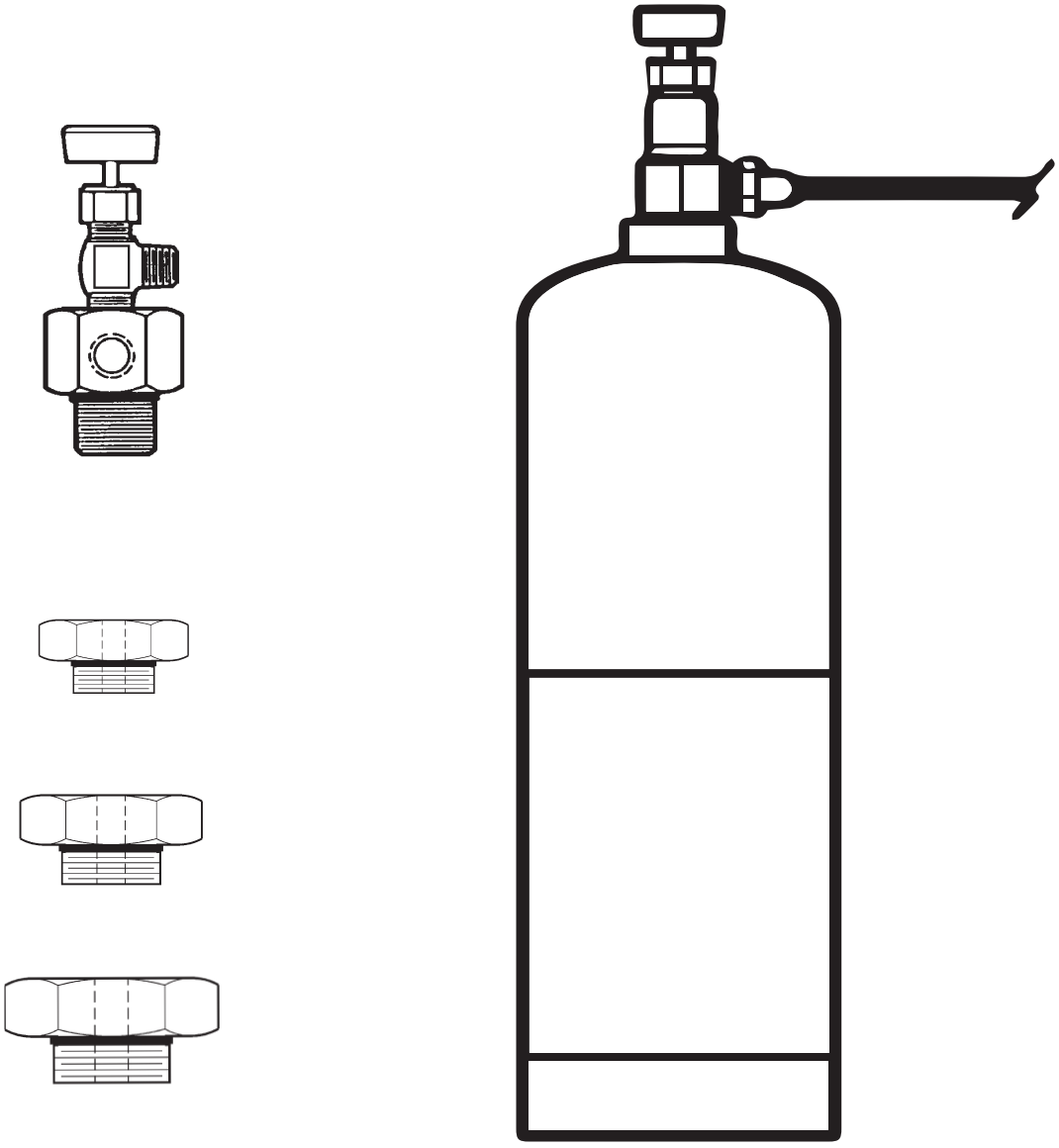
We thank you for your support in making the KITCHEN KNIGHT II system one of the top restaurant fire suppression systems in the industry today and for your continued loyalty to PYRO-CHEM Restaurant Fire Suppression products.

If you should have any questions regarding the information in this bulletin, please contact your Territory Sales Manager at 1-800-PYRO-CHEM or Technical Services Department (1-800-526-1079 / 715-732-3456).

HYDROSTATIC TEST INSTRUCTIONS

Pyro-Chem

PORTABLES, WHEELED UNITS, AND PRE-ENGINEERED SYSTEMS



tyco Fire Protection Products

One Stanton Street / Marinette, WI 54143-2542, USA / +1-715-735-7411 / www.pyrochem.com

This manual is intended to provide persons having a practical knowledge of testing procedures and safeguards with information covering the hydrostatic testing of fire extinguishers and pre-engineered system tanks manufactured or sold by Tyco Fire Protection Products. As changes in the products or testing procedures occur, this information will be updated by General Bulletins. When issued, General Bulletin information always supersedes that published here.

It is recommended that only genuine supplied PYRO-CHEM replacement components be installed on PYRO-CHEM products. Only authorized PYRO-CHEM distributors, who are trained in and authorized for a particular product line, shall be allowed to service and maintain PYRO-CHEM products.

This manual is limited to uses herein described. For other applications, contact your local authorized distributor, Tyco Territory Manager, or Tyco Fire Protection Products – Technical Services Department, Marinette, Wisconsin 54143-2542, USA.

Note: The converted metric values in this manual are provided for dimensional reference only and do not reflect an actual measurement.

Form Number: PC2013008-01

Date: 2014-APR-14

⚠ DANGER

Indicates a hazardous situation in which a person ***will*** **experience serious personal injury or death** if the situation is not avoided.

⚠ WARNING

Indicates a hazardous situation in which a person ***could*** **experience serious personal injury or death** if the situation is not avoided.

⚠ CAUTION

Indicates a hazardous situation in which a person **could experience minor or moderate personal injury** if the situation is not avoided.

CAUTION

Addresses practices not related to personal injury, such as a system part malfunctioning, property damage, or system failure.

NOTICE

Addresses general practices or observations related to system function that are *not* related to personal injury.

INTRODUCTION

PYRO-CHEM hand portables, wheeled units, and pre-engineered system tanks are designed, produced, and tested in accordance with standards, judged by many to be the most rigid in the fire protection industry. The result is safe, effective, first aid fire extinguishers.

To assure continued safe, effective operation, the pressure vessels must receive scheduled, periodic maintenance in strict compliance with procedures established by the Occupational Safety and Health Act of 1970. Under the provisions of the Act, the servicing of fire protection equipment must be conducted in accordance with the Standards of the National Fire Protection Association (NFPA) Pamphlets No. 10, 17, 17A, 30, 33, and 96. These standards are available on the NFPA website: www.nfpa.org.

TOOLS AND ACCESSORIES

The general use hand tools and accessories listed below are only those available from Tyco Fire Protection Products (TFPP). For a more comprehensive guide to tools, equipment, parts, and lubricants used in hydrostatic testing service operation, refer to the National Association of Fire Equipment Distributors Incorporated (NAFED) “Service and Recharge Training Manual.”

Part No.	Description
440623	Recharge Adaptor, Dry Chem.
79730	Touch-Up Paint, Red, 9 oz. Aerosol Can
79731	Touch-Up Paint, “CR” Red, 9 oz. Aerosol Can
436049	Touch-Up Paint, Red – Post 2008 models, 12 – 0.6 oz. Brush-in-cap Bottles
9030	Grease, Molykote #33, 5.3 oz.
25940	Inspection Seal
11790	Hydrostatic Test Record Label

HYDROTEST RECOMMENDATIONS

Parts below are taken from NFPA Pamphlet No. 10, 17, 17A, 30, 33, and 96. They serve as a general guide to the rules and regulations of hydrostatic testing as required by law.

Extinguisher and agent tanks shall be hydrostatically tested at regular intervals as required in the NFPA Standards, or more frequently when inspection or maintenance indicates a specific need. Such tests are usually required on extinguisher shells, cylinders, some cartridges and some hose assemblies.

⚠ WARNING

If, at any time, a pressure vessel or agent tank shows evidence of corrosion or mechanical injury, it shall be subjected to a hydrostatic pressure test or replaced. Important: air or gas should not be used for pressure testing as failure of a shell could be violent and dangerous. When extinguisher shells, cylinders, cartridges, or hoses fail a hydrostatic pressure test, they shall be destroyed.

Table 1 on pages 2-3 is designed to show what TFPP understands to be the current legal requirements for periodic retest, indicating both test intervals and pressures. These requirements are shown for the two principal authorities having jurisdiction over this type of product: the National Fire Protection Association (NFPA), and the Code of Federal Regulations (Department of Transportation (DOT), Mine Safety and Health Administration (MSHA), and Occupational Safety and Health Administration (OSHA)). It is important to understand the jurisdiction of these two authorities and how it may affect the product in question. You may wish to refer directly to these principal authorities to make your own interpretation of the current legal requirements.

NFPA standards have no force of law in and of themselves unless adopted by a regulatory entity that is empowered by statute to enforce regulations. However, as consensus standards developed by teams of recognized experts, they represent sound fire safety principles, practices, and procedures. We recommend the standards be observed in the case of hydrostatic retesting. Moreover, some states and municipalities have adopted NFPA standards as a part of their fire protection codes, including those parts dealing with the maintenance and hydrostatic retesting of extinguishers.

OSHA has safety jurisdiction over most workplaces in the U.S., and as such its regulations have the force of federal law. OSHA has not adopted NFPA standards for hydrotesting per se, but its requirements follow NFPA standards closely.

DOT’s hydrostatic retest requirements apply only to charged pressure vessels which are transported in commerce in the U.S. or to foreign countries. Once the product reaches its original destination, DOT rules apply only when the container is reshipped in a charged condition or being re-filled.

MSHA has safety jurisdiction over mines and generally references the appropriate NFPA and DOT regulations for additional guidelines on extinguisher hydrostatic testing.

It will be noted that there are some gaps and overlapping in the legal requirements for periodic hydrostatic retesting of some vessels. However, appropriate retest intervals and test pressures have been determined for such vessels through the NFPA Committee process and/or TFPP’s own research and experience. In many cases, compliance to the NFPA standards may put you in compliance with OSHA. (Refer to the National Consensus Standards, Appendix B, Subpart L.) A TFPP recommendation is indicated for each of the pressure vessels in Table 1, pages 2-3.

In states where the OSHA regulations differ from local regulations or statutes, the Office of the State Fire Marshal is available for counsel.

At intervals not exceeding those specified in Table 1, extinguishers shall be hydrostatically tested. For those with a designated test interval of five years, the first hydrostatic retest may be conducted between the fifth and sixth years.

TABLE 1: PERIODIC HYDROSTATIC RETEST REQUIREMENTS FOR PRESSURE VESSELS IN PYRO-CHEM

PRESSURE VESSEL	NFPA			CODE OF FEDERAL	
	STD. NO.	RETEST PERIOD	TEST PRESSURE	REF. NO.*	RETEST PERIOD
HAND PORTABLE AND WHEELED FIRE EXTINGUISHERS					
PYRO-CHEM Stored Pressure Dry Chemical, Clean Agent (HFC-236fa), and Halon 1211 Extinguishers (Agent Tanks)	10	12 years	Factory test pressure (not to exceed 3X the normal operating pressure)	1, 2	12 years
PYRO-CHEM Stored Pressure Water and Wet Chemical Hand Portable Extinguishers (Agent Tanks)	10	5 years	Factory test pressure (not to exceed 3X the normal operating pressure)	1, 2	5 years
PYRO-CHEM CO_2 Hand Portable and Wheeled Extinguishers (Aluminum and Steel Agent Tanks) DOT 3A-1800, 3AA-1800, 3AL-1800 and 3AA-2015	10	5 years	5/3 service pressure as stamped into the cylinder	1, 2, 4	5 years
PRE-ENGINEERED SYSTEMS					
PYRO-CHEM MONARCH and ATTENDANT (DOT 4BW-350)	17	12 years	Factory test pressure (not to exceed 2X the normal operating pressure)	1, 2, 3, 5	7 or 12 years
PYRO-CHEM Wet Chemical Agent Tanks (Carbon Steel and Stainless Tanks) (DOT 4BW-225 Agent Tanks)	17A	12 years	Factory test pressure (not to exceed 2X the normal operating pressure)	2	7 or 12 years
PYRO-CHEM ATTENDANT II (DOT 4BW-450 Agent Tanks)	12A	12 years	Factory test pressure (not to exceed 2X the normal operating pressure)	2, 3, 5	7 or 12 years

— As used in this chart, service pressure and operating pressure are the same.

— Dry Powder Extinguishers should be tested at the same intervals and pressures as Dry Chemical Extinguishers.

PORTABLES, WHEELED UNITS, AND PRE-ENGINEERED SYSTEMS

	REGULATIONS (DOT, MSHA & OSHA)	TFPP RECOMMENDS		
	TEST PRESSURE	**RETEST PERIOD**	**TEST PRESSURE**	**NOTES**
	Factory test pressure (not to exceed 3X the service pressure)	12 years	Check test pressure on nameplate for 3X normal operating pressure	
	Factory test pressure (not to exceed 2X the service pressure)	5 years	200 psi (13.8 bar)	
	5/3 service pressure	5 years	5/3 service pressure	• Aluminum tanks suspected of being exposed to temperatures in excess of 350 °F (177 °C) shall be removed from service and subjected to a hydrostatic test. • Agent hose assemblies must be tested at same intervals @ 2,000 psi (137.9 bar) or at service pressure, whichever is higher.
	Factory test pressure (not to exceed 2X the normal operating pressure)	7 or 12 years	700 psi (48.3 bar)	• At same interval, test 1 in. discharge hose and 1/4 in. actuation hose @ 1000 psi (68.9 bar), or at service pressure, whichever is higher.
	450 psi (31 bar)	7 or 12 years	450 psi (31 bar)	• At same interval, test 1/4 in. gas hose assembly @ 220 psi (15.2 bar), or at service pressure, whichever is higher. • If system contains an Agent Distribution Hose and Restraining Cable Assembly, a hydrostatic test is required at 220 psi (15.2 bar) for the hose assembly.
	Factory test pressure (not to exceed 2X the normal operating pressure)	7 or 12 years	900 psi (62.1 bar)	• At same interval, test 1 in. discharge hose and 1/4 in. actuation hose @ 1000 psi (68.9 bar), or at service pressure, whichever is higher.

— Factory test pressures are indicated on the extinguisher nameplates.

— Recording of hydrostatic testing shall be in accordance with NFPA-10 recommendations.

* See page 4 for references to Code of Federal Regulations.

REFERENCE NUMBERS FOR CODE OF FEDERAL REGULATIONS CFR-49

1. Part 180.209 (e) *Periodic retesting, reinspection and marking of cylinders.* Reference the table in this paragraph that specifies cylinder retest pressure and retest period. (Proposed 2006)
2. Part 180.209 (b) The periodic retest must be performed by an authorized retester and a test by interior hydrostatic pressure in a water jacket or other apparatus suitable for determination of the expansion of the cylinder. (Proposed 2006)
3. Part 180.209 (6) (b) (2) Note 2 The 10-year retest period may be extended to a 12-year period, and the 5-year retest period may be extended to a 7-year period after expiration of the first 12-year period. (Proposed 2006)
4. Part 180.209 (b) (i) For DOT-3A or 3AA cylinders manufactured after Dec. 31, 1945 and stamped with a five pointed star after the most recent test date the retest interval may be extended to 10 years. (Proposed 2006)
5. Part 180.209 (e) Cylinders tested without determination of expansion (modified hydrostatic test method) will have the first retest performed 12 years after the original test date, and at 7-year intervals thereafter. If the water jacket method is used, retest must be performed every 12 years. (Proposed 2006)

Additional References:

CFR-29 Part 1910.157 (OSHA)

CFR-30 (MSHA)
- Part 56 Surface Metal/Non metal
- Part 57 Underground Metal/Non Metal
- Part 75 Underground Coal
- Part 77 Surface Coal

CFR-49 Part 173.309 Fire Extinguishers

MANUFACTURING DATES

If the pressure vessel does not have a current hydrostatic test label attached to the shell with a recent test date, then the manufacturing date is the correct date for the periodic testing of the shell. All pressure vessels with dates indicating a need for testing must be tested to ensure the safety of the shell.

Manufacturing dates for extinguishers are available on the nameplate; or steel stamped on the base of the shell, on the bottom, on the collar of the shell, on the bottom of the skirt (FE-13-NM models), or on the hanger lug (K Class and water models).

SAFETY CONSIDERATIONS

The purpose of hydrostatic retest is to expose any weakness in a pressure vessel that would make it unsafe for use. Accordingly, any pressure vessel under test must be placed in a protective cage designed to permit visual observation of the extinguisher for evidence of distortion or leakage. When the pressure vessel is too large for a test cage (e.g., wheeled dry chemical extinguishers), a substantial barrier (shield) must be placed between the pressure vessel and the service personnel.

⚠ WARNING

Failure to observe these basic safety measures, and others, can result in serious personal injury or even death.

Hydrostatic testing should only be performed by trained, qualified persons with suitable testing equipment and facilities. For additional guidance, refer to CFR-29, CFR-49, NFPA-10, and the Compressed Gas Association Pamphlets “C-6,” “C-6.1,” and “C-1” which cover visual inspection and hydrostatic test methods.

TFPP does not assume any liability in connection with the hydrostatic testing of their pressure vessels by other than company personnel. However, the following safety considerations are offered as a guide to extinguisher service personnel.

1. Personnel performing hydrostatic testing services should have practical knowledge of test equipment, testing procedures, and of testing safeguards as the result of “hands-on” training.
2. Service personnel should wear suitable eye protection, safety shoes, and any other safety gear prescribed by their employer and/or the authority having jurisdiction.
3. A testing service company should maintain a reference library of procedures, standards or specifications for compressed and non-compressed gas cylinders and cartridges; e.g. Compressed Gas Association’s Pamphlets C-1 and C-6; NFPA’s Pamphlets No. 10, 12, 12A, 17, 17A, 30, 33, and 96; OSHA’s Part 1910, Sub Part L – Fire Protection; Department of Transportation’s Code of Federal Regulations No. 49 Transportation, Parts 100-199; and where applicable the Canadian Transport Commissions counterpart regulations.
4. When disassembling components from a pressure vessel preparatory to test, testing personnel should avoid placing any part of their body over the pressure vessel.
5. Protective cages or barriers should not be anchored to the floor during test operations.
6. Severely corroded or mechanically damaged pressure vessels should be destroyed, not subjected to pressure test to validate personal judgment.
7. Destruction of a pressure vessel should consist (minimal) of drilling a hole (1/2 in. (13 mm) diameter) in the shell through the UL manifest on the name plate and flattening or filing the fill opening threads to preclude further use of the vessel beyond scrap material.
8. Service personnel should not under any circumstances attempt to tighten a leaking connection while the pressure vessel and/or the testing apparatus is under pressure.
9. Test adaptors and fittings should be examined at periodic intervals to make certain the threads are not dangerously nicked, cross-threaded, corroded or worn.
10. A permanent file should be maintained for each tested pressure vessel. This is especially true of a pressure vessel that evidences a dent or factory made repair that was not severe enough to cause rejection under hydrostatic test.

HYDROSTATIC TEST FOR PRESSURE VESSELS

The following general instructions are used with Table 2, pages 6-7, which lists the specific adaptors required to test the different types of extinguishers.

Always be alert for any indications of damage or inability to operate the extinguisher. No manual can anticipate everything that could happen to an extinguisher. In the event that something not covered in the manual is found, determine whether any potential for damage, effect on operation or safety exists, and repair or replace, as necessary.

1. Carefully release any pressure from the extinguisher and remove external and internal parts from the shell. (Refer to the Operation, Recharge, Inspection, and Maintenance Manual provided with the extinguisher for proper procedures.)
2. Remove agent from shell and place in a labeled container. (Closed removal system recommended to limit exposure to personnel.)

   Note: Agent removed from Pre-engineered Systems shall be replaced.
3. Remove all traces of dry chemical from the shell using dry air or nitrogen.

⚠ CAUTION

Restrain object being cleaned and wear proper protective clothing and eye protection.

4. Thoroughly examine the entire shell for signs of corrosion or mechanical damage. Refer to the "Standards for Visual Inspection of Steel Compressed Gas Cylinders," Pamphlet CGA C-6, from the Compressed Gas Association, Inc.

⚠ CAUTION

Do not perform hydrostatic test on shell in poor condition. If the shell shows evidence of parent metal missing due to severe corrosion or mechanical damage, it must be destroyed and replaced. (See page 4, step 7.)

5. Connect the appropriate adaptors, fittings, and hose from the hydrostatic pump as indicated in Table 2, pages 6-7.
6. Place shell in test cage or place shield between shell and all personnel.
7. Open vent valve and pump water into the shell. When water starts to flow freely from the valve, rock the shell gently to release all air entrapped in the shell – then close vent valve.

⚠ WARNING

All air must be removed. Failure to comply may cause the shell to rupture resulting in severe personal injury or death.

8. Turn on hydrostatic pump and apply pressure at a rate-of-pressure rise to reach the designated test pressure within 1 minute. (See Table 1, pages 2-3 for test pressure.)
9. Maintain the test pressure for 1 full minute observing shell for any distortion or leakage. If no distortion or leakage is noted and the test pressure has not dropped, the hydrostatic test is successful. Stop the hydrostatic pump and open the vent valve to relieve the pressure in the shell.

   Note: Any shell that fails this hydrostatic test must be destroyed (see page 4, step 7) to prevent its further use as a pressure vessel. Shells passing this hydrostatic test must have all water and all traces of moisture completely removed before reassembly of components.

⚠ CAUTION

Relieve pressure through vent valve only. Do not attempt to remove adaptors, fittings, fill caps, etc., until pressure is released.

10. Disconnect all test fittings and remove water from the shell. Completely dry the shell (for all non-water type of extinguishers) using a commercial warm air dryer that does not exceed a temperature of 150 °F (65.5 °C). Do not place dry chemical in shell until the shell and all attachments are completely dry.
11. Perform hose test on hose assemblies as designated in Table 1, pages 2-3.
12. Examine all parts; replace worn or damaged parts with original factory components. Reassemble and refill shell according to the Operation, Recharge, Inspection, and Maintenance Manual provided with the extinguisher.
13. Record hydrostatic test information (month, year, test pressure, name or initials of person performing the test, and name of agency performing the test) on the hydrostatic test record label (see Figure 1), Part No. 11790 (or equal) and attach it to the shell. Update the permanent file on each tested extinguisher.

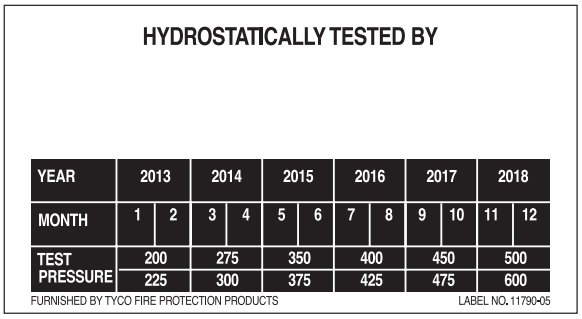


FIGURE 1

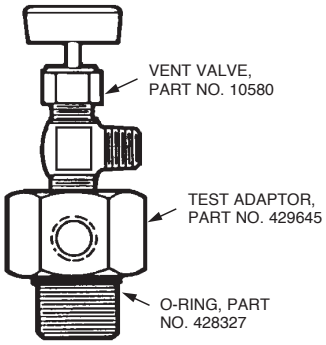
Note: Refer to current issue of NFPA No. 10 (Test Records) for latest test label requirements.

TABLE 2: SHELL ADAPTORS AND FITTINGS

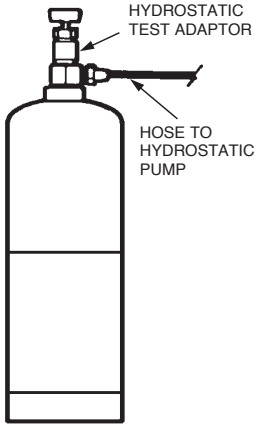
Extinguisher Identification	Part No.	Description	Directions
PYRO-CHEM Universal Valve:			
02, 05, 10, 20 (Standard and Industrial) Dry Chemical	429644	Hydrostatic Test Adaptor (Universal Valve)	Select appropriate assembly and attach to shell opening; hand tighten. Connect hydrostatic hose to assembly.
02, 05, 09, 13 Clean Agent	429644	Hydrostatic Test Adaptor (Universal Valve)	
PC02S	429644	Hydrostatic Test Adaptor	
Pre-Engineered Systems:			
PYRO-CHEM Wet Chemical System	552181	Hydrostatic Test Adaptor	Select appropriate assembly/adaptor and attach to shell fill opening, hand tighten.
PYRO-CHEM MONARCH and ATTENDANT (35 and 75 lb tanks (4BW-350))	552182	Hydrostatic Test Adaptor	Connect hydrostatic hose.
PYRO-CHEM ATTENDANT II (35 lb tank)	552182	Hydrostatic Test Adaptor	
PYRO-CHEM ATTENDANT II (80 lb tank)	31883	Hydrostatic Test Adaptor	
PYRO-CHEM KITCHEN ONE	430074	Hydrostatic Test Adaptor	Select appropriate assembly/adaptor and attach to shell fill opening, hand tighten.
PYRO-CHEM PWS-25G (Water Type)	430074	Hydrostatic Test Adaptor	Connect hydrostatic hose to assembly
Clean Agent FE-13-NM	430074	Hydrostatic Test Adaptor	

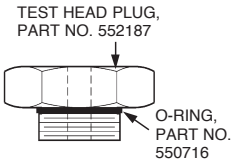
CAUTION: All test fittings are to be high pressure (3000 psi (207 bar)) steel construction.

Components

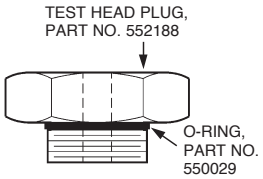


PYRO-CHEM
UNIVERSAL VALVE
HYDROSTATIC TEST ADAPTOR,
PART NO. 429644

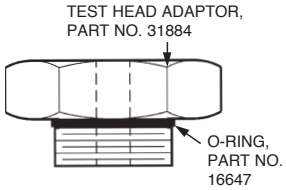




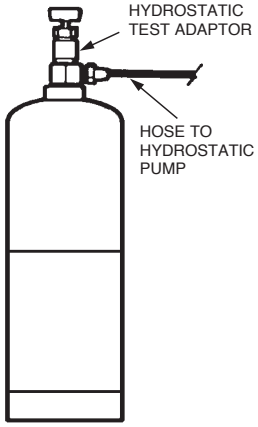
HYDROSTATIC
TEST ADAPTOR
PART NO. 552181



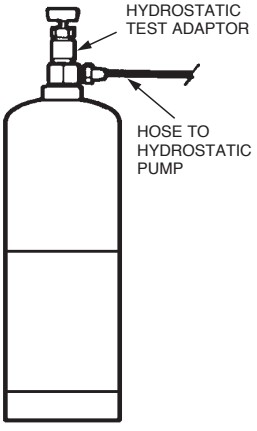
HYDROSTATIC
TEST ADAPTOR
PART NO. 552182



PYRO-CHEM ATTENDANT II
(80 LB TANK)
HYDROSTATIC TEST ADAPTOR
PART NO. 31883



HYDROSTATIC
TEST ADAPTOR
PART NO. 430074



NOTES:

INTRODUCTION

Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under, and around obstacles.

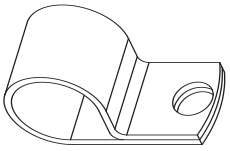
Flexible conduit is designed for use with PYRO-CHEM® restaurant systems. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

Flexible conduit CANNOT be used in detection systems.

The following design requirements (limitations) supersede the listed requirements stated in the KITCHEN KNIGHT II (PN551274) Technical Manual.

DESIGN REQUIREMENTS

- Prior to starting the flexible conduit installation, the detection system must be complete and attached to the control head.
- Flexible conduit **cannot** be utilized in detection systems.
- Flexible conduit inserts, Part No. 434347, can ONLY be used with the flexible conduit system.
- The maximum distance from a PYRO-CHEM control head to a mechanical pull station is 140 ft (42.7 m) with a maximum of 360° (for example, 3-90° and 2-45° bends, 2-90° and 4-45° bends, etc.) bends in the flexible conduit, one pulley tee (Refer to Design, Installation Manual for detailed splicing instructions), two splices, and 15 pulley tees.
- The maximum distance from a PYRO-CHEM control head to a mechanical gas valve is 75 ft (22.9 m) with a maximum of 4-90° bends in the flexible conduit and 4 pulley elbows.
- Any portion of the flexible conduit system can be substituted with EMT conduit provided the proper connections are used to join the two types of conduit.
- All bends in the flexible conduit system must have a minimum bend diameter of 6 in. (15 cm).
- When the flexible conduit is used to make 90° bends between a control head and a mechanical gas valve, the bends must start at the control head. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When the flexible conduit is used to make 90° bends between a control head and a pull station, the bends must start at the control head. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- Only PYRO-CHEM pull stations utilizing a composite (black) bushing on the back side of the pull station cover can be used with flexible conduit.
- When not utilizing a conduit offset, Part No. 79825, 2-45° bends in the flexible conduit are allowed between the strain relief on top of the control head and the location where the flexible conduit is supported. **Note: This is allowed on pull station installations only.**
- When installing flexible conduit, conduit should be secured at intervals not to exceed 5 ft (1.5 m) and before and after each bend. Flexible conduit CANNOT slide in the clamp(s) used for mounting. Make certain mounting clamp(s) do not pinch the flexible conduit. The following style clamp ('P' clip), Part No. 436150, is a suitable type for use on flexible conduit.



008141

TABLE 1

	Manual Pull	Mechanical Gas Valve	Detection
90° Cable Bends	4	4	N/A
Bend Diameter – in. (cm)	6 (15.2)	6 (15.2)	N/A
Mechanical Corner Pulley	15	4	N/A
Conduit Secured Max. ft (m)	5 (1.5)	5 (1.5)	N/A
Conduit Max. Length ft (m)	140 (42.7)	75 (22.9)	N/A
Conduit Offset or 2-45° Bends (Only between the strain relief fitting and support location	1	0	N/A
Pulley Tees	1	0	N/A
Splices	2	0	N/A

INSTALLATION INSTRUCTIONS

Note: Do not add any type of lubricants inside or on the flexible conduit. Make certain stainless steel wire rope is clean and debris-free.

The flexible conduit should be routed along the same path that EMT conduit would normally be run. Stainless steel wire rope should be routed through the flexible conduit as it is in EMT conduit.

⚠ CAUTION

Flexible conduit must not be located within 6 in. (15 cm) of the hood or in areas exceeding 130 °F (54 °C). Also, do not route flexible conduit in areas where conduit can be crushed, pinched, or broken.

Flexible conduit can be used to connect a PYRO-CHEM control head to a remote pull station or mechanical gas valves.

Before starting the system installation, take a few minutes to plan the layout of the system. This will minimize the amount of components needed to complete the installation. Once the path of the flexible conduit has been determined, verify that the layout does not exceed the design requirements.

CONNECTING THE FLEXIBLE CONDUIT TO THE PYRO-CHEM CONTROL HEAD, ELECTRICAL BOX, PULL STATION, OR MECHANICAL GAS VALVE

1. Layout the flexible conduit and secure it in place. **Note:** If inner liner is crimped, turn a drywall screw into the end to open it. See Figure 1.

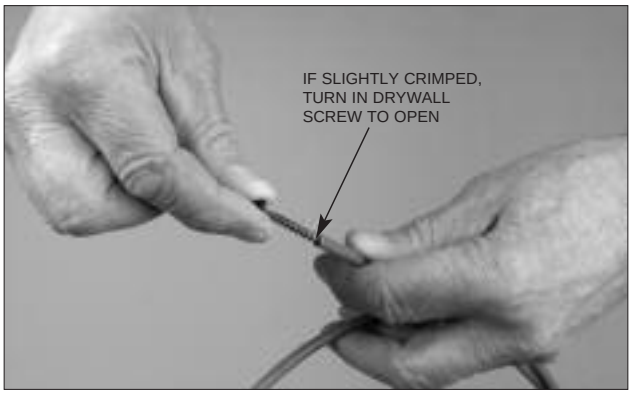


FIGURE 1
007985

CONNECTING THE FLEXIBLE CONDUIT TO THE PYRO-CHEM CONTROL HEAD, ELECTRICAL BOX, PULL STATION, OR MECHANICAL GAS VALVE (Continued)

2. Starting at the PYRO-CHEM control head, connect the conduit connector using the supplied nut. Use only PYRO-CHEM conduit fittings, Part No. 55813. See Figure 2.

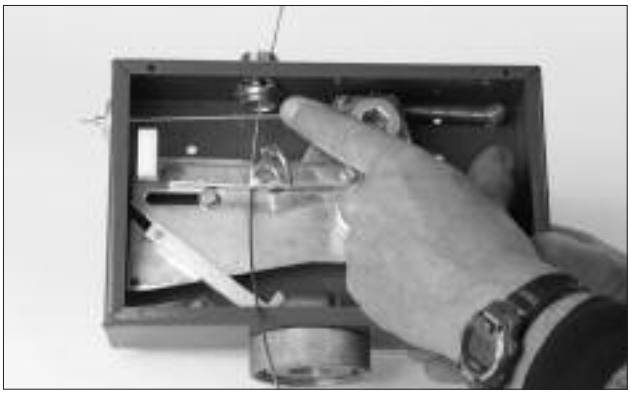


FIGURE 2
008068

3. 3. Unscrew the nut from the EMT conduit connector and remove the compression ring. Discard ring. See Figure 3.

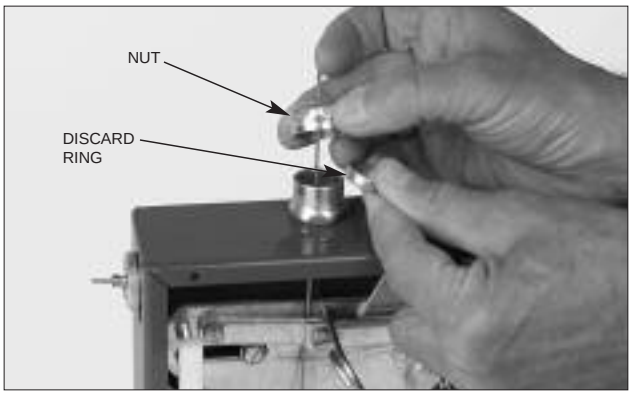


FIGURE 3
008070

4. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 4.

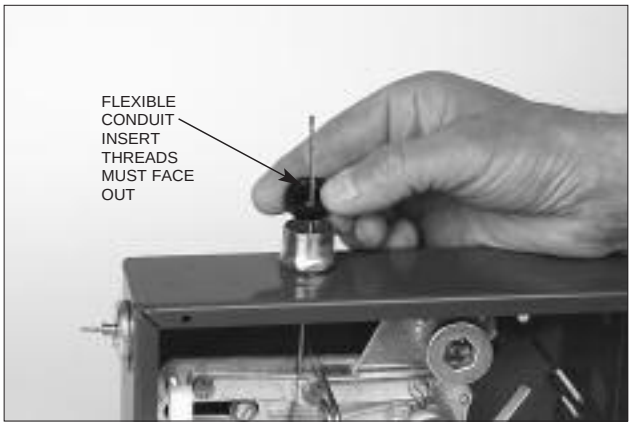


FIGURE 4
008071

5. Tighten the nut to the connector body, locking the flexible conduit insert in place. See Figure 5.

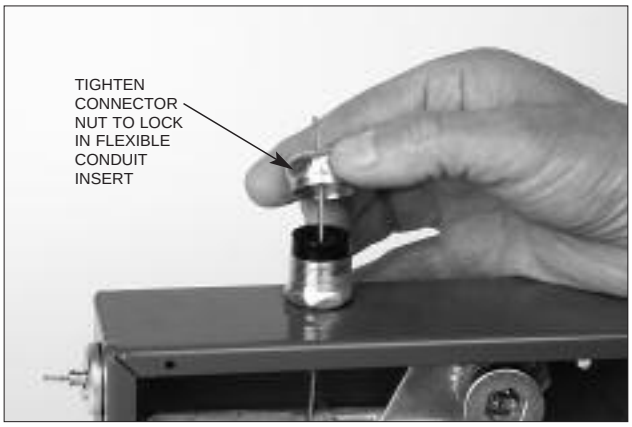


FIGURE 5
008072

6. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 6.

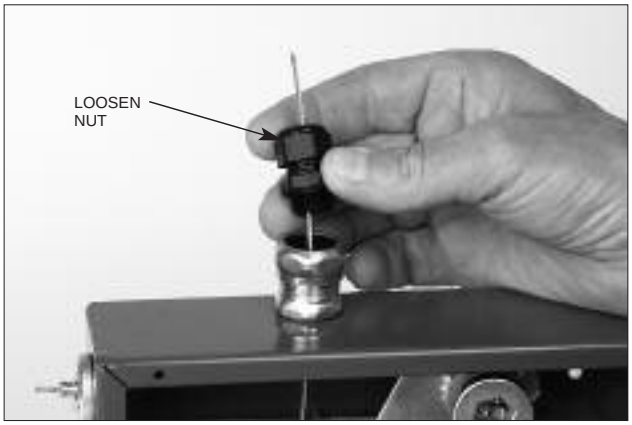


FIGURE 6
008073

7. Tighten the body of the strain relief to the conduit connector. See Figure 7.

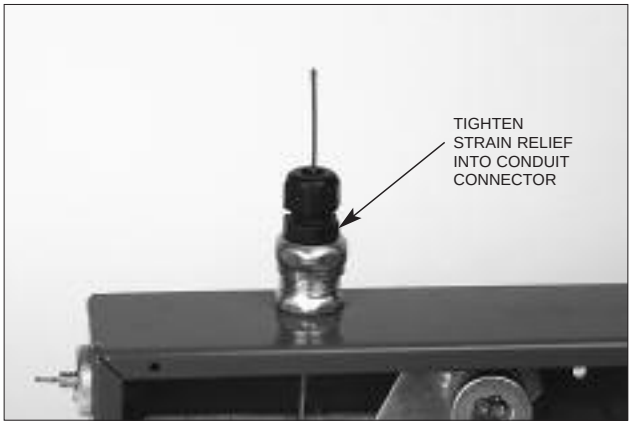


FIGURE 7
008074

CONNECTING THE FLEXIBLE CONDUIT TO THE PYRO-CHEM CONTROL HEAD, ELECTRICAL BOX, PULL STATION, OR MECHANICAL GAS VALVE (Continued)

8. Thread the wire rope through the flexible conduit. See Figure 8. (If a splice is required in the flexible conduit, proceed to "Splicing Installation Instructions.")

FIGURE 8
008075

9. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (2 mm) from the bottom of the flexible conduit insert. See Figure 9.

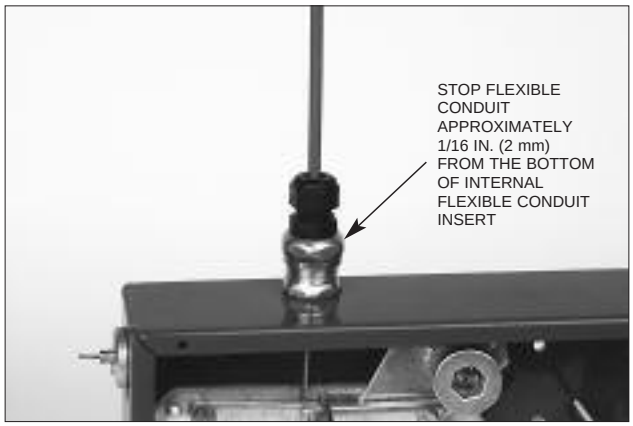


FIGURE 9
008076

10. Tighten the strain relief nut onto the strain relief. See Figure 10.

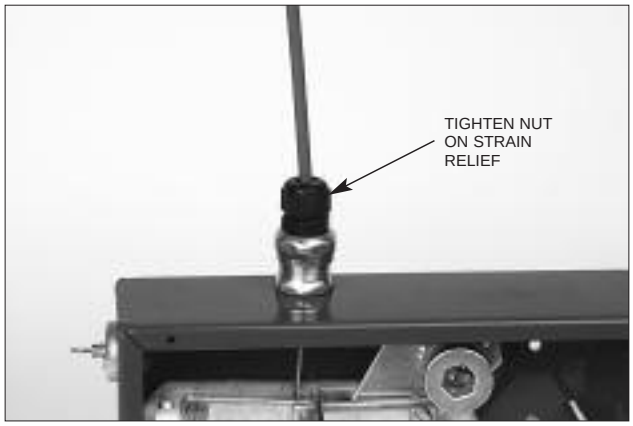


FIGURE 10
008077

CONNECTING FLEXIBLE CONDUIT TO PULLEY ELBOWS, PULLEY TEES, OR UNION FITTINGS

1. Unscrew the nut from pulley elbow, pulley tee, or EMT conduit connector and remove the compression ring. Discard ring. See Figure 1.

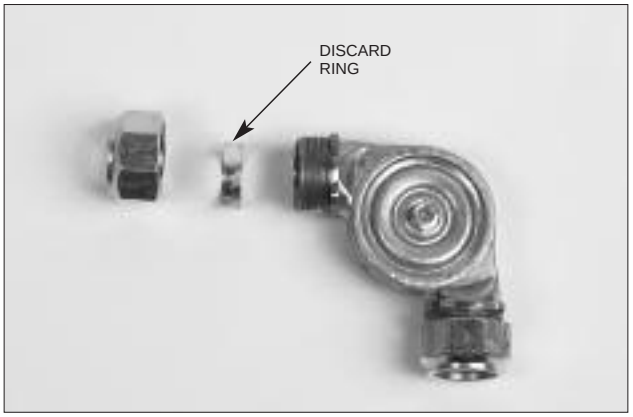


FIGURE 1
007995

2. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain thread in flexible conduit insert is facing out toward end of connector. See Figure 2.

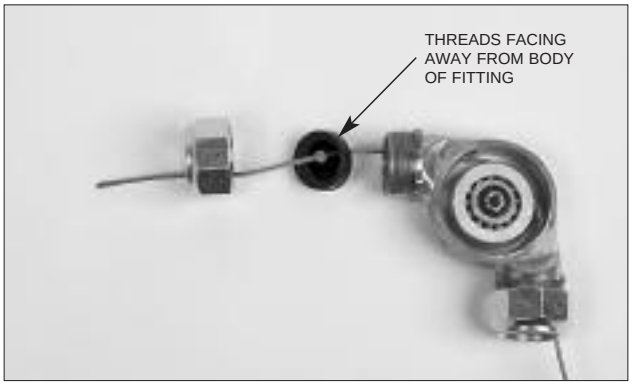


FIGURE 2
007996

3. Tighten the nut to the connector conduit body, locking the flexible conduit insert in place. See Figure 3.

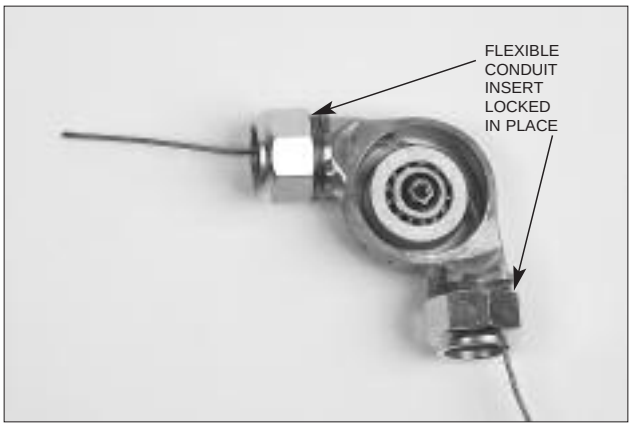


FIGURE 3
007997

CONNECTING FLEXIBLE CONDUIT TO PULLEY ELBOWS, PULLEY TEES, OR UNION FITTINGS (Continued)

4. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 4.

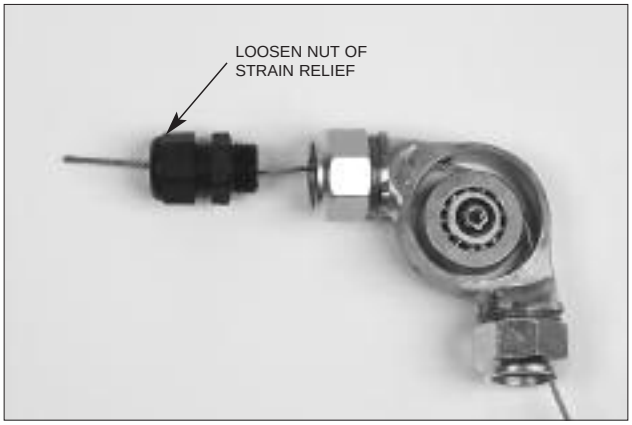


FIGURE 4
007998

5. Tighten the body of the strain relief to the conduit connector. See Figure 5.

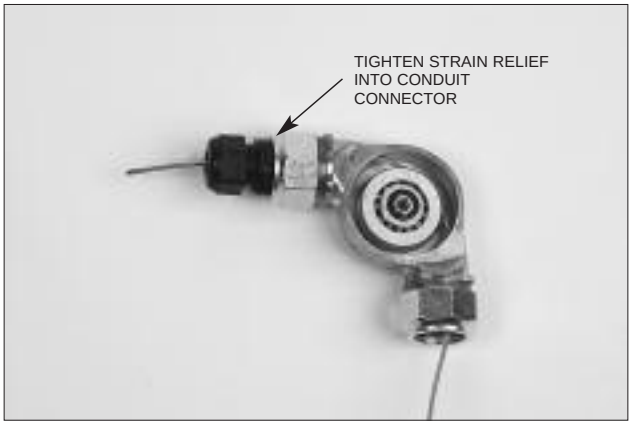


FIGURE 5
007999

6. Push the wire rope into the flexible conduit. See Figure 6.

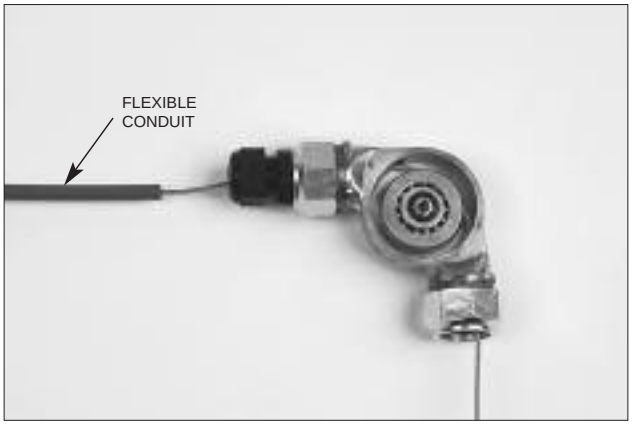


FIGURE 6
008000

7. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (2 mm) from the bottom of the flexible conduit insert. See Figure 7.

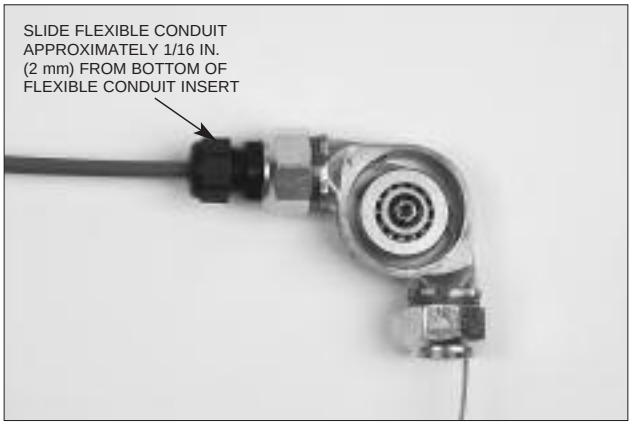


FIGURE 7
008001

8. Tighten the strain relief nut onto the strain relief. See Figure 8.

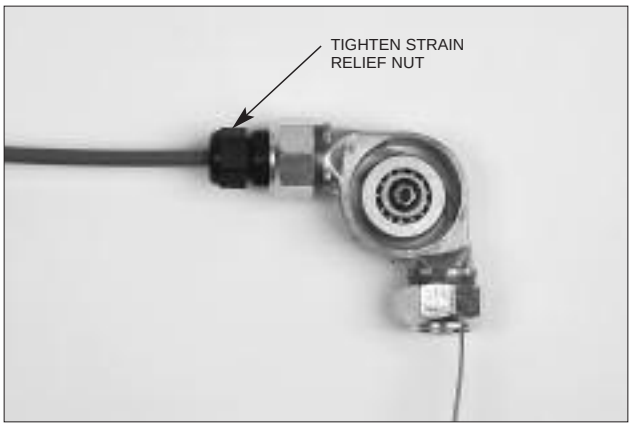


FIGURE 8
008002

9. Complete the same procedures on the other end of the conduit fitting as described in Step 1 through Step 8 above.

INSTALLING FLEXIBLE CONDUIT THROUGH A CONDUIT OFFSET

1. Starting at the PYRO-CHEM control head, connect the conduit connector using the supplied nut. Use only PYRO-CHEM conduit fittings, Part No. 55813. See Figure 1.

FIGURE 1
008068

2. Install Conduit Offset, Part No. 79825, into conduit connector and tighten nut. See Figure 2.

FIGURE 2
008069

3. Install compression union to opposite end of conduit offset. Tighten securely. See Figure 3.

FIGURE 3
008040

4. Install the conduit required to get above the ceiling. See Figure 4.

FIGURE 4
008041

5. Install compression union to top of conduit riser. See Figure 5.

FIGURE 5
008042

6. Remove union nut and ring. Discard ring. Do not reinstall nut at this time. See Figure 6.

FIGURE 6
008043

INSTALLING FLEXIBLE CONDUIT THROUGH A CONDUIT OFFSET (Continued)

7. Remove strain relief nut and install strain relief body into compression union. See Figure 7.

FIGURE 7
008044

8. Install union nut over strain relief body and tighten nut. See Figure 8.

FIGURE 8
008045

9. Install strain relief nut onto strain relief body. Do not tighten nut at this time. See Figure 9.

FIGURE 9
008046

10. Push flexible conduit completely through conduit offset. Flexible conduit should stop flush or +/– 1/2 in. (1.3 mm) from bottom of conduit of conduit fitting in PYRO-CHEM control head. See Figure 10.

FIGURE 10
008047

11. Tighten nut on strain relief on top of conduit riser. See Figure 11.

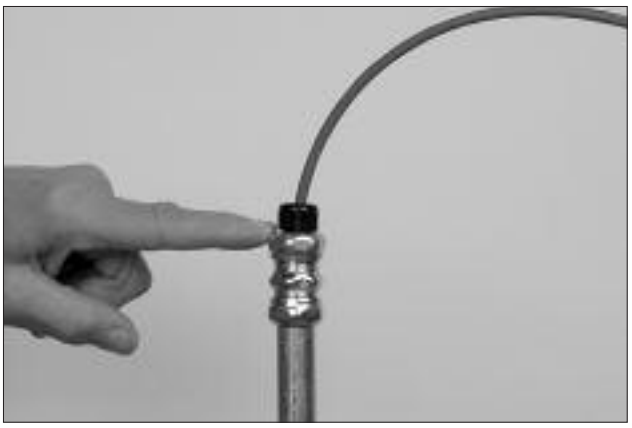


FIGURE 11
008048

12. Complete the remainder of the flexible conduit and wire rope installation to the pull station or the gas valve.

FLEXIBLE CONDUIT SPLICING (ALLOWED ON PULL STATION INSTALLATIONS ONLY)

Note: Wire rope cannot be spliced together, only the flexible conduit.

Flexible conduit can be spliced together using EMT compression fitting union, Part No. 79827, only for the pull connection.

1. Remove rings from both ends of compression union. See Figure 1.

FIGURE 1
008061

2. Install strain relief nut, strain relief, compression union nut, flexible conduit insert and compression union over the flexible conduit with wire rope installed. See Figure 2.

FIGURE 2
008049

3. Tighten compression union nut onto union body, locking flexible conduit insert in place. See Figure 3.

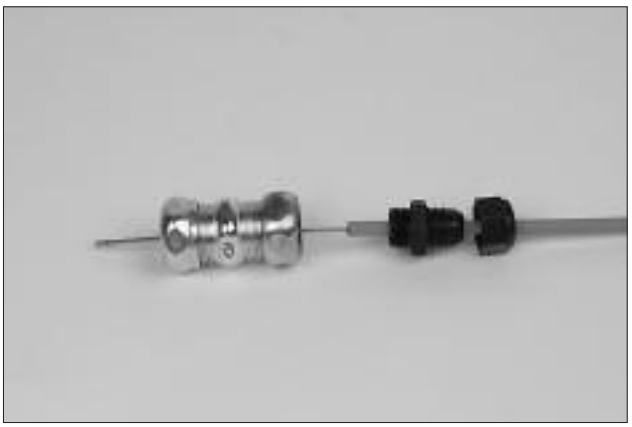


FIGURE 3
008050

4. Install strain relief body into compression union and tighten. See Figure 4.

FIGURE 4
008051

5. Push flexible conduit into strain relief until it is approximately 1/16 in. (2 mm) from the bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 5.

FIGURE 5
008052

6. Starting on the opposite end of the compression union, remove the nut. See Figure 6.

FIGURE 6
008053

FLEXIBLE CONDUIT SPLICING (ALLOWED ON PULL STATION INSTALLATIONS ONLY) (Continued)

7. Install strain relief nut, strain relief, and compression union nut on remaining section of flexible conduit and install flexible conduit insert on wire rope. See Figure 7.

FIGURE 7
008054

8. Push wire rope completely through remaining section of flexible conduit. See Figure 8.

FIGURE 8
008055

9. Tighten compression union nut onto union body, securing flexible conduit insert in place. See Figure 9.

FIGURE 9
008056

10. Tighten strain relief body into compression union. See Figure 10.

FIGURE 10
008057

11. Push flexible conduit into strain relief until it is approximately 1/16 in. (2 mm) from bottom of the flexible conduit insert, then tighten strain relief nut onto strain relief body. See Figure 11.

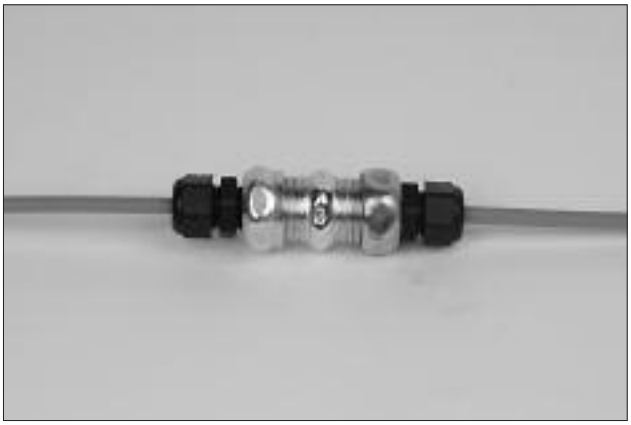


FIGURE 11
008058

12. Complete the remainder of the flexible conduit and wire rope installation.
13. To test all installations, refer to the proper sections in the KITCHEN KNIGHT® II Technical Manual, Part No. 551274.

TESTING PULL STATION/MECHANICAL GAS VALVE

To test all installations, refer to KITCHEN KNIGHT II Technical Manual, Part No. 551274, Chapter 4 (System Installation) for detailed testing information.

Wet Chemical Extinguishing Agent

Features

- Fast flame knock-down and securement of grease-related fires
- Provides a cooling effect which further enhances its ability to prevent reflash
- Designed for a wide variety of restaurant hazards
- Listed by Underwriters Laboratories (UL) as part of the KITCHEN KNIGHT II Restaurant Fire Suppression System and KITCHEN ONE K-Class Fire Extinguishers
- Ease of recharge and post-fire cleanup

Application

PYRO-CHEM Wet Chemical is designed for use only in PYRO-CHEM Restaurant Fire Suppression Systems and K-Class Fire Extinguishers. This liquid agent will combat grease-related fires as found in restaurant appliances and ventilating equipment. It should not be used for fires involving energized electrical hazards

Description

PYRO-CHEM Wet Chemical is a specially formulated, aqueous solution of an inorganic salt. The agent is pre-mixed, eliminating the need for dilution before system charging. When used as an extinguishing agent, it will produce no toxic by-products.

Agent Properties

Appearance	Clear, colorless liquid
Storage Life	12 Years
Refractive Index	1.39 – 1.41
Freeze Point	–40 °F (–40 °C)
Specific Gravity	1.32 – 1.52
Kinematic Viscosity	5.26 centistokes @ 25 °C
pH	12.5 – 13.5

Note: Care should be taken when handling the agent. If contact is made with the eyes or skin, flush with water for 15 minutes. If the agent is swallowed, dilute with water or milk and contact a physician.

Performance

When used in the KITCHEN KNIGHT II Restaurant Fire Suppression System or KITCHEN ONE K-Class Fire Extinguishers, PYRO-CHEM Wet Chemical is extremely effective on fires in restaurant ventilating equipment (hoods and ductwork), as well as in a variety of cooking appliances (deep-fat fryers, griddles, range tops, and several types of broilers and char-broilers).

010008

Suitable operating temperature is 32 °F to 120 °F (0 °C to 49 °C).

As the agent is sprayed in fine droplets (atomized) onto an appliance grease fire, it provides excellent flame knock-down, surface-cooling, and fire-securing capabilities. When the agent reacts with the hot grease, it forms a layer of foam on the surface of the fat. This soap-like blanket of foam acts as an insulator between the hot grease and the atmosphere, helping to prevent flammable vapors from escaping and reducing the chance for flame re-ignition. Post-fire cleanup can be readily accomplished by flushing the area with water or steam.

Approvals and Listings

PYRO-CHEM Wet Chemical has been tested and is listed as part of the KITCHEN KNIGHT II Restaurant Fire Suppression System with:

- Underwriters Laboratories (EX-3830)
- Underwriters Laboratories of Canada (CEX-812)
- New York City Fire Department Certificate of Approval (COA) #5719

The agent is also listed as part of KITCHEN ONE K-Class Fire Extinguishers with:

- Underwriters Laboratories (EX-5157)
- Underwriters Laboratories of Canada (CEX-1363)

Ordering Information

Part No. 553176	1.6 gal (6.1 L)
Part No. 551188	3.0 gal (11.4 L)

Recharge services are available from PYRO-CHEM Authorized distributors.

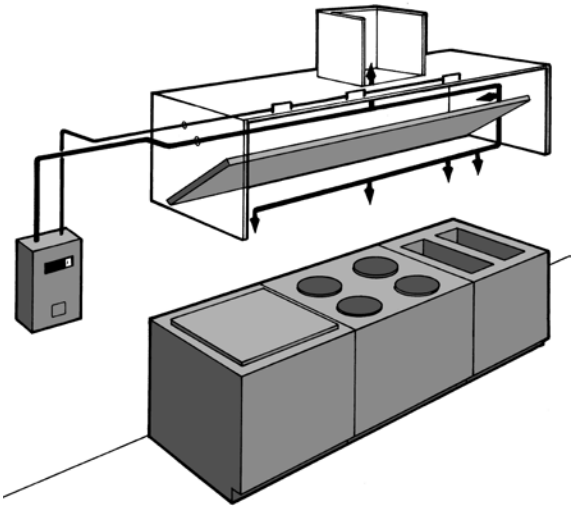
Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

Pyro-Chem

KITCHEN KNIGHT II Restaurant Fire Suppression System

Features

- UL and ULC Approved
- Complies with NFPA Standard 17A and 96
- Meets the requirements of the Building Officials and Code Administrators (BOCA)
- Meets the requirements of the International Building Code (IBC)
- Approved by the New York City Fire Department by Certificate of Approval (COA) #5719
- CE Marked

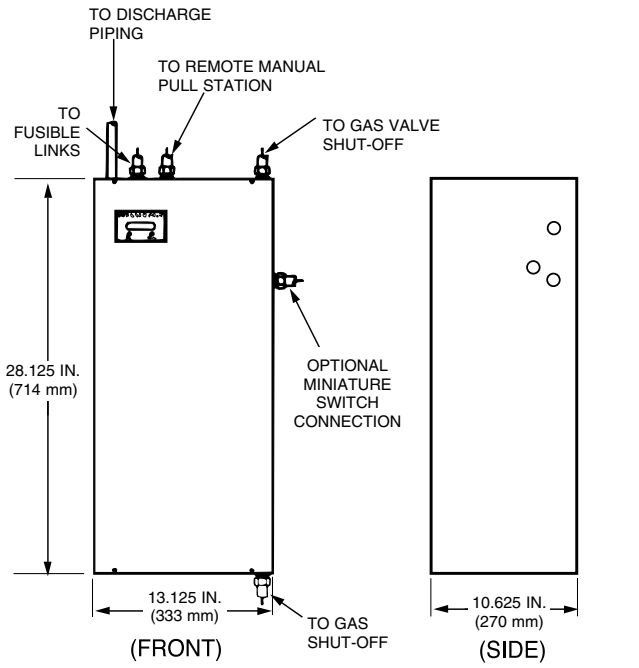


004212

General

The KITCHEN KNIGHT II Restaurant Kitchen Fire Suppression System is a pre-engineered solution to appliance and ventilating hood and duct grease fires. The system is designed to maximize hazard protection, reliability, and installation efficiency. Automatic or manual system activation releases a throttle discharge of potassium carbonate solution on the protected area in the form of fine droplets to suppress the fire and help prevent re-ignition after the discharge is complete.

OPTIONAL CYLINDER ENCLOSURE



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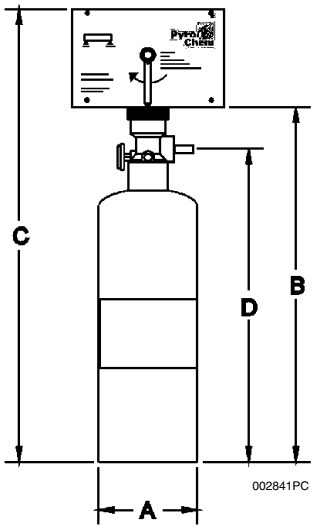


002841PC

Model No.	A in.	A (mm)	B in.	B (mm)	C in.	C (mm)	D in.	D (mm)	Flow Point Capacity	Weight lb	Weight (kg)	Mounting Bracket Used
PCL-160	8.00	(203)	17.75	(451)	23.50	(597)	15.44	(392)	5	34	(15)	MB-15
PCL-300	8.00	(203)	25.06	(637)	30.81	(783)	22.75	(578)	10	53	(24)	MB-15
PCL-460	10.00	(254)	25.06	(637)	30.81	(783)	22.75	(578)	15	83	(38)	MB-15
PCL-600	10.00	(254)	35.81	(910)	41.56	(1,056)	33.50	(851)	20	108	(49)	MB-1

System Operation

The KITCHEN KNIGHT II Restaurant Kitchen Fire Suppression System has been designed for protecting kitchen hood, plenum, exhaust duct, grease filters, and cooking appliances (such as fryers, griddles, rangetops, upright broilers, charbroilers and woks) from grease fires. The versatile state-of-the-art wet chemical distribution technique, combined with dual, independent activation capability – automatic fusible link or manual release – provides efficient, reliable protection the moment a fire is detected. Once initiated, the pressurized wet chemical extinguishing agent cylinder discharges a potassium carbonate solution through a pre-engineered piping network and out the discharge nozzles. The wet chemical discharge pattern is maintained for a duration of time to ensure suppression and inhibit re-ignition. Expanded capability provides remote manual actuation, gas equipment shutdown, and electrical system shutdown. This optional equipment will enhance the basic system functions and be applicable when designing custom configurations to suit a particular customer's needs and/or comply with local codes.

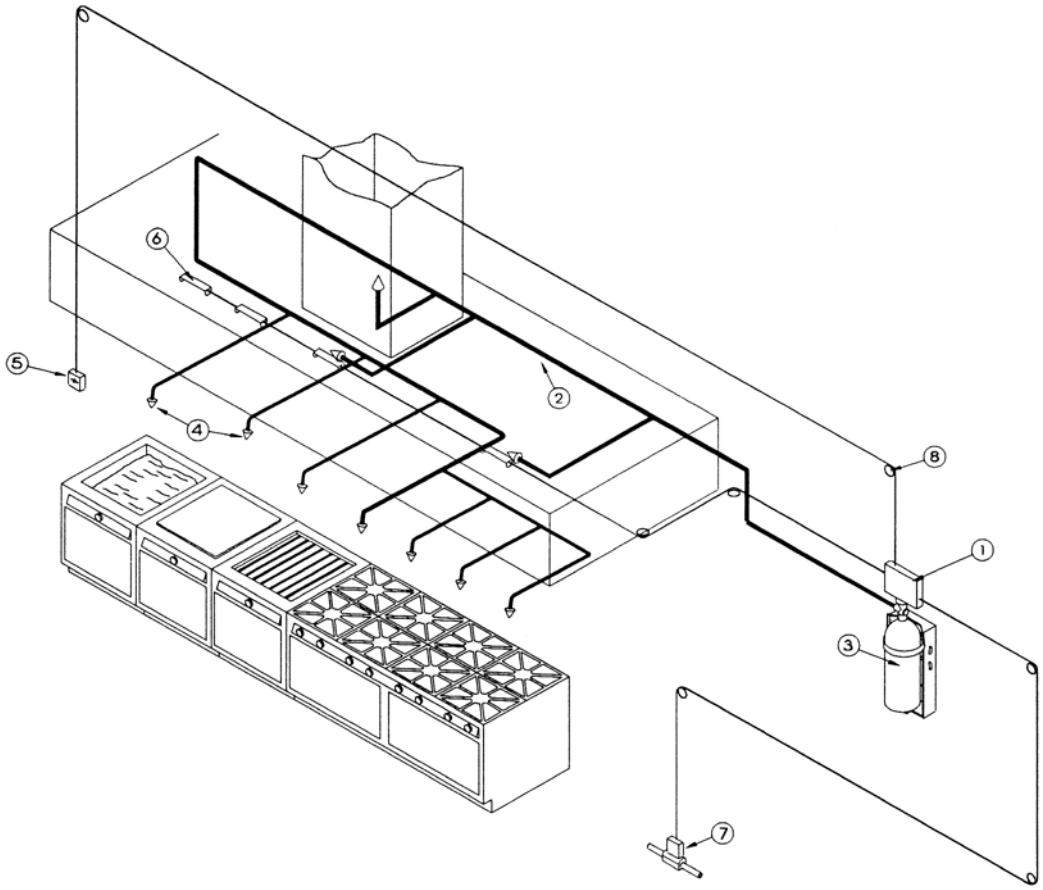
The operating temperature range of the PYRO-CHEM KITCHEN KNIGHT II System is 32 °F to 120 °F (0 °C to 49 °C).

Suggested Architect's Specifications

The fire suppression system shall be of the stored pressure, wet chemical pre-engineered fixed nozzle type manufactured by Tyco Fire Protection Products. A carbon dioxide cartridge shall be used as the pneumatic releasing device for the system. The cartridge shall be an integral part of the control head assembly. The wet chemical storage cylinder shall be a DOT-rated cylinder for stored pressure of 225 psig (15.5 bar), and a pressure gauge shall be provided on the cylinder valve for visual inspection. The system shall be capable of automatic and manual actuation. Automatic actuation shall be provided by an appropriate number of fusible link detectors mounted in series on a stainless steel wire input line to the control head. Manual actuation shall be provided by turning a handle on the cylinder control head cover, if available, and/or remotely by a cable operated pull station with a dedicated stainless steel line connected between the pull station and the control head mechanism.

The system shall have been tested to the UL Standard for Fire Extinguishing Systems for Protection of Restaurant Cooking Area, UL300, and Listed by Underwriters Laboratories, Inc. It shall be installed in accordance with the National Fire Protection Association standards, NFPA 17A Standard for Wet Chemical Systems, and NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, and comply with all local and/or state codes and standards. Refer to PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System Manual, Part No. 551274, for detailed installation and maintenance instructions.

Typical Installation



Typical Installation (Continued)

1. **Cylinder Control Head** – Integral design allows direct connection of the actuation pressure cylinder to the control head without the need of high pressure hose or pipe. Separate wire cable activation lines for automatic fusible links and remote pull station provide an added measure of safety. Unique technique for achieving necessary input wire cable tension.
2. **Piping** – Unbalanced piping network simplifies application design and installation. Requires no additional piping to connect system pressure cylinder to extinguishing agent container. Schedule 40 black iron, chrome-plated, or stainless steel pipe can be used.
3. **Cylinders** – Contain PYRO-CHEM Potassium Carbonate wet chemical solution stored at 225 psig (15.5 bar). Includes pressure gauge for visual maintenance checks. 1.6, 3.0, 4.6, and 6.0 gallon sizes provide 5, 10, 15, and 20 flow point coverage respectively, offering a broad range of application coverage.
4. **Nozzles** – Can be fixed or fitted with a swivel adaptor allowing the nozzle to be rotated approximately 30° in all directions.
5. **Remote Manual Pull Station** – Simple operating instructions with double action release minimizes accidental manual operation of the system. Maximum limitations of 150 ft (45.7 m) cable run with 1/16 in. cable and 40 corner pulleys apply. A dedicated wire cable input line to the cylinder control head provides manual operation in addition to automatic operation utilizing fusible link detection.

   The pull station is compatible with flexible conduit.
6. **Fusible Link Detection Equipment** – Accommodates both series and terminal placement to minimize inventory and simplify ordering. All necessary components are included for efficient assembly and installation. Fusible links rated for maximum ambient temperature must be ordered separately. Maximum limitations of 20 fusible links on a 150 ft (45.7 m) cable run with 40 corner pulleys provide substantial hazard coverage.
7. **Automatic Gas Shut-Off Valve** – Complies with requirements pertaining to the shut off of fuel as described by NFPA 17A. Can be reset at control head after regular maintenance/service check for convenience of service technician. Maximum limitations of 100 ft (45.7 m) cable run with 30 corner pulleys provide mounting flexibility.

   The gas shut-off valve is compatible with flexible conduit.
8. **Corner Pulleys And Accessories** – Designed to ensure reliable system function as tested by Underwriters Laboratories.
9. **Agent Distribution Hose (Not Shown)** – Kitchen appliances manufactured with or resting on caster (wheels/rollers) include an agent distribution hose as a component of the suppression system. This allows the appliance to be moved for cleaning purposed without disconnecting the appliance fire suppression protection. The hose assembly includes a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose.
10. **Flexible Conduit (Not Shown)** – Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

    Flexible conduit can be used only with the Remote Manual Pull Station and Mechanical Gas Valves.

Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

Pyro-Chem

PYRO-CHEM KITCHEN KNIGHT II
PCL-160/300/460/600 NOZZLE COVERAGE/PIPE VOLUMES
CONVERSION SUMMARY SHEET

Appliance	Nozzle Type	Flow Points	Width in. (cm) Max. Side	Length or Area sq in (cm^2)	Min. Height in. (cm)	Max. Height in. (cm)
Deep Fat Fryer – Vat	2H	2	19 1/2	19 in.	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Vat	2L		(49.5)	(48 cm)	13 (33)	24 (61)
Deep Fat Fryer – Drip Pan (Vat 18 in. x 18 in. max. (45.7 cm x 45.7 cm))	2H	2	27 3/4	500	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Drip Pan (Vat 18 in. x 18 in. max. (45.7 cm x 45.7 cm))	2L		(70.5)	(3225.8)	13 (33)	24 (61)
Deep Fat Fryer – Drip Pan (Vat 19 1/2 in. x 19 in. max. (49.5 cm x 48.3 cm))	2H	2	25 3/8	495	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Drip Pan (Vat 19 1/2 in. x 19 in. max. (49.5 cm x 48.3 cm))	2L		(64.5)	(3193.5)	13 (33)	24 (61)
Two Burner Range	1H	1	12	28 in.	40 (102)	50 (127)
Two Burner Range (Low Proximity)	1L		(30.5)	(71 cm)	13 (33)	24 (61)
Two Burner – Back Shelf (High Proximity)	2L	2	28 (71)	336 (2167.7)	24 (61)	35 (89)
Four Burner Range	2L	2	28 (71)	28 in. (71 cm)	34 (86)	48 (122)
Small Wok	1H	1	24 in. dia.	6 in. depth	24 (61)	48 (122)
Small Wok (Low Proximity)	1L		(61 cm)	(15.2 cm)	13 (33)	24 (61)
Large Wok	2H	2	30 in. dia.	8 in. depth	24 (61)	48 (122)
Large Wok (Low Proximity)	2L		(76.2 cm)	(20.3 cm)	13 (33)	24 (61)
Small Griddle	1H	1	36	1080	24 (61)	48 (122)
Small Griddle (Low Proximity)	1L		(91.4)	(6968)	10 (25)	24 (61)
Large Griddle	2H	2	48	1440	24 (61)	48 (122)
Large Griddle (Low Proximity)	2L		(122)	(9290)	10 (25)	24 (61)
Gas Radiant Char-Broiler	1H	1	26	624	24 (61)	48 (122)
Gas Radiant Char-Broiler (Low Proximity)	1L		(66)	(4025.8)	13 (33)	24 (61)
Large Gas Radiant Char-Broiler	2H	2	36	864	36 (91)	48 (122)
Large Gas Radiant Char-Broiler (Low Proximity)	2L		(91.4)	(5574)	13 (33)	36 (91)
Lava Rock Char-Broiler	2L	2	26 (66)	624 (4025.8)	15 (38)	35 (89)
Natural Charcoal Char-Broiler (max. fuel depth 6 in. (15 cm))	1H	1	24	480	24 (61)	35 (89)
Natural Charcoal Char-Broiler (Low Proximity)	1L		(61)	(3096.8)	15 (38)	24 (61)
Mesquite Char-Broiler (max. fuel depth 6 in. (15 cm))	1H	1	24	480	24 (61)	35 (89)
Mesquite Char-Broiler (Low Proximity)	1L		(61)	(3096.8)	15 (38)	24 (61)
Upright/Salamander Broiler	1L	1	36 in. width (91.5 cm)	28 in. dia. (71 cm)	Front edge; above the grate	
Salamander Broiler (Internal Chamber)	1H	1	15 1/2 (39.4)	31 (78.7)	Centered 12-14 in. (30.5-35.6 cm) in front of broiler and positioned 16-18 in. (40.6-45.7 cm) above top of broiler; nozzle aimed at center of opening	
Chain Broiler (Internal Chamber)	1L	1	27 in. width (68.5 cm)	38 in. dia. (96.5 cm)	Front edge; 1-3 in. (2.5-7.5 cm) above chain	
Tilt Skillet/Braising Pan	Coverage limitations are based on fryer sizes including the drip boards. Exception: Tilt Skillets and Braising Pans may exceed maximum of 6 ft^2 (0.56 m^2)					

PYRO-CHEM KITCHEN KNIGHT II
PCL-160/300/460/600 NOZZLE COVERAGE/PIPE VOLUMES
CONVERSION SUMMARY SHEET

Plenum	Nozzle Type	Flow Points	Width ft (m)	Length ft (m)	Nozzle Placement (See manual for more detail)
Single Bank/V Bank	1H	1	4 (1.2)	10 (3)	0-6 in. (0-15.25 cm) from end of plenum

Duct	Nozzle Type	Flow Points	Max. Side in. (cm)	Perimeter in. (cm)	Diameter in. (cm)	Length
Rectangle/Circular	2D	2	34 (86)	100 (254)	31 7/8 (81)	Unlimited
Rectangle/Circular	(2) 2D	4	51 (129.5)	150 (381)	47 1/2 (121)	Unlimited
Rectangle/Circular	1L	1	16 3/4 (42.5)	50 (127)	16 (41)	Unlimited

1/4 in. = 20.5 ml per ft **3/8 in. = 37.5 ml per ft** **1/2 in. = 59.8 ml per ft** **3/4 in. = 105 ml per ft**

Cylinder Size	Flow Pts	Total Pipe Vol	1st Nozzle to Last Nozzle	Total Pipe Maximum Pipe Length								From 1st Nozzle to Last Nozzle Maximum Pipe Length							
				1/4 in.		3/8 in.		1/2 in.		3/4 in.		1/4 in.		3/8 in.		1/2 in.		3/4 in.	
				ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)
PCL 160	5	1500	600	73.1	(22.3)	40.0	(12.2)	25.0	(7.6)	—		29.2	(8.9)	16.0	(4.9)	10.0	(3)	—	
PCL 300	10	1910	1125	93.2	(28.4)	50.9	(15.5)	31.9	(9.7)	18.2	(5.5)	54.9	(16.7)	30.0	(9.1)	18.8	(5.7)	10.7	(3.4)
PCL 460	14	3400	3000	165.9	(50.6)	90.7	(27.6)	56.9	(17.3)	32.4	(9.9)	146.3	(44.6)	80.0	(24.4)	50.2	(15.3)	28.6	(8.7)
PCL 460	15	2600	2000	126.8	(38.7)	69.3	(21.1)	43.5	(13.3)	24.8	(7.6)	97.6	(29.7)	53.3	(16.3)	33.4	(10.2)	19.1	(5.8)
PCL 600	19	4215	1688/side	205.6	(62.7)	112.4	(34.25)	70.5	(21.5)	40.1	(12.2)	82.3	(25.1)	45.0	(13.7)	28.2	(8.6)	16.1	(4.9)
PCL 600	20	3465	1312.5/side	169.0	(51.5)	92.4	(28.1)	57.9	(17.6)	33.0	(10)	64.0	(19.5)	35.0	(10.7)	22.0	(6.7)	12.5	(3.8)

Pipe Length ft (m)	Volume of Agent per Pipe Length/Size			
	1/4 in.	3/8 in.	1/2 in.	3/4 in.
1 (0.30)	20.5	37.5	59.8	105
2 (0.61)	41	75	119.6	210
3 (0.91)	61.5	112.5	179.4	315
4 (1.22)	82	150	239.2	420
5 (1.52)	102.5	187.5	299	525
6 (1.83)	123	225	358.8	630
7 (2.13)	143.5	262.5	418.6	735
8 (2.44)	164	300	478.4	840
9 (2.74)	184.5	337.5	538.2	945
10 (3.05)	205	375	598	1050
11 (3.35)	225.5	412.5	657.8	1155
12 (3.66)	246	450	717.6	1260
13 (3.96)	266.5	487.5	777.4	1365
14 (4.27)	287	525	837.2	1470
15 (4.57)	307.5	562.5	897	1575
16 (4.88)	328	600	956.8	1680
17 (5.18)	348.5	637.5	1016.6	1785
18 (5.49)	369	675	1076.4	1890
19 (5.80)	389.5	712.5	1136.2	1995
20 (6.10)	410	750	1196	2100

Minimum Pipe Volumes for a Fryer, Range, and Wok		
Cylinder Size	**Entire System**	**At or before appliance**
PCL 160	239 ml - 1 Flow Pt	180 ml - 1 Flow Pt
PCL 300	300 ml - 4 Flow Pts	239 ml - 2 Flow Pts
PCL 460	660 ml - 10 Flow Pts	180 ml - 2 Flow Pts
PCL 600	960 ml - 14 Flow Pts	120 ml - 2 Flow Pts

General Rules:

1. Measurements taken from fittings centerline (All SCH. 40 Pipe).
2. Maximum difference in elevation from valve outlet to any nozzle is 10 ft (3.05 m).
3. Largest diameter pipe must be used first and decrease in size as installation moves away from the tank.
4. No traps in the piping.
5. Two elbows are allowed in place of a swivel. Elbows used as a swivel do not have to be subtracted from the total allowed.
6. Maximum of 25 elbows.
7. Maximum of 5 elbows between nozzle and preceding tee.
8. Maximum flows for 1/4 in. pipe = 6 flows.
9. Maximum volume allowed for 1/4 in. pipe from tee to nozzle is 410 ml (20 ft or 6.10 m).

Additional rules for PCL 600:

1. Split piping must be used with a maximum of 14 flows on a side.
2. No nozzles before the split.
3. Minimum 1/2 in. pipe must be used to the first split.

PYRO-CHEM®
KITCHEN KNIGHT® II
PCL-160/300/460/600
NOZZLE COVERAGE SUMMARY SHEET

KITCHEN KNIGHT. II®

Appliance	Nozzle Type	Flow Points	Width in. (cm) Max. Side	Length or Area sq in (cm^2)	Min. Height in. (cm)	Max. Height in. (cm)
Deep Fat Fryer – Vat	2H	2	19 1/2	19 in.	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Vat	2L		(49.5)	(48 cm)	13 (33)	24 (61)
Deep Fat Fryer – Drip Pan (Vat 18 in. x 18 in. max. (45.7 cm x 45.7 cm))	2H	2	27 3/4	500	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Drip Pan (Vat 18 in. x 18 in. max. (45.7 cm x 45.7 cm))	2L		(70.5)	(3225.8)	13 (33)	24 (61)
Deep Fat Fryer – Drip Pan (Vat 19 1/2 in. x 19 in. max. (49.5 cm x 48.3 cm))	2H	2	25 3/8	495	24 (61)	48 (122)
Deep Fat Fryer (Low Proximity) – Drip Pan (Vat 19 1/2 in. x 19 in. max. (49.5 cm x 48.3 cm))	2L		(64.5)	(3193.5)	13 (33)	24 (61)
Two Burner Range	1H	1	12	28 in.	40 (102)	50 (127)
Two Burner Range (Low Proximity)	1L		(30.5)	(71 cm)	13 (33)	24 (61)
Two Burner – Back Shelf (High Proximity)	2L	2	28 (71)	336 (2167.7)	24 (61)	35 (89)
Four Burner Range	2L	2	28 (71)	28 in. (71 cm)	34 (86)	48 (122)
Small Wok	1H	1	24 in. dia.	6 in. depth	24 (61)	48 (122)
Small Wok (Low Proximity)	1L		(61 cm)	(15.2 cm)	13 (33)	24 (61)
Large Wok	2H	2	30 in. dia.	8 in. depth	24 (61)	48 (122)
Large Wok (Low Proximity)	2L		(76.2 cm)	(20.3 cm)	13 (33)	24 (61)
Small Griddle	1H	1	36	1080	24 (61)	48 (122)
Small Griddle (Low Proximity)	1L		(91.4)	(6968)	10 (25)	24 (61)
Large Griddle	2H	2	48	1440	24 (61)	48 (122)
Large Griddle (Low Proximity)	2L		(122)	(9290)	10 (25)	24 (61)
Gas Radiant Char-Broiler	1H	1	26	624	24 (61)	48 (122)
Gas Radiant Char-Broiler (Low Proximity)	1L		(66)	(4025.8)	13 (33)	24 (61)
Large Gas Radiant Char-Broiler	2H	2	36	864	36 (91)	48 (122)
Large Gas Radiant Char-Broiler (Low Proximity)	2L		(91.4)	(5574)	13 (33)	36 (91)
Lava Rock Char-Broiler	2L	2	26 (66)	624 (4025.8)	15 (38)	35 (89)
Natural Charcoal Char-Broiler (max. fuel depth 6 in. (15 cm))	1H	1	24	480	24 (61)	35 (89)
Natural Charcoal Char-Broiler (Low Proximity)	1L		(61)	(3096.8)	15 (38)	24 (61)
Mesquite Char-Broiler (max. fuel depth 6 in. (15 cm))	1H	1	24	480	24 (61)	35 (89)
Mesquite Char-Broiler (Low Proximity)	1L		(61)	(3096.8)	15 (38)	24 (61)
Upright/Salamander Broiler	1L	1	36 in. width (91.5 cm)	28 in. dia. (71 cm)	Front edge; above the grate	
Chain Broiler (Internal Chamber)	1L	1	27 in. width (68.5 cm)	38 in. dia. (96.5 cm)	Front edge; 1-3 in. (2.5-7.5 cm) above chain	
Tilt Skillet/Braising Pan	Coverage limitations are based on fryer sizes including the drip boards. Exception: Tilt Skillets and Braising Pans may exceed maximum of 6 ft^2 (0.56 m^2)					

Plenum	Nozzle Type	Flow Points	Width ft (m)	Length ft (m)	Nozzle Placement (See manual for more detail)
Single Bank/V Bank	1H	1	4 (1.2)	10 (3)	0-6 in. (0-15.25 cm) from end of plenum

Duct	Nozzle Type	Flow Points	Max. Side in. (cm)	Perimeter in. (cm)	Diameter in. (cm)	Length
Rectangle/Circular	2D	2	34 (86)	100 (254)	31 7/8 (81)	Unlimited
Rectangle/Circular	(2) 2D	4	51 (129.5)	150 (381)	47 1/2 (121)	Unlimited
Rectangle/Circular	1L	1	16 3/4 (42.5)	50 (127)	16 (41)	Unlimited

PYRO-CHEM® KITCHEN KNIGHT® II PIPE VOLUMES CONVERSION CHART

KITCHEN KNIGHT. II®

1/4 in. = 20.5 ml per ft **3/8 in. = 37.5 ml per ft** **1/2 in. = 59.8 ml per ft** **3/4 in. = 105 ml per ft**

Cylinder Size	Flow Pts	Total Pipe Vol	1st Nozzle to Last Nozzle	Total Pipe Maximum Pipe Length								From 1st Nozzle to Last Nozzle Maximum Pipe Length							
				1/4 in.		3/8 in.		1/2 in.		3/4 in.		1/4 in.		3/8 in.		1/2 in.		3/4 in.	
				ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)	ft	(m)
PCL 160	5	1500	600	73.1	(22.3)	40.0	(12.2)	25.0	(7.6)	—		29.2	(8.9)	16.0	(4.9)	10.0	(3)	—	
PCL 300	10	1910	1125	93.2	(28.4)	50.9	(15.5)	31.9	(9.7)	18.2	(5.5)	54.9	(16.7)	30.0	(9.1)	18.8	(5.7)	10.7	(3.4)
PCL 460	14	3400	3000	165.9	(50.6)	90.7	(27.6)	56.9	(17.3)	32.4	(9.9)	146.3	(44.6)	80.0	(24.4)	50.2	(15.3)	28.6	(8.7)
PCL 460	15	2600	2000	126.8	(38.7)	69.3	(21.1)	43.5	(13.3)	24.8	(7.6)	97.6	(29.7)	53.3	(16.3)	33.4	(10.2)	19.1	(5.8)
PCL 600	19	4215	1688/side	205.6	(62.7)	112.4	(34.25)	70.5	(21.5)	40.1	(12.2)	82.3	(25.1)	45.0	(13.7)	28.2	(8.6)	16.1	(4.9)
PCL 600	20	3465	1312.5/side	169.0	(51.5)	92.4	(28.1)	57.9	(17.6)	33.0	(10)	64.0	(19.5)	35.0	(10.7)	22.0	(6.7)	12.5	(3.8)

Pipe Length		Volume of Agent per Pipe Length/Size			
ft	(m)	1/4 in.	3/8 in.	1/2 in.	3/4 in.
1	(0.30)	20.5	37.5	59.8	105
2	(0.61)	41	75	119.6	210
3	(0.91)	61.5	112.5	179.4	315
4	(1.22)	82	150	239.2	420
5	(1.52)	102.5	187.5	299	525
6	(1.83)	123	225	358.8	630
7	(2.13)	143.5	262.5	418.6	735
8	(2.44)	164	300	478.4	840
9	(2.74)	184.5	337.5	538.2	945
10	(3.05)	205	375	598	1050
11	(3.35)	225.5	412.5	657.8	1155
12	(3.66)	246	450	717.6	1260
13	(3.96)	266.5	487.5	777.4	1365
14	(4.27)	287	525	837.2	1470
15	(4.57)	307.5	562.5	897	1575
16	(4.88)	328	600	956.8	1680
17	(5.18)	348.5	637.5	1016.6	1785
18	(5.49)	369	675	1076.4	1890
19	(5.80)	389.5	712.5	1136.2	1995
20	(6.10)	410	750	1196	2100

Minimum Pipe Volumes for a Fryer, Range, and Wok		
Cylinder Size	**Entire System**	**At or before appliance**
PCL 160	239 ml - 1 Flow Pt	180 ml - 1 Flow Pt
PCL 300	300 ml - 4 Flow Pts	239 ml - 2 Flow Pts
PCL 460	660 ml - 10 Flow Pts	180 ml - 2 Flow Pts
PCL 600	960 ml - 14 Flow Pts	120 ml - 2 Flow Pts

General Rules:

1. Measurements taken from fittings centerline (All SCH. 40 Pipe).
2. Maximum difference in elevation from valve outlet to any nozzle is 10 ft (3.05 m).
3. Largest diameter pipe must be used first and decrease in size as installation moves away from the tank.
4. No traps in the piping.
5. Two elbows are allowed in place of a swivel. Elbows used as a swivel do not have to be subtracted from the total allowed.
6. Maximum of 25 elbows.
7. Maximum of 5 elbows between nozzle and preceding tee.
8. Maximum flows for 1/4 in. pipe = 6 flows.
9. Maximum volume allowed for 1/4 in. pipe from tee to nozzle is 410 ml (20 ft or 6.10 m).

Additional rules for PCL 600:

1. Split piping must be used with a maximum of 14 flows on a side.
2. No nozzles before the split.
3. Minimum 1/2 in. pipe must be used to the first split.

A Tyco International Company

One Stanton Street
Marinette, WI 54143-2542
www.pyrochem.com

BULLETIN

Bulletin No. 2438

DATE: October 11, 2012

TO: Authorized PYRO-CHEM KITCHEN KNIGHT II Restaurant Systems Distributors

FROM: Product Management, Restaurant Systems

SUBJECT: Grease Lock Filter Testing

We are pleased to announce that we have completed the limited fire testing specified below on the Grease Lock Filters (GLFs) manufactured by Ellis Fibre Ltd. This testing was conducted in response to customer inquiries regarding the potential impact of the GLFs on the performance of PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems.

NOTICE: This is offered as additional product information and is not an endorsement of GLFs. The testing should not be interpreted as a representation of the safety of GLFs or an extension of our warranty to GLFs or systems containing non-PYRO-CHEM brand parts.

Based upon the results of the testing performed, we found that the GLFs, under these test conditions, did not negatively affect the performance of the restaurant systems. Fire protection system modifications are not necessary when the GLFs meet the following requirements.

GLFs must:

- Be installed upstream of UL1046 Listed metal baffle-type exhaust hood grease filters.
- Be installed more than 18 in. (457 mm) away from the appliance cooking surface or flue outlet (heat source).
- Be installed within Ellis Fibre filter support brackets (See Bracket Configuration 1 and 2).
- Be installed and replaced according to the manufacturer's instructions.
- Not allow grease to drip outside the support bracket or drip cup.

GLF Models:

The filter models listed below were tested and will not negatively impact PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems.

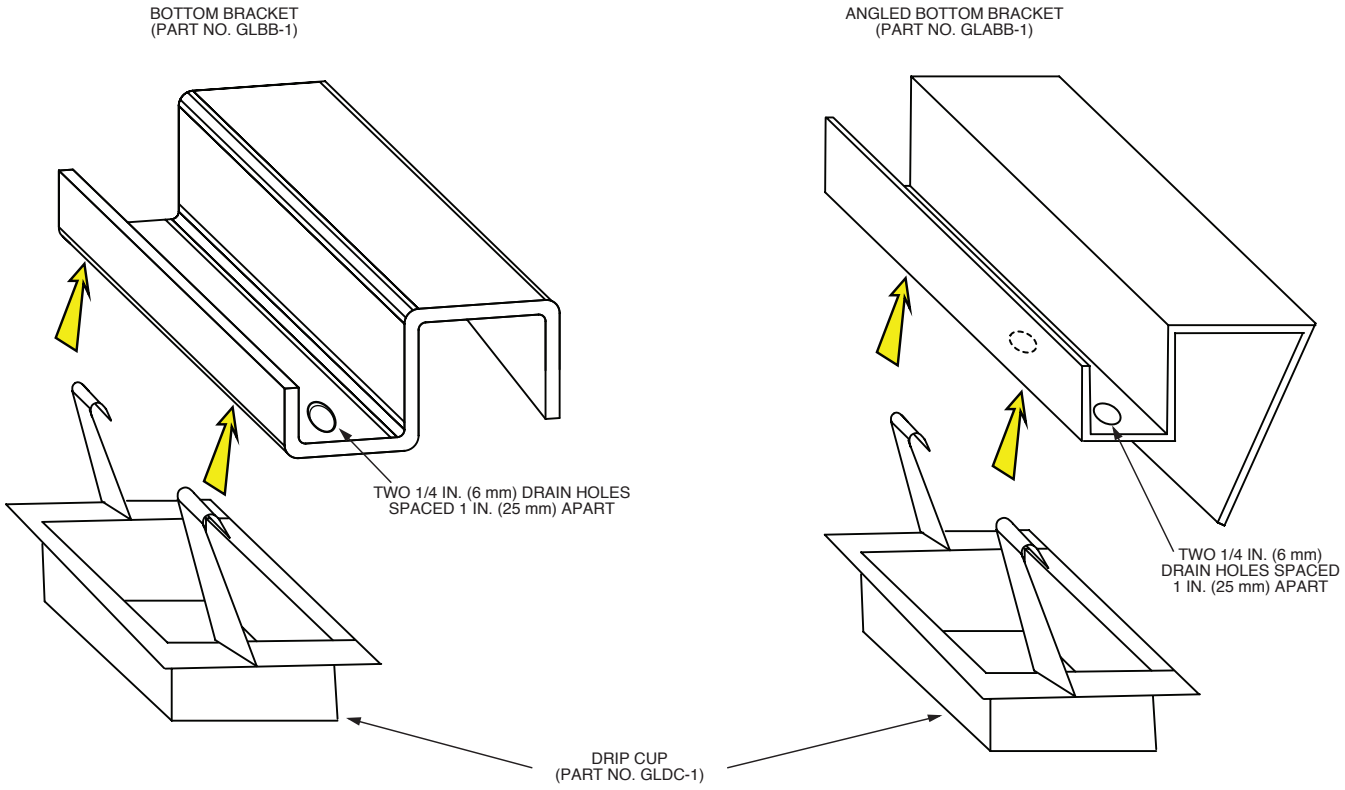
- B50VB50 (0S/100L)
- B50VB50 (5S/95L)
- B50VB50 (10S/90L)

Test Limitations:

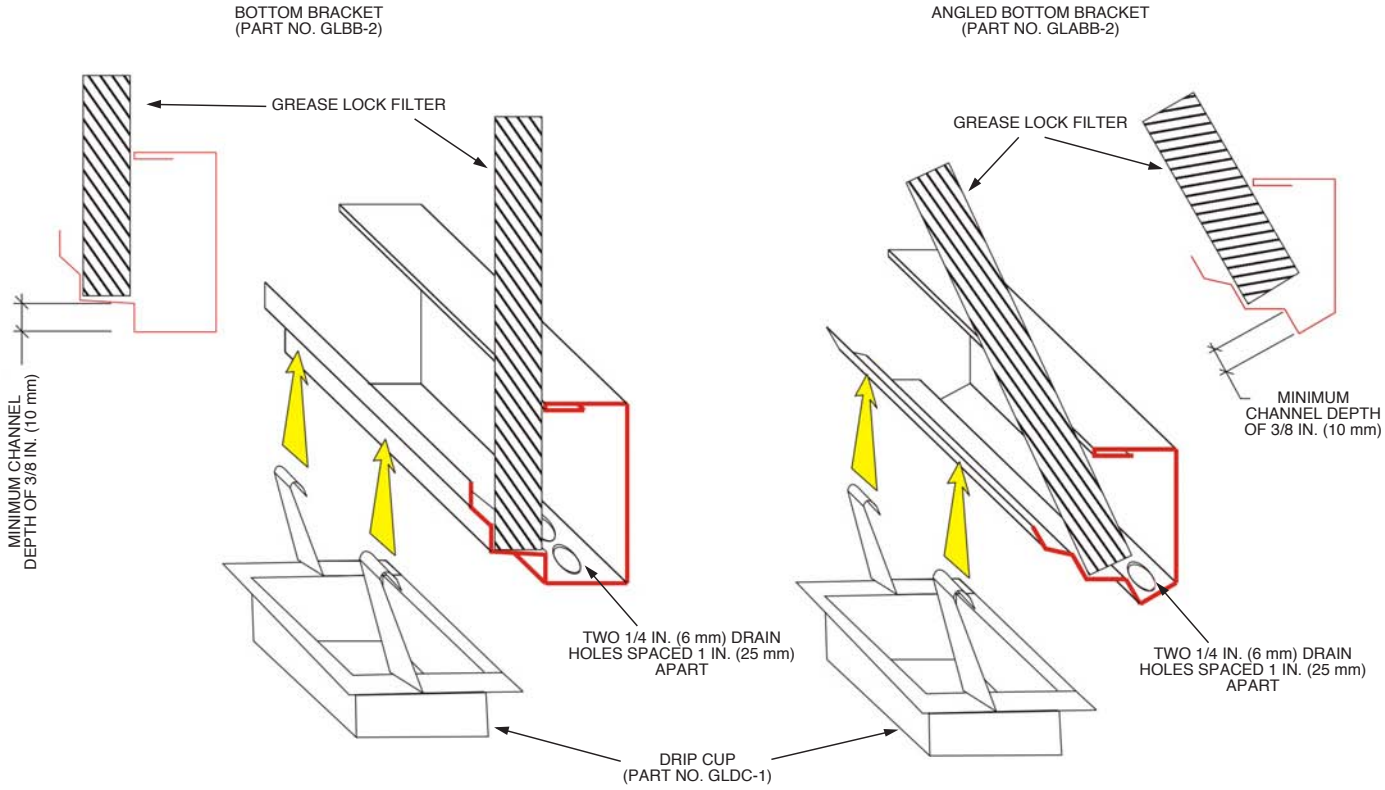
This testing was limited to fire testing only. No tests were conducted on the impact of air flow or detector reaction times. The limited GLF testing involved a traditional baffle-filtered exhaust hood and **did not** encompass all types of restaurant exhaust systems, such as:

- Water Wash Hoods
- Down Draft Exhaust Systems
- Hoods intended to be used with Solid Fuel cooking
- Pollution Control Units or other Secondary Filtration Systems
- Re-circulating Hood Systems

BRACKET CONFIGURATION 1
(All part numbers belong to Ellis Fibre)



BRACKET CONFIGURATION 2
(All part numbers belong to Ellis Fibre)



Should you have questions regarding this bulletin, please contact Technical Services as noted below.

Bulletin No. 2016122
UL EX 3830; UL EX 3437

DATE: May 20, 2016

TO: To Authorized PYRO-CHEM Restaurant System Distributors

FROM: Product Management, Restaurant Systems

SUBJECT: NEW Stainless Steel Scissor Linkage and Fusible Link Offering

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce the New Stainless Steel Scissor Linkage used in the PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression System and the MONARCH Industrial Dry Chemical System. The new scissor linkage will provide a means for easier installation of the detection line while using a continuous run of wire rope.

The new stainless steel scissor linkage offers the following limitations:

- Maximum Number of Detectors: **20**
- Maximum length of wire rope: **150 ft (45.7 m)**
- Maximum number of Elbows: **40**

New Part No.	Replaces Part No.	Description	Suggested List Price (USD)*
435547	550131/551032	Detector, Series (Scissor Linkage) Each	$ 35.25
435548	550035/550041	Detector, Series (Scissor Linkage) 25-Pack	$ 824.00
435546	N/A	Detector, Terminal (Scissor Linkage) Each	$ 44.00
440495	N/A	Detector, Terminal (Scissor Linkage) 10-Pack	$ 147.00
439515	N/A	Scissor Linkage 10-Pack	$ 150.00

***Note:** Prices are subject to change without notice. Always refer to the latest price files on the PYRO-CHEM extranet prior to ordering.

Note: The scissor linkage cannot be hooked inside the detector bracket channel when installed.

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UL EX 3830; UL EX 3437

The SL style fusible link is also approved to be used with the PYRO-CHEM KITCHEN KNIGHT II and MONARCH fire suppression systems, when installed in the new scissor linkage and detector bracket. The SL fusible links are fully color-coded to help ensure the proper temperature-rated link is installed for the application. Color-coding allows for easy identification by installing technicians and simplifies inspection and validation by local Authorities Having Jurisdiction.

Part No. 439085	**Part No. 439086**	**Part No. 439087**	**Part No. 439088**	**Part No. 439089**
 009928	 009929	 009930	 009931	 009932
Temperature Rating: 165 °F (74 °C)	**Temperature Rating:** 212 °F (100 °C)	**Temperature Rating:** 280 °F (138 °C)	**Temperature Rating:** 360 °F (183 °C)	**Temperature Rating:** 450 °F (232 °C)
Maximum Allowable Temperature Exposure: 100 °F (38 °C)	**Maximum Allowable Temperature Exposure:** 150 °F (66 °C)	**Maximum Allowable Temperature Exposure:** 225 °F (107 °C)	**Maximum Allowable Temperature Exposure:** 290 °F (143 °C)	**Maximum Allowable Temperature Exposure:** 360 °F (182 °C)
Color of Link: Black	**Color of Link:** White	**Color of Link:** Blue	**Color of Link:** Red	**Color of Link:** Green
Quantity: Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25	**Quantity:** Pack of 25

This bulletin is a temporary supplement to the KITCHEN KNIGHT II Technical Manual (PN551274-06) dated November 10, 2014 and the MONARCH Technical Manual (PN553565) dated February 1, 2010. The information contained in this bulletin will be added to the manuals upon the next printing.

Should you have questions pertaining to this bulletin, please contact Technical Services as noted below.

Bulletin No. 2016059
UL EX-3830

DATE: May 3, 2016

TO: All Authorized PYRO-CHEM Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: KITCHEN KNIGHT II System Coverage of the Imperial Model IABR-36 and IABR-48 Gas-Radiant Char-Broilers with Wood Smoker Boxes and Chip Holders.

NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold valid certification credentials for design and/or service of the system(s) referenced within this bulletin.

We are pleased to announce the appliance-specific coverage for KITCHEN KNIGHT II Wet Chemical Restaurant Fire Suppression Systems when protecting the Imperial Gas Radiant Char-broilers: IABR-36 and IABR-48, with Wood Smoker Box and Chip Holders.

The outlined models are protected within the parameters indicated in this bulletin. The information in this bulletin will serve as a supplement for the KITCHEN KNIGHT II Restaurant Fire Suppression System Design, Installation, Recharge and Maintenance Manual (Part No. 551274-06) dated November 10, 2014 and will be added to the manual at the next reprint.

See Page 2 for details.

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The following nozzle position and coverage limitations must be followed:

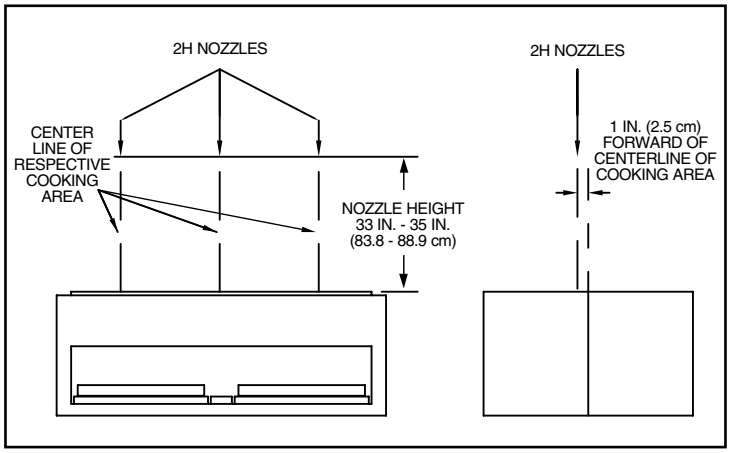
Nozzle Quantity: 3

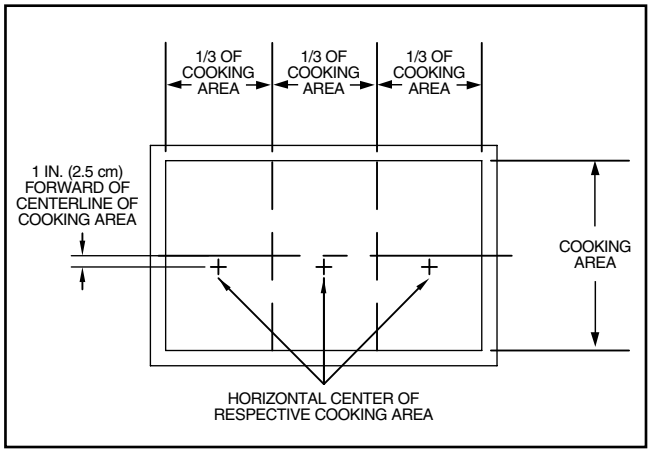
Nozzle Type: 2H

Nozzle Height: 33 in. to 35 in. (838 mm to 886 mm) above the top of the broiler grate surface

Nozzle Location: Each nozzle is to protect 1/3 of the cooking area and located in the horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.

Nozzle Aiming Point: Horizontal center of the respective cooking area, 1 in. (25 mm) forward of the longitudinal center line of the cooking area.





Model	Grate Dimension	Gas Output
IABR-36	32.5 in. (825 mm) x 21 in. (533 mm)	90,000 BTU
IABR-48	44.5 in. (1,130 mm) x 21 in. (533 mm)	120,000 BTU

The Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Should you have questions regarding this bulletin, please contact your Territory Sales Manager or International Area Manager, or contact Technical Services as listed below.

Bulletin No. 2015295

DATE: February 11, 2016

TO: Authorized PYRO-CHEM KITCHEN KNIGHT II and MONARCH Distributors

FROM: Quality Assurance

SUBJECT: Failure of Control Head to Operate

WARNING
VERY IMPORTANT SAFETY NOTICE

If you own, sell or service
PYRO-CHEM KITCHEN KNIGHT II Restaurant Fire Suppression Systems or
MONARCH Industrial Fire Suppression Systems,
please read and follow the instructions in this BULLETIN.

FAILURE TO READ AND FOLLOW THE INFORMATION IN THIS BULLETIN INCREASES THE RISK THAT A PYRO-CHEM KITCHEN KNIGHT II RESTAURANT FIRE SUPPRESSION SYSTEM OR MONARCH INDUSTRIAL FIRE SUPPRESSION SYSTEM COULD FAIL TO ACTIVATE IN A FIRE.

Tyco Fire Protection Products (Tyco) received isolated reports of Control Heads failing to operate during the commissioning of systems. We discovered an issue with the Spring Plate located in the Control Head that could interfere with other moving parts within the Control Head which could result in the system failing to activate.

Once aware of the issue, Tyco implemented appropriate corrective actions including containment and rework of the Control Heads.

Further testing by Tyco found the affected Control Heads could pass commissioning but the Spring Plate could seize over time. Therefore, Tyco is implementing a field remediation program for affected units. Affected units were sold between January 1, 2015 and September 8, 2015.

Action

Visit www.controlhead.net using your company's unique customer number and password provided in the cover letter to this bulletin. The website lists your company's purchases between January 1, 2015 and September 8, 2015. Please update the number of Control Heads that you have in your possession that are within the affected time range. Tyco will contact you within the next business day from when you update this information and provide direction on how these units you have in stock will be replaced.

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Distributors that have installed the Control Head(s) should make arrangements to visit the properties where these are installed as soon as possible. Confirm if the Control Head is within the affected time period. If so, complete the replacement of the Spring Plate as outlined in the Mechanical Control Head Spring Plate Replacement Instruction Sheet, Part No. 443220 provided with this Bulletin. The Bulletin and Replacement Instruction Sheet will also be available on www.controlhead.net and the PYRO-CHEM Distributor Extranet. Tyco has already shipped Spring Plate Assembly Kits to Distributors that received Control Heads during the affected time period. You may email ControlHead@tycoint.com for more Spring Plate Assembly Kits should that be necessary.

Distributors will be eligible for a $200 credit for the first Control Head they repair at each site and $75 for each additional Control Head repaired at the same site. In addition, Tyco will reimburse the cost of other system components recommended for replacement in the Mechanical Control Head Spring Plate Replacement Instruction Sheet. In order to receive your credit, please visit www.controlhead.net and enter the complete site information in the Job Site Verification section. You will receive notification from Tyco when the credit has been processed.

Identification

The Control Head has a serial number inside the Control Head (see Photo 1). Products manufactured during the affected time period between January 1, 2015 and September 8, 2015 **will have a serial code between 201529883 and 201541533.**

Marked Control Heads

Units marked with a blue dot as shown in Photo 1 have already been reworked at Tyco or were built after September 8, 2015 and do not need to be repaired in the field regardless of the serial code.

Replacement Spring Plates used for field replacement have been marked with a black circle (see Photo 2). Control Heads in the field with Spring Plates containing this mark have already been reworked in the field and no further action is necessary.

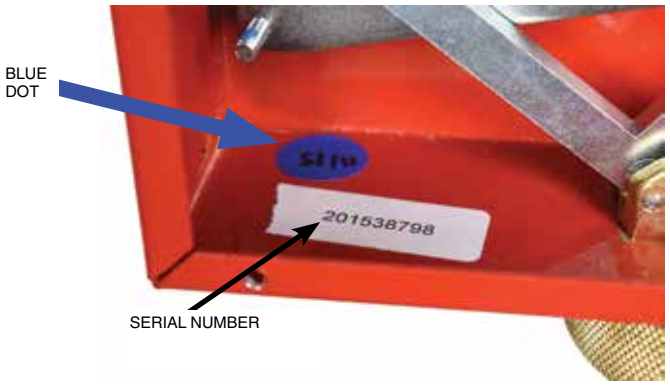


PHOTO 1

PHOTO 2

Refer to the specific system Design, Installation, Recharge and Maintenance Manual for any procedure not addressed in the Mechanical Control Head Spring Plate Instruction Sheet.

Questions

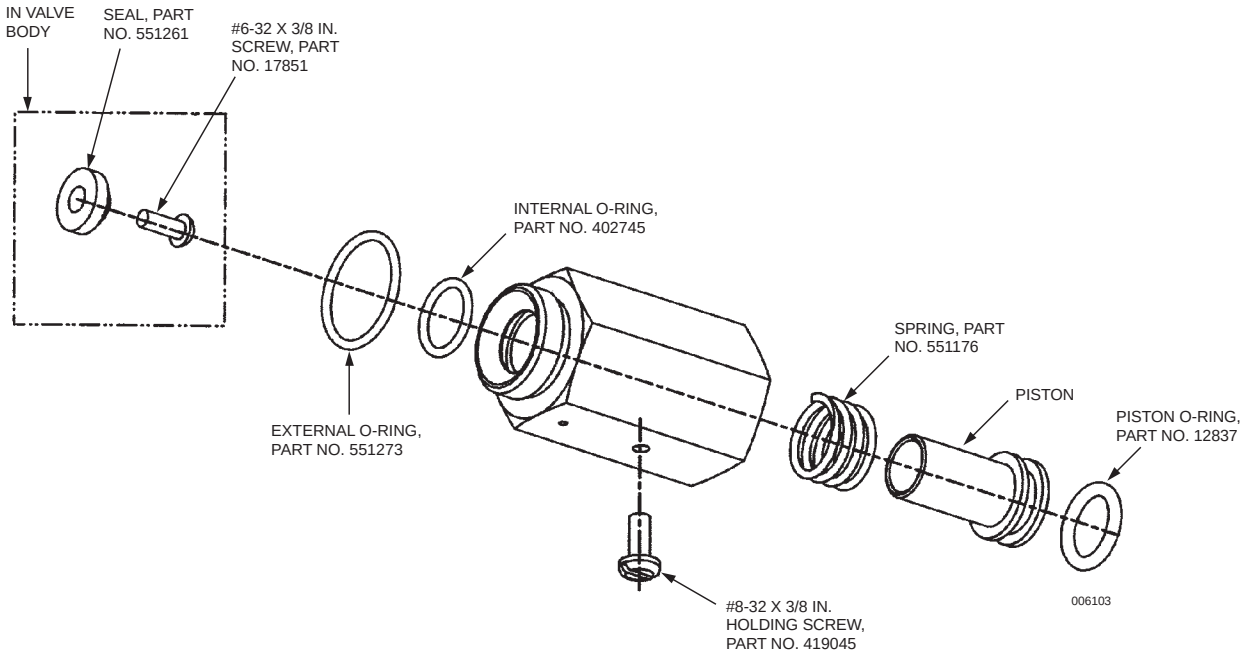
If you have any questions, please send an email to: ControlHead@tycoint.com

Thank you in advance for checking and replacing the mechanical control head spring plates in a timely manner.

INSTRUCTIONS FOR REBUILDING KITCHEN KNIGHT II VALVE PRESSURE REGULATOR

The following steps are necessary to properly rebuild the KITCHEN KNIGHT II Pressure Regulator.

1. Remove the pressure regulator from the tank valve.
2. Remove 8-32 x 3/8 in. long pan head screw from body of regulator. Discard.
3. Using a non-metallic rod (a plastic pen or wooden dowel works fine), push piston out of regulator body. Note: End of piston is visible on valve end of the regulator. Take care not to scratch the internal regulator body. Discard spring.
4. Remove all used O-rings: Discard all.
   - Piston O-Ring
   - External thread O-Ring
   - Internal O-Ring
5. Carefully clean piston and internal regulator surface.
6. **In Valve Body:** Remove 6-32 x 3/8 in. long pan head screw and seal. Discard both.
7. Install new seal, Part No. 551261, and 6-32 x 3/8 in. long pan head screw, Part No. 17851, into valve body. Tighten until screw bottoms out in valve body.
8. Lubricate all new O-Rings for pressure regulator. Use Dow Corning #4 or equal.
9. Reinstall internal O-Ring, Part No. 402745, external O-Ring, Part No. 551273, and piston O-Ring, Part No. 12837. Note: Piston O-Ring and internal O-Ring are very similar in size. To determine the correct one to use, note the thickness of each. The piston O-Ring is thicker (1/8 in.) than the internal O-Ring (1/16 in.).
10. Insert spring, Part No. 551176, and piston, into regulator body.
11. Using a non-metallic rod, push piston into regulator body far enough to completely compress the spring. Hold in place and install 6-32 x 3/8 in. holding screw, Part No. 419045, into threaded hole on side of regulator. Screw must be threaded completely into body. **Note: Make certain screw is holding the piston in place but not actually forced into the side of the piston. Piston must be free to move in the direction of the valve body.**
12. Reinstall rebuilt regulator into valve body. Hand tighten.



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BULLETIN

Bulletin No. 2360

DATE: July 29, 2009

TO: PYRO-CHEM® Restaurant System Distributors

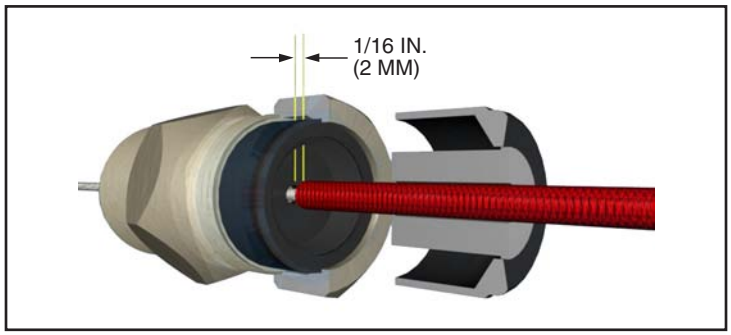
FROM: Product Management, Restaurant Systems

SUBJECT: Installation Update for Flexible Conduit System

First, thank you for your tremendous response to our new flexible conduit system. Initial input has indicated that there is a significant reduction in installation time for both pull station and mechanical gas valve connections when using this new method.

As with virtually every new product, heavy use often uncovers more effective and efficient installation methods. Therefore, we would like to emphasize two important installation procedures that should be followed carefully to help ensure proper installation...

- **DO NOT** cut the wire rope to length before feeding it into the flexible conduit. **The wire rope should be fed directly from its spool through the flexible conduit**. This method will help avoid possible kinking of the wire rope which can make it difficult to feed.
- **BE SURE** to slide the flexible conduit into the strain relief until it is approximately **1/16 in. (2 mm) from the bottom of the flexible conduit insert** as shown below.



Again, when installation instructions are followed properly, you will enjoy the significant time-saving benefits provided by the PYRO-CHEM flexible conduit system.

If you should have any questions regarding this bulletin, please contact your U.S. Territory Manager or International Sales Manager; or call Technical Services at 1-800-526-1079/1-715-732-3465.

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BULLETIN

Bulletin No. 2346

DATE: February 27, 2009

TO: PYRO-CHEM® sRestaurant System Distributors and OEM's

FROM: Product Management – Restaurant Systems

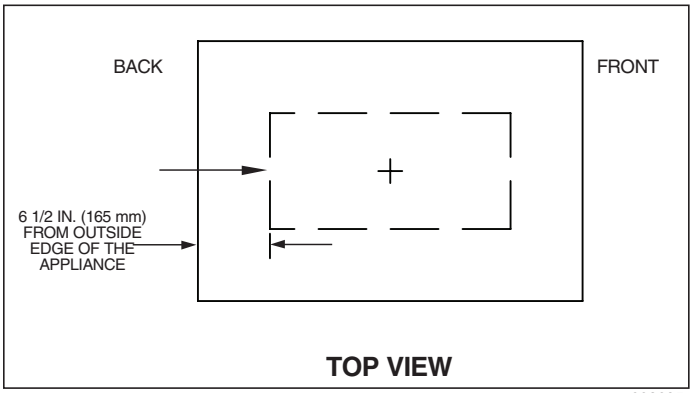
SUBJECT: KITCHEN KNIGHT® II Protection of Nieco Overhead Chain-Broiler

We are pleased to announce appliance-specific fire protection of the Nieco Broiler Model MBP 84 (with catalyst) for low profile applications using the KITCHEN KNIGHT II system. This protection scheme has been added to our UL 300 appliance-specific protection approvals based on the coverage established for the Nieco Model 94 Broiler.

The following nozzle positioning and coverage limitations must be followed:

Nieco Broiler – Model MPB 84 with Catalyst ONLY

Nozzle Type	2L
Nozzle Quantity	One
Nozzle Height	20 in. (508 mm)
Nozzle Location	6.5 in (165 mm) from any edge of the appliance top
Nozzle Direction	Aim at center of opening



TOP VIEW

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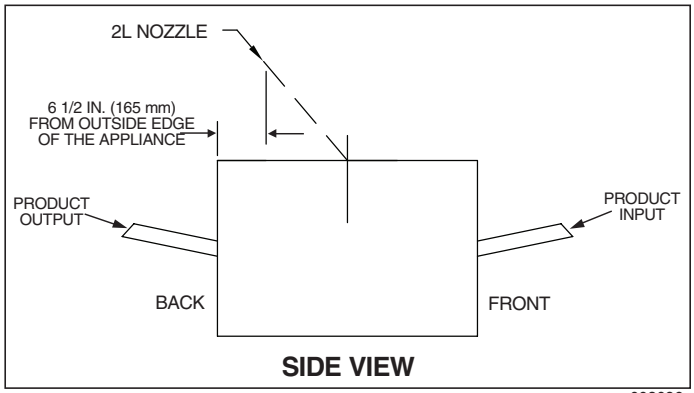

SIDE VIEW

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Please note that in applications that cannot utilize an overhead application, standard chain broiler protection is acceptable using the 1L Nozzle installed at the opening.

If you should have any questions pertaining to this bulletin please contact your Territory Sales Manager or call Technical Services at 1-800-526-1079 or 1-715-732-3456.

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905-847-0217

BULLETIN

Bulletin Number: 2323 **Date:** July 23, 2008

TO: Authorized PYRO-CHEM® Pre-Engineered Systems Distributors and OEMs

FROM: Quality Assurance

SUBJECT: Proper System Installation and Inspection of Control Heads

If you own or service any of the following PYRO-CHEM Pre-Engineered System Control Heads, please read and follow the instructions in this Product Service Bulletin.

PYRO-CHEM Pre-Engineered Systems Control Head
Models: NMCH, MCH, NECH, and ECH

⚠ WARNING

FAILURE TO READ AND FOLLOW THE INFORMATION IN THIS PRODUCT SERVICE BULLETIN INCREASES THE RISK THAT A PYRO-CHEM PRE-ENGINEERED SYSTEM WILL FAIL TO OPERATE WHEN IT IS NEEDED.

Existing Systems

This **PRODUCT SERVICE BULLETIN** affects PYRO-CHEM® KITCHEN KNIGHT® II, MONARCH®, ATTENDANT™, and ATTENDANT™ II Pre-Engineered Systems.

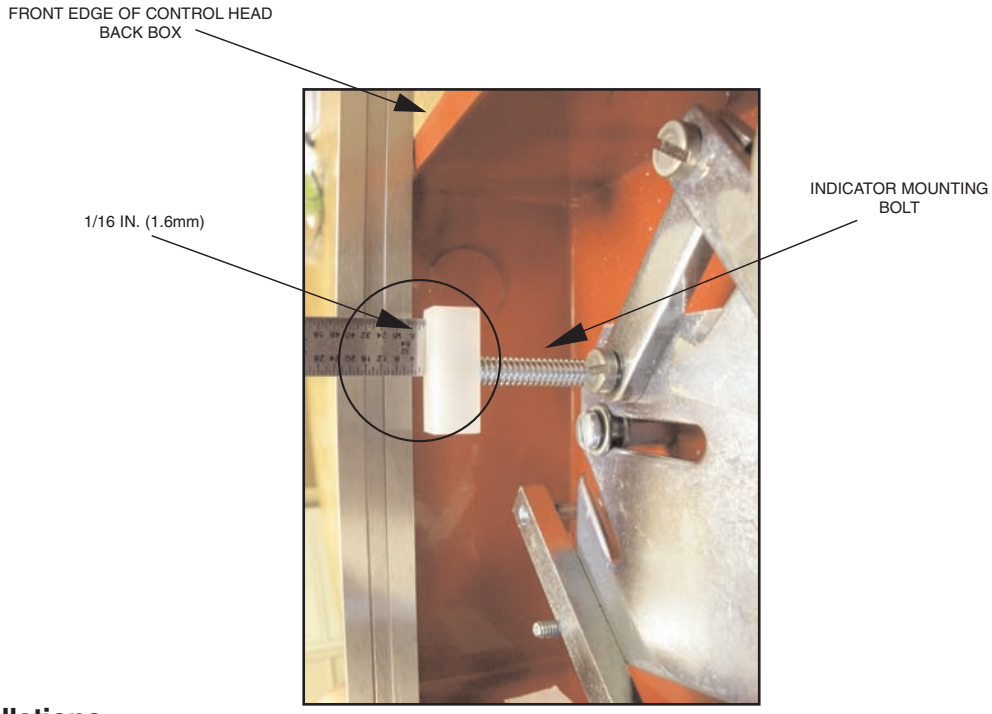
This **PRODUCT SERVICE BULLETIN** is to advise of a potential issue that could render the system inoperative.

The system should be checked to make sure the white indicator tab is not binding on the cover assembly. Binding could cause the system to be inoperative.

Corrective Action

If binding is occurring, the following corrective action should be taken:

As shown in the diagram below, turn the indicator mounting bolt until you have 1/16 in. (1.6 mm) clearance between the front edge of the control head back box and white indicator surface.



New Installations

To ensure avoidance of binding, a new procedure must be followed. Before placing a pre-engineered system into service, all components must be checked for proper operation. As required in the PYRO-CHEM Technical Manuals for Pre-Engineered Systems, the Control Head must be checked to ensure satisfactory operation by cutting the terminal link or "S" hook holding the link; and then by operating the manual pull station with the CO_2 cartridge removed from the control head actuator. **To further ensure proper operation, an additional step is being added to the system checkout after installation and maintenance of the PYRO-CHEM Control Head**.

It is now required to fully re-assemble the cover plate to the control head prior to operating the control head by cutting the terminal link or pulling the manual pull station. This additional step will be added to the next revision of the PYRO-CHEM Technical Manuals for KITCHEN KNIGHT II, MONARCH and ATTENDANT/ATTENDANT II Pre-Engineered Systems.

This additional exercise has been added to ensure the white indicator tab is not binding on the cover assembly.

Recommended Action

At your next scheduled service maintenance, please make sure that the Control Head is mechanically tested with the cover plate installed as described in this bulletin.

If you are uncertain how to follow any of the recommendations in this **PRODUCT SERVICE BULLETIN**, or if you have other questions pertaining to this bulletin, please contact your Quality Assurance Department at 1-800-526-1079 or 1-715-732-3465 then press 7**.**

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BULLETIN

Bulletin Number: 2320 **Date:** July 8, 2008

TO: All PYRO-CHEM® Restaurant System Distributors and OEM's

FROM: Product Management – Restaurant Systems

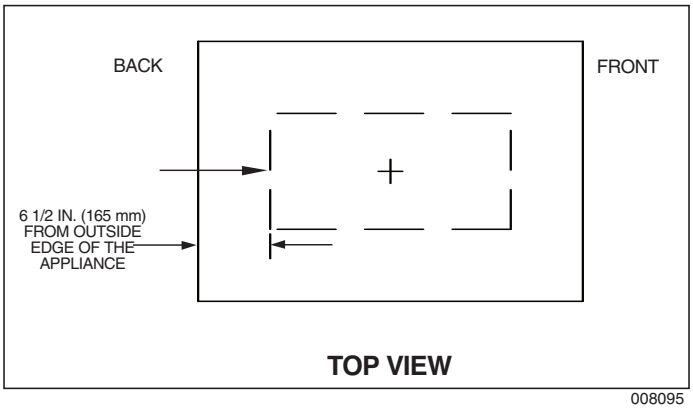
SUBJECT: KITCHEN KNIGHT® II Nieco Broiler Protection – Model MPB 94 - with Catalyst Only

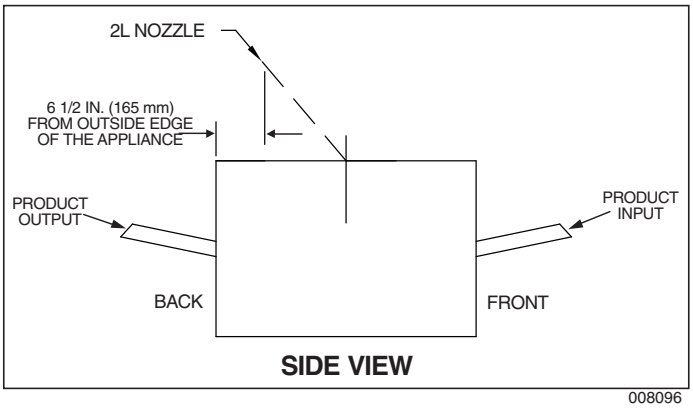
PYRO-CHEM is pleased to announce KITCHEN KNIGHT II appliance-specific fire protection for the Nieco Broiler Model MBP 94 for low profile applications. This design was tested to offer overhead coverage protection versus the chain broiler protection currently being utilized. This bulletin is a temporary supplement to the KITCHEN KNIGHT II Technical Manual (PN551274-4) dated March 1, 2006 and is not intended to replace the requirements and limitations outlined in the current manual. The information contained in this bulletin will be added to the manual upon the next printing.

Nieco Broiler: Model MPB 94 (109,590 Btu/hr Maximum)

The following nozzle position and coverage limitations must be followed:

Nozzle quantity.....One
Nozzle type.....2L
Nozzle height.....20 in. (508 mm)
Nozzle location.....6 1/2 in. (165 mm) inside from outside edge of the appliance top
Nozzle aim point.....Aimed at center of catalyst





If you should have any questions pertaining to this bulletin, please contact your Territory Sales Manager or call Technical Services at 1-800-526-1079 or 1-715-732-3465.

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BULLETIN

Bulletin Number: 2287 **Date:** April 24, 2007

TO: All Authorized PYRO-CHEM® Pre-Engineered System Distributors and OEM's

FROM: Product Management, Pre-Engineered Systems

SUBJECT: Electric Gas Valve Installation

When installing the Electric Gas Shut-Off Valve used with PYRO-CHEM Pre-Engineered Systems, it is important that the supplier's recommended installation instructions be followed.

The positioning instructions provided with the gas valve state that the **"Valve must be mounted with solenoid vertical and upright."**

The valve should be located in the fuel gas supply line to the cooking appliance(s). The valve body has an arrow which indicates the direction of gas flow through the valve.

If you should have any questions regarding the information found in this bulletin, please contact the Technical Services Department at 1-800-526-1079

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BULLETIN

Bulletin Number: 2281 **Date:** February 27, 2007

TO: All KITCHEN KNIGHT® II System Distributors

FROM: Product Management, Restaurant Systems

SUBJECT: KITCHEN KNIGHT II Tank Hydro-Test Specifications

KITCHEN KNIGHT II tank assemblies are manufactured under two different specifications. It is important to understand the difference in the manufacturing specifications and the impact they have on the labeling and 12-year hydro-test requirements.

In September 2005, PYRO-CHEM changed the manufacturing process for the PCL 300 Tank Assembly. With this change, both the PCL 160 and PCL 300 are now manufactured to "MEET DOT REQUIREMENTS." They also meet specific requirements in Title 49 Code of Federal Regulations Ch 1 Part 173 section 309 (49 CFR 173.309) that exempt them from labeling/serializing.

The PCL 460 and PCL 600 continue to be manufactured to the 4BW DOT specification and do require serialization.

Because of the different manufacturing processes there are different hydro-test requirements as well as labeling requirements.

The specific hydro-test requirements are as follows:

Tank Size	Tank Specification	Service Pressure	Hydro-Test Pressure
PCL 160	Meets DOT Requirements	225 psi (15.51 bar)	3 x Service Pressure = 675 psi (46.54 bar)
PCL 300	Meets DOT Requirements	225 psi (15.51 bar)	3 x Service Pressure = 675 psi (46.54 bar)
PCL 460	4BW DOT	225 psi (15.51 bar)	2 x Service Pressure = 450 psi (31.03 bar)
PCL 600	4BW DOT	225 psi (15.51 bar)	2 x Service Pressure = 450 psi (31.03 bar)

If you should have any questions pertaining to this bulletin, please contact your Territory Sales Manager at 1-800-PYRO-CHEM or Technical Services Department (1-800-526-1079/1-715-732-3456).

US / INTERNATIONAL
Tyco Safety Products
One Stanton Street
Marinette, WI 54143-2542
800-526-1079
715-732-3465

CANADA
Tyco Safety Products
871 Equestrian Court Unit 1A,
2nd Floor
Oakville, ON L6L 6L7 Canada
877-992-6785
905-847-0217

BULLETIN

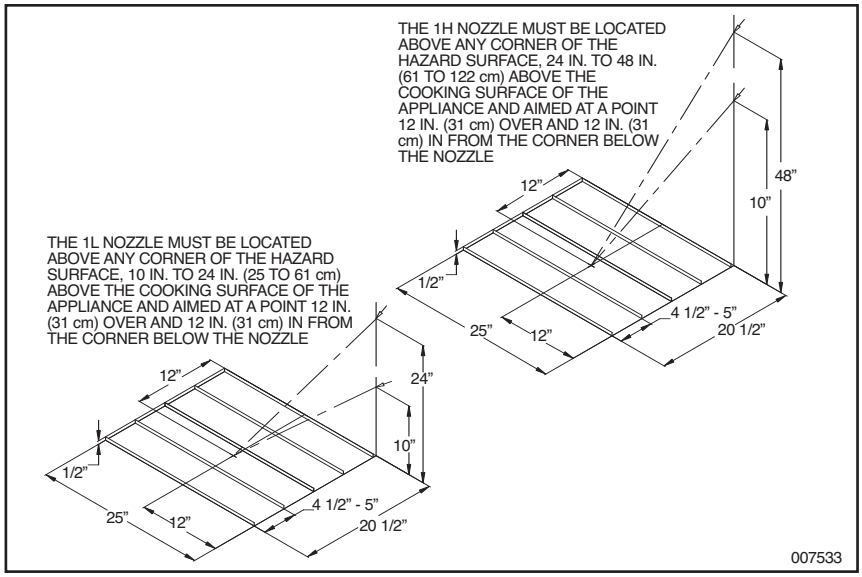
Bulletin Number: 2280 **Date:** February 13, 2007

TO: All PYRO-CHEM® Authorized Restaurant System Distributors and OEMs

FROM: Product Management – Restaurant Systems

SUBJECT: Grill Staging Lane Dividers

PYRO-CHEM has recently completed testing to verify fire protection requirements for griddles utilizing the grill staging lane dividers most commonly found at WENDY'S Restaurants.



The dividers measure 0.5 in. (13 mm) high and are spaced 4.5 – 5 in. (11.4 – 12.7 cm) apart. The maximum area of coverage allowed per nozzle when using the staging lane dividers is 20.5 in. wide x 25 in. deep (52.1 x 63.5 cm).

Nozzle positioning is as follows:

Nozzle Type	Nozzle Height	Position and Aim Point
1L – Low Proximity	10 in. – 24 in. (25 cm – 61 cm)	Front corner of griddle aimed 12 in. over and 12 in. in from the corner below the nozzle
1H – High Proximity	24 in. – 48 in. (61 cm – 122 cm)	Front corner of griddle aimed 12 in. over and 12 in. in from the corner below the nozzle

This protection is PYRO-CHEM recommended and should be followed when grill staging dividers are present.

If you should have any questions regarding the information in this bulletin please contact your Territory Sales Manager at 1-800-PYRO-CHEM or Technical Services Department (1-800-526-1079 / 1-715-732-3456).

2009 STANDARD PRODUCTS PARTS CATALOG

Portable Fire Extinguishers and Restaurant Fire Suppression Systems

Pyro-Chem

tyco Fire Protection Products

TABLE OF CONTENTS

PC2.5VBABC-1 (UL)
PC2.5VBABC-1 (ULC)

PC5VBABC+1 (UL)
PC5VBABC+1 (ULC)
PC5VBABC-1 (UL)
PC5VBABC-1 (ULC)

PC5ABC+1 (UL)
PC5ABC+1 (ULC)
PC5ABC-1 (UL)
PC5ABC-1 (ULC)

PC5PK-1 (UL)
PC5PK-1 (ULC)

PC5BC-1 (UL)

PYRO-CHEM® DRY CHEMICAL EXTINGUISHERS are designed for the protection of light, ordinary, and extra high hazards. They are suitable for both industrial and commercial fire protection needs. Extinguishing agents are available for fires involving Class A (ordinary combustibles), Class B (flammable liquids and gases), and Class C (energized electrical equipment) materials.

- Fits most extinguisher cabinets
- Six-year limited warranty
- Seamless, welded steel shell is 100% hydrotested to 600 psi (41 bar)
- 100% leak tested via mass spectrometry
- Tough polyester-urethane powder paint
- Extruded aluminum valve, plated steel valve stem, steel pick-up tube, and plated steel ring pin
- Glare-resistant Mylar nameplate with bar-coded model and serial number
- Listed/Approved by UL, ULC, and USCG
- Color-coded pressure gauge
- Nearly 800 distributors worldwide
- Standard CO_2 hanger hook

Model	PC2.5VBABC-1*	PC5ABC+1 PC5ABCVB+1	PC5ABC-1 PC5ABCVB-1	PC5PK-1	PC5C-1
Bracket Part No.	24610	429146	429146	429146	429146
Agent Capacity	2 1/2 lb (1.1 kg) ABC	5 lb (2.3 kg) ABC	5 lb (2.3 kg) ABC	5 lb (2.3 kg) PK	5 lb (2.3 kg) BC
UL Rating	1-A: 10-B:C	3-A: 40-B:C	3-A: 10-B:C	60-B:C	40-B:C
ULC Rating	1-A: 10-B:C	3-A: 40-B:C	3-A: 10-B:C	60-B:C	40-B:C
Agent Flow Rate					
lb/sec (kg/sec)	0.31 (0.14)	0.38 (0.17)	0.34 (0.15)	0.30 (0.14)	0.35 (0.16)
Charged Weight (with agent)	5 lb (2.3 kg)	9 lb, 14 oz (4.2 kg)	9 lb, 14 oz (4.2 kg)	9 lb, 14 oz (4.2 kg)	9 lb, 14 oz (4.2 kg)
Dimensions:					
Height: in.	14 1/4	17	17	17	17
(mm)	(362)	(432)	(432)	(432)	(432)
Width: in.	5 1/2	8 1/2	8 1/2	8 1/2	8 1/2
(mm)	(140)	(216)	(216)	(216)	(216)
Depth in.	3 3/8	4 7/16	4 7/16	4 7/16	4 7/16
(mm)	(86)	(113)	(113)	(113)	(113)

* VB: Includes Vehicle Bracket

Extinguisher Model No.	Part No.
PC2.5VBABC-1 (UL)	552920
PC2.5VBABC-1 (ULC)	552921
PC5ABC+1 (UL)	552929
PC5VBABC+1 (UL)	552930
PC5ABC+1 (ULC)	552933
PC5VBABC+1 (ULC)	552934
PC5ABC-1 (UL)	552925
PC5ABC-1 (ULC)	552923
PC5VBABC-1 (UL)	552924
PC5VBABC-1 (ULC)	552922
PC5PK-1 (UL)	552927
PC5PK-1 (ULC)	552926
PC5BC-1 (UL)	552928

PC10HABC-1 (UL)
PC10HABC-1 (ULC)

PC10HPK-1 (UL)
PC10HPK-1 (ULC)

PC10HBC-1 (UL)
PC10HBC-1 (ULC)

PC10TABC-1 (UL)
PC10TABC-1 (ULC)

PC20ABC+1 (UL)
PC20ABC+1 (ULC)

PC20PK-1 (UL)
PC20PK-1 (ULC)

PC20BC-1 (UL)
PC20BC-1 (ULC)

Model	PC10H ABC-1	PC10T ABC-1	PC10H PK-1	PC10H BC-1	PC20 ABC+1	PC20 PK-1	PC20 BC-1
Bracket Part No.	30865	417898	30865	30865	30937	30937	30937
Agent Capacity	10 lb (4.5 kg) ABC	10 lb (4.5 kg) ABC	10 lb (4.5 kg) PK	10 lb (4.5 kg) BC	20 lb (9.1 kg) ABC	20 lb (9.1 kg) PK	20 lb (9.1 kg) BC
UL Rating	10-A: 60-B:C	4-A: 60-B:C	80-B:C	40-B:C	20-A: 120-B:C	120-B:C	80-B:C
ULC Rating	4-A: 60-B:C	4-A: 60-B:C	80-B:C	40-B:C	10-A: 120-B:C	120-B:C	80-B:C
Agent Flow Rate							
lb/sec (kg/sec)	0.52 (0.24)	0.52 (0.24)	0.48 (0.22)	0.65 (0.29)	0.76 (0.34)	0.68 (0.31)	0.99 (0.45)
Charged Weight (with agent)	17 lb, 14 oz (8.1 kg)	17 lb, 14 oz (8.1) kg)	17 lb, 14 oz (8.1 kg)	17 lb, 14 oz (8.1 kg)	32 lb, 2 oz (14.6 kg)	32 lb, 2 oz (14.6 kg)	32 lb, 2 oz (14.6 kg)
Dimensions:							
Height: in. (mm)	18 1/2 (470)	21 3/4 (553)	18 1/2 (470)	18 1/2 (470)	22 1/2 (572)	22 1/2 (572)	22 1/2 (572)
Width: in. (mm)	8 1/2 (216)	8 1/2 (216)	8 1/2 (216)	8 1/2 (216)	9 1/2 (241)	9 1/2 (241)	9 1/2 (241)
Depth: in. (mm)	5 27/32 (148)	5 (127)	5 27/32 148)	5 27/32 (148)	7 7/32 (183)	7 7/32 (183)	7 7/32 (183)

Extinguisher Model No.	Part No.
PC10HABC-1 (UL)	552936
PC10HABC-1 (ULC)	552939
PC10TABC-1 (UL)	552937
PC10TABC-1 (ULC)	552940
PC10HPK-1 (UL)	552944
PC10HPK-1 (ULC)	552943
PC10HBC-1 (UL)	552938
PC10HBC-1 (ULC)	552942
PC20ABC+1 (UL)	552946
PC20ABC+1 (ULC)	552947
PC20PK-1 (UL)	553081
PC20PK-1 (ULC)	553080
PC20BC-1 (UL)	552949
PC20BC-1 (ULC)	552948

CD05A-1 (UL)
CD05A-1 (ULC)

CD10A-1 (UL)
CD10A-1 (ULC)

CD15A-1 (UL)
CD15A-1 (ULC)

CD20A-1 (UL)
CD20A-1 (ULC)

PYRO-CHEM® CARBON DIOXIDE EXTINGUISHERS are designed to protect areas where Class B (flammable liquids and gases) or Class C (energized electrical equipment) fires could occur. They may be used indoors where winds and drafts do not affect discharge or where a clean extinguishing agent is required.

- Nonconductive, noncorrosive clean extinguishing agent
- Aluminum shell is sturdy, yet lightweight
- UL, ULC listed and USGC approved (up to 15 lb)
- Six-year limited warranty

Model	CD05A-1	CD10A-1	CD15A-1	CD20A-1
Bracket Part No.	25419	79456	79456	79456
Agent Capacity	5 lb (2.3 kg)	10 lb (4.6 kg)	15 lb (6.9 kg)	20 lb (9.2 kg)
UL Rating	5-B:C	10-B:C	10-B:C	10-B:C
ULC Rating	5-B:C	10-B:C	10-B:C	10-B:C
Charged Weight (with agent)	13 1/2 lb (6.1 kg)	26 3/4 lb (12.1 kg)	35 3/4 lb (16.2 kg)	46 3/4 lb (21.2 kg)
Dimensions				
Height: in. (mm)	18 1/4 (464)	20 3/4 (527)	27 1/4 (692)	27 1/2 (699)
Width: in. (mm)	7 1/4 (187)	10 15/16 (278)	10 15/16 (278)	12 (305)
Depth: in. (mm)	5 11/32 (135)	7 (178)	7 (178)	8 3/32 (206)

Extinguisher Model No.	Part No.
CD05A-1 (UL)	552083
CD05A-1 (ULC)	552087
CD10A-1 (UL)	552084
CD10A-1 (ULC)	552088
CD15A-1 (UL)	552085
CD15A-1 (ULC)	552089
CD20A-1 (UL)	552086
CD20A-1 (ULC)	552090

FE02VB (UL)
FE02VB (ULC)

CLEAN AGENT EXTINGUISHERS are designed for protection of light, ordinary and extra high hazards. These compact and portable extinguishers are suited for both industrial and commercial fire protection needs. Typical applications include:

- Computer rooms
- Essential communication areas
- Irreplaceable data, document, and art storage rooms
- Laboratories
- Sensitive/expensive equipment
- Non-magnetic (NM) unit available

Model	FE02VB	FE05	FE09	FE13	FE13NM
Bracket Part No.	24610 (Included)	429146	422737	30937	—
Agent Capacity	2.5 lb (1.1 kg)	4.75 lb (2.2 kg)	9.5 lb (4.3 kg)	13.25 lb (6 kg)	13.25 lb (6 kg)
Charged Weight	5.0 lb (2.3 kg)	9.5 lb (4.3 kg)	21.81 lb (4.65 kg)	25.63 lb (11.63 kg)	20.00 lb (9.1 kg)
Agent Flow Rate (per sec.)	0.30 lb (0.14 kg)	0.60 lb (0.27 kg)	1.15 lb (0.52 kg)	1.12 lb (0.51 kg)	1.12 lb (0.51 kg)
Dimensions					
Height: in. (mm)	14 1/4 (362)	17 (432)	18 3/4 (476)	22 1/2 (572)	25 1/2 (648)
Width: in. (mm)	5 3/4 (146)	8 1/2 (216)	9 (229)	9 1/2 (241)	9 (229)
Depth: in. (mm)	3 3/8 (86)	4 7/16 (113)	7 (178)	7 (178)	7 (178)

FE05 (UL)
FE05 (ULC)

FE09 (UL)
FE09 (ULC)

Extinguisher Model No.	Part No.
FE02VB (UL)	551965
FE02VB (ULC)	551969
FE05 (UL)	551966
FE05 (ULC)	551970
FE09 (UL)	551967
FE09 (ULC)	551971
FE13 (UL)	551968
FE13 (ULC)	551972
FE13NM (UL)	433916
FE13NM (ULC)	433917

FE13 (UL)
FE13 (ULC)

FE13NM (UL)
FE13NM (ULC)

KITCHEN ONE® EXTINGUISHERS

KS6000 (UL)
KS6000 (ULC)

The **KITCHEN ONE® EXTINGUISHER** is an attractive, easy to use and maintain, stainless steel extinguisher for use in K-Class kitchen applications.

Model No.	**KS6000**
UL Rating	2-A:K
ULC Rating	1-A:K
Capacity	1.6 gal (6 L) of PYRO-CHEM wet solution
Dimensions:	
Height:	21 1/4 in. (540 mm)
Width:	9 1/2 in. (241 mm)
Depth:	7 in. (178 mm)

Extinguisher Model No.	**Part No.**
KS6000 (UL)	552055
KS6000 (ULC)	552500

PYRO-CHEM® WATER EXTINGUISHER

PWS2.5 (UL)
PWS2.5 (ULC)

PYRO-CHEM® WATER EXTINGUISHER is designed to protect all types of areas containing Class A (ordinary combustibles) fire hazards except those with Class C (energized electrical equipment) potential as water will conduct electricity. Stainless steel butt weld construction for long life and corrosion resistance. UL listed.

- Color-coded pressure gauge
- Six-year limited warranty

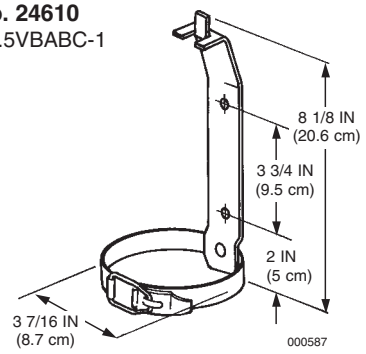
Model	**PWS2.5**
Agent Capacity	2 1/2 gal (9.46 L)
UL Rating	2-A
Charged Weight (with agent)	28 lb (12.7 kg)
Dimensions:	
Height:	25 1/2 in. (647 mm)
Width:	9 in. (229 mm)
Depth:	7 in. (178 mm)

Extinguisher Model No.	**Part No.**
PWS2.5 (UL)	552050
PWS2.5 (ULC)	552501

Bracket Part No.
24610
429146

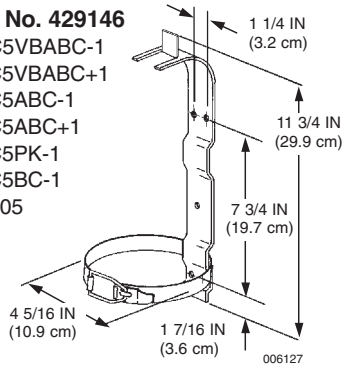
Brackets are available for each Clean Agent hand portable extinguisher. Certain applications require extinguishers to be mounted in brackets for safety and restraint.

Part No. 24610
- PC2.5VBABC-1



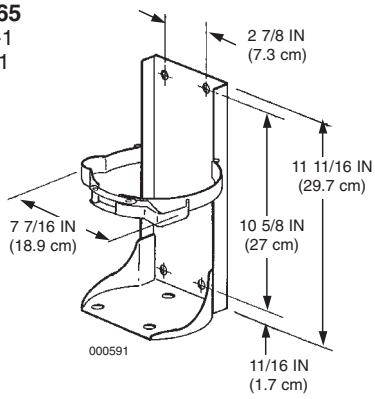
HOLE SIZE: 1/8 IN (0.3 cm)

Part No. 429146
- PC5VBABC-1
- PC5VBABC+1
- PC5ABC-1
- PC5ABC+1
- PC5PK-1
- PC5BC-1
- FE05



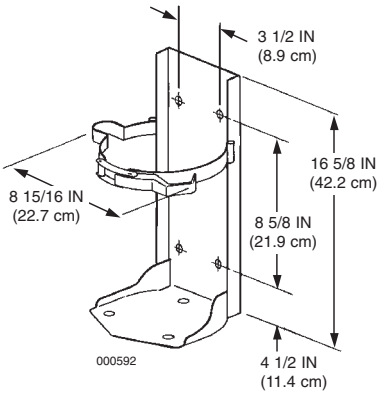
Bracket Part No.
30865
30937
25419
79456

Part No. 30865
- PC10HABC-1
- PC10TABC-1
- PC10BC-1
- PC10PK-1



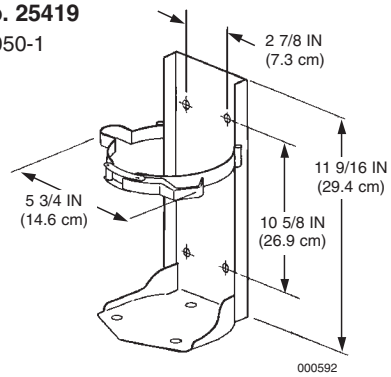
HOLE SIZE: 3/8 IN (1 cm)

Part No. 30937
- PC20ABC+1
- PC20PK-1
- PC20BC-1
- PWS2.5
- FE13

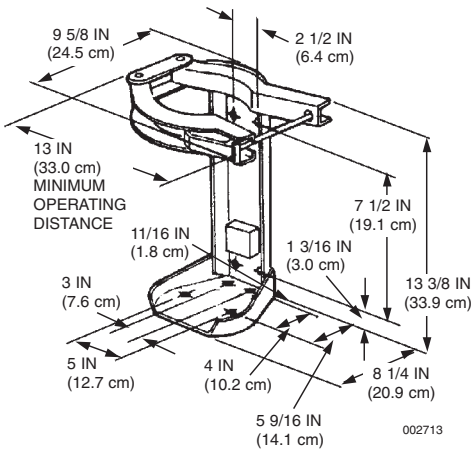


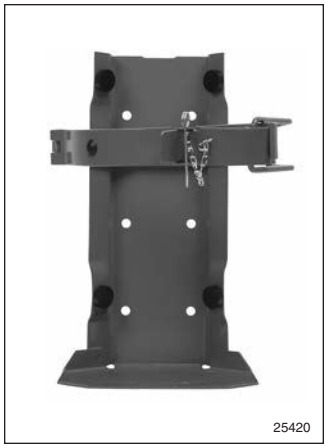
HOLE SIZE: 7/16 IN (1.1 cm)

Part No. 25419
- CO2-050-1



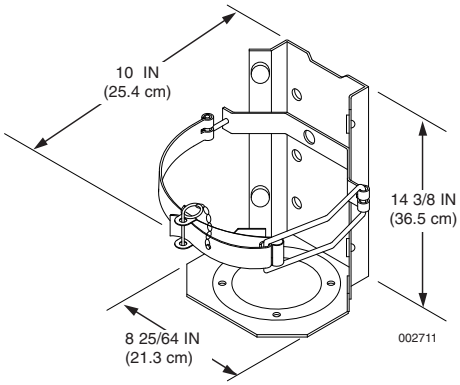
Part No. 79456
- CO2-10-1
- CO2-15-1

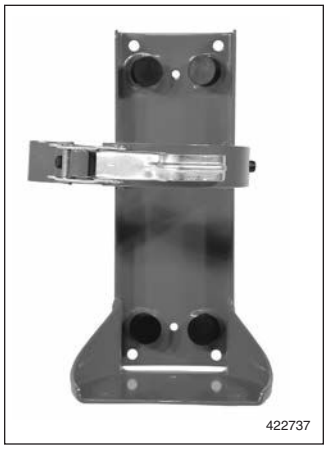




Part No. 25420

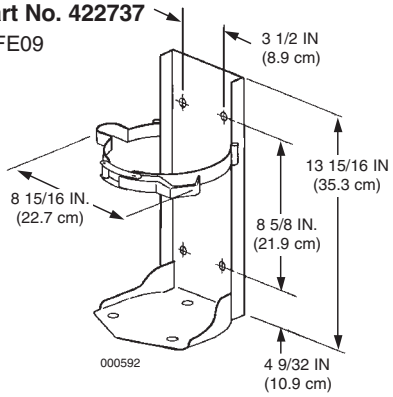
- CO2-20-1





Part No. 422737

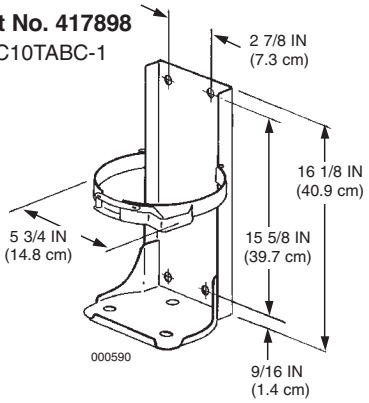
- FE09



HOLE SIZE: 7/16 IN (1.1 cm)

Part No. 417898

- PC10TABC-1



HOLE SIZE: 3/8 IN (1 cm)

Bracket Part No.
25420
422737
417898

MODEL PC2.5VBABC-1

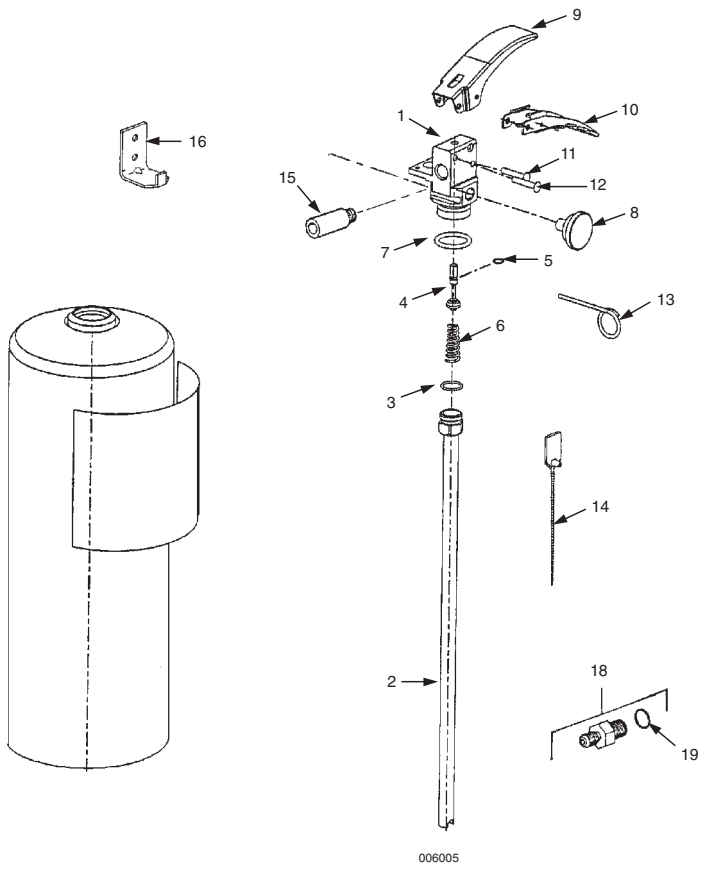


FIG. NO.	DESCRIPTION	PART NUMBER PC2.5VBABC-1
—	Valve Assembly	429083
1	Valve Body, Machined	428062
2	Tube, Pick-Up	428795
3	O-Ring (Pick-up Tube)	76076
4	Valve Stem Assembly (Includes O-Ring)	429099
5	O-Ring	11873
6	Spring	415565
7	O-Ring	428327
8	Gauge, Pressure	56776
9	Lever, Operating	429096
10	Handle, Carrying	429097
11	Rivet, Operating Lever	428130
12	Rivet, Carrying Handle	428130
13	Pull Pin (Ring Pin)	16235
14	Seal, Visual Inspection	25940
15	Nozzle Tip Assembly	428269
16	Hanger Hook (if desired)	21873
17	Bracket Assembly (Not Shown)	24610
18	Adaptor Assembly, Recharge	429642
19	O-Ring	57744

MODELS PC5ABC-1, PC5VBABC-1, PC5ABC+1, PC5VBABC+1, PC5PK-1, PC5BC-1

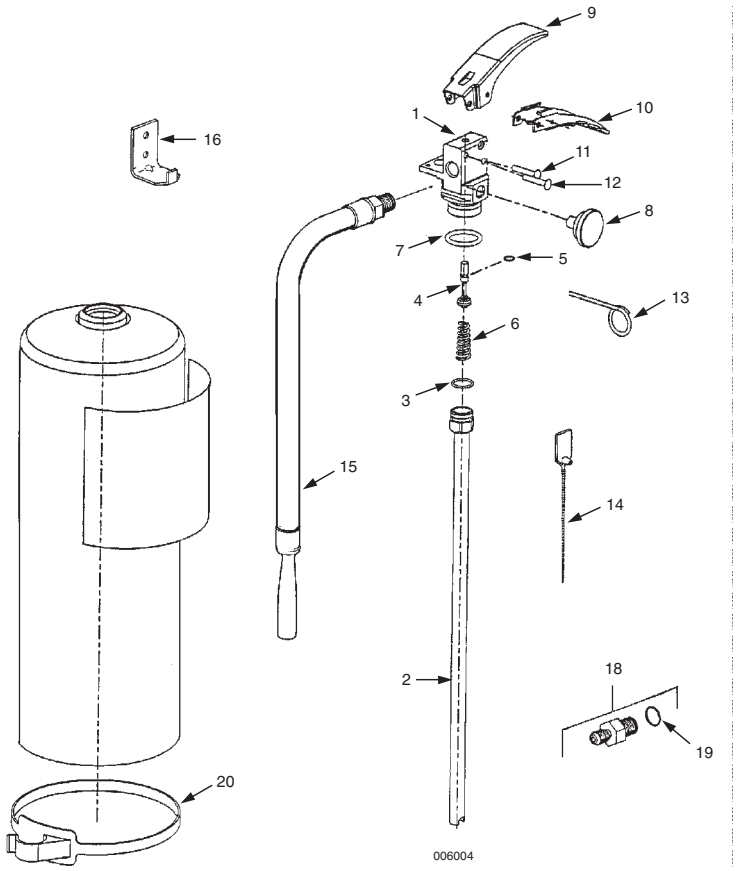


FIG. NO.	DESCRIPTION	PART NUMBER					
		PC5ABC+1	PC5VBABC+1	PC5PK-1	PC5ABC-1	PC5VBABC-1	PC5BC-1
—	Valve Assembly	429084	429084	429084	429084	429084	429084
1	Valve Body, Machined	428062	428062	428062	428062	428062	428062
2	Tube, Pick-Up	428796	428796	428796	428796	428796	428796
3	O-Ring (Pick-up Tube)	76076	76076	76076	76076	76076	76076
4	Valve Stem Assembly (Includes O-Ring)	429099	429099	429099	429099	429099	429099
5	O-Ring	11873	11873	11873	11873	11873	11873
6	Spring	415565	415565	415565	415565	415565	415565
7	O-Ring	428327	428327	428327	428327	428327	428327
8	Gauge, Pressure	56776	56776	56776	56776	56776	56776
9	Lever, Operating	429096	429096	429096	429096	429096	429096
10	Handle, Carrying	429097	429097	429097	429097	429097	429097
11	Rivet, Operating Lever	428130	428130	428130	428130	428130	428130
12	Rivet, Carrying Handle	428130	428130	428130	428130	428130	428130
13	Pull Pin (Ring Pin)	16235	16235	16235	16235	16235	16235
14	Seal, Visual Inspection	25940	25940	25940	25940	25940	25940
15	Hose Assembly	428729	428729	428730	428728	429728	428731
16	Hanger Hook	54405	—	54405	54405	—	54405
17	Bracket Assembly (Not Shown)	—	429146	—	—	429146	—
18	Adaptor Assembly, Recharge	429642	429642	429642	429642	429642	429642
19	O-Ring	57744	57744	57744	57744	57744	57744
20	Hose Retainer	427995	—	427995	427995	—	427995

MODELS PC10HABC-1, PC10TABC-1, PC10BC-1, PC10PK-1, PC20ABC+1, PC20BC-1, PC20PK-1

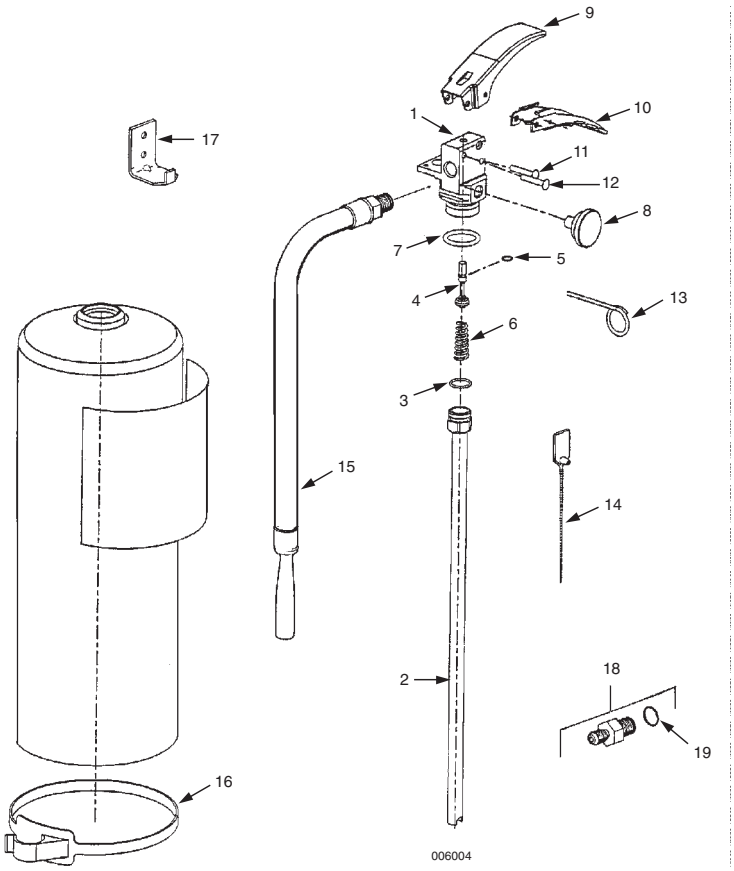
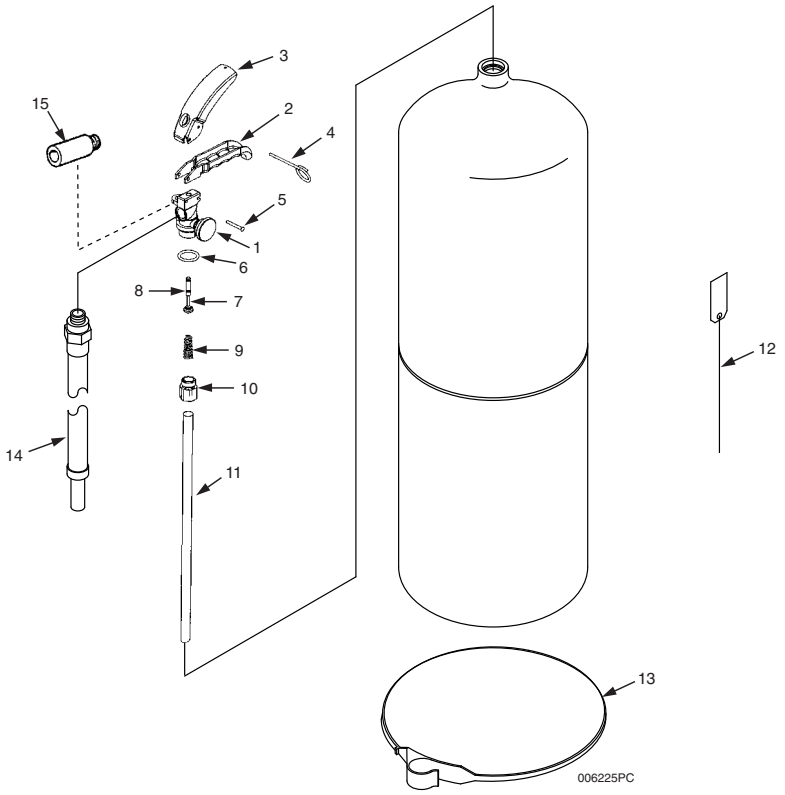


FIG. NO.	DESCRIPTION	PART NUMBER						
		PC10TABC-1	PC10HABC-1	PC10PK-1	PC10BC-1	PC20ABC+1	PC20PK-1	PC20BC-1
—	Valve Assembly	429086	429085	429085	429085	429087	429087	429087
1	Valve Body, Machined	428062	428062	428062	428062	428062	428062	428062
2	Tube, Pick-Up	428798	428797	428797	428797	428799	428799	428799
3	O-Ring (Pick-up Tube)	76076	76076	76076	76076	76076	76076	76076
4	Valve Stem Assembly (Includes O-Ring)	429099	429099	429099	429099	429099	429099	429099
5	O-Ring	11873	11873	11873	11873	11873	11873	11873
6	Spring	415565	415565	415565	415565	415565	415565	415565
7	O-Ring	428327	428327	428327	428327	428327	428327	428327
8	Gauge, Pressure	56776	56776	56776	56776	56776	56776	56776
9	Lever, Operating	429096	429096	429096	429096	429096	429096	429096
10	Handle, Carrying	429097	429097	429097	429097	429097	429097	429097
11	Rivet, Operating Lever	428130	428130	428130	428130	428130	428130	428130
12	Rivet, Carrying Handle	428130	428130	428130	428130	428130	428130	428130
13	Pull Pin (Ring Pin)	16235	16235	16235	16235	16235	16235	16235
14	Seal, Visual Inspection	25940	25940	25940	25940	25940	25940	25940
15	Hose and Nozzle Assembly	428732	428732	428734	428732	428736	428738	428740
16	Hose Retainer	427995	427995	427995	427995	427995	427995	427995
17	Hanger Hook	428222	428223	428223	428223	428224	428224	428224
18	Adaptor Assembly, Recharge	429642	429642	429642	429642	429642	429642	429642
19	O-Ring	57744	57744	57744	57744	57744	57744	57744
20	Bracket Assembly (Not Shown)	417898	30865	30865	30865	30937	30937	30937

MODELS ABC-025-B, ABC-050-H, ABC-10-H, ABC-20-H, ABC-30-H, PDC-10-H, PKD-10H, PKD-20H, PDC-20H (PRE-2005 OR DISCONTINUED)



ITEM NO.	DESCRIPTION	PART NUMBER				
		2.5 LB	5 LB	10 LB	20 LB	30 LB
1	Gauge 195 psi	56776	56776	56776	56776	56776
2	Handle – Black/Chrome	551979/552183	551979/552183	429160/432776	429160/432776	429160/432776
3	Lever – Black/Chrome	552003/552184	552003/552184	429163/432775	429163/432775	429163/432775
4	Pull Pin	429172	429172	429172	429172	429172
5	Rivet	552016	552016	429165	429165	429165
6	O-Ring, Collar	552007	552007	429537	429537	429537
7	Valve Stem Assembly	552143	552143	552144	552144	552144
8	O-Ring, Valve Stem	552006	552006	429159	429159	429159
9	Spring	415565	415565	415565	415565	415565
10	Pick-up Tube Adapter	431719	431719	431720	431720	431720
11	Pick-up Tube	431730	431731	431732	431733	431734
12	Visual Seal	429191	429191	429191	429191	429191
13	Hose Retainer	~	432708	432708	432709	432709
14	Hose Assembly	~	~	~	~	~
	ABC	~	551981	551997	552145	552146
	PDC	~	~	551983	~	~
15	Nozzle	552163	~	~	~	~
—	Wall Bracket (Not Shown)	552017	552017	552018	429205	429205
—	Vehicle Bracket (Not Shown)	551954	551955	~	~	~
—	Bracket, Heavy Duty (Not Shown)	551957	551958	551952	551953	551953
—	Recharge Adapter (Not Shown)	552014	552014	430057	430057	430057
—	Service Manual (Not Shown)	552037	552037	552037	552037	552037

MODEL D-30 (DISCONTINUED)

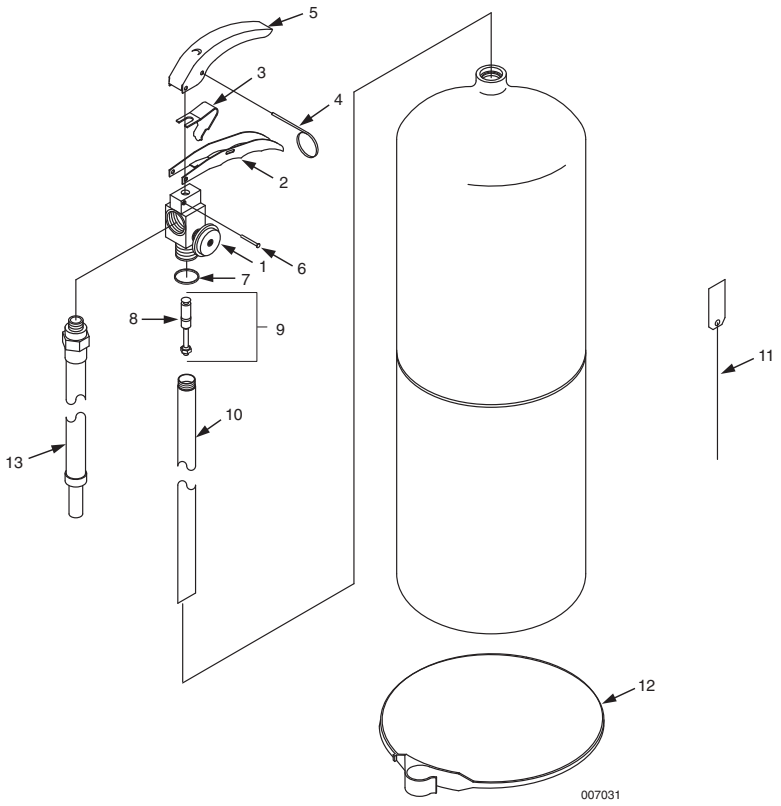


FIG. NO.	DESCRIPTION	PART NO.
1	Gauge (195 psi)	56776
2	Handle, Black	429160
3	Leaf Spring	429162
4	Pull Pin	429172
5	Lever, Black	429163
6	Rivet	429165
7	O-Ring, Collar	429537
8	O-Ring, Valve Stem	429159
9	Valve Stem Assembly	552144
10	Pick-up Tube	552516
11	Visual Seal	429191
12	Hose Retainer	427995
13	Hose Assembly	552957
—	Bracket, Heavy Duty (Not Shown)	551953
—	Wall Bracket (Not Shown)	429205
—	Recharge Adapter (Not Shown)	430057

MODEL PWS-25-G

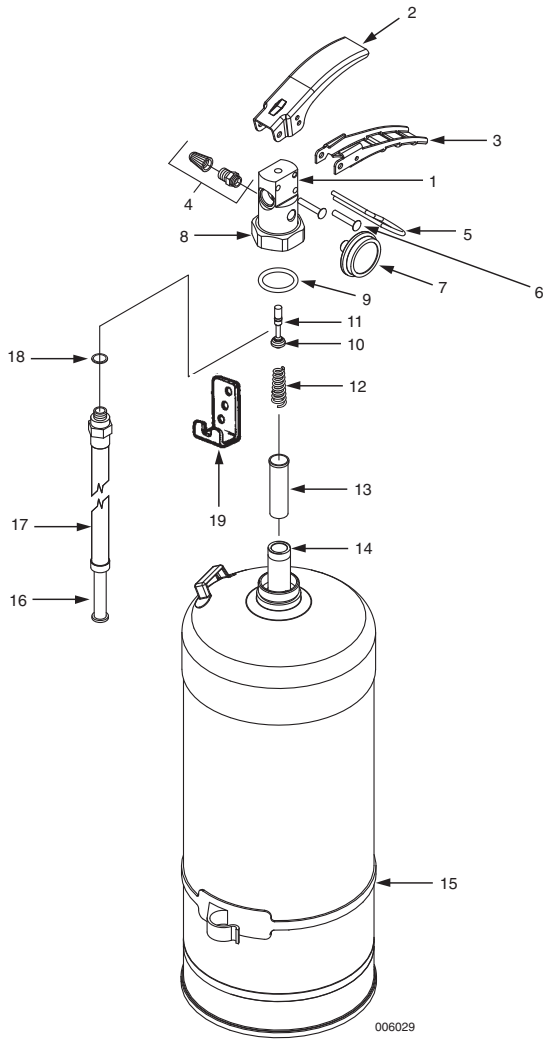
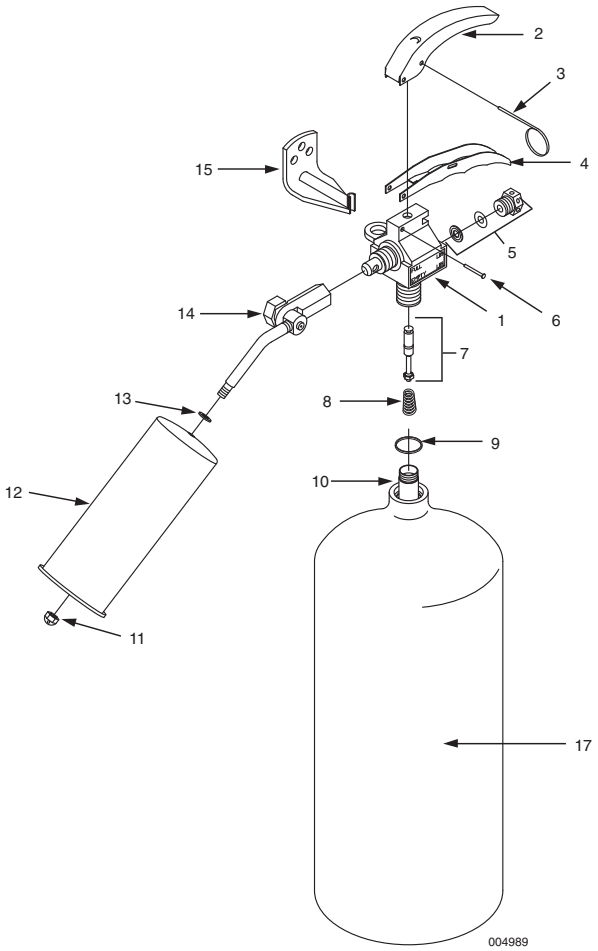


FIG. NO.	DESCRIPTION	PART NO.
1	Valve Body	430821
2	Lever	430924
3	Handle	430273
4	Air Valve Assembly	429542
5	Ring Pin	430115
6	Rivet (2)	430250
7	Gauge	429536
8	Collar Nut	430274
9	O-Ring, Collar	56909
10	Valve Stem Assembly	429099
11	O-Ring, Valve Stem	11873
12	Spring	430004
13	Fill Tube	429541
14	Pick-Up Tube Assembly	430793
15	Hose Retainer	427995
16	Nozzle Tip	432913
17	Hose and Nozzle Assembly	429543
18	O-Ring, Hose	429544
19	Hanger Bracket	430056
—	Bracket, Heavy Duty (Not Shown)	551953
—	Visual Seal (Not Shown)	25940
—	Service Manual (Not Shown)	552056
—	Caution Placard (Not Shown)	432915

MODEL CD05A-1



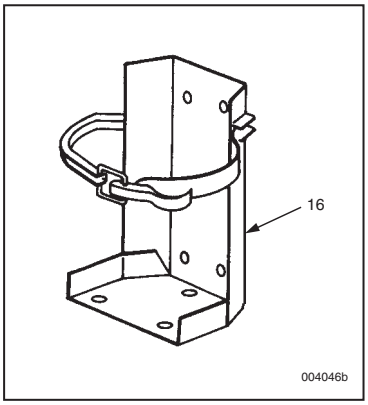
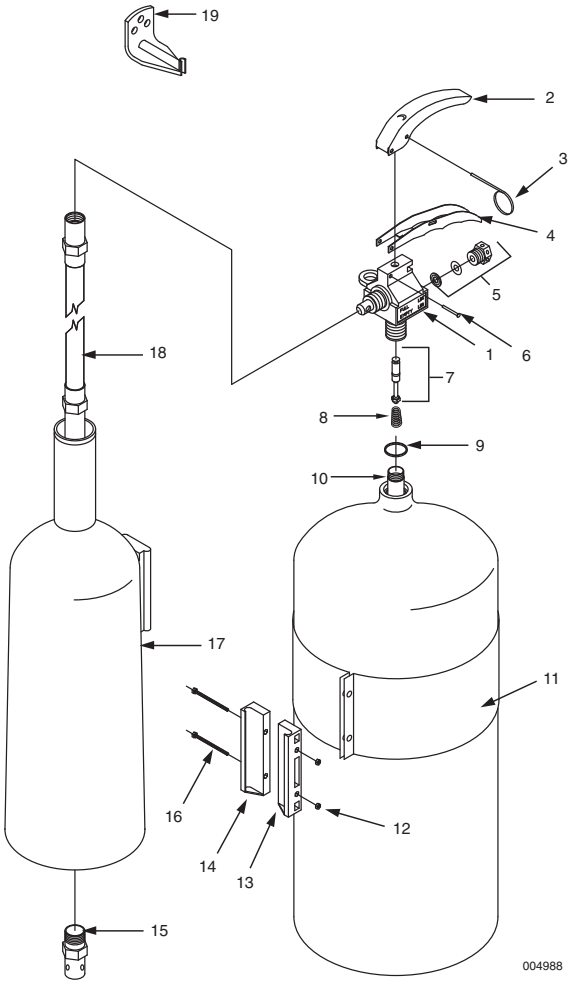


FIG. NO.	DESCRIPTION	PART NO. CO2-050-I
1	Valve Body	431000
2	Lever, Chrome	432775
3	Ring Pin	423624
4	Handle, Chrome	432776
5	Safety Plug Assembly (Includes Safety Disc and Washer)	429515
6	Rivet, Handle and Lever	429165
7	Plunger Assembly	429154
8	Spring	415565
9	O-Ring	429170
10	Pick-Up Tube	79475
11	Nozzle	429185
12	Horn	429184
13	Nylon Washer	429183
14	Swivel Assembly	429173
15	Hanger Hook	79356
16	Bracket, Heavy Duty	551952
17	Replacement Nameplate For ULC Replacement Nameplates, Call Customer Service	430860
—	Service Manual (Not Shown)	552038
—	Visual Seal (Not Shown)	25940

MODELS CD10A-1, CD15A-1, CD20A-1



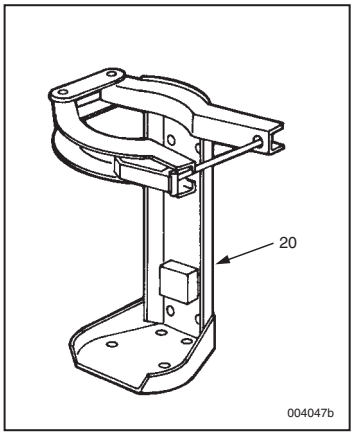


FIG. NO.	DESCRIPTION	PART NO. CD10A-I	CD15A-I	CD20A-I
1	Valve Body	429151	429151	429151
2	Lever, Chrome	432775	432775	432775
3	Pull Pin	423624	423624	423624
4	Handle, Chrome	432776	432776	432776
5	Safety Plug (Includes Safety Disc and Washer)	429515	429515	429515
6	Rivet, Handle and Lever	429165	429165	429165
7	Assembly, Valve Stem	429154	429154	429154
8	Spring	415565	415565	415565
9	O-Ring	429170	429170	429170
10	Pick-Up Tube	431551	79478	79478
11	Replacement Nameplate (For ULC Replacement Namplates, Call Customer Service	430861	430862	430863
12	Hex Nut (2)	429202	429202	429202
13	Right Clamp	429199	429199	429199
14	Left Clamp	429200	429200	429200
15	Nozzle Orifice	429198	429210	431621
16	Screw (2)	429201	429201	429201
17	Horn	429197	429197	429197
18	Hose	429196	429196	429196
19	Hanger Hook	79357	79357	429205
20	Heavy Duty Bracket	551953	551953	551959
—	Service Manual (Not Shown)	552038	552038	552038
—	Visual Seal (Not Shown)	429191	429191	429191

MODEL KS6000

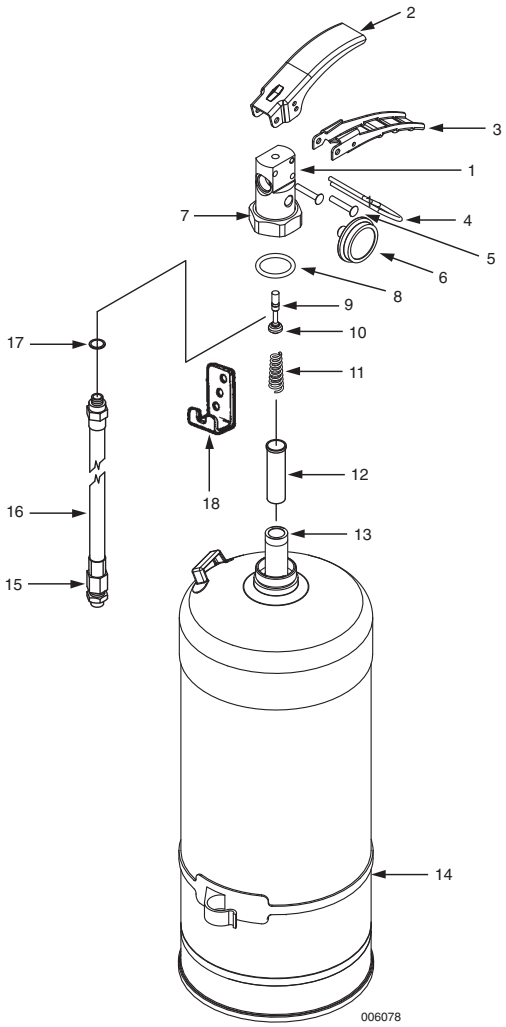
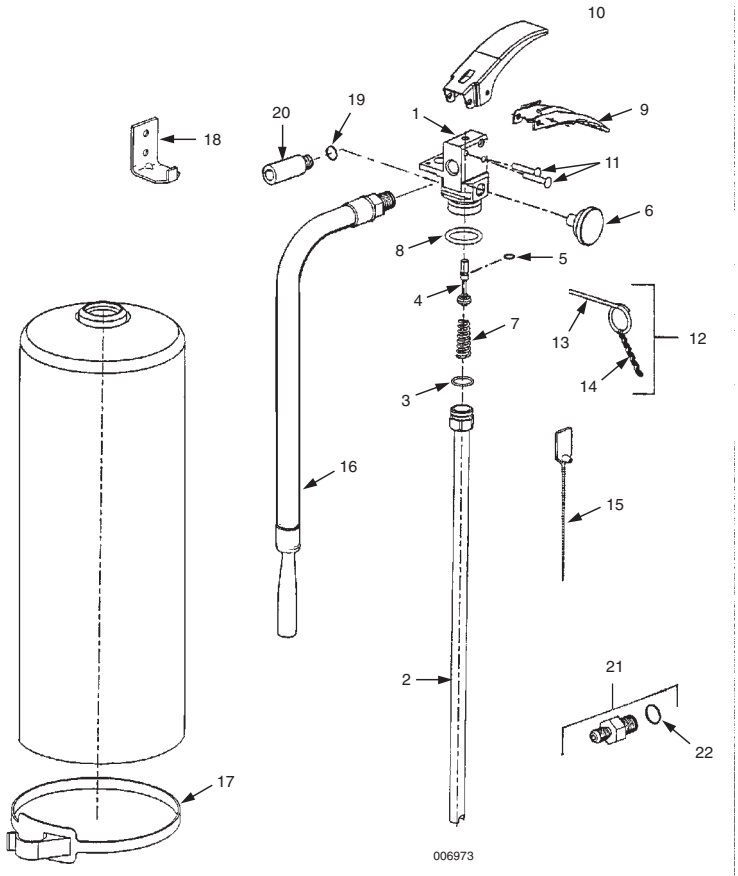


FIG. NO.	DESCRIPTION	PART NO.
1	Valve Body	430271
2	Lever	430924
3	Handle	430273
4	Ring Pin	430115
5	Rivet	430250
6	Gauge	429536
7	Collar Nut	430274
8	O-Ring, Collar	56909
9	O-Ring, Valve Stem	11873
10	Valve Stem Assembly	429099
11	Spring	430004
12	Fill Tube	429541
13	Pick-Up Tube Assembly	430851
14	Hose Retainer	427995
15	Nozzle Tip	426074
16	Hose and Nozzle Assembly	430055
17	O-Ring, Hose	429544
18	Hanger Bracket	430056
—	Bracket, Heavy Duty (Not Shown)	551837
—	Visual Seal (Not Shown)	25940
—	Service Manual (Not Shown)	552056
—	Warning Placard (Not Shown)	426034

MODELS FE-02, FE-05, FE-09, FE-13



ITEM NO.	DESCRIPTION	PART NUMBER			
		FE-02	FE-05	FE-09	FE-13
1	Valve Body	429100	429100	429100	429100
2	Pick-up Tube	428795	428796	428797	428799
3	O-Ring, Pick-up Tube	76076	76076	76076	76076
4	Valve Stem Assembly	428804	428804	428804	428804
5	O-Ring, Valve Stem	11873	11873	11873	11873
6	Gauge	426264	426264	428940	428940
7	Spring	415565	415565	415565	415565
8	O-Ring, Valve Body	428327	428327	428327	428327
9	Handle	429097	429097	429097	429097
10	Push Lever	429096	429096	429096	429096
11	Rivet (2)	428130	428130	428130	428130
12	Ring Pin/Chain Assembly	16234	16234	16234	16234
13	Ring Pin	16235	16235	16235	16235
14	Chain	507	507	507	507
15	Visual Seal	25940	25940	25940	25940
16	Hose and Nozzle Assembly	—	428742	428743	428743
17	Hose Retainer	—	427995	427995	427995
18	Hanger Bracket	21873	54405	428224	428224
19	O-Ring, Nozzle	57744	—	—	—
20	Nozzle	429118	—	—	—
21	Adapter Assembly, Recharge	429642	429642	429642	429642
22	O-Ring, Adapter	57744	57744	57744	57744
—	Vehicle Bracket (Not Shown)	24610	429146	551837	551831
—	Service Manual (Not Shown)	552029	552029	552029	552029

MODEL FE13NM NON-MAGNETIC

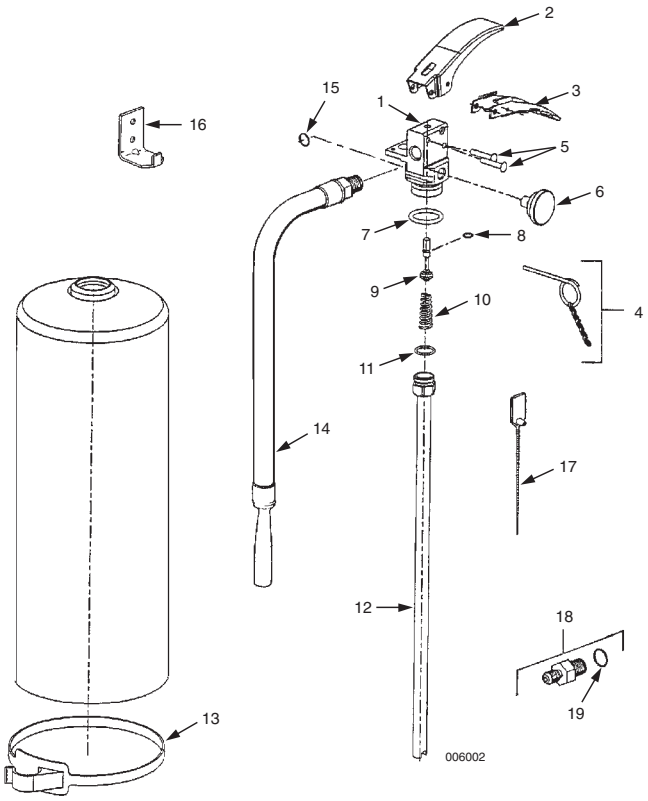
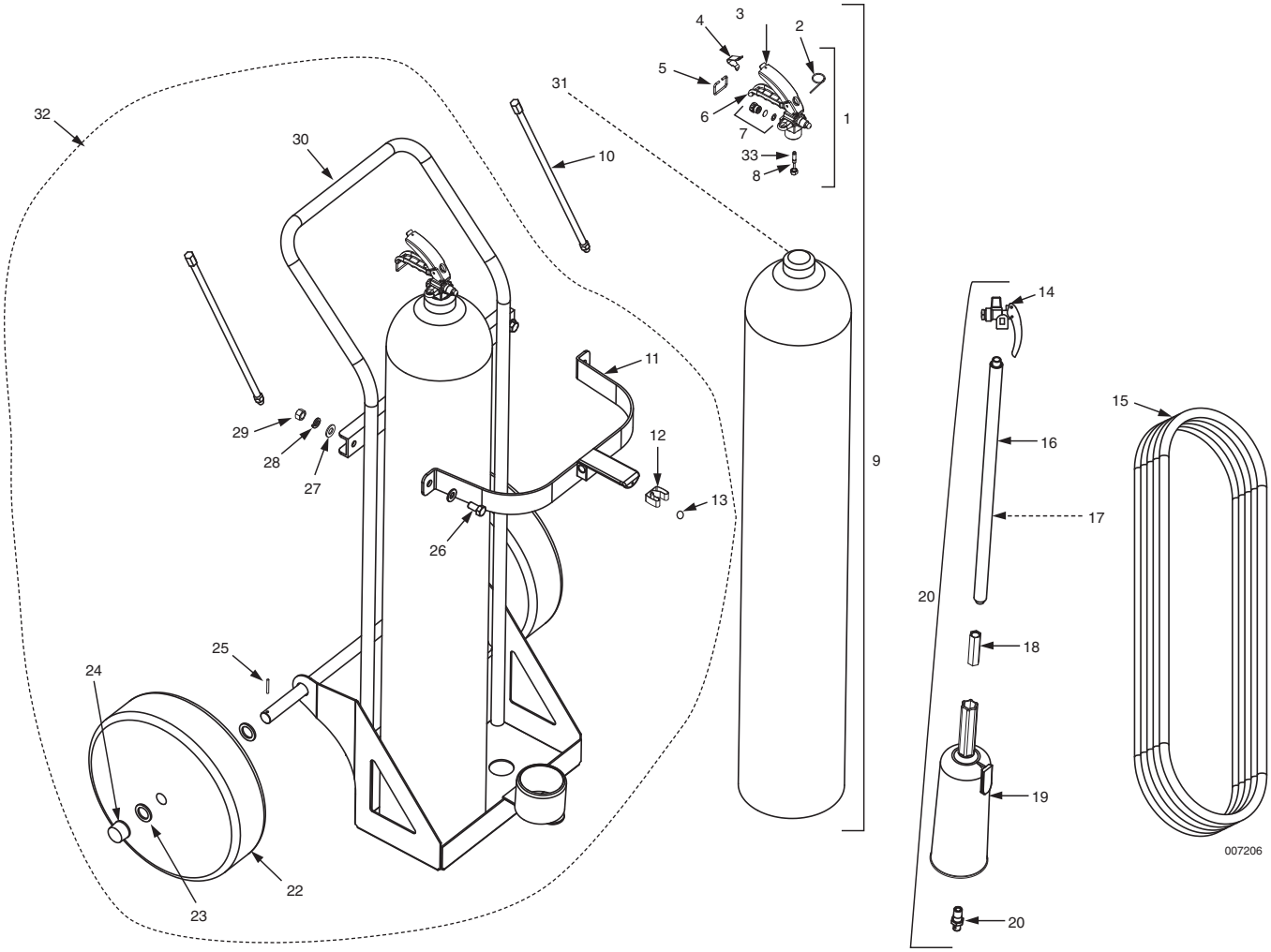


FIG. NO.	DESCRIPTION	PART NUMBER
1	Valve Body	428434
2	Lever, S.S.	428428
3	Handle, S.S.	428429
4	Ring Pin and Chain Assembly	432947
5	Rivet	428430
6	Gauge, 75 psi	428940
7	O-Ring, Collar	428327
8	O-Ring, Valve Stem	11873
9	Valve Stem	428432
10	Spring	430004
11	O-Ring, Pick-up Tube	76076
12	Pick-up Tube Assembly	432897
13	Hose Retainer	427995
14	Hose and Nozzle Assembly	432948
15	O-Ring, Hose	57744
16	Wall Hanger	432964
17	Visual Inspection Seal	25940
18	Adapter Assembly, Recharge	429642
19	O-Ring	57744

⚠ CAUTION

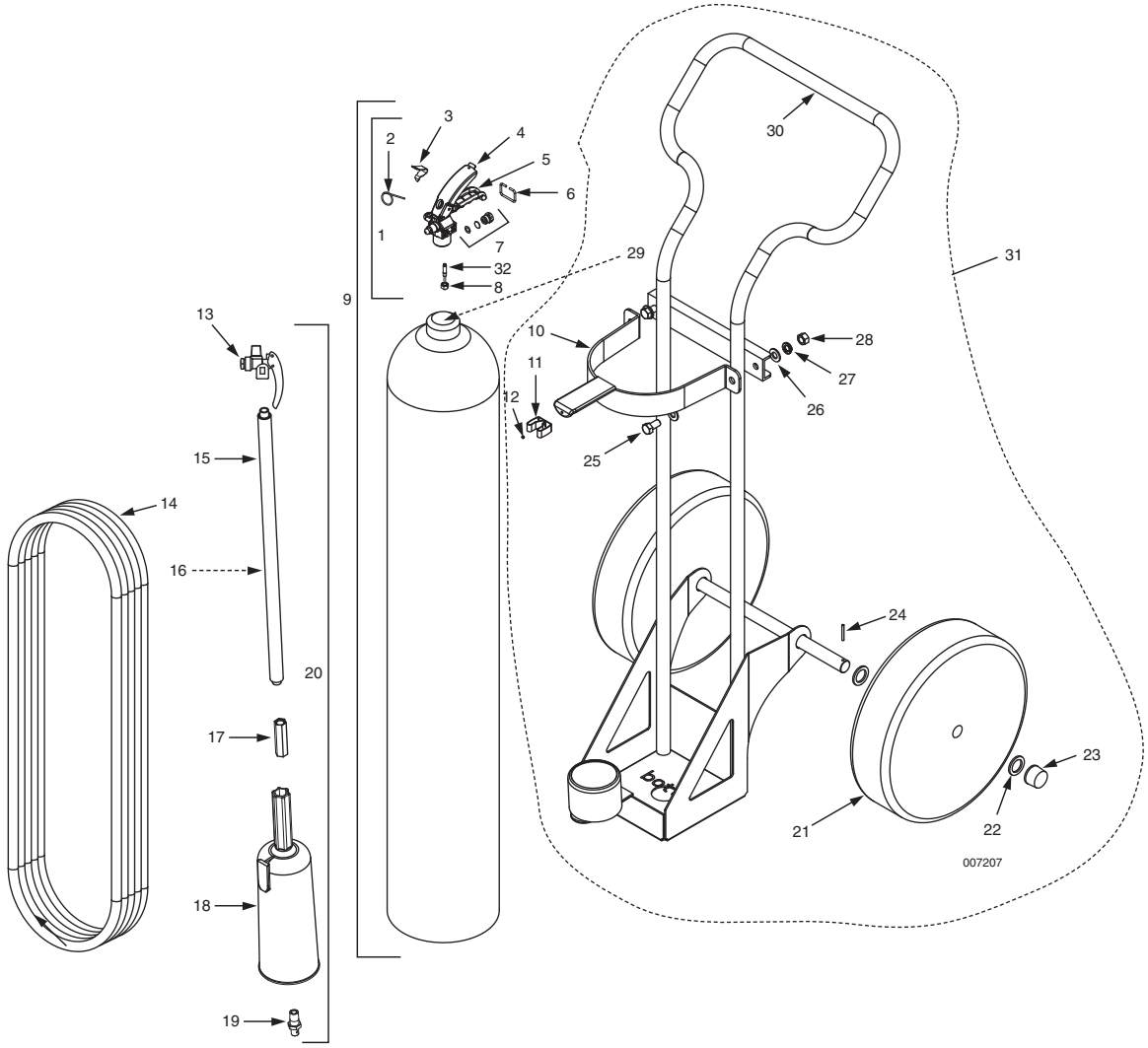
This extinguisher and associated components have been tested and shown to be non-magnetic to 3.0 tesla. Use only these authorized components for repair or service. Use of non-authorized components may not be non-magnetic and could result in injury.



MODEL CD-100-D-1 – PART NO. 553261 (UL); PART NO. 552300 (ULC)

Fig. No.	Description	Part No.
1	Valve Assembly (no pick-up tube)	429238
2	Pull Pin	423624
3	Lever, Chrome	429243
4	Leaf Spring	429162
5	Lever Catch	429244
6	Handle, Chrome	432776
7	Safety Plug Kit	434607
8	Plunger Stem	429154
9	50 lb (22.7 kg) CO_2 Shipping Assembly	552314
10	20 in (50.8 cm) Hose Assembly	552356
11	Bracket – Painted	552311
12	Hose Clip	552309
13	Rivet – Stainless Steel	552307
14	Discharge Valve Sub-Assembly	552719
15	Hose Assembly, 40 ft (12.2 m)	552302
16	Rubber Tubing	552721
17	Discharge Pipe	552720
18	Horn Adaptor	552724

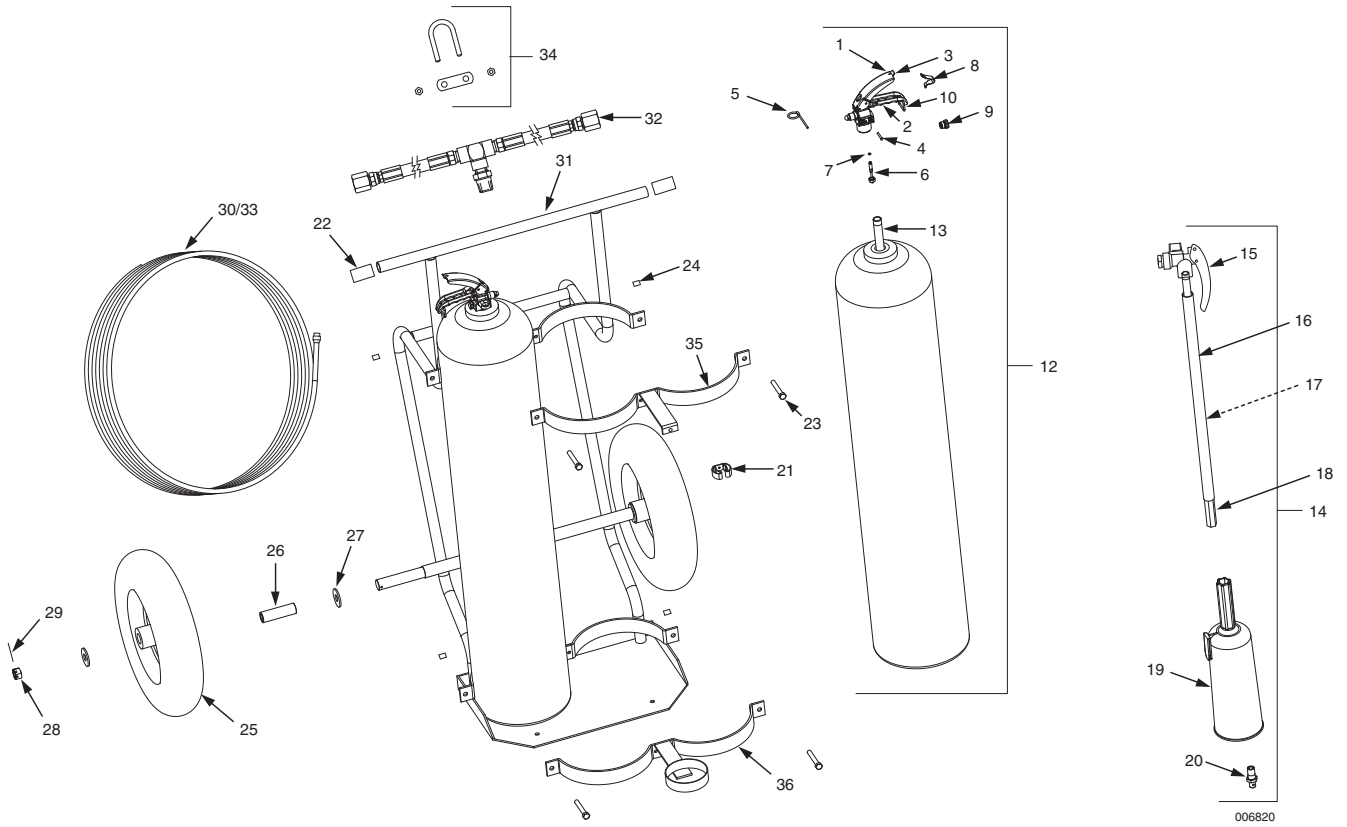
Fig. No.	Description	Part No.
19	Discharge Horn	429197
20	Discharge Nozzle	552723
21	Discharge Valve/Horn Assembly	429249
22	16 in (40.6 cm) Wheel	53870
23	Washer	53541
24	Hub Cap	53867
25	Roll Pin	69855
26	1/2 – 13 Hex Head Bolt	16117
27	1/2 Flat Washer	17486
28	1/2 Lockwasher	16121
29	1/2 – 13 Hex Nut	16119
30	100 lb (45.4 kg) CO_2 Cart Only	552313
31	Pickup Tube	552336
32	100 lb (45.4 kg) CO_2 Cart Assembly (Excluding CO_2 Cylinder)	553327
33	O-Ring, Valve Stem	429159
—	Safety Plug Kit	429515



MODEL CD-50-D-1 – PART NO. 552362 (UL); PART NO. 552333 (ULC)

Fig. No.	Description	Part No.	Fig. No.	Description	Part No.
1	Valve Assembly (no pick-up tube)	429238	18	Discharge Horn	429197
2	Pull Pin	423624	19	Discharge Nozzle	552723
3	Leaf Spring	429162	20	Discharge Valve/Horn Assembly	429249
4	Lever, Chrome	429243	21	16 in (40.6 cm) Wheel	53870
5	Handle, Chrome	432776	22	Washer	53541
6	Lever Catch	429244	23	Hub Cap	53867
7	Burst Disc	434607	24	Roll Pin	69855
8	Plunger Stem	429154	25	1/2 – 13 Hex Head Bolt	16117
9	50 lb (22.7 kg) CO_2 Shipping Assembly	552314	26	1/2 Flat Washer	17486
10	Bracket – Painted	552331	27	1/2 Lockwasher	16121
11	Hose Clip	552309	28	1/2 – 13 Hex Nut	16119
12	Rivet – Stainless Steel	552307	29	Pickup Tube	552336
13	Discharge Valve Sub-Assembly	552719	30	50 lb (22.7 kg) CO_2 Cart Only	552332
14	Hose Assembly, 15 ft (4.6 m)	552334	31	50 lb (22.7 kg) CO_2 Cart Assembly (Excluding CO_2 Cylinder)	553326
15	Rubber Tubing	552721			
16	Discharge Pipe	552720	32	O-Ring, Valve Stem	429159
17	Horn Adaptor	552724	—	Safety Plug Kit	429515

MODELS CO2-50, CO2-100 (UL)



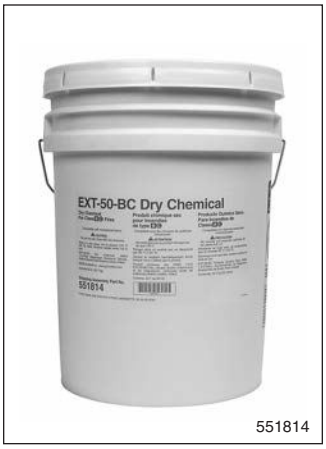
ITEM NO.	DESCRIPTION	PART NUMBER CO2-50	PART NUMBER CO2-100	ITEM NO.	DESCRIPTION	PART NUMBER CO2-50	PART NUMBER CO2-100
---	Extinguisher Shipping Assembly	551883	551884	21	Hose Clip	552730	552730
1	Valve Assembly (less pick-up tube)	429238	429238	22	Handle Grip	552732	552732
2	Handle, Chrome	429242	429242	23	Hex-Head Cap Screw	552731	552731
3	Lever, Chrome	429243	429243	24	Lock Nut	552690	552690
4	Rivet	429165	429165	25	Rubber Tire – 16 in. (41 cm)	552734	552734
5	Pull Pin	423624	423624	26	Wheel Bushing	552779	552779
6	Plunger Assembly	429155	429155	27	Washer	552735	552735
7	O-Ring, Stem	429159	429159	28	Slotted Hex Nut	552736	552736
8	Leaf Spring	429162	429162	29	Cotter Pin	552737	552737
9	Safety Disc Nut Assembly	429515	429515	30	Hose Assembly – 15 ft. (4.6 m)	429248	N/A
10	Wire Catch	429244	429244	31	Cart Sub-Assembly	552989	552987
11	Visual Seal (Not Shown)	25940	25940	32	Manifold Assembly	N/A	429268
12	50 Lb. CO_2 Cylinder	552984	552984	33	Hose Assembly – 40 ft. (12.2 m)	N/A	429273
13	Pick-up Tube	429247	429247	34	“U” Clamp and Nuts	N/A	429276
14	Discharge Valve/Hose Assembly	429249	429249	35	Top Front Bracket	552752	552986
15	Discharge Valve Sub-Assembly	553001	553001	36	Bottom Front Bracket	552752	552985
16	Rubber Tubing	552721	552721	37	Non-UL Replacement Nameplate (Not Shown)	553003	553004
17	Discharge Pipe	552720	552720				
18	Horn Adaptor	552724	552724				
19	Discharge Horn	429197	429197				
20	Discharge Nozzle	552723	552723				

552519

551820

552518

552880



551814

ABC DRY CHEMICAL AGENT

ABC DRY CHEMICAL is a multipurpose extinguishing agent, meaning it is effective on Class A, B, and C fires. This monoammonium phosphate-based agent is available in 45 lb (20.4 kg) pails.

Part No.	Description
552519	ABC Dry Chemical (ABC-45), 45 lb (20.4 kg) Pail
551820	ABC Dry Chemical (EXT-45-ABC-SP), 45 lb (20.4 kg) Pail
551218	ABC Dry Chemical High Performance (ABCR-45H), 45 lb (20.4 kg) Pail
552880	ABC Dry Chemical (ABC STDUS), 45 lb (20.4 kg) Pail

BC DRY CHEMICAL AGENT

BC DRY CHEMICAL is a sodium bicarbonate-based extinguishing agent for use on Class B and C fires.

Part No.	Description
551814	BC Dry Chemical, 50 lb (22.7 kg) Pail

551816


551950

PK DRY CHEMICAL AGENT

PK DRY CHEMICAL is a potassium-based extinguishing agent for use on Class B and C fires. It is the most effective dry chemical for flammable and combustible liquid fires.

Part No.	Description
551816	PK Dry Chemical (EXT-50-PK), 50 lb (22.7 kg) Pail
551950	PK Dry Chemical (PK PR-50), 50 lb (22.7 kg) Pail


552963

CLASS D DRY POWDER AGENT

CLASS D POWDER is a sodium-based agent for use on most Class D fires involving combustible metals including sodium, potassium, sodium-potassium, and magnesium.

Part No.	Description
552963	Class D Powder, 50 lb (22.7 kg) Pail

553176

551188

PYRO-CHEM® WET AGENT RECHARGE

The agent used in PYRO-CHEM KITCHEN KNIGHT II Systems is a potassium carbonate-based solution that is extremely effective for grease-related kitchen fires. This agent is available for cylinder recharging in 1.6 Gallon (6.1 L) and 3.0 Gallon (11.4 L) containers.

Part No.	Description
553176	1.6 Gallon (6.1 L) Shipping Assembly
551188	3.0 Gallon (11.4 L) Shipping Assembly


551059

GAS CARTRIDGES

Part No.	Description
551059	16 gram Carbon Dioxide Actuation Cartridge – 6-Pack


551026


551027

KITCHEN KNIGHT® II NOZZLES

Part No.	Description
551026	1L Nozzle – 10 Pack with Blow-Off Cap
551027	2L Nozzle – 10 Pack with Blow-Off Cap
551029	1H Nozzle – 10 Pack with Blow-Off Cap
551028	2H Nozzle – 10 Pack with Blow-Off Cap
551038	2D Nozzle – 10 Pack with Blow-Off Cap


551029


551028


551038


551528


550016


418569 / 423572


550926


551265

551269

NOZZLE BLOW-OFF CAPS, ADAPTORS AND AIMING DEVICES

Part No.	Description
418569	Swivel Adaptor, Single
423572	Swivel Adaptor, 25/package
551265	Nozzle Aiming Device Only
550926	Nozzle Aiming Device Adaptor Only
551269	Replacement Battery for 551265
551528	Wet Nozzle Cap – 10 Pack
550016	Rubber Blow-Off Cap – 10 Pack


423250/423251


415670/415671


550166


436063


550857/550859


423253


79153

PULLEY ELBOWS AND TEE

Part No.	Description
423250	Pulley Elbow, Compression Type, Single
423251	Pulley Elbow, Compression Type, 50/package
415670	Pulley Elbow, Set Screw Type, Single
415671	Pulley Elbow, Set Screw Type, 50/package
550166	Pulley Tee
436063	Condiut Offset Assembly, 6 Pack

MECHANICAL SEALING ADAPTORS

Part No.	Description
550857	Quick Seal Adaptor – 3/8 in.
550858	Quick Seal Adaptor – 3/8 in. (Pack of 24)
550859	Quick Seal Adaptor – 1/2 in.
550860	Quick Seal Adaptor – 1/2 in. (Pack of 24)
79153	Adaptor, 1/2 in EMT Compression-Seal, 24/package
423253	Hood Seal Adaptor Assembly, 6/package


550131/5500335


550132/550041


550876

DETECTORS

Part No.	Description
550131	FLK-1 Fusible Link with 10 in. (25.4 cm) Bracket
550035	FLK-25 Fusible Link with 10 in. (25.4 cm) Bracket – Pack of 25
550132	FLK-1A Fusible Link with 8 in. Bracket (20.3 cm) Bracket
550041	FLK-25A Fusible Link with 8 in. (20.3 cm) Bracket – Pack of 25
550876	FLH-25 Hanger, Fusible Link – Pack of 25

FUSIBLE LINKS

Part No.	Description
551522	165 Degree, 10 Pack (ML Style)
551523	212 Degree, 10 Pack (ML Style)
551524	280 Degree, 10 Pack (ML Style)
551525	360 Degree, 10 Pack (ML Style)
551526	450 Degree, 10 Pack (ML Style)
551527	FL-500, 500 °F, 10 Pack

550593/550594/550595/550596

551049/550185/550186

GAS SHUT-OFF EQUIPMENT

Part No.	Description
550593	GV-75 Gas Valve, Mechanical, 3/4 in. Pipe
550594	GV-100 Gas Valve, Mechanical, 1 in. Pipe
550595	GV-125 Gas Valve, Mechanical, 1 1/4 in. Pipe
550596	GV-150 Gas Valve, Mechanical, 1 1/2 in. Pipe
551049	GV-200 Gas Valve, Mechanical, 2 in. Pipe
550185	GV-250 Gas Valve, Mechanical, 2 1/2 in. Pipe
550186	GV-300 Gas Valve, Mechanical, 3 in. Pipe


13707/13708


550360


13709/13710


550363

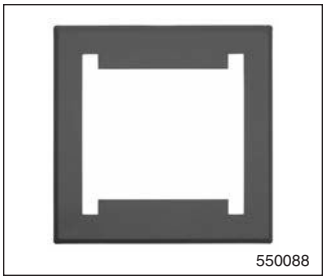

17643

550302

GAS SHUT-OFF EQUIPMENT

Part No.	Description
13707	Gas Valve, Electrical (110V, 60 Hz) 3/4 in
13708	Gas Valve, Electrical (110V, 60 Hz) 1 in
13709	Gas Valve, Electrical (110V, 60 Hz) 1 1/2 in
13710	Gas Valve, Electrical (110V, 60 Hz) 2 in
17643	Gas Valve, Electrical (110V, 60 Hz) 3 in
550302	SM-120 System Current Monitor Reset/Relay
550360	Gas Valve, Electrical (110V, 60 Hz) 1 1/4 in
550363	Gas Valve, Electrical (110V, 60 Hz) 2 1/2 in

551074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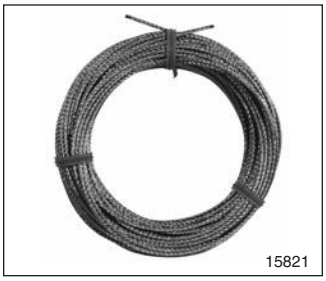
551709

REMOTE PULL STATION/ACCESSORIES

Part No.	Description
551074	RPS-M Remote Pull Station
550088	RPS-MTR Trim Ring
551709	RPS-MGR Glass Rod


15821


79653

WIRE ROPE

Part No.	Description
15821	Wire Rope, 50 ft (15 m)
79653	Wire Rope, 500 ft (152 m)


434525


434347

FLEXIBLE CONDUIT

Part No.	Description
434525	Flexible Conduit, 500 ft (152.4 m)
435979	Strain Relief (Pack of 50)
434347	Flexible Conduit Insert (Pack of 50)
79827	1/2 in. Compression Union
436150	P-Clip (Pack of 50)

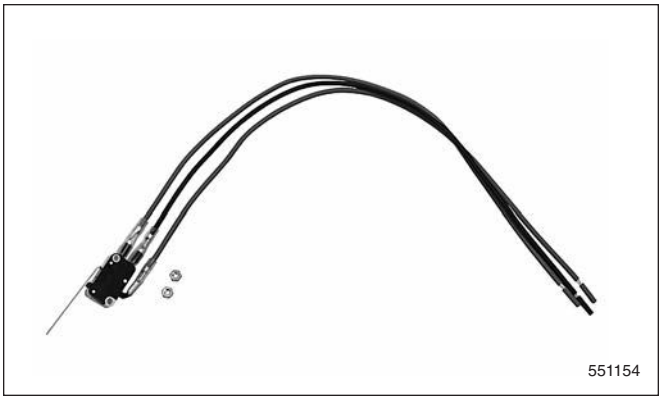

435979


79827


436150

ELECTRICAL SWITCHES

Part No.	Description
551154	MS-SPDT, One Switch Kit
551155	MS-DPDT, Two Switch Kit
551156	MS-3PDT, Three Switch Kit
551157	MS-4PDT, Four Switch Kit
550077	Alarm Initiating Switch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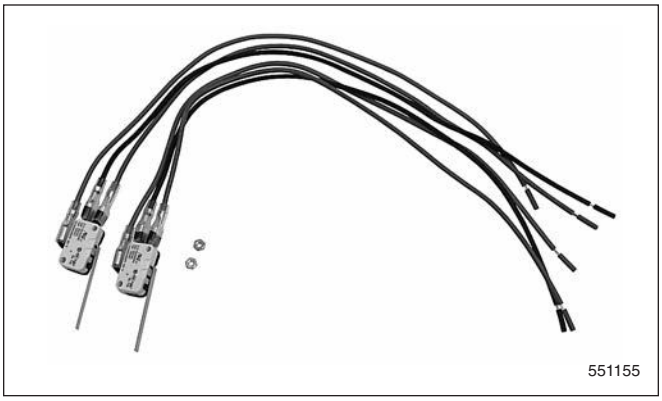
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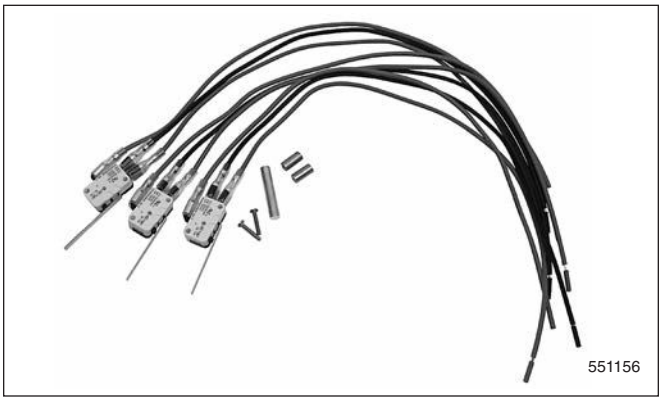
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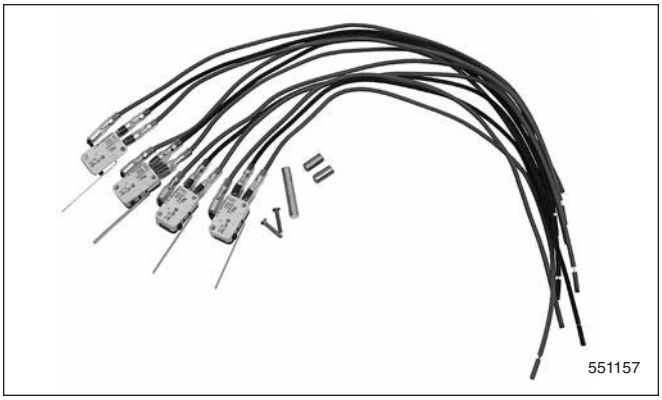
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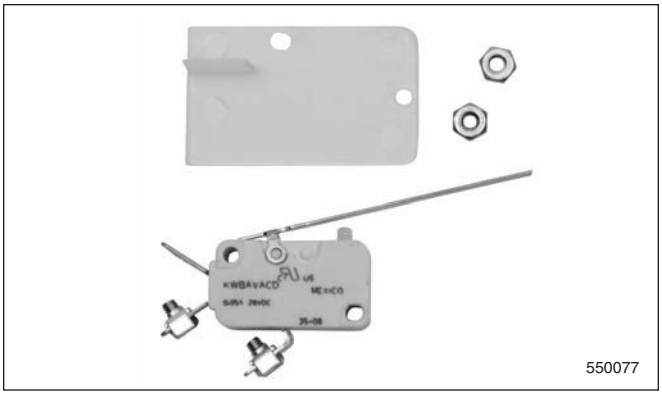
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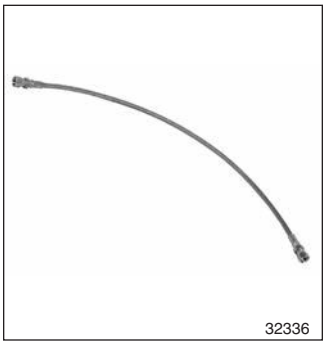
417582


32336


430815


32338


31811


31810


550985

57593


551061


55531


550698

79656

SPARE PARTS & ACCESSORIES

Part No.	Description
417582	Actuation Hose, Stainless Braided, 8 in.
31809	Actuation Hose, Stainless Braided, 16 in
32336	Actuation Hose, Stainless Braided, 24 in
430815	Actuation Hose, Stainless Braided, 42 in
32338	Adapter, Male Straight, 7/16-20 Flare x 1/4 in NPT
31811	Branch Tee, Male, 7/16-20 Flare x 1/4 in NPT
31810	Elbow, Male, 7/16-20 Flare x 1/4 in NPT
550985	Pressure Regulator Assembly
551061	Pressure Regulator Rebuild Kit
55531	Control Head Replacement O-Ring
57593	O-Ring Lubricant
550698	Wet Valve Rebuild Kit
79656	Flushing Concentrate, 12 Bottles/package


550122


24919

434528


435982


5511240

SPARE PARTS & ACCESSORIES

Part No.	Description
550122	Oval Sleeves, 100/package
24919	Stop Sleeves, 10/package
434528	Multitone Strobe, 115V
435982	Discharge Hose and Tether Kit
551240	PCL-AK Recharge Adaptor Kit KITCHEN KNIGHT II

417459

553486


552173


552181


550788


550853

SPARE PARTS & ACCESSORIES

Part No.	Description
417459	Fire Emergency Nameplate (English/Spanish)
553486	Fan Label – Pack of 10
552173	Micro-Switch Extension Kit
552181	Hydrotest Adaptor
550788	VT-1 Wet Valve Tool
550853	MB-P2 Control Head Mounting Bracket

MANUALS

Part No.	Description
551274	KITCHEN KNIGHT II Manual
551017	KITCHEN KNIGHT II Owners Manual
552056	KITCHEN ONE Hand Portable Manual

1-800-526-1079
(USA/Canada)

1-715-732-3465
(International)

www.pyrochem.com

PC2009081-01

Pyro-Chem

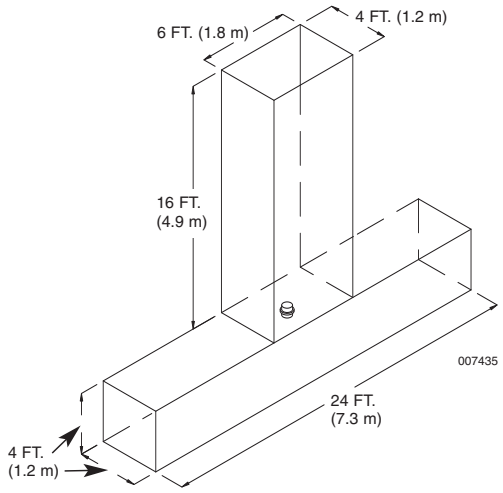
tyco Fire Protection Products

One Stanton Street
Marinette, WI 54143-2542 USA

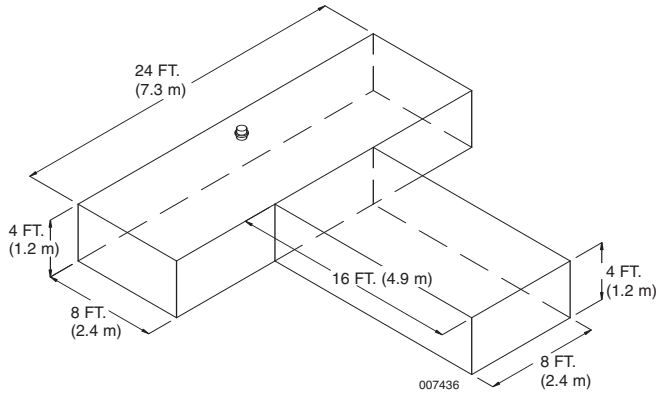
Data/ Specification Sheet

PYRO-CHEM® MONARCH® THREE-WAY NOZZLE APPLICATION SHEET

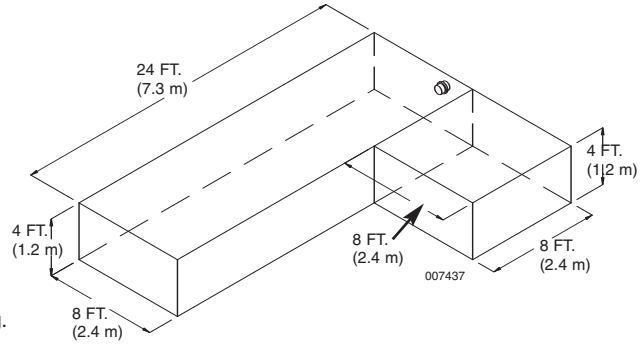
Protection Area	Nozzle	Protection Zone/Nozzle L W H	Maximum Specifications	Nozzle Location within Protection Zone	Nozzle Orientation
Down draft Side exhaust Inverted tee	N-PLU	Plenum 24 x 4 x 4 ft. (7.3 x 1.2 x 1.2 m) Vertical Riser 6 x 4 x 16 ft. (1.8 x 1.2 x 4.9 m)	768 cu. ft. (21.8 cu. m)	5 inches up. Centered vertically and horizontally in plenum.	Aimed up. Side holes aimed at ends of plenum.



Protection Area	Nozzle	Protection Zone/Nozzle L W H	Maximum Specifications	Nozzle Location within Protection Zone	Nozzle Orientation
Down draft Pit and Trench Tee shaped	N-PLU	Pit 24 x 8 x 4 ft. (7.3 x 2.4 x 1.2 m) Trench 16 x 8 x 4 ft. (4.9 x 2.4 x 1.2 m)	1280 cu. ft. (36.2 cu. m)	5 inches off wall oppposite trench. Centered vertically and horizontally in pit.	Aimed at opposite end of trench. Side holes aimed at opposite ends of pit.



Protection Area	Nozzle	Protection Zone/Nozzle L W H	Maximum Specifications	Nozzle Location within Protection Zone	Nozzle Orientation
Down draft Pit and Trench L shaped	N-PLU	Pit 24 x 8 x 4 ft. (7.3 x 2.4 x 1.2 m) Trench 8 x 8 x 4 ft. (2.4 x 2.4 x 1.2 m)	1024 cu. ft. (28.9 cu. m)	5 inches off wall oppposite longest leg. Centered vertically in pit.	Aimed at opposite end of longest leg. Side holes aimed at oppposite end of shortest leg.



One Stanton Street
Marinette, WI 54143

PYRO-CHEM MONARCH PIPING/ELBOW PARAMETERS

Tank Size	Nozzle Quantity	Nozzle Type	Piping Section	Size	Length Maximum	Elbows Maximum
17 lb. (7.7 kg)	1	NV-P1, NV-DP2, N-PLU, NV-UF	Cylinder to nozzle	3/4 in.	36 ft. (10.9 m)	7
17 lb. (7.7 kg)	2	NV-UF nozzles or any combination	Cyl to T1	3/4 in.	36 ft. (10.9 m)	7
		NV-P1, NV-DP2, N-PLU	T1 to nozzle	3/4 in.	14 ft. (4.3 m)	4
35 lb. (15.9 kg)	3	NV-UF nozzles or any combination	Cyl to T1	3/4 in.	36 ft. (10.9 m)	7
			T1 to T2	3/4 in.	14 ft. (4.3 m)	3
		NV-P1, NV-DP2, N-PLU	T2 to nozzle	3/4 in.	8 ft. (2.4 m)	2
			T1 to nozzle	3/4 in.	12 ft. (3.7 m)	4
35 lb. (15.9 kg)	4	NV-UF nozzles or any combination	Cyl to T1	1 in.	30 ft. (9.1 m)	7
			T1 to T2	1 in.	8 ft. (2.4 m)	2
		NV-P1, NV-DP2, N-PLU	T2 to nozzle	3/4 in.	8 ft. (2.4 m)	4

Maximum height of nozzle from base of tank to nozzle – 20 ft. (6.1 m)

Data/ Specification Sheet

ABCR Dry Chemical Extinguishing Agent

APPLICATION

PYRO-CHEM® ABCR may be used to combat fires in ordinary combustible materials such as wood, cloth, paper, rubber and many plastics (Class A) as well as fires in flammable liquids, gases and greases (Class B) and fires involving energized electrical equipment (Class C). ABCR is of particular value on combination fires (Class A and B together) and on Class A fires at temperatures which would freeze water. A typical application is the heavy equipment used in the logging industry.

ABCR is available in hand portable extinguishers.

DESCRIPTION

ABCR is the only one of PYRO-CHEM's dry chemicals that provides Class A fire extinguishment. It is a monoammonium phosphate based dry chemical containing chemical additives. The resultant agent is free-flowing, water repellant, non-abrasive, and when used as a fire extinguishing agent will produce no toxic effects. ABCR is yellow in color to differentiate it from the other dry chemical agents.

Moisture may combine with monoammonium phosphate based agents in post fire situations to produce mild corrosion. Because of this, prompt cleanup is recommended. If the agent cannot be readily swept up, warm water may be used as a solvent.

PEFORMANCE

Monoammonium phosphate based extinguishants are unique among dry chemicals because of their "A" rating. PYRO-CHEM ABCR is at least 4 to 5 times as effective as an equal weight of water on Class A fires. Various extinguishers will operate at temperatures as low as –65 °F and as high as 120 °F (–54 °C and 49 °C).

Caution: Never mix ABCR with bicarbonate based dry chemicals. A chemical reaction that is harmful to the extinguisher will take place.

ORDERING INFORMATION

PYRO-CHEM ABCR is available in:

Part No.	Description
552519	45 lb (20.4 kg) Pail
552518	45 lb (20.4 kg) Pail (Tech Grade)

Refill services are available from your local PYRO-CHEM distributor.

APPROVALS AND LISTINGS

Nationally recognized testing laboratories grant an approval or listing for the combination of an extinguisher and its agent. Numerous types and sizes of approved or listed ABCR extinguishers are available. Following discharge, these extinguishers are to be refilled only with the original agent, as specified on the nameplate. This agent meets specifications of agencies of the U.S. and Canadian governments.

PYRO-CHEM
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Technical Bulletin

Number 01

Dry Chemical Clean-Up Procedures

Dry chemical is a proven firefighting agent used in portable extinguishers and fixed pipe fire suppression systems. Its fast flame knockdown characteristics can be attributed to its chemical makeup and small particle size. These same attributes help dry chemical find its way in and around nearly everything in the vicinity of discharge. This tends to raise two questions:

1. How does dry chemical agent affect the materials in the surrounding area?
2. What are the recommendations for cleaning up and/or neutralizing those areas exposed to the dry chemical agent?

The Effects of Dry Chemical Extinguishing Agent

Tests have been conducted to investigate the possible corrosive effects of dry chemical on common metals such as steel and aluminum. Corrosion was not evident on any sample in contact with dry chemical under dry conditions. If dry chemical is left on surfaces which are exposed to moisture, discoloration and dulling of aluminum parts and paint finishes can be expected.

Dry chemical should be cleaned up promptly to avoid being contaminated with moisture whether through direct contact or humidity. Dry chemicals may be corrosive to surfaces which are sensitive to mildly acidic or mildly alkaline materials.

The various base materials used in manufacturing dry chemicals account for the differences in the pH level from agent to agent.

- **PYRO-CHEM® ABC Multipurpose Dry Chemical** is a monoammonium phosphate based dry chemical containing additives that make it free-flowing and water repellent.
- Typical/Average particle size is approximately 20 microns.
- PYRO-CHEM ABC Multipurpose Dry Chemical is color coded yellow for identification purposes and can be used on class A and B type fires and is class C rated..
- Monoammonium phosphate is slightly acidic in the presence of moisture resulting in mild corrosive properties.
- Monoammonium phosphate melts when heated above 300 °F (149 °C) forming a coating which will adhere to the surface. The coating will continue to adhere even after the surface has cooled. This coating, when exposed to moisture, is also acidic.
- **PYRO-CHEM Regular-Stearated (BC) Dry Chemical** is a sodium bicarbonate based dry chemical containing additives that make it free-flowing and water repellent.
- Typical/Average particle size is approximately 20 microns.
- PYRO-CHEM Regular-Stearated (BC) Dry Chemical is color coded light blue for identification purposes and is capable of extinguishing class B fires, and is class C rated.
- Sodium bicarbonate is mildly alkaline and can be corrosive to surfaces that are affected by alkaline residue.
- **Fire Extinguisher BC Purple-K Dry Chemical** is a potassium bicarbonate based dry chemical containing additives that makes it free-flowing and water repellent.
- Typical/Average particle size is approximately 20 microns.
- Fire Extinguisher BC Purple-K Dry Chemical is color coded violet for identification purposes and is capable of extinguishing class B fires, and is class C rated.
- Potassium bicarbonate is mildly alkaline and can be corrosive to surfaces that are affected by alkaline residue.

Dry Chemical Clean-Up Recommendations

The complexity of the equipment and its susceptibility to corrosive material will dictate the degree of cleanup necessary. For example, an outdoor diked area will require much less clean-up time than an automotive paint spray booth. It may also be necessary to request clean-up recommendations from the manufacturer of the affected equipment. If electrical wiring or equipment is in or around the contaminated area, it must be shut off prior to cleanup.

When dry chemical cleanup is required, it should be accomplished immediately by following these recommended steps.

- Sweep or vacuum the settled residual dry chemical. If vacuuming, use a filter such as a HEPA filter which is capable of trapping the small dry chemical particles. If necessary, wipe with a damp soft cloth.
- To break down the silicone in the dry chemical, spray the area with a solution of 50% isopropyl alcohol and 50% warm water. After the solution has set for a few minutes, rinse with warm water.
- To neutralize sodium bicarbonate and potassium bicarbonate based dry chemicals, spray or wash the area with a solution of 98% hot water and 2% vinegar (one cup of vinegar to three gallons of water). Let stand for a few minutes; then rinse with warm water.
- To neutralize monoammonium phosphate based dry chemical, spray or wash the area with a solution of hot water and baking soda (one cup of baking soda to three gallons of water.) Let stand for a few minutes; then rinse with warm water.
- Wash the area with a mild soap and water solution; then rinse.
- Blow dry to remove residual water.
- If any electrical contacts have been affected by a dry chemical discharge, use an approved electrical contact cleaner.