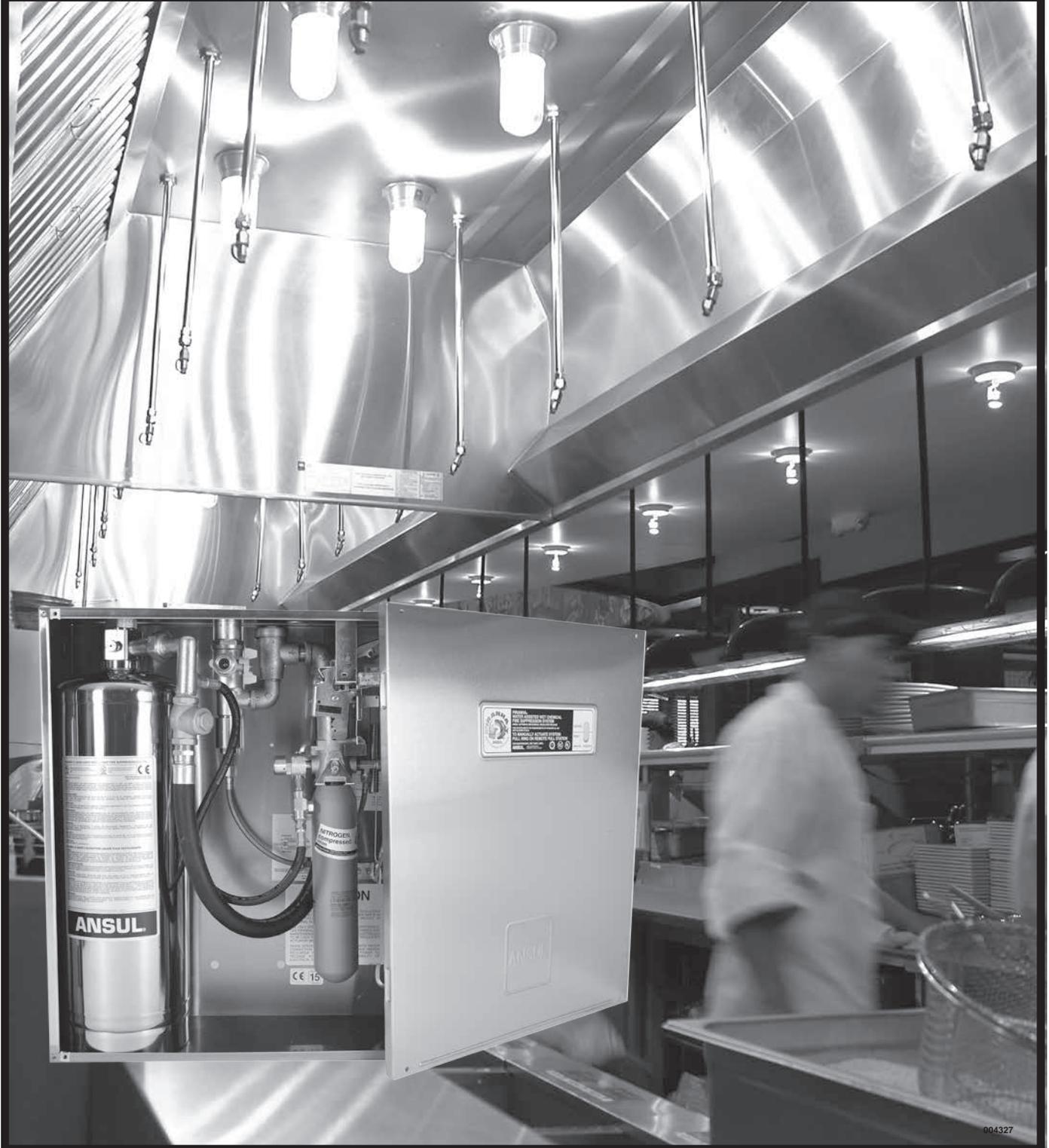


# PIRANHA RESTAURANT FIRE SUPPRESSION SYSTEM



## DESIGN, INSTALLATION, RECHARGE, AND MAINTENANCE MANUAL





This manual is intended for use with ANSUL® PIRANHA 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 design, install, recharge, 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 hydrostatic testing of all applicable components as indicated in the maintenance section of this manual.

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

ANSUL PART NO. 423385-08

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 **DANGER**

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

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 **WARNING**

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

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 **CAUTION**

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

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**CAUTION**

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

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**NOTICE**

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

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## DESIGN AND APPLICATION

The PIRANHA Restaurant Fire Suppression System has been developed and tested to UL 300 and UL 1254 Standards and is designed to provide fire protection for restaurant cooking appliances, hoods, and ducts. The system is to be installed and maintained in accordance with NFPA 17A, NFPA 96, and local codes. It is a pre-engineered group of mechanical and electrical components for installation by an authorized ANSUL distributor or OEM (original equipment manufacturer). The basic system consists of an AUTOMAN regulated release assembly which includes a regulated release mechanism, an agent/water valve, and test outlet. One of three liquid agent storage tank sizes, ordered separately, will be housed within the release 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. Shutdown of fuel and power to appliances located under protected ventilating equipment shall be in accordance with NFPA 96, NFPA 17A, and all local codes and the authority having jurisdiction.

Additional equipment includes: remote manual pull station, automatic water shut down device, mechanical and electrical gas valves, pressure switches, 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. These accessories are to be installed in accordance with NFPA 72, NFPA 70, and local codes.

The PIRANHA system suppresses fire by spraying the plenum area, the filters, cooking surfaces, and the exhaust duct system with a predetermined flow rate of PRX 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 forming a layer of soap-like foam on the surface of the fat. This layer acts as a barrier between the hot grease and the atmosphere, thus helping to prevent the escape of combustible vapors.

The system is designed as a hybrid (agent and water) system. Upon actuation, agent is discharged onto the hazard area. Immediately following agent discharge, the internal water valve changes position and allows water to flow onto the same hazard areas, continually replenishing the foam blanket and cooling the hot appliance.

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.

- ▶ It is also required that make up or supply air fans, integral
- ▶ to the exhaust hood(s) being protected, be shut down upon system actuation.

## UL LISTING

The PIRANHA Restaurant Fire Suppression System has been tested and is listed by UL as a pre-engineered system. The system is in compliance with UL 300 Test Standard. These tests require extinguishment of fires which are initiated in deep fat fryers, griddles, char-broilers, upright broilers, chain-broilers, woks, ranges, 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.

## DEFINITION OF TERMS

**Actuation Gas Line:** Piping from the AUTOMAN Regulated Release Assembly which supplies nitrogen gas pressure to the Regulated Actuator Assembly for multiple-tank system actuation.

**Agent Tank:** A pressure vessel containing the PRX liquid agent.

**AUTOMAN Regulated Release Assembly (Electrical):** A 120VAC or 24VDC assembly which contains the regulated release mechanism, water flow valve, anti-siphon vacuum breaker, water pressure test outlet, 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, water flow valve, anti-siphon vacuum breaker, water pressure test outlet, agent tank, and expellant gas hose within a metal enclosure. The enclosure contains knockouts to facilitate component hookups.

**Anti-Siphon Vacuum Breaker:** A device located in the AUTOMAN release assembly and the regulated actuator assembly which is designed to prevent back-siphonage of possible contaminated water into a potable water supply.

**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.”

**Basic Unit:** The PIRANHA system option that requires the water to be supplied by either the domestic water source or ▶ from the wet pipe sprinkler system water supply.

**Blow-Off Cap:** A cap which covers the end of the nozzle tip and prevents grease from plugging the nozzle orifice.

**DEFINITION OF TERMS (Continued)**

**Bull Tee:** A bull tee is defined as a tee positioned in the system so that the flow enters the center inlet of the tee and exits 90° out both side outlets.

**Bursting Disc:** A disc installed in the tank adaptor which eliminates the siphoning of the agent up the pipe during extreme temperature variations.

**Cartridge:** A sealed, steel pressure vessel containing nitrogen gas used to pressurize the agent tank.

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

**Continuous System:** A continuous distribution piping system is one that does not include a bull tee between the agent tank and the first nozzle.

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

**Cooking Hazard Area:** The cooking hazard area is defined as the heated portion of the appliance where the actual cooking operation is performed, such as the griddle plate, broiler grate, fryer pot, wok pan, range burner grates, etc.

**Dedicated Nozzle Appliance Protection:** 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.

**Dedicated PIRANHA Waterline:** The dedicated PIRANHA waterline is defined as the waterline between the water source connection and the PIRANHA regulated releasing device(s). No other fixture connections are allowed on this waterline.

**Department of Transportation (DOT):** DOT stamped pressure vessels (cartridges) meet the requirements of the Department of Transportation.

**Detector:** A mechanical or electrical device used for automatic operation of the fire suppression system.

**Detector Linkage:** A device used to support the fusible link housed in a bracket.

**Distribution Piping:** Piping which delivers the extinguishing agent and water from the tank to each discharge nozzle.

**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, plenums, and/or other items or air handling equipment.

**Equivalent Length:** Length of distribution piping, defined in feet, which includes the actual length of pipe (measured from center to center of fittings) and a given pipe length value assigned to each fitting used that must be added to the overall pipe length sum.

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

**Fire Alarm Panel:** A component of a building fire alarm system which receives signals from initiating devices or other fire alarm panels, and provides outputs to audible and visual alarm notification devices.

**Full Hood Continuous Appliance Protection:** Full hood continuous protection is overlapping nozzle appliance protection that covers the complete appliance line-up located under the total hood length. All appliances under the hood are those which can be an ignition source of grease in the hood, grease removal device or duct.

**Fusible Links:** A fixed temperature heat detecting device, used in a mechanical heat detector, employed to restrain the operation of a mechanical control until its designed temperature is reached. When the link reaches its set temperature, a solder connection, keeping two link halves intact, melts. The link's separation allows slack in a tensioned wire to trigger the release mechanism.

**Gas Valve:** A 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 from pressure released from the N<sub>2</sub> cartridge, mechanically unlatches a mechanical gas valve actuator, causing the gas valve to close upon system actuation.

**Group Appliance Protection:** Group protection is 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.

**Hazard Zone:** The hazard zone is defined as a theoretical, flat and level, rectangular surface, that includes all of the cooking hazard areas of the protected appliances under a common hood. The purpose of the hazard zone is to provide a means for locating and aiming the appliance protection nozzles.

**Heat Detector (Electrical):** A device that detects either abnormally high temperature or rate of temperature rise, or both.

**Heat Detector (Mechanical):** A device which includes the detector bracket, detector linkage, and fusible link.

**Highest Normal Domestic Water Usage:** The highest normal domestic water usage is defined as the total water usage from those water usage points (sinks, dishwashers, toilets, etc.) that could be operated simultaneously under normal usage, during a 24 hour period.

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

**Linear Length:** The actual length of piping measured from center to center of fittings.

**Liquid Agent:** A specially-formulated, aqueous solution of inorganic salts used for the knockdown and suppression of fire.

### DEFINITION OF TERMS (Continued)

**Maximum Length of Cooking Appliance:** The maximum dimension, on any side, which may be protected with overlapping protection.

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

**Minimum Piping:** Minimum length of distribution piping required between the agent tank outlet and a nozzle protecting a fryer, wok, braising pan, tilt skillet, or range when only one nozzle is used with a tank.

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

**Nozzle Aiming/Location Graph:** A graph used as an aid in determining appliance nozzle location, nozzle aiming, and hazard zone placement. The graph includes a hood side view with numbered “X” and “Y” axes. The graph may indicate appliance nozzle aiming points either on the floor or at a given hazard surface height.

**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.

**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 PIRANHA 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 PIRANHA installation and maintenance manual which is part of the UL listing.

**Primary Domestic Control Valve:** The primary domestic control valve is defined as the primary shut-off valve which controls all of the water to the food service facility being protected.

**Pulley Elbow:** A device used to change the direction of the stainless steel cable 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 stainless steel cables 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, water flow valve, anti-siphon vacuum breaker, pneumatic actuator, and expellant gas hose within a metal enclosure. This assembly is used to pressurize an additional agent tank 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.

**Releasing Panel:** A device listed to automatically operate the AUTOMAN 24VDC regulated release assembly.

**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.

**Split System:** A split distribution piping system includes a bull tee between the agent tank and the first nozzle.

**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 stainless steel cable ends, or “terminates.” There is only one terminal detector per detection system.

**Thru Tee:** A thru tee is defined as a tee positioned in the system so that as the flow enters a side inlet and exits straight through the tee to the outlet opposite and also exits 90° through the center outlet.

**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.

**Transport Canada (TC):** TC stamped pressure vessels (cartridges) meet the requirements of Transport Canada.

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

**Water Flow Valve:** A specially-designed valve located within the AUTOMAN Regulated Release and the Regulated Actuator which controls the flow of water following the agent discharge.

**Water Shutdown Device:** The Water Shutdown Device (Part No. 426294) is an optional component which can be field installed in the AUTOMAN release. With this device installed, the water flow to the discharge nozzles will automatically shut down after a minimum of 10 minutes after system actuation.

**SECTION 1 – GENERAL INFORMATION**

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PAGE 1-4 REV. 06 2013-APR-02

*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**NOTES:**

## TOTAL SYSTEM

The PIRANHA system has been designed and tested in accordance with UL 300 and UL 1254 and is to be installed and maintained in accordance with NFPA 17A, NFPA 96, and local codes.

The PIRANHA Restaurant Fire Suppression System is a pre-engineered, fixed, automatic fire suppression system developed specifically for improved fire protection of commercial and institutional restaurant cooking appliances, exhaust hoods, and ducts. When actuated, the system discharges a fixed amount of proprietary wet chemical agent followed by water through the same nozzles. For domestic or sprinkler water supply systems, water is provided by the connection of the PIRANHA dedicated water supply. This connection is made after the primary domestic control valve serving the food service facility. No other shut-off valve(s) is allowed between the primary domestic control valve and the PIRANHA lockable, full flow, indicating, shut-off valve.

The three sizes of systems are:

- PIRANHA-7: (7 nozzle capacity)
- PIRANHA-10: (10 nozzle capacity)
- PIRANHA-13: (13 nozzle capacity)

The system is designed to provide either full hood continuous overlapping protection for a typical cooking appliance lineup or group protection for one or more appliances under a longer hood. The system can be pre-piped prior to the appliances being put in place. Appliances protected within this manual that are eligible for overlapping nozzle protection can be freely interchanged within the hazard zone without changing or relocating the nozzles.

Appliances that are not eligible for overlapping protection (such as upright broilers, chainbroilers, etc.) will require appliance specific dedicated nozzle installation.

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.

## DESCRIPTION OF SYSTEM – BASIC UNIT

The tank assembly is filled with a proprietary wet agent under atmospheric pressure. The system is equipped with a pneumatically controlled water flow valve. The water inlet port of the valve assembly is connected through the PIRANHA dedicated water supply to the water source downstream of the primary domestic control valve servicing the food service facility or the wet pipe sprinkler system water supply. See "Water Supply Requirements" in Section 4. The valve is closed and under static water pressure. The high pressure gas inlet port of the valve is piped to the high pressure side of the AUTOMAN release mechanism and is under atmospheric pressure until the fire suppression system is actuated. This high pressure line includes a check valve to trap high pressure gas in the line when the system is actuated. The low pressure gas inlet port on the pick-up tube assembly is piped to the low pressure side of the gas pressure regulator and is also under atmospheric pressure until the system is actuated. The gas pressure regulator receives its pressure from a gas cartridge installed in the release mechanism. The tank discharge outlet on the pick-up tube assembly is connected to the discharge piping of the agent/water distribution system.

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### NOTICE

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The PIRANHA system includes an atmospheric anti-siphon vacuum breaker as an integral component, built into the AUTOMAN Release. The atmospheric anti-siphon vacuum breaker is used to eliminate the possibility of creating a vacuum, thus eliminating back siphonage of agent into the potable water supply. The atmospheric anti-siphon vacuum breaker meets the requirements of ASSE (American Society of Sanitation Engineers) Standard 1001, ANSI (American National Standards Institute) Standard A112.1.1 and CSA (Canadian Standards Association) Standard B64. Based on backflow prevention testing by an independent laboratory, the PIRANHA system has been specifically listed and approved by IAPMO (International Association of Plumbing and Mechanical Officials) in accordance with PS108-98, and each PIRANHA system bears the IAPMO/UPC logo indicating approval under the Uniform Plumbing Code.

Underwriters' Laboratories (UL) has tested the PIRANHA system for mechanical and fire suppression performance in accordance with UL Standard 300. UL has not evaluated the integral anti-siphon vacuum breaker or any other backflow prevention device with respect to their ability to prevent backflow from occurring.

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## SECTION 2 – SYSTEM DESCRIPTION

UL EX 5174

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

### ► SYSTEM OPERATION – BASIC UNIT

When a fire is detected by the fire suppression system, the ► spring-loaded AUTOMAN Release assembly automatically actuates to puncture the seal of the expellant gas cartridge, thereby releasing gas under high pressure to both the high ► pressure inlet of the water flow valve and the high pressure inlet of the pressure regulator, where the high gas pressure is reduced to a lower operating pressure for the agent tank. ► The high pressure gas opens the valve to the water supply by moving the internal stem assembly toward the water inlet against the force of the spring and the static water pressure. Once the stem assembly is unseated, the trapped high pressure gas will hold it open until the gas pressure is manually released after the fire event when the system is recharged and reset. The low pressure gas from the regulator enters the top of the tank to expel the wet agent from the tank through the tank discharge outlet, discharge piping, and discharge nozzles. Once the low pressure gas is flowing, the regulator will feed the low pressure gas into the tank at a constant pressure until the decaying pressure of the gas in the cartridge falls below the preset outlet pressure of the regulator, at which time the gas pressure from the regulator will also decay.

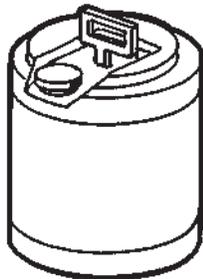
Although the valve was opened initially by the high gas pressure, water will not flow into the tank until the water pressure from the water supply overcomes the decaying gas pressure of the low pressure gas in the top of the tank, at which time water will automatically commence flowing through the ► tank, discharge piping, and the discharge nozzles. Water will continue to flow until it is manually shutoff upstream from the water flow valve after the fire event is concluded or it was shut off approximately 10 minutes after actuation if the system has ► a water shutdown device installed in the AUTOMAN Release. ►

### EXTINGUISHING AGENT

PRX Liquid Fire Suppressant (Part No. 423320) is a specially-formulated, aqueous solution of inorganic salts designed for fast knock-down and suppression of grease-related fires. The agent is shipped in a translucent 5.0 gallon (18.9 L) plastic container. The agent is colored red for easy identification. Agent

- ▶ storage life expectancy is twelve years. When installing agent in
- ▶ a PIRANHA system, the temperature range is 32 °F to 130 °F (0 °C to 54 °C).

### PRX LIQUID FIRE SUPPRESSANT



5.0 GALLON (18.9 L) PAIL

FIGURE 3-1  
001606

### REGULATED RELEASE ASSEMBLY (MECHANICAL)

- ▶ The AUTOMAN Regulated Mechanical Release Assembly (Part No. 423477) contains the regulated release mechanism, water flow valve, anti-siphon vacuum breaker, water pressure test outlet, 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 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 150 psi (10.3 bar) when the system is actuated.

The assembly is shipped with two factory installed single-pole, double throw (SPDT) electrical switches.

Agent tanks must be purchased separately and must be mounted within the enclosure.

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)

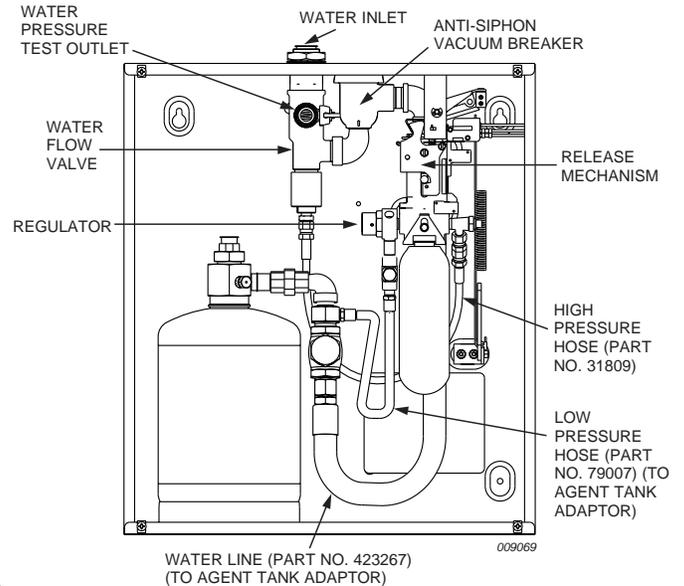


FIGURE 3-2

### ▶ REGULATED RELEASE ASSEMBLY (120VAC ELECTRICAL)

- ▶ The AUTOMAN Regulated Electrical Release Assembly (Part No. 423386) is identical to the mechanical version except it contains a factory installed 120VAC solenoid and two single-pole, double throw (SPDT) electrical switches.

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.

**SECTION 3 – SYSTEM COMPONENTS**

UL EX 5174

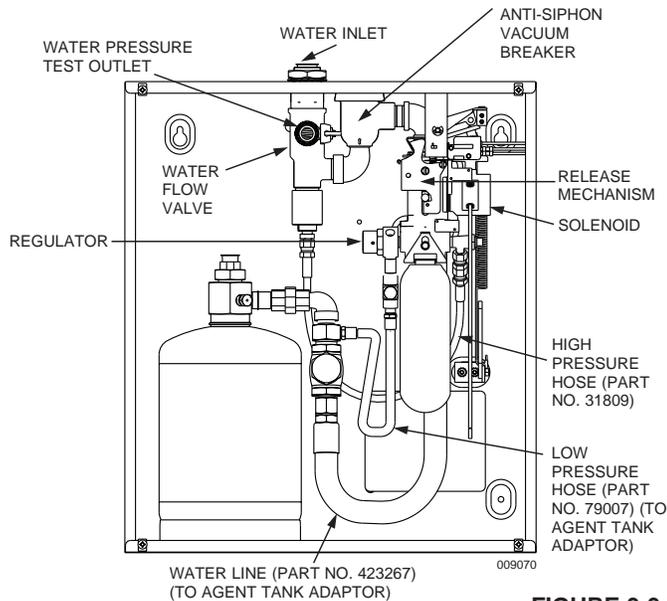
PAGE 3-2 REV. 06 2013-APR-02

*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**REGULATED RELEASE ASSEMBLY  
(120VAC ELECTRICAL) (Continued)**

- ▶ The 120VAC electrical release can be used in combination with fusible link detection, when multiple exhaust hoods share a common exhaust ductwork, and a form of simultaneous operation of PIRANHA fire systems is required in accordance with NFPA 17A, Standard for Wet Chemical Extinguishing Systems.

**AUTOMAN REGULATED RELEASE ASSEMBLY  
(120VAC ELECTRICAL)**



**FIGURE 3-3a**

**REGULATED RELEASE ASSEMBLY (24VDC ELECTRICAL)**

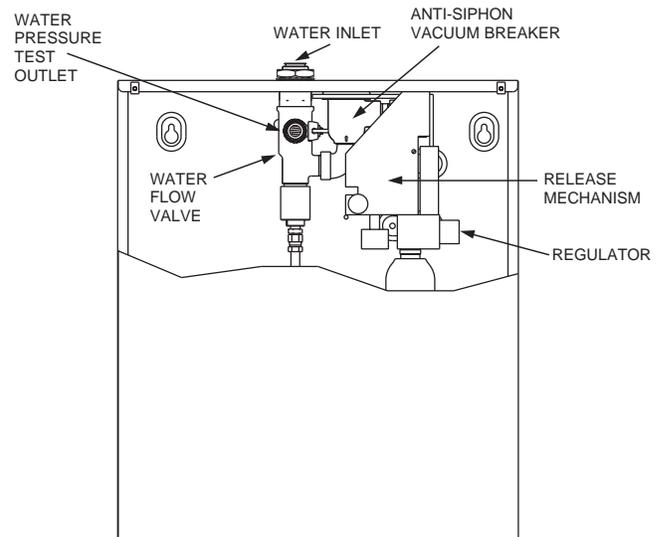
The 24VDC Regulated Release Assembly (Part No. 437425) is used where electric detection is required via the use of a releasing control panel. This assembly consists of a 24VDC AUTOMAN II-C regulated release mechanism, water flow valve, anti-siphon vacuum breaker, water pressure test outlet, expellant gas hose, and enclosure knockouts to facilitate the installation of actuation piping, expellant piping, detection system, and additional equipment, including a means for monitoring the presence of the expellant gas cartridge. 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 an electric detector, or a snap action switch installed in a PIRANHA Regulated Release Assembly. 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.

The 24VDC electrical release can also be used when multiple exhaust hoods share a common exhaust ductwork, and a form of simultaneous operation of PIRANHA fire suppression systems is required in accordance with NFPA 17A, Standard for Wet Chemical Extinguishing Systems.

- ▶ **Note:** The 24VDC Regulated Release Assembly is required to be used with either the AUTOPULSE 542R Control Panel (Part No. 433607) or the AUTOPULSE Z-10 Control Panel (Part No. 430525).

**AUTOMAN REGULATED RELEASE ASSEMBLY  
(24VDC ELECTRICAL)**

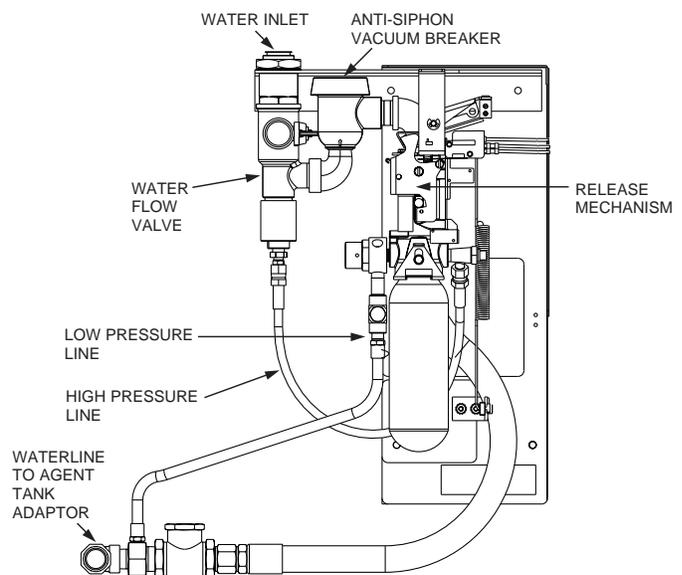


**FIGURE 3-3b**  
009056

**REGULATED RELEASE ASSEMBLY (MECHANICAL) WITH OEM BRACKET**

The Mechanical Regulated Release Assembly with OEM Bracket (Part No. 423629) contains the same release mechanism and water flow components as the standard mechanical regulated release assembly without being housed in a stainless steel enclosure. The assembly is attached to a metal backplate for mounting inside a cabinet or appliance stand.

- ▶ A Regulated Release Assembly (24VDC Electrical) with OEM Bracket (Part No. 437426) is also available.



**FIGURE 3-4**  
009071

### REMOTE MECHANICAL RELEASE

- ▶ The Remote Mechanical Release (Part No. 433485) is used to
- ▶ actuate up to five PIRANHA regulated actuators. The remote mechanical release utilizes a 101-10 carbon dioxide cartridge as the actuation pressure to operate the PIRANHA regulated actuators.

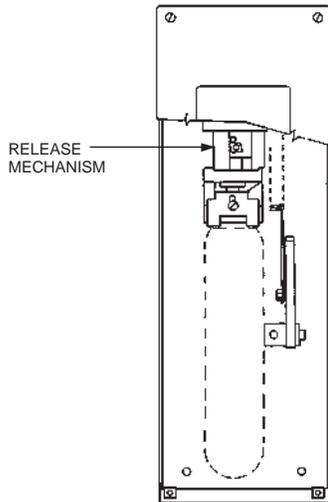


FIGURE 3-5  
007498

### REGULATED ACTUATOR ASSEMBLY

The Regulated Actuator Assembly (Part No. 423368) contains the regulator, water flow valve, anti-siphon vacuum breaker, pneumatic actuator, water pressure test outlet, 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 pneumatic actuator is designed to puncture the expellant gas cartridge seal upon receiving pressure from the regulated release assembly actuation piping.

Agent tanks must be purchased separately and must be mounted within the enclosure. The enclosure contains a knockout to facilitate distribution piping hookup.

### REGULATED ACTUATOR ASSEMBLY

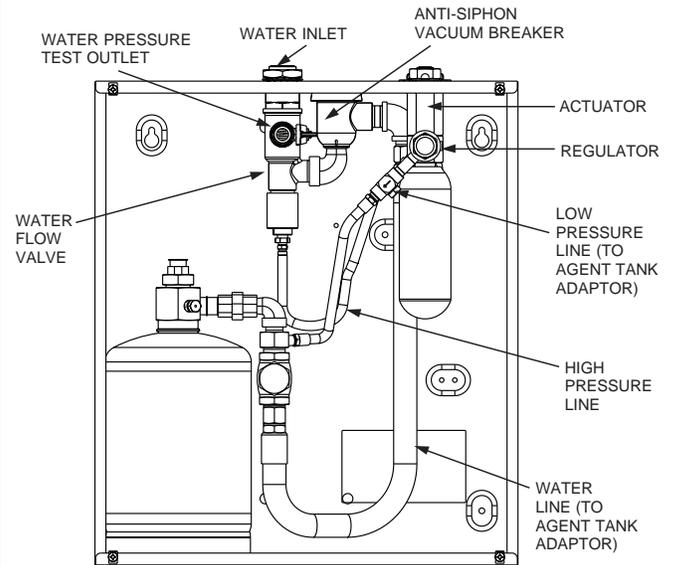


FIGURE 3-6  
009072

### REGULATED ACTUATOR ASSEMBLY WITH OEM BRACKET

The Regulated Actuator Assembly With OEM Bracket (Part No. 426640) contains the same actuator mechanism and water flow components as the standard regulated actuator assembly without being housed in a stainless steel enclosure. The assembly is attached to a metal backplate for mounting inside a cabinet or appliance stand.

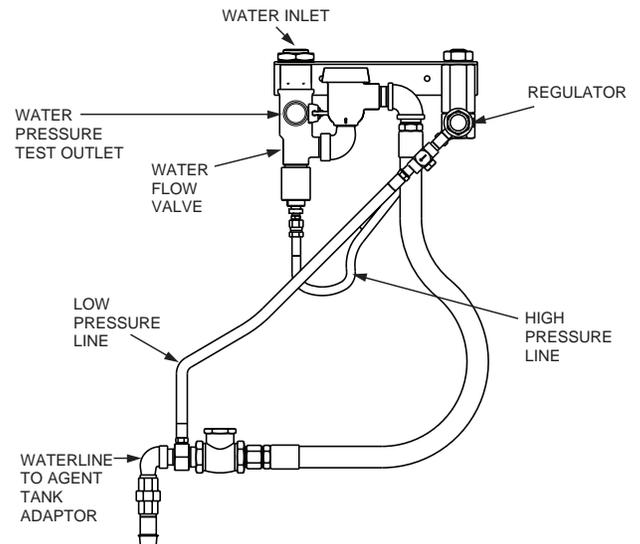


FIGURE 3-7  
009073

**SECTION 3 – SYSTEM COMPONENTS**

UL EX 5174

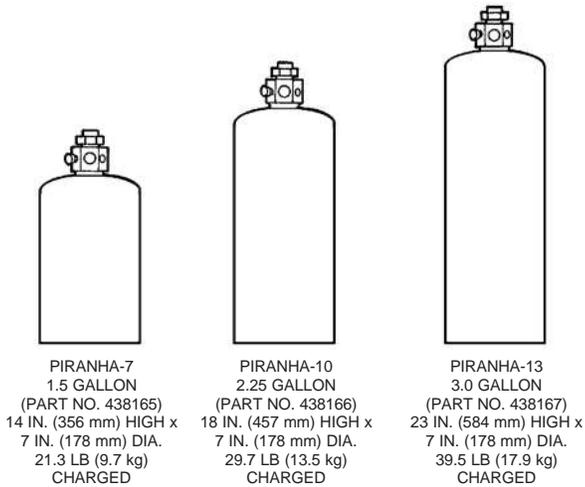
PAGE 3-4 REV. 07 2015-MAR-12

*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**AGENT TANKS**

The agent tanks are shipped uncharged and must be filled with 1.5 gal, 2.25 gal, or 3.0 gal (5.7 L, 8.5 L, or 11.4 L) of only PRX Liquid Fire Suppressant during installation.

The tank is constructed of stainless steel and must be 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 outlet size for each tank is 1/2 in. NPT.



**FIGURE 3-8**  
001706

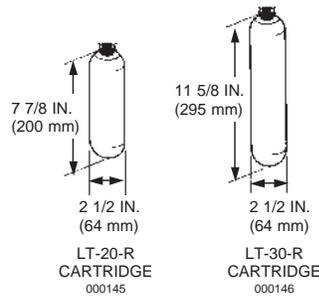
**GAS CARTRIDGES**

The PIRANHA system uses cartridges to store nitrogen expellant gas 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.

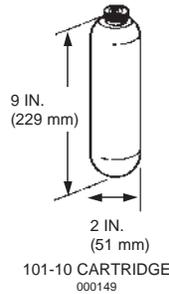
Available gas cartridges for each system or component:

Cartridge	Gas	System/Component
LT-20-R	Nitrogen	PIRANHA-7
LT-30-R	Nitrogen	PIRANHA-10 PIRANHA-13
101-10	Carbon Dioxide	Remote mechanical release assembly

**NITROGEN GAS CARTRIDGES**



**CARBON DIOXIDE CARTRIDGE**



**FIGURE 3-9**

Cartridge Description	TC/DOT Part No.	European Part No.	TFRI * Part No.
LT-20-R (N <sub>2</sub> )	423429	428440	441086
LT-30-R (N <sub>2</sub> )	423435	428441	441087
101-10 (CO <sub>2</sub> )	423439	428443	—
101-10 (CO <sub>2</sub> )	15850 **	—	—

\*China sales only

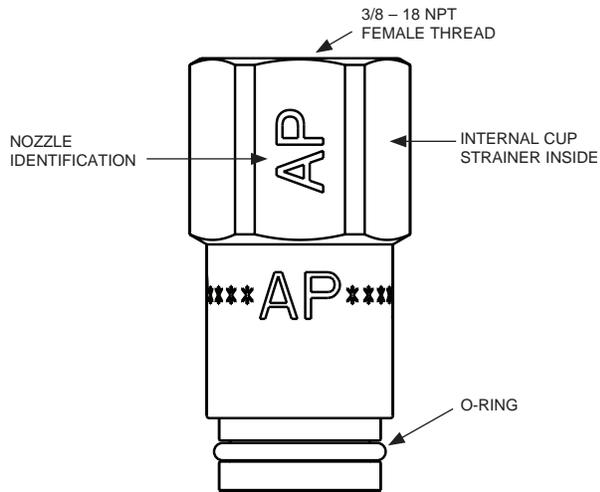
▶ \*\* DOT only

► **NOZZLES**

Discharge nozzles consist of a chrome-plated brass one-piece nozzle body. The nozzle assembly contains a stainless steel strainer and retaining spring. Each nozzle is stamped with an identifying set of letters, indicating nozzle type.

Nozzles are shipped with metal blow-off caps included. Replacement blow-off caps are available.

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



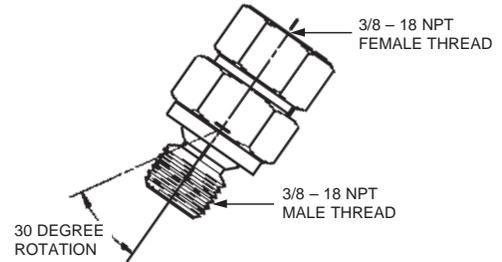
**FIGURE 3-10**  
009561

**Nozzle Identification Chart**

Nozzle Type	Nozzle Part No.	Nozzle Application	Package Quantity
P34	442088	High Proximity	10
P41	442153	High Proximity	10
AP	440006	Med. Prox./Plenum	50
DL	440009	Low Prox. Duct	25

► **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 must be ordered as a Swivel Adaptor Shipping Assembly (Part No. 423572) which contains 25 Swivel Adaptors.



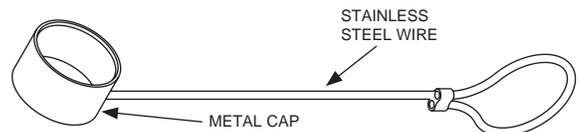
**FIGURE 3-11**  
000003

► **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 3-12**  
009475

**SECTION 3 – SYSTEM COMPONENTS**

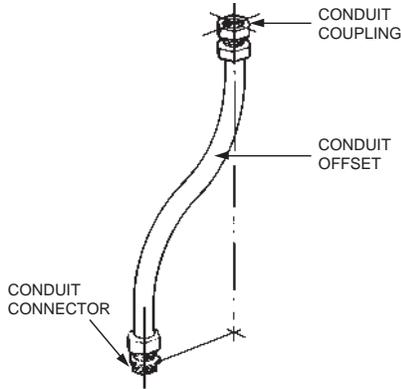
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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**CONDUIT OFFSET ASSEMBLY**

The Conduit Offset Assembly (Part No. 435961) is used to change direction of the stainless steel cable 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.

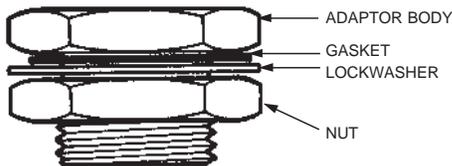


**FIGURE 3-13**  
000153

**“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., 3/8 in., 1/2 in., or 3/4 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 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.

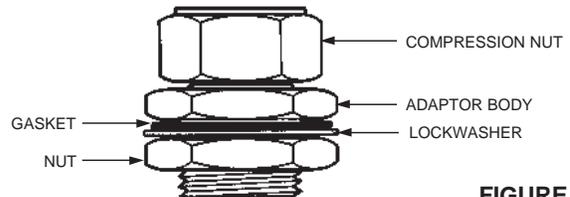


**FIGURE 3-14**  
000154

**“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., 3/8 in., 1/2 in., and EMT conduit size of 1/2 in. Each “Compression-Seal” adaptor shipping assembly must be ordered as stated below.

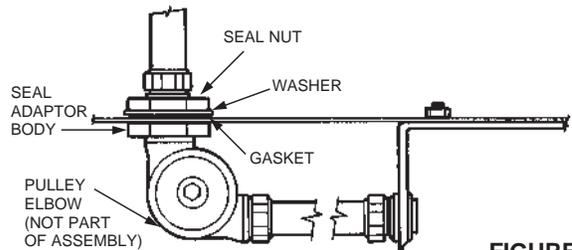
Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/4 in. Pipe	79149	24	3/4 in.
3/8 in. Pipe	79151	24	1 1/8 in.
1/2 in. Pipe	79147	24	1 1/8 in.
1/2 in. EMT Conduit	79153	24	1 1/8 in.



**FIGURE 3-15**  
000155

**“HOOD SEAL” ADAPTOR ASSEMBLY**

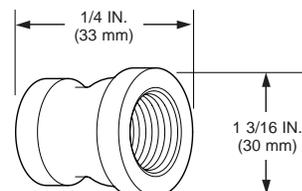
This adaptor assembly is a mechanical bulkhead fitting that produces a liquid-tight seal around 1/2 in. EMT conduit when installing the detection line through restaurant hoods and duct. The adaptor accepts a high temperature pulley elbow and, when used, correctly positions the elbow or conduit in line 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 6 as Shipping Assembly (Part No. 423253).



**FIGURE 3-16**  
000156

**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.



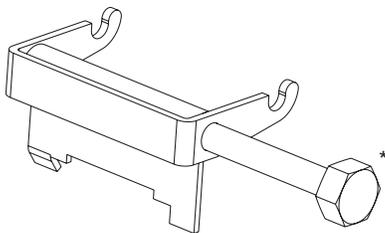
**FIGURE 3-17**  
008324

► **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.

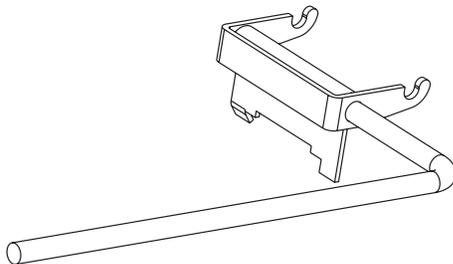
Part No.	Description
► 441042	Short Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
► 441041	Long Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
► 26310	Cocking Lever only (AUTOMAN II-C)
416018	Cocking Lever only (Mechanical Gas Valve)
► 438031	Lock Pin

**Short Handle Cocking Lever**

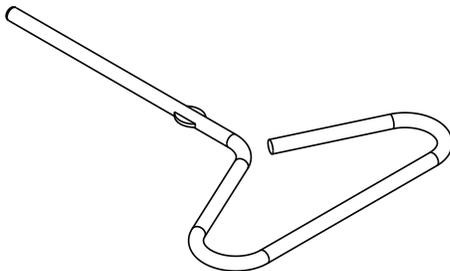


\*Requires a crescent wrench or open end/box wrench

**Long Handle Cocking Lever**



**Lock Pin**



**FIGURE 3-18**  
008325d

**DETECTION EQUIPMENT**

**Fusible Link Detector:** A fusible link 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. (Two Quik-Fastener screws are included with each detector.) The linkage is used to support the fusible link. The fusible link is designed to separate at a specific temperature and release the stainless steel cable, thereby actuating the regulated release mechanism.

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

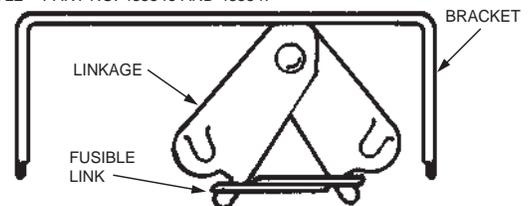
The detector consists of two types of assemblies:

**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 stainless steel cable “terminates,” or is anchored at the detector bracket. Only one terminal detector is required per detection system. Terminal Detector (Part No. 435546) is available in a 10/Pkg. shipping assembly (Part No. 440495).

**The Series Detector (Part No. 435547)** is any detector located in-line between the regulated release assembly and the terminal detector. The detector is available in a 25/Pkg. shipping assembly (Part No. 435548).

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

SCISSOR STYLE – PART NO. 435546 AND 435547



**FIGURE 3-19**  
000159

► **Quik-Fastener Screws (UL Listed)**

The Quik-Fastener screw provides installers an approved method for fastening components inside hoods or ducts. The two-step process for installation provides simple removal when the system design changes. Drill proper size 1/8 in. holes with the Quik-Fastener Double-Ended Pilot Drill and tighten to 45 in-lb (5 N•m) with the magnetic driver. See list for part numbers.

Part No.	Description
441641	24 Pack of Quik-Fastener screws with 1/8 in. pilot drill
441643	1/8 in. Quik-Fastener Pilot Drill
► 441642	Quik-Fastener Magnetic Driver

**SECTION 3 – SYSTEM COMPONENTS**

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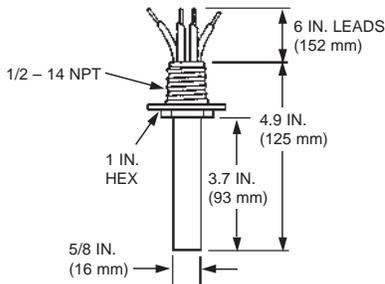
PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

**DETECTION EQUIPMENT (Continued)**

**Electric Thermal Detector:** Rate compensating temperature 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 AUTOPULSE control panel. Temperature increases over 40 °F (4 °C) per minute, however, may initiate an alarm condition in the control panel.



**FIGURE 3-20**  
007354

**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.

**FUSIBLE LINK**

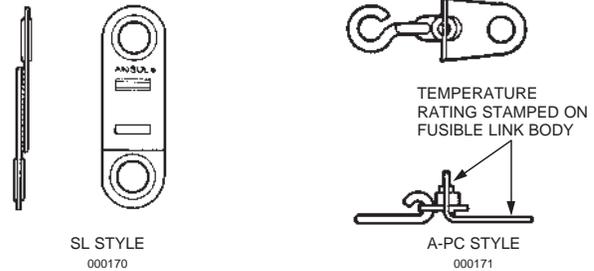
Select correct UL Listed fusible link(s) for installation in detector(s) according to the temperature condition chart below:

**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 (74 °C)	100 °F (38 °C)	Black
439086 (25)	212 °F (100 °C)	150 °F (66 °C)	White
439087 (25)	280 °F (138 °C)	225 °F (107 °C)	Blue
439088 (25)	360 °F (182 °C)	290 °F (143 °C)	Red
439089 (25)	450 °F (232 °C)	360 °F (182 °C)	Green

**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)



**FIGURE 3-21**

**PULLEY ELBOWS**

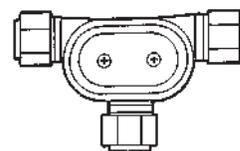
There are two types of pulley elbows used to change the direction of the stainless steel cable by 90°. It is recommended that temperatures not exceed of 700 °F (371 °C). Part No. 415670 has socket ends with set screws for 1/2 in. conduit, and Part No. 423250 has compression ring ends also for 1/2 in. 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).



**FIGURE 3-22**

**PULLEY TEE**

The Pulley Tee (Part No. 427929) is used to change the direction of two stainless steel cables 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 3-23**  
000447

**STAINLESS STEEL CABLE**

The 1/16 in. stainless steel blue tracer cable is used for actuation of mechanical detection, remote manual pull stations, and mechanical gas valves. The cable is available in 50 ft (15 m) (Part No. 15821) and 500 ft (152.4 m) (Part No. 79653) lengths.

**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. One pull station is required per system. It is recommended to include a standard or deep electrical box (supplied by others). Trim Rings (Part No. 427074 (pack of 10)) and Break Rod (Part No. 24915 (pack of 10)) are available.

- ▶ **Part No. 434618 (Without Stainless steel cable)**
- ▶ **Part No. 435960 (With 50 ft (15.2 m) of Stainless steel cable)**



**FIGURE 3-24**  
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 in conjunction with EMT conduit. Flexible conduit can be used only with the Molded Manual Pull Station (Part No. 434618) and mechanical gas valve installations.

Part No.	Description
434525	Flexible conduit, 500 ft (152.4 m)
435959	Flexible conduit with 500 ft (152.4 m) wire rope
439104	Stainless steel cable pre-fed into 50 ft (15.2 m) conduit lengths
435979	Flexible conduit strain relief (50-pack)
434347	Flexible conduit inserts (50-pack)
436150	"P"-clips (50-pack)

- ▶ **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 for connection to the release mechanism.

Part No.	Description	Maximum Operating Pressure
55598	3/4 in. Gas Valve (ANSUL)	10 psi (0.7 bar)
55601	1 in. Gas Valve (ANSUL)	10 psi (0.7 bar)
55604	1 1/4 in. Gas Valve (ANSUL)	10 psi (0.7 bar)
55607	1 1/2 in. Gas Valve (ANSUL)	10 psi (0.7 bar)
55610	2 in. Gas Valve (ANSUL)	10 psi (0.7 bar)
25937	2 1/2 in. Gas Valve (ASCO)	5 psi (0.3 bar)
25938	3 in. Gas Valve (ASCO)	5 psi (0.3 bar)

Pipe Size in.	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 <sup>3</sup> 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

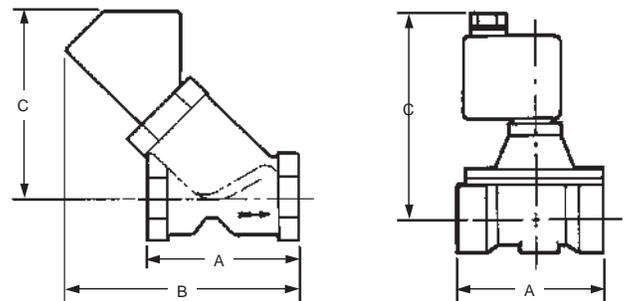
To calculate gas flow for other than 1 inch p.d.:

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

To calculate gas flow for other than 0.64 SP GR:

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

Valve Size	A		B		C	
	in.	(mm)	in.	(mm)	in.	(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.

2 1/2 IN. THRU 3 IN.

004208

004209

**FIGURE 3-25**

### SECTION 3 – SYSTEM COMPONENTS

UL EX 5174

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

#### 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 120VAC and are UL Listed.

Part No.	Description	Maximum 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 in.	Flow Capacity (CFH)	BTU/HR, at 1 in. P.D.
	P.D. 1 in. WC 0.64 SP GR	0.64 SP GR 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.:

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

To calculate gas flow for other than 0.64 SP GR:

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

Valve Size	A		B	
	in.	(mm)	in.	(mm)
3/4 in.	3 5/16	(81.0)	3 5/8	(92.1)
1 in.	5	(127.0)	6 27/32	(173.8)
1 1/2 in.	5	(127.0)	5 19/32	(142.1)
2 in.	6 3/32	(78.6)	5 15/16	(150.8)
3 in.	7 13/16	(198.4)	7 29/32	(200.8)

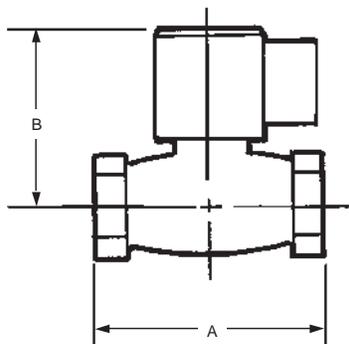


FIGURE 3-26  
004210

#### 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 can not be re-opened, allowing gas to flow, until the reset relay button is manually pressed, re-energizing the circuit. The reset relay is available 120VAC. The manual reset relay is also recommended for electrical shut down.

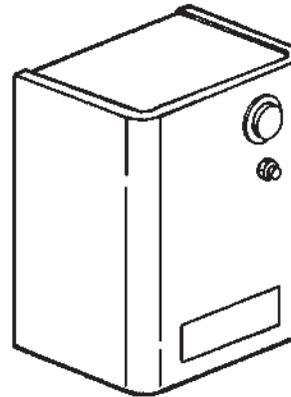


FIGURE 3-27  
000087

#### 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

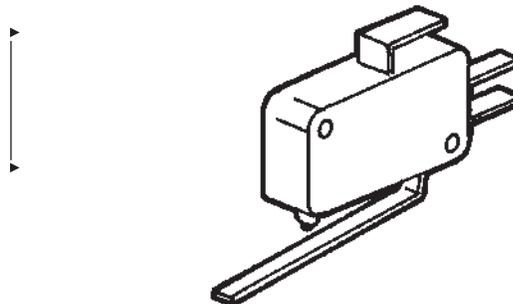


FIGURE 3-28  
001612

### 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 circuit from 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.

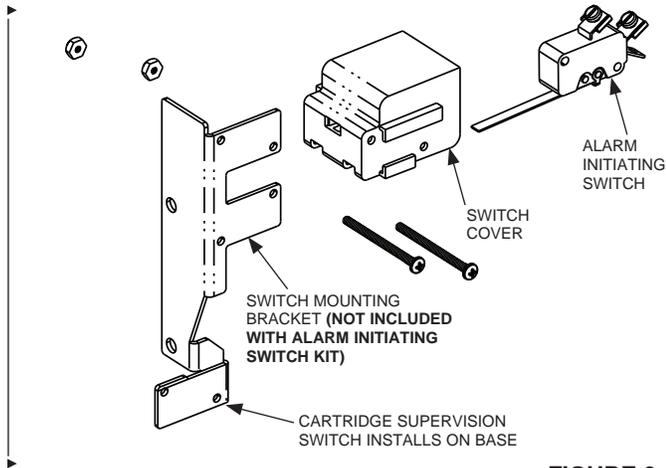


FIGURE 3-29  
004890

### BURSTING DISC

The Bursting Disc is installed in the tank adaptor assembly. The bursting disc eliminates the siphoning of the agent up the pipe during extreme temperature variations. The bursting discs are available in packs of 10 (Part No. 423666).



FIGURE 3-30  
000172

### REGULATOR TEST KIT

The Test Kit Assembly (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.

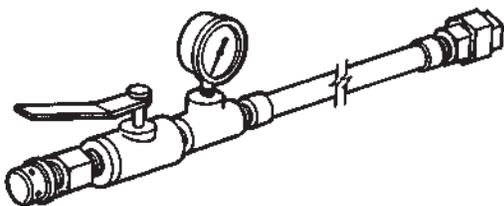


FIGURE 3-31  
000169

### WATER PRESSURE TESTING ASSEMBLY

The Water Pressure Testing Assembly (Part No. 423556) is used to determine if the water supply used in the PIRANHA System has a high enough pressure to function properly. The assembly is attached to the test outlet in the AUTOMAN Release Assembly. The test assembly contains a built-in orifice to simulate system water flow characteristics. When the test outlet is opened, allowing the water to flow, the water pressure is indicated on the gauge on the Testing Assembly. Each AUTOMAN or Regulated Actuator on the same water supply requires its own Pressure Testing Assembly during the pressure test.

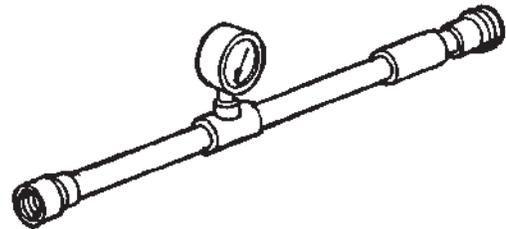


FIGURE 3-32  
001688

### 1/4 IN. CHECK VALVE

- ▶ The 1/4 in. check valve(s) (Part No. 25627) is installed when
- ▶ multiple remote releases are part of the system. This prevents actuation gas from escaping from an open actuator which may have had the cartridge removed.

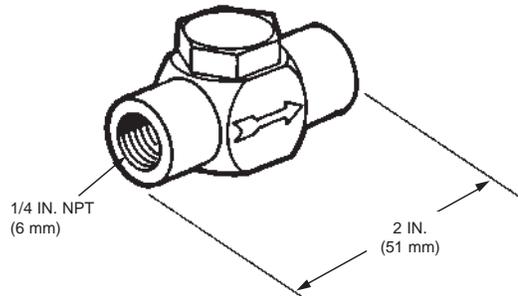


FIGURE 3-33  
000899

### SAFETY RELIEF VALVE

A spring-loaded pressure relief valve (Part No. 15677) is used to prevent excessive pressure from building up in the actuation line. The valve is set to relieve at 265 psi (18.3 bar). After system discharge, all pressure in the actuation line can be relieved by pulling the ring on the safety relief valve.

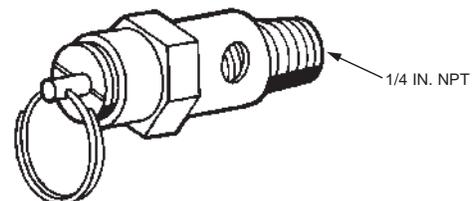


FIGURE 3-34  
000437

## SECTION 3 – SYSTEM COMPONENTS

UL EX 5174

PAGE 3-12 REV. 07 2015-MAR-12

PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### 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.

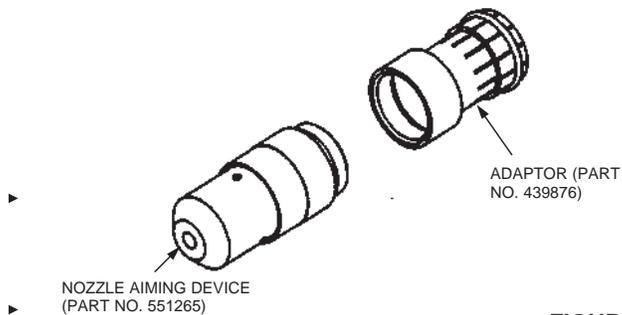


FIGURE 3-35  
006520

### WATER SHUTDOWN DEVICE

The Water Shutdown Device (Part No. 426294) is an optional component which can be field-installed in the AUTOMAN Release. With this device installed, the water flow to the discharge nozzles will automatically shut down after a minimum of 10 minutes after system actuation.

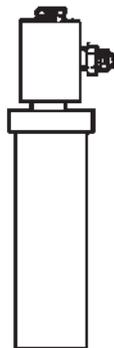


FIGURE 3-36  
003405

### STAINLESS STEEL ACTUATION HOSE

The Stainless Steel Actuation Hose is used to connect the actuation line compression tees between each pneumatic actuator. 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.

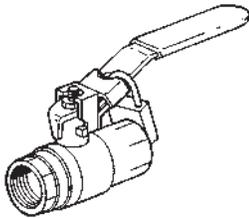
**Note:** The Agent Distribution Hose is authorized for use with only UL Listed ANSUL Wet Chemical Restaurant Fire Suppression Systems.

▶ **LOCKABLE FULL FLOW INDICATING SHUT-OFF VALVE**

- ▶ A UL listed water shut-off valve, in accordance with NFPA 96 and suitable for fire protection service, is required at or very near the beginning of the dedicated system water supply line. TYCO supplies a UL Listed lockable (open position) ball valve in the 3/4 in., 1 in., and 1 1/4 in. sizes. **Note:** If larger sizes are
- ▶ needed, they will need to be sourced elsewhere. The valve
- ▶ must be a full-flow ball valve, locked open in a fire-ready mode, and can be closed temporarily for system service. An aluminum tag (Part No. 423664) is available to attach to the valve lock. This tag indicates that the valve is for the PIRANHA Fire
- ▶ Suppression System and that the valve must be locked in the OPEN position.

Also available is a padlock, (all locks keyed alike) (Part No. 423727).

<u>Part No.</u>	<u>Description</u>
▶ 423955	3/4 in. Lockable Shut-Off Ball Valve
▶ 423956	1 in. Lockable Shut-Off Ball Valve
▶ 423957	1 1/4 in. Lockable Shut-Off Ball Valve



**FIGURE 3-38**  
001752

▶ **FLUSHING CONCENTRATE KIT**

The ANSUL Flushing Concentrate Kit (Part No. 79656) is a package of 12, 32 oz. bottles of concentrate. One bottle is used per tank after each discharge to clean the piping of any agent residue.

**NOTES:**

## SYSTEM DESIGN

The PIRANHA 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 PIRANHA system must be trained, and hold a current ANSUL certificate in a PIRANHA training program.

All appliances under the exhaust hood must be positioned in accordance with the terms of its listing and according to all local codes and the Authority Having Jurisdiction (AHJ).

The PIRANHA system is a pre-engineered hybrid wet chemical system utilizing PRX agent for suppressing the fire and water to cool down the cooking appliances, eliminating reflash. Design of the PIRANHA system will require not only consideration of the protection capabilities of the system, but also the source of water supply.

The PIRANHA and the R-102 systems use several common components. The agents are compatible, therefore, they may be used together for cooking appliance, hood, and duct protection. The primary AUTOMAN Release can be either a PIRANHA or an R-102 release and can actuate up to two additional PIRANHA or R-102 Regulated Actuators. In systems utilizing a remote release, any combination of up to five 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 PIRANHA or R-102, unless the center-to-center spacing between the adjacent PIRANHA or R-102 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 the PIRANHA system, unless the hood ensures that water cannot find its way to the appliances protected with R-102.
- Mixing systems in a common plenum **is not** allowed.

### CAUTION

Never mix PRX agent and ANSULEX LPH agent in the same tank. If mixed in the same tank, the fire suppression system will not perform properly.

The following sections must be carefully followed and completed before attempting any installation.

- Nozzle Placement Requirements
- Agent Distribution Piping Requirements
- Tank Quantity and Cartridge Requirements
- Actuation Gas Line Requirements
- Water Piping Requirements
- Detection System Requirements
- Manual Pull Station Requirements
- Mechanical and Electrical Gas Valve Requirements
- Electric Switch and Pressure Switch Requirements

## DUCT PROTECTION

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 17A and all local codes.

### 1. Single Nozzle Duct Protection:

One DL nozzle (Part No. 426093) will protect rectangular or square ducts with a maximum perimeter of 100 in. (2.5 m) and diagonal dimension of duct must not exceed 37 3/8 in. (949 mm); round ducts must not exceed 32 in. (81 mm) diameter. The nozzle must be installed 0 in. to 8 in. (0 mm to 203 mm) into the duct opening and 0 in. to 3 in. (0 mm to 76 mm) from the front edge, and aimed at the center of the opening. See Figure 4-1.

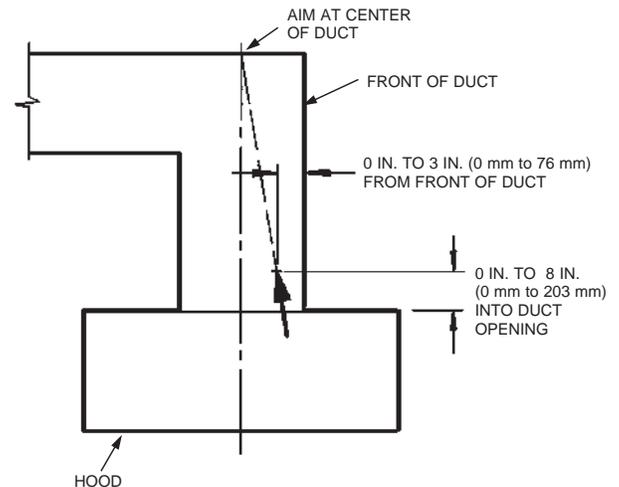


FIGURE 4-1  
001639

### 2. Multiple Nozzle Duct Protection: (Rectangular or Square Ducts Only)

When rectangular or square ducts exceed the perimeter limit of 100 in. (2.54 m), modular duct protection can be utilized. The duct must be divided into equal modules with the diagonal dimension of each module not exceeding 37 3/8 in. (949 mm). See Figure 4-2.

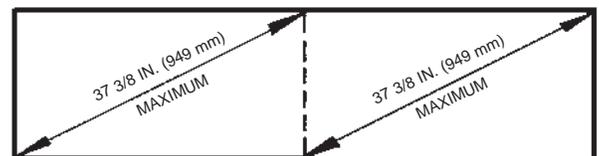


FIGURE 4-2  
001610

The DL nozzle must be installed 0 in. to 8 in. (0 mm to 203 mm) into the duct opening and 0 in. to 3 in. (0 mm to 76 mm) from the front edge and aimed at the center of the opening.

DUCT PROTECTION (Continued)

**NOTICE**

In installations where a UL listed damper assembly is employed, the DL 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. Transition Protection: When a transition is located between the hood and the exhaust duct, the base or collar of the transition is considered to be the duct opening. Follow duct design and nozzle location requirements.

**Note:** For information on secondary filtration units, contact Technical Services.

PLENUM PROTECTION

The PIRANHA system uses the AP Nozzle (Part No. 423480) for plenum protection.

One AP nozzle will protect 11 linear ft (3.4 m) of plenum length, either single filter bank or “V” bank. The nozzle must be located as shown in Figure 4-3, and aimed down the length of the plenum. The filter height **must not** exceed 25 in. (635 mm). The nozzle must be positioned 0 in. to 6 in. (0 mm to 152 mm) from the end of the hood to the tip of the nozzle.

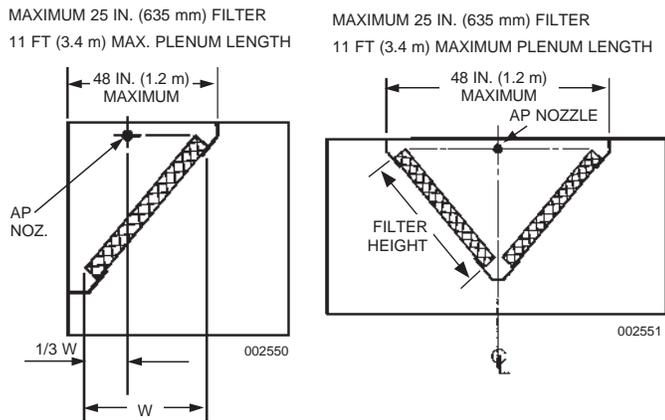


FIGURE 4-3

For a plenum, either single or “V” bank, with a linear extension longer than 11 ft (3.4 m), each filter bank may be protected using one plenum nozzle every 11 ft (3.4 m) or less depending on the overall length of the plenum. See Figure 4-4. The nozzles may point in the opposite directions as long as the entire plenum area is protected, and the 11 ft (3.4 m) limitation is not exceeded. See Figure 4-5. The nozzle positioning shown in Figure 4-6 is not an acceptable method of protection because the plenum area directly under the tee is not within the discharge pattern of either nozzle.

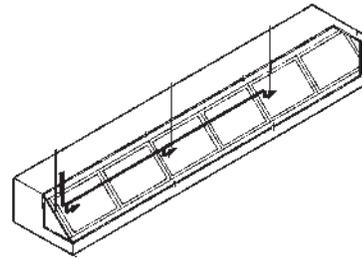


FIGURE 4-4  
000206

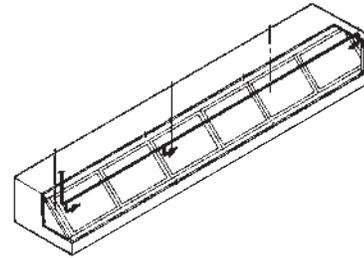


FIGURE 4-5  
000207

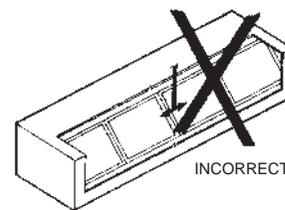


FIGURE 4-6  
000208

APPLIANCE PROTECTION DEFINITIONS

Cooking Hazard Area

The cooking hazard area is defined as the heated portion of the appliance where the actual cooking operation is performed, such as the griddle plate, broiler grate, fryer pot, wok pan, range burner grates, etc.

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 32 in. (813 mm) deep by the length of the cooking hazard(s). The centerline of the hazard zone must bisect the 32 in. (813 mm) depth 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.

**APPLIANCE PROTECTION DEFINITIONS (Continued)**

**Full hood continuous protection** is defined as overlapping nozzle appliance protection that covers the complete appliance line-up located under the total hood length. All appliances under the hood are those which can be an ignition source of grease in the hood, grease removal device or 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.

See Figure 4-10 (full hood continuous protection) and Figure 4-11 (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.

**APPLIANCE PROTECTION**

Per NFPA 96 (2011 Edition), “Cooking equipment that produces grease-laden vapors and that might be a source of ignition of grease in the hood, grease removal device, or duct shall be protected by fire extinguishing equipment.”

Cooking appliances tested and approved include fryers, griddles, ranges, broilers, woks, tilt skillets and tilt braising pans. The PIRANHA system provides two types of appliance protection: overlapping and dedicated appliance protection. Following is a list of cooking appliances, along with their maximum cooking hazards, which can be protected with overlapping nozzle coverages.

- ▶ For appliance hazard surfaces that **exceed the listed protection** sizes, multiple zones must be utilized. Align entire hazard area within the multiple zones.

**▶ Overlapping Nozzle Coverage – High Proximity (P34 Nozzle)**

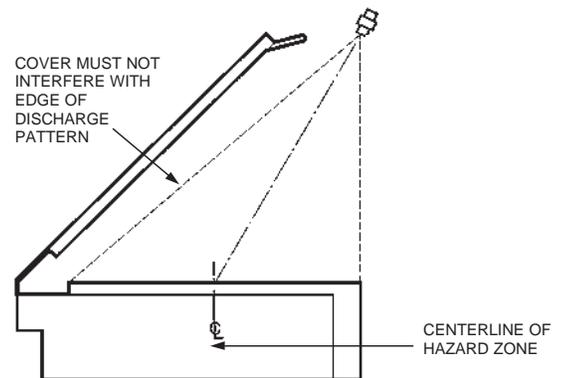
Appliance Type	Maximum Cooking Hazard
Fryer	28 in. (711 mm) Deep x 5.8 ft <sup>2</sup> (0.54 m <sup>2</sup> )
Griddle	36 in. (914 mm) Deep x Unlimited Length
Range	32 in. (813 mm) Deep x Unlimited Length
Wok, Maximum	18 in. (457 mm) Diameter x 4.75 in. (120 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/Tilt Skillet*	28 in. (711 mm) Deep x Unlimited Length
Gas-Radiant Char-Broiler	32 in. (813 mm) Deep x Unlimited Length
Electric Char-Broiler	32 in. (813 mm) Deep x Unlimited Length

\*See Figure 4-7 for nozzle location

**▶ Overlapping Nozzle Coverage – High Proximity (P41 Nozzle)**

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (864 mm) Deep x 5.8 ft <sup>2</sup> (0.54 m <sup>2</sup> )
Griddle	36 in. (914 mm) Deep x Unlimited Length
Range	32 in. (813 mm) Deep x Unlimited Length
Wok, Maximum	18 in. (457 mm) Diameter x 4.75 in. (120 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/Tilt Skillet*	34 in. (864 mm) Deep x Unlimited Length
Gas-Radiant Char-Broiler	32 in. (813 mm) Deep x Unlimited Length
Electric Char-Broiler	32 in. (813 mm) Deep x Unlimited Length

\*See Figure 4-7 for nozzle location



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

**FIGURE 4-7**  
000071

**▶ Overlapping Appliance Nozzle and Hazard Zone Locations – High Proximity**

1. All overlapping high proximity appliance nozzles must be the P34 nozzle (Part No. 442088) or the P41 nozzle (Part No. 442153) 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. (See Installation Section for detailed aiming instructions.) The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
2. The nozzles must be located within the outlined section forward of the centerline or aim-line of the selected hazard zone. See Figures 4-8 and 4-9, page 4-4.

**Note:** The centerline of the hazard zone or aim-line cannot exceed 16 in. (406 mm) from either the front or back edge of the zone. **Exception:** Fryer, griddle, braising pan/tilt skillet; refer to Overlapping Nozzle Coverage – High Proximity charts.

APPLIANCE PROTECTION (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – High Proximity (Continued)

3. The hazard zone must be located from front to rear so that its 32 in. (813 mm) depth covers the depth of all the cooking hazards of the protected appliances. **Exception:** If depth of the cooking hazard of a fryer, griddle or braising pan/tilt skillet exceeds 32 in. (813 mm), position the hazard appliance so that its rear edge is located a maximum of 4 in. (101 mm) beyond the rear of the hazard zone.

P34 NOZZLE PLACEMENT

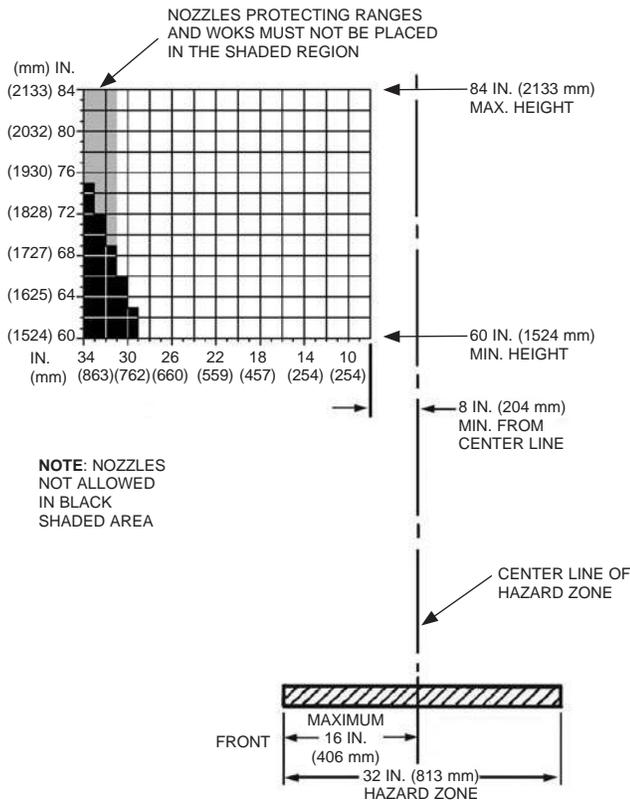


FIGURE 4-8  
009562

P41 NOZZLE PLACEMENT

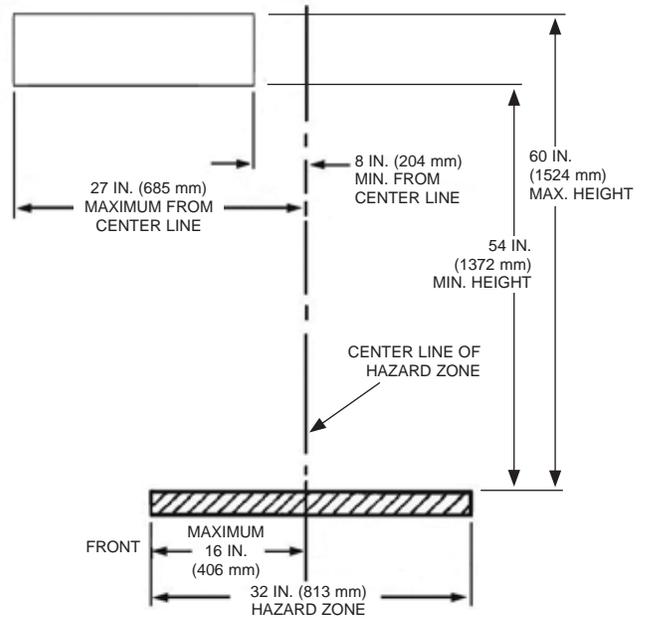


FIGURE 4-9  
009563

4. 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 4-10 and 4-11.

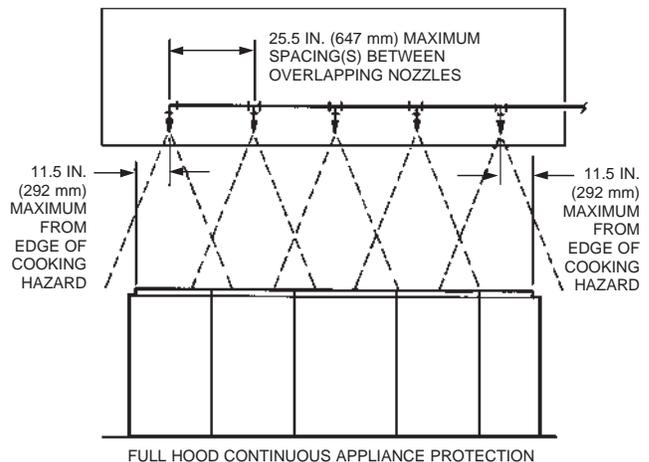
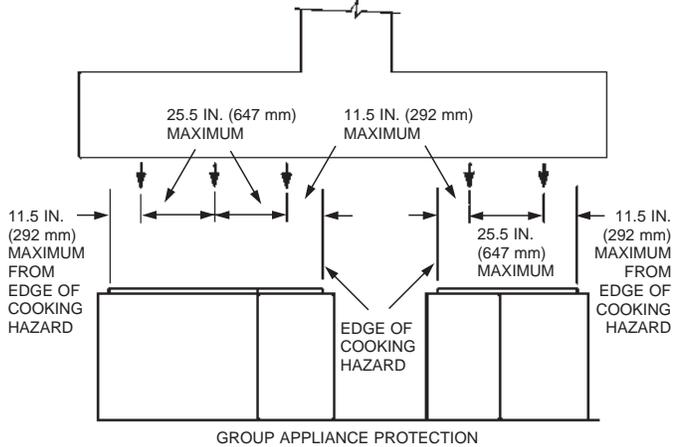


FIGURE 4-10  
001710

**APPLIANCE PROTECTION (Continued)**

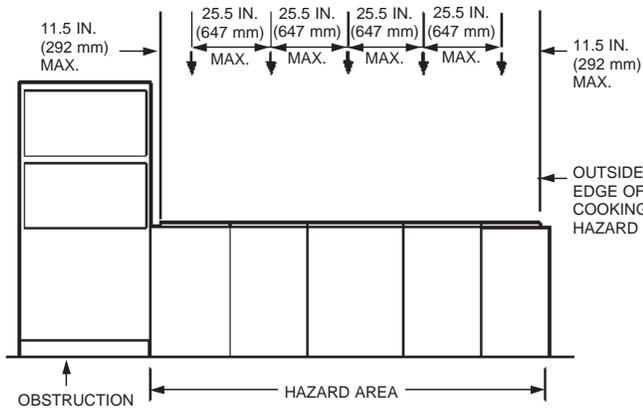
**Overlapping Appliance Nozzle and Hazard Zone Locations – High Proximity (Continued)**

**Step 4 (Continued)**



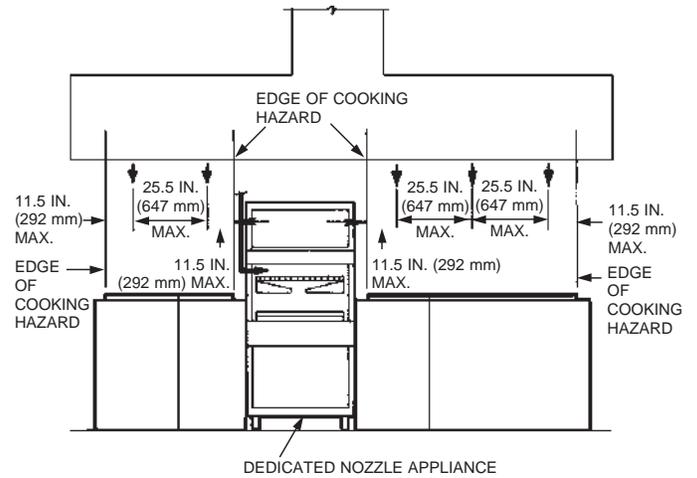
**FIGURE 4-11**  
001720

5. When taller appliance(s) or other 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 4-12.



**FIGURE 4-12**  
001713

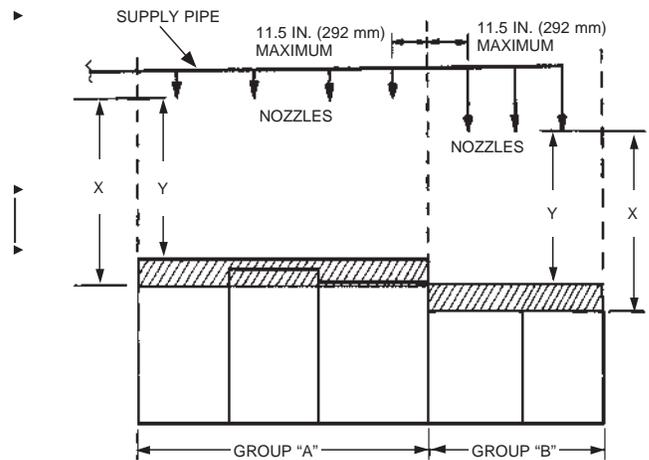
6. When appliances requiring dedicated nozzle coverage are located within the overlapping appliance nozzle protected area, the overlapping appliance nozzle spacing must start with the appliance(s) adjacent to the dedicated appliance. See Figure 4-13.



**FIGURE 4-13**  
001756

7. On protected appliances, all nozzles located in a group must be within 54 in. to 84 in. (1371 mm to 2133 mm) for high proximity, 40 in. to 48 in. (1016 mm to 1219 mm) for medium proximity, or 13 in. to 24 in. (330 mm to 610 mm) for low proximity above the hazard surfaces. Once that dimension is exceeded, a new group must be started. See Figure 4-14. For the high proximity nozzles, it may be necessary to start a new group of nozzles if the nozzle location with respect to the hazard zone falls outside of the approved locations in Figure 4-9.

**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.



	X		Y	
Proximity	in.	(mm)	in.	(mm)
High	84	(2133)	54	(1371)
Medium	48	(1219)	40	(1016)
Low	24	(610)	13	(330)

**FIGURE 4-14**  
006917

**SECTION 4 – SYSTEM DESIGN**

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**APPLIANCE PROTECTION (Continued)**

► **Overlapping Nozzle Coverage – Medium Proximity**  
 ► **(AP Nozzle)**

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (864 mm) Deep x 5.8 ft <sup>2</sup> (0.54 m <sup>2</sup> )
Griddle	36 in. (914 mm) Deep x Unlimited Length
Range	32 in. (813 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. (864 mm) Deep x Unlimited Length
Lava Rock Char-Broiler	32 in. (813 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. (813 mm) Deep x Unlimited Length (12 in. (305 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	36 in. (914 mm) Deep x Unlimited Length

\* See Figure 4-7, page 4-3, for nozzle location

**Overlapping Appliance Nozzle and Hazard Zone Locations**

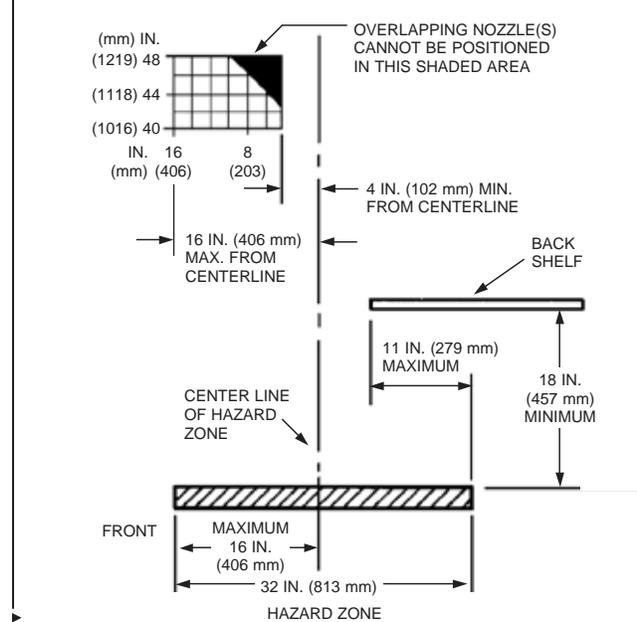
► – **Medium Proximity**

- 1. All overlapping medium proximity appliance nozzles must be the AP nozzle (Part No. 440006) 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. (See Installation Section for detailed aiming instructions.) The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
- 2. The overlapping medium proximity appliance nozzles must be located 40 in. to 48 in. (1016 mm to 1219 mm) above the top surface of the protected appliances. See Figure 4-16.

**Exception No. 1:** Nozzle dimensions for wok protection are measured to bottom of wok.

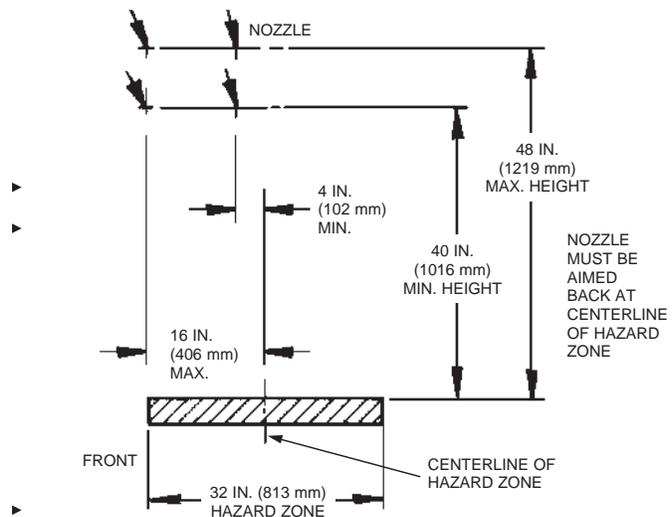
- **Exception No. 2:** When using overlapping medium proximity appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 4-15. Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone and no less than 18 in. (457 mm) above the hazard zone. See Figure 4-15.

► **APPLIANCE WITH A BACK SHELF**



**FIGURE 4-15**  
001758

- 3. The overlapping medium proximity appliance nozzles must be located 4 in. to 16 in. (102 mm to 406 mm) forward of the centerline or aimline of the selected hazard zone. See Figure 4-16.



**FIGURE 4-16**  
001614

**Note:** The centerline of the hazard zone or aimline cannot exceed 16 in. (406 mm) from either the front or back edge of the zone. (**Exception:** Fryer, griddle, gas radiant, or electric charbroiler; see Overlapping Nozzle Coverage - Medium Proximity chart.)

**APPLIANCE PROTECTION (Continued)**

**Overlapping Appliance Nozzle and Hazard Zone Locations**

► **Medium Proximity (Continued)**

4. The hazard zone must be located from front to rear so that its 32 in. (813 mm) depth covers the depths of all the cooking hazards of the protected appliances.

**Exception:** If the depth of a cooking hazard of a fryer, griddle, or braising pan/tilt skillet exceeds 32 in. (813 mm), then the selected hazard zone must be located so that its centerline is equidistant from the front and back edges of that cooking hazard. If the depth of the cooking hazard of a griddle exceeds 32 in. (813 mm), then the selected hazard appliance area can be located a maximum of 4 in. (102 mm) forward or back of the edge of the hazard zone.

- 5. For further nozzle placement details refer to items 4 through 7 on pages 4-4 and 4-5.

**Overlapping Nozzle Coverage – Low Proximity**

► (DL Nozzle)

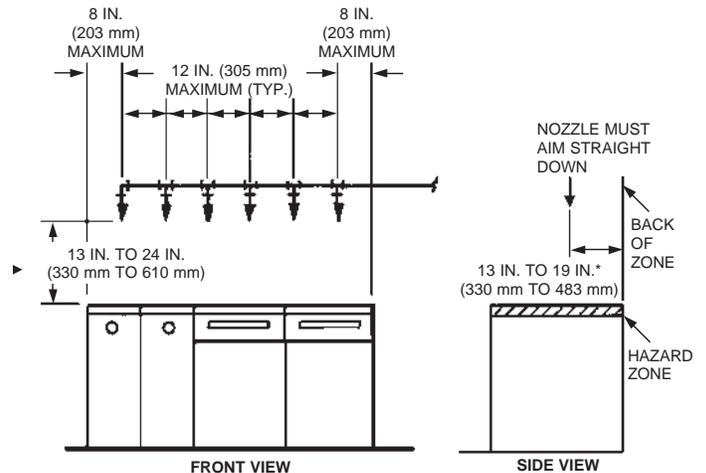
Appliance Type	Maximum Cooking Hazard
Fryer	27 5/8 in. (702 mm) x 4 ft <sup>2</sup> (0.4 m <sup>2</sup> )
Griddle	36 in. (914 mm) Deep x Unlimited Length
Range	32 in. (813 mm) Deep x Unlimited Length
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Charcoal Broiler	32 in. (813 mm) Deep x Unlimited Length (4 in. (102 mm) Maximum Fuel Depth)
Lava Rock Char-Broiler	32 in. (813 mm) Deep x Unlimited Length
Mesquite Wood Broiler	32 in. (813 mm) Deep x Unlimited Length (6 in. (152 mm) Maximum Fuel Depth)

**Overlapping Appliance Nozzle and Hazard Zone Location – Low Proximity**

1. All overlapping low proximity appliance nozzles must be the DL nozzle (Part No. 426093) and must be located at the same height above the hazard and in a straight line from right to left. See Figure 4-17.
2. The overlapping low proximity appliance nozzle must be located 13 in. to 24 in. (330 to 610 mm) above the top surface of the protected appliances. See Figure 4-17.
3. The overlapping low proximity appliance nozzle must be located 13 in. to 19 in. (330 to 483 mm) from the back of the hazard zone, and aimed straight down.

**Exception:** When protecting ranges, if the nozzle height is lower than 17 in. (432 mm), the hazard cooking surface must not exceed 15 in. (381 mm) to the front or back of the nozzle centerline. See Figure 4-17.

4. For each group of protected appliances, the overlapping low proximity appliance nozzles must be located from right to left so that each end nozzle is located a maximum of 8 in. (203 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside nozzles must be located between the two end nozzles at a maximum spacing of 12 in. (305 mm). See Figure 4-17.



\*See range exception in Step. 3.

**FIGURE 4-17**

004206

- 5. For further nozzle placement details refer back to item 7 on page 4-5.

**SECTION 4 – SYSTEM DESIGN**

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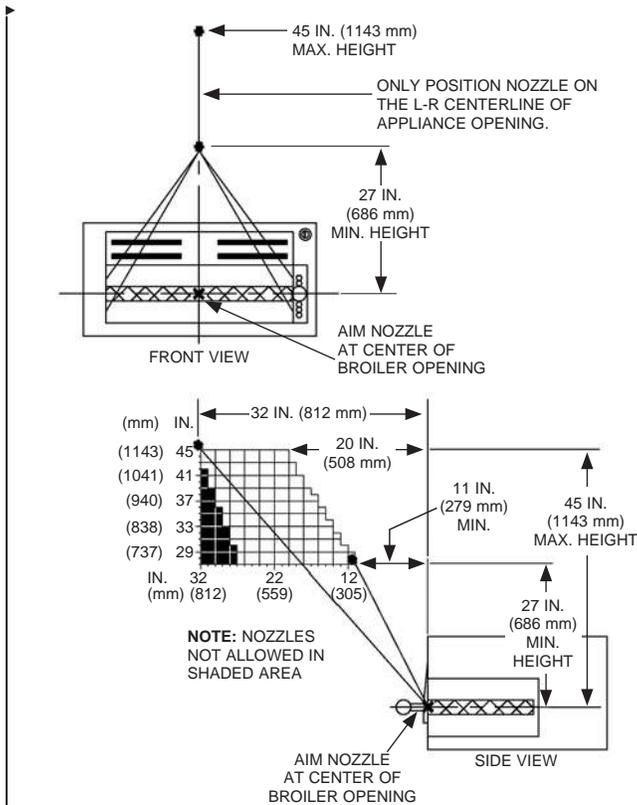
**APPLIANCE PROTECTION (Continued)**

**Dedicated Nozzle Coverage**

Following is a list of cooking appliances, along with their maximum cooking hazards, which must be protected with dedicated nozzle coverages:

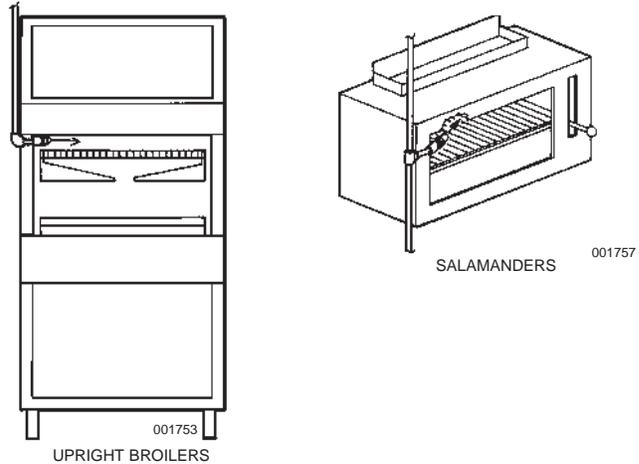
Appliance Type	Maximum Cooking Hazard	Nozzle Type	Nozzle Location
Salamanders	15 in. (381 mm) depth x 28 in. (711 mm) width (inside cooking chamber)	P34	See Fig. 4-18
Upright Broilers, Salamanders	27 1/2 in. (699 mm) depth x 35 1/2 in. (902 mm) width (inside cooking chamber)	AP	See Fig. 4-19
Chain Broiler (Under or Over Burner)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	AP	See Fig. 4-20
Open Top Chain Broiler (Under Burner Only)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	AP	See Fig. 4-21

**P34 NOZZLE - SALAMANDERS**



**FIGURE 4-18**  
009564

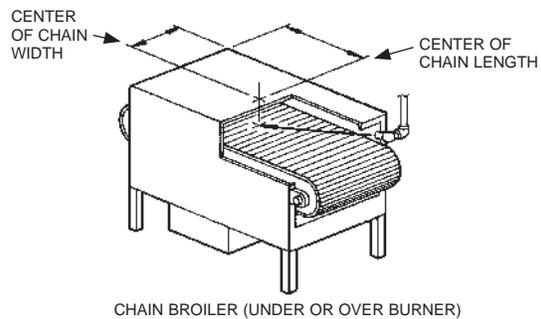
**AP NOZZLE**



LOCATE NOZZLE OUTSIDE IN EITHER OF THE UPPER CORNERS OF BROILER AND AIM AT CENTER OF GRATE WHEN GRATE IS IN HIGHEST POSITION. NOZZLE TIP MUST BE FLUSH WITH FRONT EDGE OF BROILING CHAMBER.

**FIGURE 4-19**

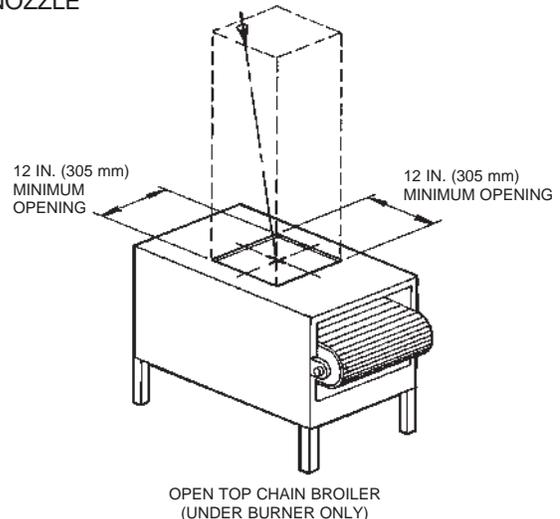
**AP NOZZLE**



LOCATE NOZZLE OUTSIDE IN EITHER OF THE UPPER CORNERS OF BROILER CHAMBER, ABOVE CHAIN, AND AIM AT CENTER OF CHAIN. NOZZLE TIP MUST BE FLUSH WITH THE FRONT EDGE OF BROILING CHAMBER.

**FIGURE 4-20**  
001712

**AP NOZZLE**



NOZZLE MUST BE LOCATED WITHIN THE PERIMETER OF THE OPENING, 20 IN. – 40 IN. (508 mm – 1016 mm) ABOVE THE TOP OF THE BROILER AND AIMED AT THE CENTER OF THE OPENING.

**FIGURE 4-21**  
001759

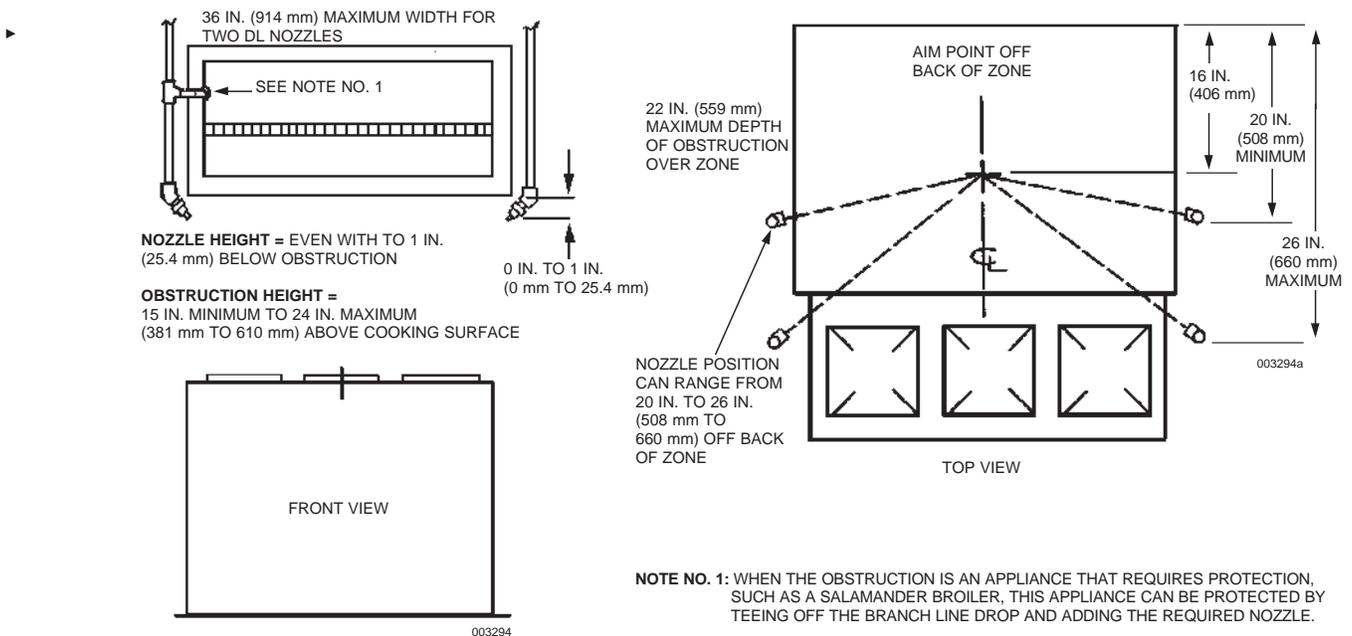
**PROTECTION UNDER OBSTRUCTIONS**

Under obstruction protection gives the designer the ability to protect ranges and griddles which are located under such obstructions as salamanders, cheese melters, plate shelves, etc., by dropping the nozzle down alongside the obstruction and angling the discharge pattern to the center of the hazard. Another advantage of this design is that horizontal discharge piping does not have to be run under the obstruction, thus collecting grease and in some cases is not allowed to do so. See Figure 4-22.

- **Appliance Types Under Obstruction:** Ranges – 32 in. (813 mm) deep, Griddles – 36 in. (914 mm) deep.
- **Obstruction Types:** Salamander broilers, cheese melters, plate shelves, etc.
- **Obstruction:** Obstruction cannot fall below nozzle height.
- **Obstruction Depth:** 22 in. (559 mm) maximum depth of obstruction over zone.

- **Obstruction Width:** 36 in. (914 mm) maximum width.
- **Nozzle Height:** 15 in. to 24 in. (381 to 610 mm) above the cooking surface.
- **Nozzle Spacing:** Maximum distance between two DL nozzles is 36 in. (914 mm).
- **Nozzle Position:** Nozzle position must be between 20 in. to 26 in. (508 to 660 mm) off the back of the zone.
- **Nozzle Aim Point:** Aim point must be 16 in. (406 mm) off the back of the zone at the centerline between the nozzles.
- ▶ **Nozzle Quantity:** A minimum of two DL nozzles are required.

RANGES: 32 IN. (813 mm) DEEP X 42 IN. (1066 mm) WIDE PER EACH SET OF NOZZLES  
 GRIDDLE: 36 IN. (914 mm) DEEP X 36 IN. (914 mm) WIDE PER EACH SET OF NOZZLES



**FIGURE 4-22**

**SECTION 4 – SYSTEM DESIGN**

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**NOZZLE PLACEMENT SUMMARY CHART**

**Overlapping Coverage**

**Appliance Hazard (Overlapping Protection) High Proximity**

Nozzle			
Type	Height	Maximum Spacing	Location
P34	60 in. (1524 mm) to 84 in. (2133 mm)	11.5 in. (292 mm) from edge of hazard zone; 25.5 in. (647 mm) center to center of nozzles	See Fig. 4-8
P41	54 in. (1371 mm) to 60 in. (1524 mm)	11.5 in. (292 mm) from edge of hazard zone; 25.5 in. (647 mm) center to center of nozzles	See Fig. 4-9

**Appliance Hazard (Overlapping Protection) Medium Proximity**

Nozzle			
Type	Height	Maximum Spacing	Location
AP	40 in. to 48 in. (1016 mm to 1219 mm) above top of appliance	11.5 in. (292 mm) from edge of hazard zone 25.5 in. (647 mm) center to center of nozzles	4 in. to 16 in. (102 mm to 406 mm) forward of hazard zone center line or aimline. Nozzle must be aimed at hazard zone centerline or at an aimline that does not exceed 16 in. (406 mm) from the front or back of the zone.

**Appliance Hazard (Overlapping Protection) Low Proximity**

Nozzle			
Type	Height	Maximum Spacing	Location
DL	13 in. to 24 in. (330 mm to 610 mm) above top of appliance	8 in. (203 mm) from edge of hazard zone 12 in. (305 mm) center to center	13 in. to 19 in. (330 mm to 483 mm) from back of hazard zone. Nozzle must be aimed straight down.

**Dedicated Nozzle Coverage**

Appliance Type	Maximum Cooking Hazard	Nozzle Type	Nozzle Location
Salamanders	15 in. (381 mm) depth x 28 in. (711 mm) width (inside cooking chamber)	P34	See Fig. 4-18
Upright Broilers, Salamanders	27 1/2 in. (699 mm) depth x 35 1/2 in. (902 mm) width (inside cooking chamber)	AP	See Fig. 4-19
Chain Broiler (Under or Over Burner)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	AP	See Fig. 4-20
Open Top Chain Broiler (Under Burner Only)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	AP	See Fig. 4-21

**Plenum and Duct Coverage**

**Plenum Hazard**

Nozzle Type	Height	Maximum Spacing	Location
AP	Even with top of filter(s)	11 ft (3.4 m) per nozzle	Aimed horizontal

**Duct Hazard**

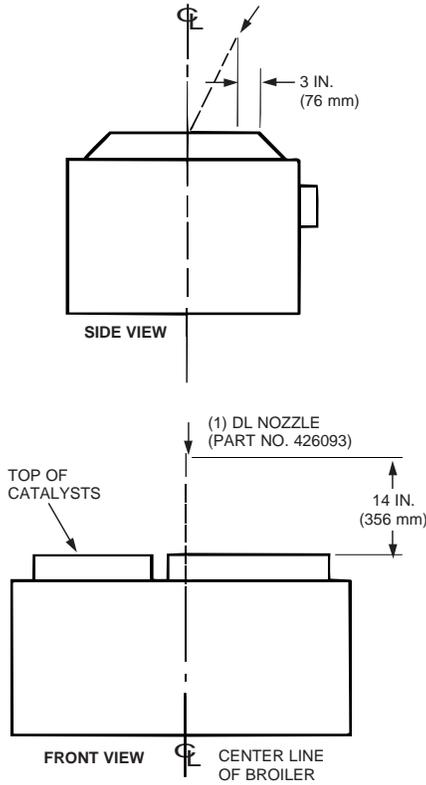
DL	0 in. to 8 in. (0 mm to 203 mm) into duct	100 in. (2.5 m) perimeter or circumference per nozzle unlimited length	0 in. to 3 in. (0 mm to 76 mm) from front edge of duct aimed into center of duct
----	---	--	--

**Note:** Square or rectangular ducts, maximum diagonal of 37 3/8 in. (949 mm); Round ducts, maximum diameter of 32 in. (81 mm).

**SPECIFIC APPLICATION BY MODEL**

**Nieco Broiler – Model 9025 (With Catalysts)**

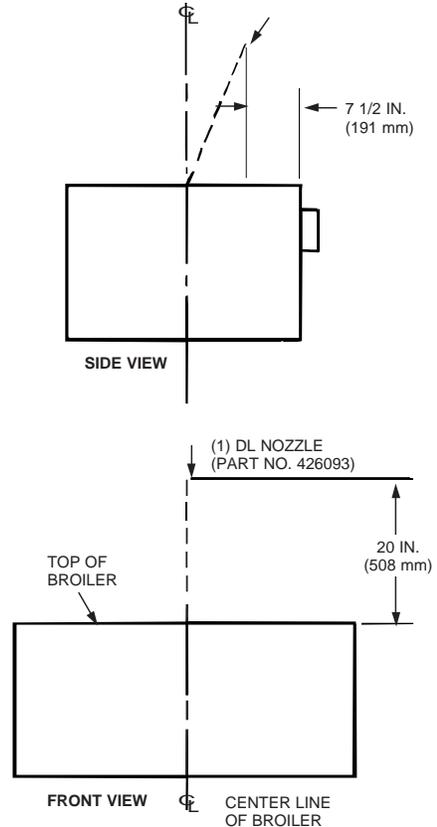
- **Nozzle Quantity/Type:** One DL nozzle (Part No. 426093).
- **Nozzle Height:** 14 in. (356 mm) above top of catalyst. See Figure 4-23.
- **Nozzle Location:** 3 in. (76 mm) back from front edge of catalysts. See Figure 4-23.
- **Nozzle Aiming Point:** Aimed at center of broiler top. See Figure 4-23.



**FIGURE 4-23**  
004352

**Nieco Broiler – Model 9025 (Without Catalysts)**

- **Nozzle Quantity/Type:** One DL nozzle (Part No. 426093).
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 4-24.
- **Nozzle Location:** 7 1/2 in. (191 mm) back from front edge of appliance. See Figure 4-24.
- **Nozzle Aiming Point:** Aimed at center of broiler top. See Figure 4-24.



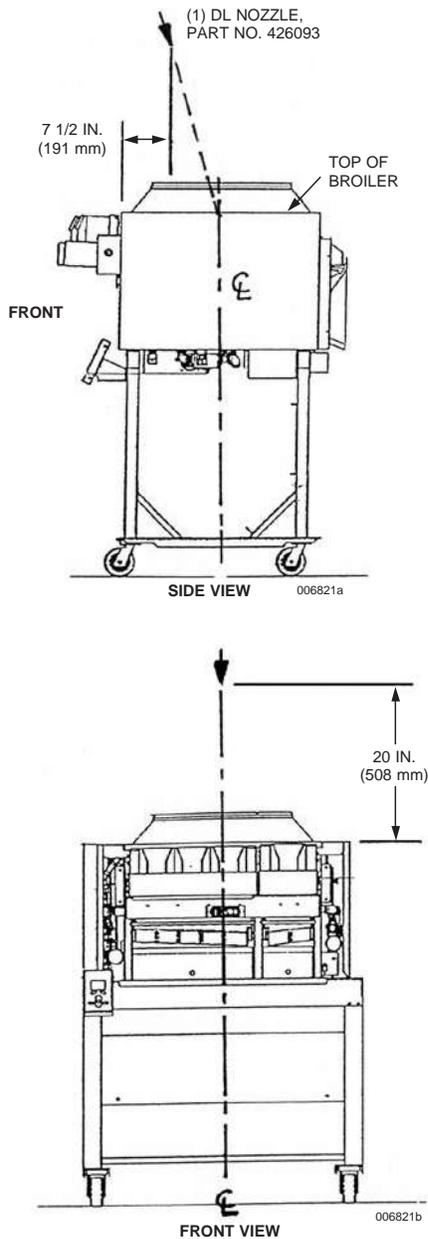
**FIGURE 4-24**  
004353

**SECTION 4 – SYSTEM DESIGN**

**SPECIFIC APPLICATION BY MODEL (Continued)**

**Nieco Broiler – Model 9015 (With or Without Catalyst)**

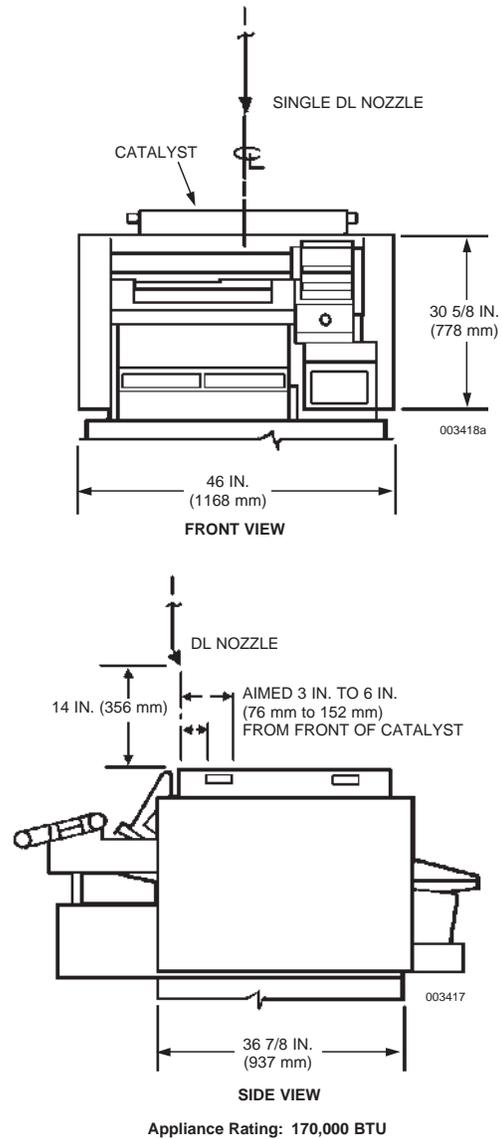
- **Nozzle Quantity/Type:** One DL nozzle (Part No. 426093).
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 4-25.
- **Nozzle Location:** 7 1/2 in. (191 mm) back from front edge of appliance. See Figure 4-25.
- **Nozzle Aiming Point:** Aim at center of broiler top. See Figure 4-25.



**FIGURE 4-25**

**Marshall Air Systems Model AutoBroil 2001BK Multi-Chamber Broiler**

- **Nozzle Type:** DL type nozzle (Part No. 426093).
- **Nozzle Quantity:** One per appliance.
- **Nozzle Location:** The nozzle tip must be located 14 in. (356 mm) directly above the appliance, aligned with the front face and centerline of the catalyst. The aim point must be 3 in. to 6 in. (76 mm to 152 mm) behind the front edge of the catalyst on the centerline. See Figure 4-26.



**FIGURE 4-26**

**SPECIFIC APPLICATION BY MODEL (Continued)**

**Dunkin Donuts Fryer Model DD400CGF**

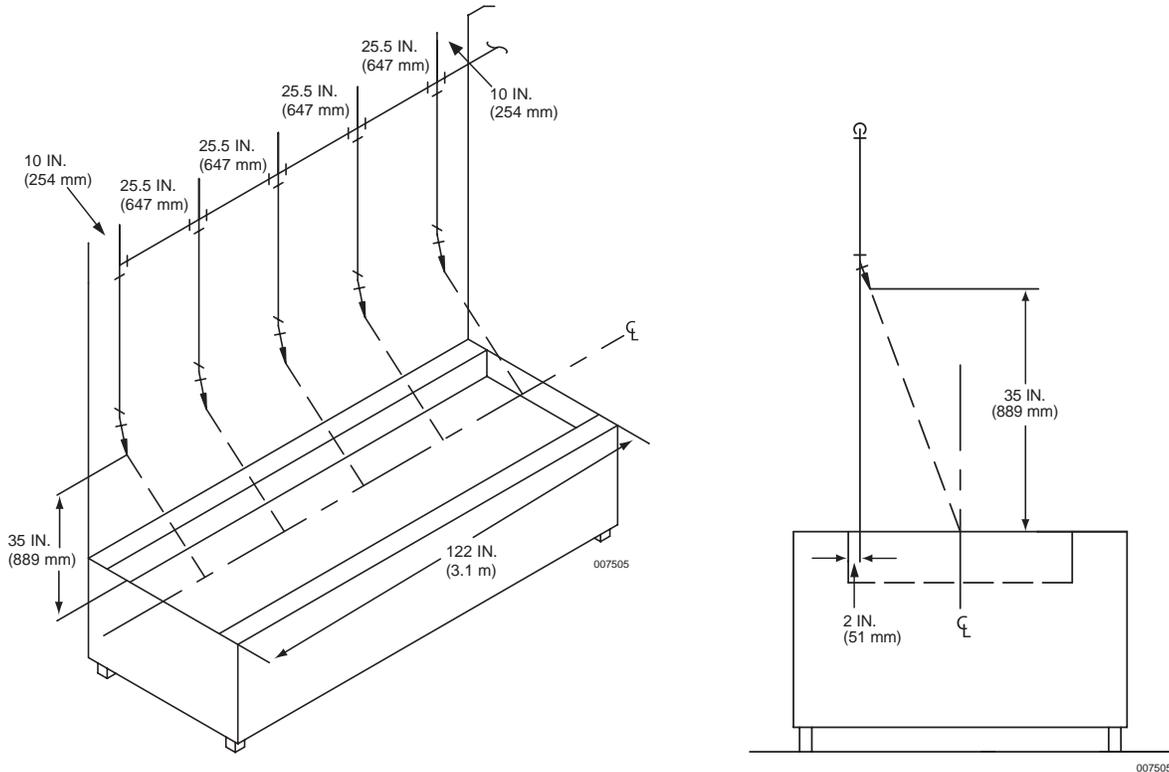
- **Nozzle Type:** AP Nozzle (Part No. 423480)
- **Nozzle Spacing:** 11.5 in. (292 mm) maximum from end of fryer and 25.5 in. (647 mm) maximum on centers
- **Nozzle Height:** 35 in. (889 mm) above top of appliance
- **Nozzle Position:** 2 in. (51 mm) in from inside edge of fry vat
- **Nozzle Aim Point:** Along the centerline of fry vat

**Fryer Specifications:**

- **Vat Size:**  
 Length: 122 in. (3099 mm)  
 Width: 31.3 in. (795 mm)  
 Depth: 11 in. (279 mm)
- **BTU Rating:** 360k
- **Vat Oil Capacity:**  
 1250 lb (567 kg)

**Note:** Five AP nozzles are required to protect the fryer. The amount of agent normally used must be doubled and, at a minimum, a PIRANHA-10 tank (Part No. 422877) must be used for fryer protection.

See Figure 4-27



**FIGURE 4-27**

**SECTION 4 – SYSTEM DESIGN**

■ UL EX 5174

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

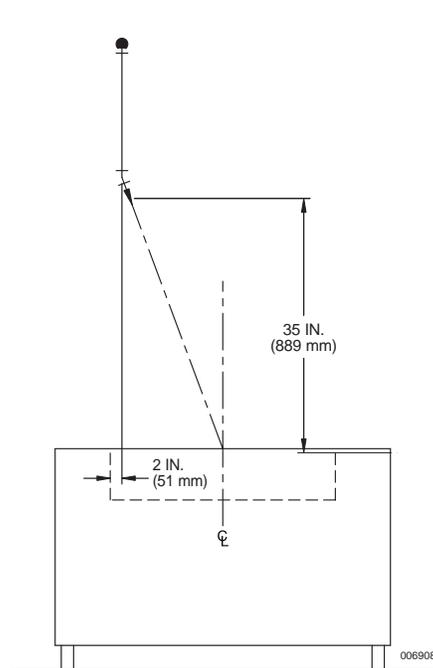
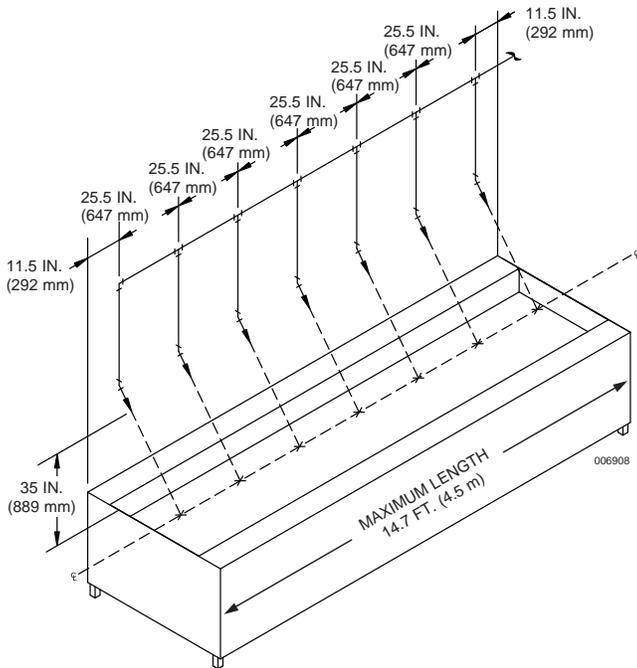
**SPECIFIC APPLICATION BY MODEL (Continued)**

- ▶ **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:** AP Nozzle (Part No. 423480)
- **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 Aim Point:** Along centerline of fry vat

**Note:** Figure 4-25 shows maximum size fryer (Model 1000 D/H). Smaller size fryers (Models 65 D/H, 110 D/H, 110M, 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 4-28.

- ▶ **Note:** Determine the number of nozzles needed, and double the amount of agent normally used. For example, if five AP nozzles are required for the fryer, at minimum a PIRANHA-10 tank (Part No. 422877) will be required for the fryer protection.
- ▶ Additional protection is needed for the duct and plenum.



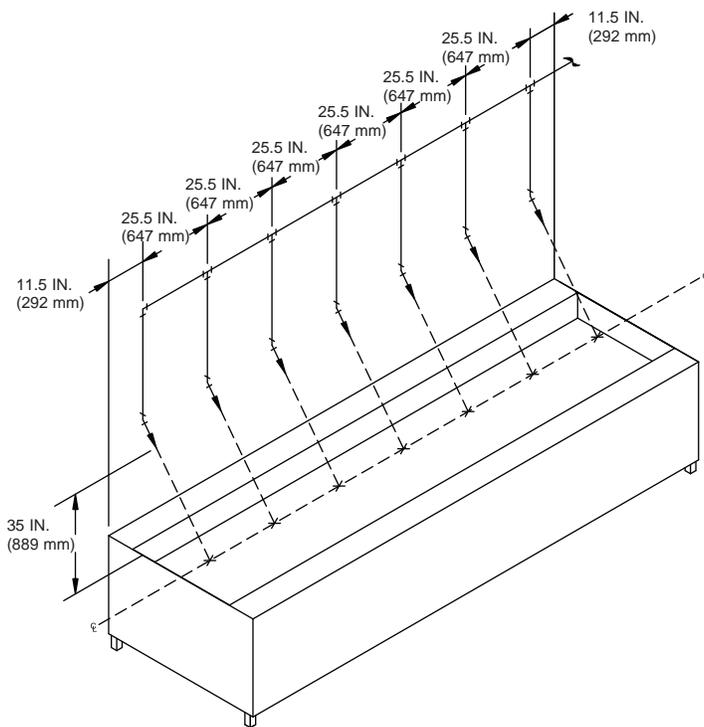
**FIGURE 4-28**

**SPECIFIC APPLICATION BY MODEL (Continued)**

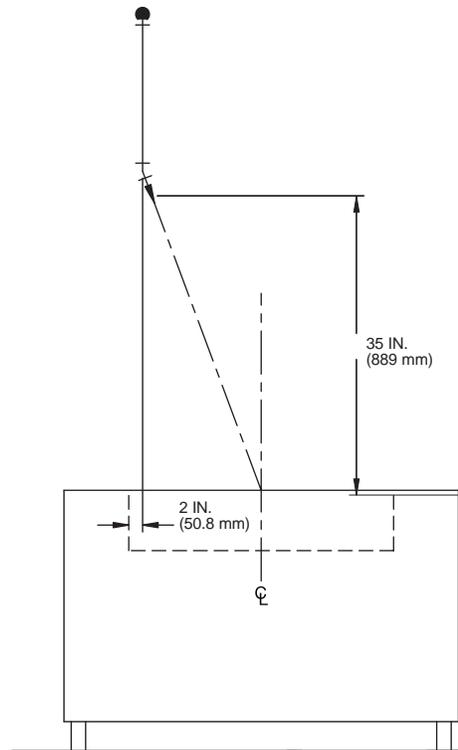
**Belshaw Century Fryers – Models C100, C200, C200G, C300G, C400, C400G, C600, and C600G**

- **Nozzle Type:** AP Nozzle (Part No. 423480)
- **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 Aim Point:** Along the centerline of fry vat

**Note:** Determine the number of nozzles needed, and double the amount of agent normally used. For example, if five AP nozzles are required for the fryer vat, at minimum a PIRANHA-10 tank (Part No. 422877) will be required for the fryer protection. Additional protection is needed for the duct and plenum.



006908



006908a

**FIGURE 4-29**

**BELSHAW CENTURY FRYERS**

<b>Specifications</b>	<b>C100</b>	<b>C200</b>	<b>C200G</b>	<b>C300G</b>	<b>C400</b>	<b>C400G</b>	<b>C600</b>	<b>C600G</b>
<b>Fryer Vat Size</b>								
Length: in.	65	65	65	65	122.25	122	122.25	122
(mm)	(1651)	(1651)	(1651)	(1651)	(3105)	(3099)	(3105)	(3099)
Width: in.	12	20	20	31.25	20.25	21.25	31	31.25
(mm)	(305)	(508)	(508)	(794)	(514)	(540)	(787)	(794)
Depth: in.	5.25	5.25	9.75	9.75	6.25	11.25	7.12	11.00
(mm)	(133)	(133)	(248)	(248)	(159)	(286)	(181)	(279)
BTU Rating: K	–	–	188	200	–	350	–	360
Vat Oil Capacity: lb	110	188	346	700	478	600	675	1250
(kg)	(50)	(85)	(157)	(318)	(217)	(272)	(306)	(567)

## SECTION 4 – SYSTEM DESIGN

■ UL EX 5174

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### TANK AND CARTRIDGE REQUIREMENTS CHART

The following chart is used to determine tank (and cartridge) requirements after the total number of nozzles have been determined.

Maximum Total No. of Nozzles	Quantity and Size of Tank(s)	Nitrogen Cartridge Size Required
7	(1) PIRANHA-7	LT-20-R
10	(1) PIRANHA-10	LT-30-R
13	(1) PIRANHA-13	LT-30-R
14	(1) PIRANHA-7 (1) PIRANHA-7*	LT-20-R LT-20-R
17	(1) PIRANHA-7 (1) PIRANHA-10*	LT-20-R LT-30-R
20	(1) PIRANHA-10 (1) PIRANHA-10*	LT-30-R LT-30-R
23	(1) PIRANHA-10 (1) PIRANHA-13*	LT-30-R LT-30-R
26	(1) PIRANHA-13 (1) PIRANHA-13*	LT-30-R LT-30-R
27	(1) PIRANHA-7 (1) PIRANHA-10* (1) PIRANHA-10*	LT-20-R LT-30-R LT-30-R

Additional combinations are available up to a maximum system size of 65 nozzles (five PIRANHA-13).

\* Regulated Actuator

### DISTRIBUTION PIPING REQUIREMENTS

Once the nozzle placement and quantity of tanks has been determined, it is then necessary to determine the piping configuration from each tank to the discharge nozzles. This section contains the guidelines and limitations for designing the distribution piping so that the system will discharge from all nozzles utilized at proper flow rates. These limitations should also be referred to when selecting the mounting location for the regulated release and agent tank. See Section 5 – Installation for pipe specifications.

### DISTRIBUTION PIPING DEFINITIONS

**Bull Tee:** A bull tee is defined as a tee positioned in the system so that the flow enters the center inlet of the tee and exits 90° out both side outlets. See Figure 4-30.

**Thru Tee:** A thru tee is defined as a tee positioned in the system so that the flow enters a side inlet and exits straight through the tee to the opposite outlet and also exits 90° through the center outlet. See Figure 4-30.

**Continuous System:** A continuous distribution piping system is one that does not include a bull tee between the agent tank and the first nozzle. See Figure 4-30.

**Split System:** A split distribution piping system contains a bull tee between the agent tank and first nozzle. See Figure 4-30.

**Equivalent Length:** Length of distribution piping, defined in feet, which includes the actual length of pipe (measured from center to center of fittings) and a given pipe length value assigned to each fitting used that must be added to the overall pipe length sum.

**Linear Length:** The actual length of piping measured from center to center of fittings.

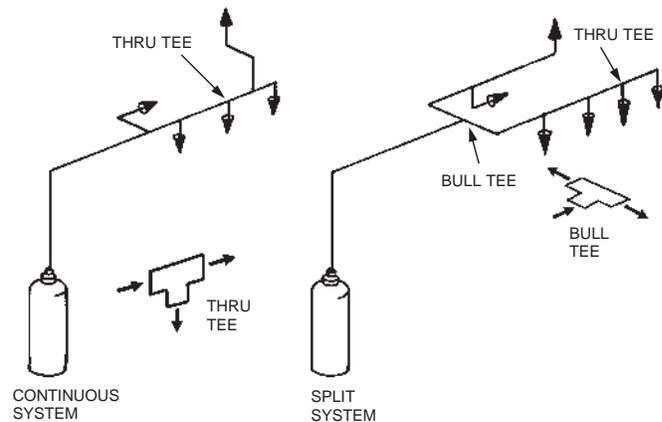


FIGURE 4-30  
001685

### GENERAL DISTRIBUTION PIPING RULES (Common to All Size Systems Both High and Low Proximity)

1. Maximum elevation difference between the top of the tank to the highest nozzle = 9 ft (2.7 m)
2. Maximum elevation difference between the lowest nozzle to the highest nozzle on each tank = 7 ft (2.1 m)
3. Minimum amount of total linear piping for a single nozzle system used to protect a fryer, wok, range, tilt skillet or braising pan = 8.0 ft (2.4 m)
4. Maximum nozzles allowed downstream of the center outlet of a thru tee = 2. See Figure 4-31.
5. Linear pipe lengths are measured center to center of fittings.

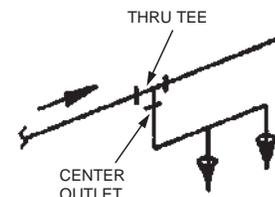


FIGURE 4-31  
001686

6. Multiple bull tees are allowed in both continuous and split systems as long as maximum linear and equivalent lengths are not exceeded.
7. No nozzles are allowed on the 1/2 in. pipe run.
8. Minimum number of nozzles in a system = 2 (low proximity only).
9. Minimum linear pipe between tees = 1 ft (0.3 m).

**SYSTEM DISTRIBUTION PIPING RULES  
(For Each Size System)**

▶ **PIRANHA-7 System**

Capacity 1.5 gal minimum – 7 nozzle maximum

Pipe Size	1/2 in.	3/8 in.
Maximum Length (Equivalent)	20 ft (6.1 m)	90 ft (27.4 m)
Elbow Equivalent – 90°	1.6 ft (457 mm)	1.4 ft (432 mm)
Elbow Equivalent – 45°	0.8 ft (254 mm)	0.7 ft (203 mm)
Tee Equivalent	*	2.7 ft (813 mm)

Continuous System:

1. Maximum linear pipe after first 3/8 in. tee = 50 ft (15.2 m)
2. Maximum nozzles elevated above supply line = 4

Split System:

1. Maximum equivalent length on each side of first bull tee split = 40 ft (12.2 m)
2. Maximum total **combined** pipe length after first bull tee (either 3/8 in. or reducing) = 37 ft (11.3 m)
3. Maximum nozzles on one side of a piping split that includes a duct nozzle = 3
4. Maximum nozzles on one side of a piping split that does not include a duct nozzle = 5
5. Maximum elevation above supply bull tee = 4 ft (1.2 m)
6. Maximum of 3 nozzles above the supply bull tee split
7. Maximum linear pipe between nozzles = 12 ft (3.7 m)

\* Equivalent length for the 3/8 x 3/8 x 1/2 in. reducing tee, if used, is not required to be added to the maximum equivalent pipe length.

▶ **PIRANHA-10 System**

Capacity 2.25 gal minimum – 10 nozzle maximum

Pipe Size	1/2 in.	3/8 in.
Maximum Length (Equivalent)	20 ft (6.1 m)	110 ft (33.5 m)
Elbow Equivalent – 90°	1.6 ft (457 mm)	1.4 ft (432 mm)
Elbow Equivalent – 45°	0.8 ft (254 mm)	0.7 ft (203 mm)
Tee Equivalent	*	2.7 ft (813 mm)

Continuous System:

1. Maximum linear pipe after first 3/8 in. tee = 60 ft (18.3 m)
2. Maximum nozzles elevated above supply line = 5

Split System:

1. Maximum 55 equivalent ft (16.8 m) on each side of first bull tee split
2. Maximum total combined linear length of all pipe after first bull tee (either 3/8 in. or reducing) = 60 ft (18.3 m)
3. Maximum nozzles per line with duct nozzle = 5
4. Maximum nozzles per line without duct nozzle = 7
5. Maximum elevation above supply bull tee = 4 ft (1.2 m)
6. Maximum linear pipe between nozzles = 20 ft (6.1 m)

\* Equivalent length for the 3/8 x 3/8 x 1/2 in. reducing tee, if used, is not required to be added to the maximum equivalent pipe length.

▶ **PIRANHA-13 System (Split System Only)**

Capacity 3.0 gal minimum – 13 nozzle maximum

Pipe Size	1/2 in.	3/8 in.
Maximum Length (Equivalent)	20 ft (6.1 m)	140 ft (42.7 m)
Elbow Equivalent – 90°	1.6 ft (457 mm)	1.4 ft (432 mm)
Elbow Equivalent – 45°	0.8 ft (254 mm)	0.7 ft (203 mm)
Tee Equivalent	*	2.7 ft (813 mm)

1. Maximum 70 equivalent ft (21.3 m) on each side of the reducing bull tee
2. Maximum linear length after the first 3/8 in. tee on each side of the split = 35 ft (10.7 m)
3. Maximum nozzles per line with duct nozzle = 8
4. Maximum nozzles per line without duct nozzle = 10
5. Maximum elevation above supply bull tee = 4 ft (1.2 m)
6. Maximum linear pipe between nozzles = 20 ft (6.1 m)
7. Maximum number of nozzles without a reducing bull tee = 10
8. When using a reducing bull tee, no more than 10 nozzles may be used on either side of the tee.
9. 1/2 of the remaining 3/8 in. pipe under 140 ft (42.7 m) can be added to the total of the 1/2 in. supply piping length.
10. When using a PIRANHA-13, 1/2 in. pipe must be used from the tank to the 3/8 x 3/8 x 1/2 in. reducing tee and 3/8 in. pipe must be used from the tee to the nozzles.

\*Equivalent length for the 3/8 x 3/8 x 1/2 in. reducing tee is not required to be added to the maximum equivalent pipe length.

**Note:** When utilizing 10 or less nozzles with a PIRANHA-13 tank, the PIRANHA-10 or PIRANHA-7 guidelines may be used depending on the amount of nozzles.

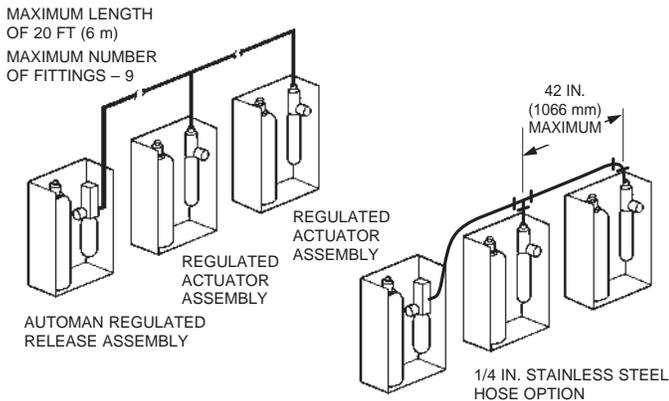
**SECTION 4 – SYSTEM DESIGN**

**ACTUATION GAS LINE REQUIREMENTS**

This section contains the requirements for the actuation gas lines between the regulated release mechanism and each regulated actuator regulator. These limitations should be considered when selecting the component mounting locations.

**Actuation Gas Line – 2 Additional Tanks Maximum**

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings or single lengths of stainless steel actuation hose and fittings.
2. The actuation gas line is installed from the regulated release mechanism to each regulated actuator connected within the system. When using pipe, 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 m)** when using an LT-20-R or an LT-30-R cartridge. See Figure 4-32.



**FIGURE 4-32**  
001640

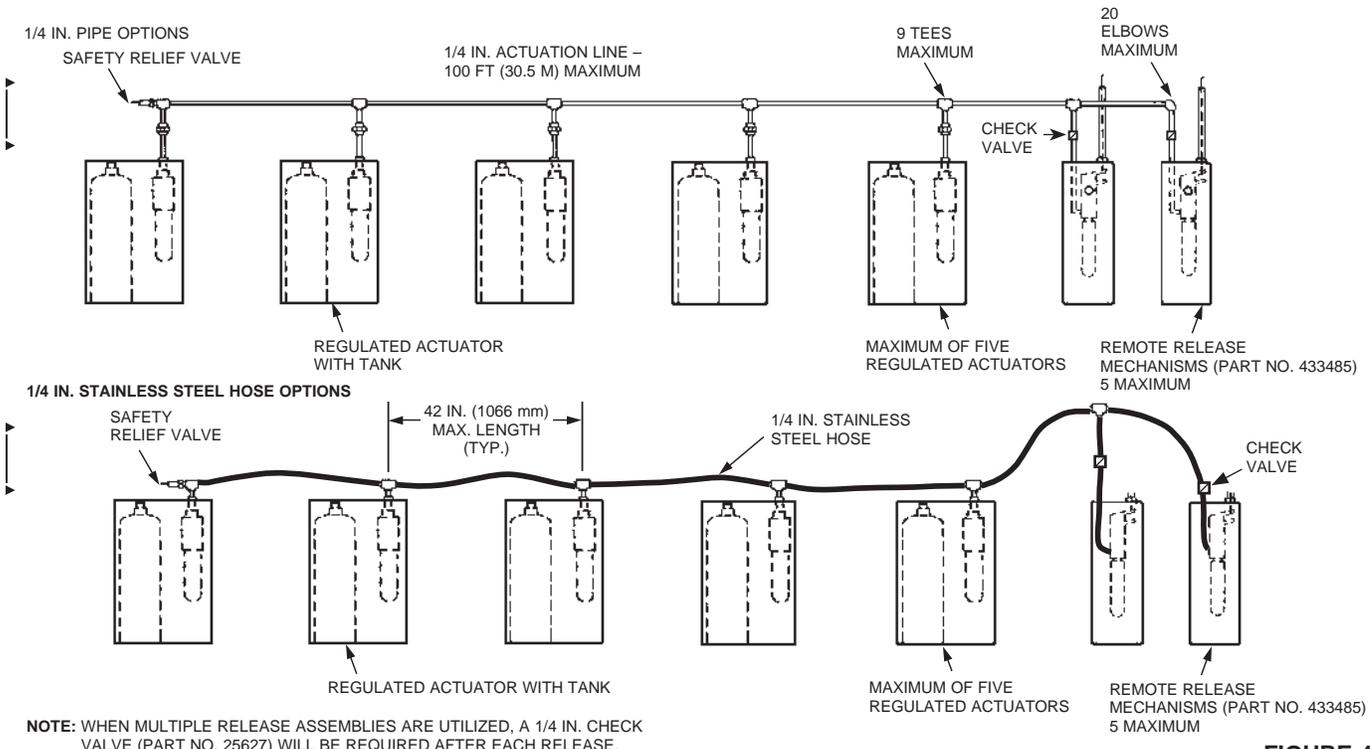
3. When pipe is used, a combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

**Actuation Gas Line – 5 Tanks Maximum – Using 1/4 in. Piping**

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 is installed from the remote mechanical release to each 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 (30.5 m) when using pipe.
3. When pipe is used, a combined total of 20 elbows and 9 tees may be used in these lines. Two 45° elbows equal one 90° elbow. See Figure 4-33.
4. Use only a 101-10 carbon dioxide cartridge in the 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.

**Actuation Gas Line – 5 Tanks Maximum – Using 1/4 in. Stainless Steel Hose**

1. Maximum hose length cannot exceed 17.5 ft (5.3 m).
2. Maximum of 5 regulated actuators allowed.



**NOTE:** WHEN MULTIPLE RELEASE ASSEMBLIES ARE UTILIZED, A 1/4 IN. CHECK VALVE (PART NO. 25627) WILL BE REQUIRED AFTER EACH RELEASE.

**FIGURE 4-33**  
001641

**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 the detection system.

**Detector Identification**

Generally, mechanical fusible link detection is used with the PIRANHA fire suppression system. However, electric detection is also available when specified.

**Mechanical Fusible Link Detector:** There are two variations of fusible link detectors which are distinguished from each other by their location in the detection system.

1. The Terminal Detector (Part No. 435546) 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 stainless steel cable ends, or “terminates.”
2. A Series Detector (Part No. 435547) is any detector located in-line between the regulated release mechanism and the terminal detector.

▶ **Stainless Steel Cable:** The 1/16 in. stainless steel blue tracer 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.

**Fusible Link Detector/Pulley Elbow/Conduit Off-Set 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 Off-Set Conduit	15	20	150 ft (45.7 m)
Scissors Style Detector (With Off-Set Conduit	15	16	150 ft (45.7 m)

2. If the hazard requires more than 15 detectors, up to five Remote Releases (Part No. 433485) can be used for system actuation. Each 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.

**Fusible Link 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 approved pulley elbows (Part No. 423254 or 415670). See Figure 4-34.

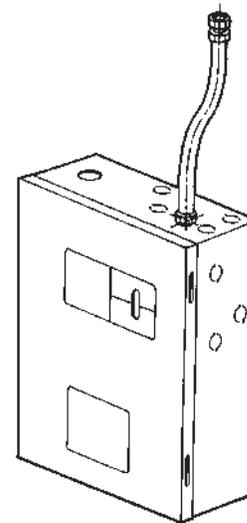


FIGURE 4-34  
000270

**Fusible Link Selection**

Select correct UL Listed fusible link(s) for installation in detector(s) according to the temperature condition. Two styles are available. See Figure 4-35. The Maximum Registering Thermometer (Part No. 15240) is one method that 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. See Component Section for detailed temperature ratings.

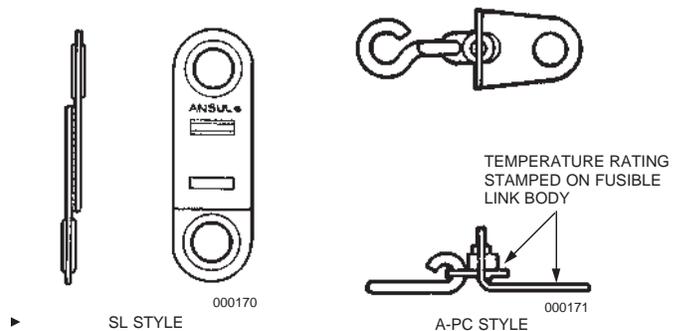


FIGURE 4-35

**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 24 VDC Regulated Release Assembly.

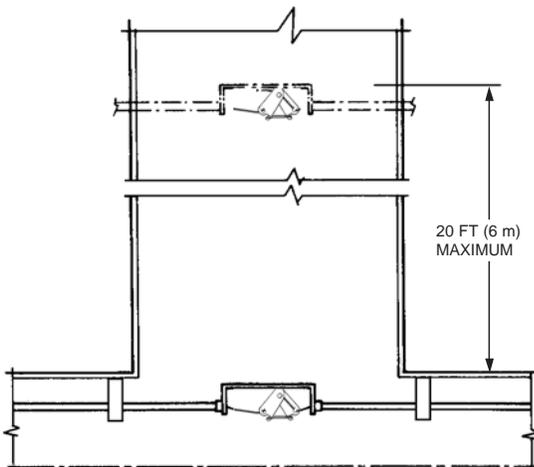
**Note:** Consider the rate of temperature increase in the location chosen for the detector when using electric thermal detection. A transient rush of warm air up to 40 °F (4 °C) per minute may expand the shell, but not enough to trigger the AUTOPULSE control panel. Temperature increases over 40 °F (4 °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 Section 3 – System Components.

**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 (6.1 m) into the duct opening. See Figure 4-36.



**FIGURE 4-36**  
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 airstream 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.

**Note:** For information on secondary filtration units, contact Technical Services.

**COOKING APPLIANCES**

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.

**MANUAL PULL STATION REQUIREMENTS**

A remote manual pull station (Part No. 434618 or 435960) allows the PIRANHA system to be manually operated at some point distant from the regulated release assembly. One pull station is required for each system. The pull station should be installed in accordance with NFPA and local code requirements. The pull station is the only source of manual actuation of the regulated release assembly.

**Pull cable limits:**

Maximum length of cable: 150 ft (45.7 m) when using 1/2 in. EMT conduit.

Maximum number of pulley elbows per pull station : 20

One pulley tee (Part No. 427929) is allowed per system.

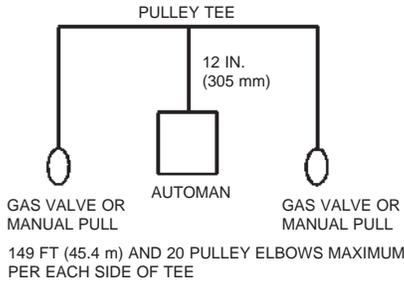
The maximum length of cable from the AUTOMAN to a pull station is 150 ft (45.7 m) with a maximum of 20 pulley elbows used per side of the tee. As the tee is located farther from the AUTOMAN, the 150 ft (45.7 m) maximum must be observed but as pulley elbows are placed between the AUTOMAN and the tee, 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 4-37 for three different examples. **Note: Gas valves and pull stations cannot be mixed on the same pulley tee system.**

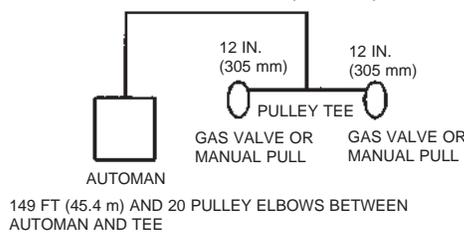
**MANUAL PULL STATION REQUIREMENTS (Continued)**

**Note:** For details on use of flexible conduit with remote manual pull station, refer to Installation section.

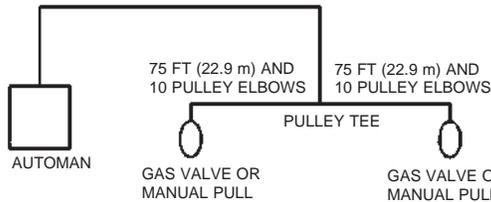
**TEE CLOSE TO AUTOMAN (EXAMPLE)**



**TEE CLOSE TO GAS VALVES OR MANUAL PULL (EXAMPLE)**



**TEE HALFWAY BETWEEN AUTOMAN AND GAS VALVES OR MANUAL PULL (EXAMPLE)**



**FIGURE 4-37**  
004907

**Manual Pull Station – Part No. 435960 or 434618**

Parts that may be used for installation of a remote manual pull station are:

Description	Part No.
Remote Manual Pull Station Assembly*	434618
Remote Manual Pull Station Assembly	435960
Pulley Elbow	423250
Pulley Elbow	415670
Pulley Tee	427929
1/16 in. Stainless Steel Cable 50 ft (15 m)	15821
Oval Press-To-Crimp Sleeves	4596
Break Rod (1)	4834

\* Assembly includes parts listed below:

**MECHANICAL GAS VALVE REQUIREMENTS**

An approved mechanical gas shut-off valve system can be attached to the PIRANHA system when mechanical fusible link detection is used. **Note:** When electric thermal detection is used, an electric gas valve(s) will be required for gas shut-off. 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) when using 1/2 in. EMT conduit. The maximum number of pulley elbows that may be used is 20 for each valve.

One pulley tee (Part No. 427929) is allowed per system.

A maximum of two gas valves can be connected to a single air cylinder.

A maximum of four gas valves per each AUTOMAN Release (two air cylinders each with two valves connected).

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 4-37 for three different examples. **Note: Gas valves and pull stations cannot be mixed on the same pulley tee system.**

**Note:** For details on use of flexible conduit with mechanical gas valves, refer to Installation section.

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 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 130 °F (0 °C to 54 °C). The valves are not weatherproof and must be located indoors in areas approved by the “authority having jurisdiction.”

## SECTION 4 – SYSTEM DESIGN

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### ELECTRICAL GAS VALVE REQUIREMENTS

A UL Listed electrically-operated gas shut-off valve can be attached to the PIRANHA 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 (mechanical detection), or AUTOPULSE alarm relay (electrical detection), and a manual reset relay. For more information on the types of electric (snap-action) switches, refer to the Electrical Switch, Field Installation 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 PIRANHA 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 PIRANHA 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.**

### 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.

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.

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)	14702

\*Valves are normally closed when de-energized.

### ELECTRICAL SWITCH REQUIREMENTS

The electric (snap-action) switches for the PIRANHA 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 4-112 through 4-114 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.

Each AUTOMAN Regulated Release Assembly includes two single-pole, double-throw (SPDT) snap-action switches. Each switch is rated at 21 amp, 1 HP, 125, 250, 277 VAC or 2 HP 250, 277 VAC. Six wire assemblies are included.

**Note:** A relay must be supplied by others if the equipment load exceeds the rated capacity of the switch.

## WARNING

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, resulting in possible personal injury or death.

### AUTOPULSE 542R Control Panel (Part No. 433607), AUTOPULSE Z-10 Control Panel (Part No. 430525) Requirements

**Note:** For instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

Electrical wiring and equipment shall be installed in accordance with NFPA 70 (National Electrical Code), NFPA 72, and the requirements of the authority having jurisdiction.

### ELECTRICAL SWITCH REQUIREMENTS (Continued)

If a fire alarm system is provided, the fire suppressing 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.

### WATER SUPPLY REQUIREMENTS

The water flow valve located in each AUTOMAN Regulated Release and each Regulated Actuator assembly must be connected to the food service domestic water supply or a wet pipe sprinkler system. The water supply must provide an adequate simultaneous flowing water pressure at each PIRANHA Water Pressure Testing Assembly gauge.

Each PIRANHA waterline must meet the following requirements:

- The minimum size waterline must be 1 in. pipe or tubing.  
**Exception:** In some single tank systems, 3/4 in. pipe/tubing may be acceptable. The actual size must be determined by pressure drop calculations using an assumed water flow of 10 gpm (38 Lpm) for each PIRANHA water valve.
- Must include a full flow, locked-open, tamper-proof shut-off valve.
- Maximum water pressure at the Pressure Tester Gauge must not exceed 100 psi (6.9 bar).
- Consider adding a 3/4 in. union above the AUTOMAN Regulated Release and Regulated Actuator Assembly connected to the dedicated PIRANHA waterline to facilitate servicing the system.

► **Note:** For additional wet pipe sprinkler system specification and connection information, refer to Section 5 – Installation, *Connecting to Wet Pipe Sprinkler System*, page 5-4.

### Domestic Waterline Connection

► In addition to the above waterline requirements the food service domestic water supply must meet the following requirements:

- When connected to a domestic waterline, it is recommended to use one release and two regulated actuators. See Figure 4-38.
- The dedicated PIRANHA system waterline piping must be connected to a water source downstream from the primary domestic control valve to the food service facility. The “primary domestic control valve” is defined as the primary shut-off valve that controls the water to the food service facility being protected.
- A water supply line within a given occupancy may supply plumbing fixtures other than the PIRANHA system. However, the connection to the supply line that provides water to the PIRANHA system must be dedicated to supply only the PIRANHA system. No other domestic connections on that dedicated PIRANHA line are to be made.

- There must be no shut-off valves between the primary domestic control valve to the food service facility and the PIRANHA system, other than the PIRANHA system control valve (lockable full flow indicating shut-off valve).
- The water usage points (sinks, dishwashers, toilets, etc) within the food service facility that are connected to the waterline from which the dedicated PIRANHA system piping is supplied, and which may be operated simultaneously during normal water usage, shall be operated during the PIRANHA water pressure test and taken into consideration when calculating the size of the waterline piping.

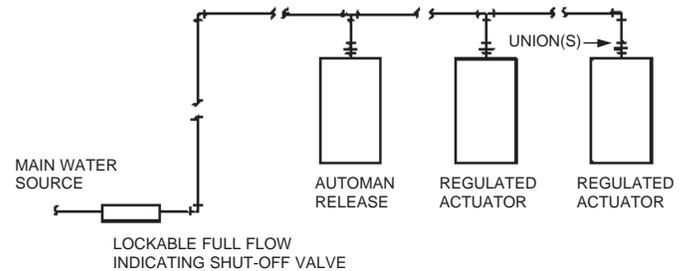


FIGURE 4-38  
001618

## SECTION 4 – SYSTEM DESIGN

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PIRANHA Restaurant Fire Suppression System  
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### WATER SUPPLY REQUIREMENTS (Continued)

#### Minimum Water Supply Pressure Requirements

System Type	Number of Nozzles	Calculated Minimum Water Pressure at AUTOMAN Release or Actuator		Minimum Water Pressure (Test Gauge Reading)	
		psi	(bar)	psi	(bar)
Continuous	2-10	33	(2.3)	30	(2.1)
Split	13	33	(2.3)	30	(2.1)
Split	12	33	(2.3)	30	(2.1)
Split	11	33	(2.3)	30	(2.1)
Split	10	22	(1.52)	19	(1.31)
Split	9	21	(1.45)	18	(1.24)
Split	8	21	(1.45)	18	(1.24)
Split	7	17	(1.17)	15	(1.03)
Split	6	17	(1.17)	15	(1.03)
Split	5	17	(1.17)	15	(1.03)
Split	4	17	(1.17)	15	(1.03)
Split	3	17	(1.17)	15	(1.03)
Split	2	17	(1.17)	15	(1.03)

All continuous type systems and all PIRANHA-13 systems with 11 or more nozzles require a minimum flowing calculated 33 psi (2.3 bar) water pressure at the AUTOMAN release and a minimum of 30 psi (2.1 bar) water pressure at the pressure tester gauge. **Note:** There is a 2 psi to 3 psi (0.1 bar to 0.2 bar) pressure drop through the tester.

The following limitations must not be exceeded when utilizing the lower water pressure requirements:

- The use of lower water pressure is restricted to split systems only. A split distribution piping system includes a bull tee between the agent tank and the first nozzle.
- A PIRANHA-13 system can be used if limited to 10 nozzles and piped to the requirements of a PIRANHA-10 system.
- Mixing of PIRANHA-7, PIRANHA-10, and PIRANHA-13 (if limited to 10 nozzles) is permitted.

### BACKFLOW PREVENTION

Each AUTOMAN Regulated Release and Regulated Actuator Assembly includes an anti-siphon vacuum breaker which serves as the approved backflow prevention device\* for the PIRANHA system.

\*The backflow prevention device has not been evaluated by UL, but does meet the requirements of ASSE Standard 1001, ANSI Standard A112.1.1, and CSA Standard B64. It has been listed and approved by IAPMO in accordance with PS108-98.

### WATER SHUTDOWN DEVICE

The Water Shutdown Device (Part No. 426294) is an optional component which can be field installed in the AUTOMAN Release. With this device installed, the water flow to the discharge nozzles will automatically shut down after a minimum of 10 minutes after system actuation. See Section 5, Installation, for detailed mounting instructions.

### SIZING WATERLINE

#### Waterline Requirements

1. It is the designer's responsibility to verify that the water supply to the protected hazard has been designed with the capacity and pressure to provide the minimum required flowing pressure to each PIRANHA System, when flowing simultaneously with the highest normal domestic water usage anticipated for the food service facility.

The "**highest normal domestic water usage anticipated for the food service facility**" is defined as the total water usage from those water usage points (sinks, dishwashers, etc.) that might reasonably be expected to be operated simultaneously at some time during a normal 24 hour day.

2. The water valve in each regulated release and regulated actuator must be connected to the water supply by a waterline sized to provide a flowing water pressure at each pressure tester gauge as stated in "Water Supply Requirements."
3. When connected to a domestic waterline, it is recommended to use one release and two regulated actuators. See Figure 4-39.

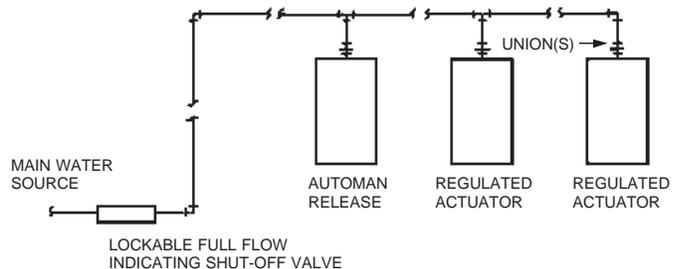


FIGURE 4-39

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**Note:** If more than 3 tanks are utilized in a single system, the waterline will need to be sized for a water flow of 10 gpm (38 Lpm) x no. of tanks at a flowing pressure of 33 psi (2.3 bar) with all tanks discharging simultaneously.

4. Each PIRANHA waterline must meet the requirements stated in "Water Supply Requirements."
5. Piping and fittings must be:
  - Type M seamless copper water tube per ASTM B88 as a minimum (Type L and Type K can also be used) with copper solder fittings
  - CPVC plastic pipe, either Schedule 40 per ASTM F441 or SDR17 per ASTM F442, with adhesive-type socket fittings
  - Schedule 40 galvanized steel pipe per ASTM A53 with galvanized steel or galvanized malleable iron threaded fittings

**SIZING WATERLINE (Continued)**

**Waterline Sizing Procedure**

Design the optimum dedicated waterline routing from the water supply connection to the PIRANHA water valve(s), including the fittings, center to center pipe lengths, and elevation changes. **Note:** Water supply connection tee must be included in the equivalent length calculations.

1. Determine the available flowing pressure of the water supply at the dedicated waterline connection. If unknown to the restaurant management, contact the Municipal Water Authority for flowing pressure or conduct a flowing water pressure test at the connection point.
2. Calculate the maximum allowable pressure drop by subtracting the minimum pressure required at each AUTOMAN Release or regulated actuator from the available water pressure.
3. Calculate the equivalent length of the waterline from the main water connection to the furthest PIRANHA water valve. The equivalent length is the actual linear length (center to center of fittings) of the waterline plus the equivalent length of each fitting, including the connection tee. See Table below. If the waterline feeds more than one water valve, do not include the equivalent lengths for the line tees or the line from the water valve which feeds the water valve(s) closer to the water line connection.

Nominal Pipe or Tube Size	Equivalent Length of 90° Elbow	Equivalent Length of Tee
3/4 in.	2 ft (610 mm)	4 ft (1.01 m)
1 in.	2 ft (610 mm)	5 ft (1.5 m)
1 1/4 in.	3 ft (914 mm)	6 ft (1.8 m)
1 1/2 in.	4 ft (1.01 m)	8 ft (2.4 m)
2 in.	5 ft (1.5 m)	10 ft (3.1 m)

4. Calculate the waterline flowing pressure drop by multiplying the equivalent feet (or meters) of waterline times the pressure drop per foot from the pipe or tube table below for the number of tanks in system.

**Pressure Drop (psi) Per Equivalent Foot of Waterline – Schedule 40 Pipe Sizes**

No. of Tanks	Waterline Pipe Size (Schedule 40)				
	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.
1 (10 gpm)	0.100	0.030	0.008	0.004	0.001
2 (20 gpm)	0.376*	0.109	0.028	0.013	0.004
3 (30 gpm)	-----	0.238*	0.059	0.027	0.008

Reference: Crane Flow of Fluids Through Valves, Fittings and Pipe – Crane Technical Paper No. 410, 22nd printing, 1985.

**Metric: Pressure Drop (bar) Per Equivalent Meter of Waterline – Schedule 40 Pipe Sizes**

No. of Tanks	Waterline Pipe Size (Schedule 40)				
	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.
1 (37.9 Lpm)	0.0226	0.0068	0.0018	0.0008	0.0002
2 (75.7 Lpm)	0.0851*	0.0247	0.0063	0.0029	0.0008
3 (113.6 Lpm)	-----	0.0538*	0.0134	0.0062	0.0018

Reference: Crane Flow of Fluids Through Valves, Fittings and Pipe – Crane Technical Paper No. 410, 22nd printing, 1985.

**Pressure Drop (psi) Per Equivalent Foot of Waterline – Tube Sizes**

No. of Tanks	Waterline Tube Size				
	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.
1 (10 gpm)	0.108	0.029	0.010	0.004	0.001
2 (20 gpm)	0.409*	0.106	0.039	0.014	0.004
3 (30 gpm)	-----	0.231*	0.083	0.029	0.009

**Metric: Pressure Drop (bar) Per Equivalent Meter of Waterline – Tube Sizes**

No. of Tanks	Waterline Tube Size				
	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.
1 (37.9 Lpm)	0.0244	0.0066	0.0023	0.0009	0.0002
2 (75.7 Lpm)	0.0925*	0.0240	0.0088	0.0032	0.0009
3 (113.6 Lpm)	-----	0.0523*	0.0188	0.0066	0.0020

Reference: Based on Hazen-Williams Formula:

$$P = \frac{4.52 Q^{1.85}}{C^{1.85} d^{4.87}}$$

Where: P = Friction loss, psi per linear foot  
Q = Flow, q.p.m.  
d = Average I.D., in inches  
C = Constant, 150

\* These pressure drop factors may be marginal when calculating the PIRANHA dedicated waterline pressure loss. See Notice.

**NOTICE**

If the asterisked pressure drop factors are utilized for pressure loss calculations, accurate **flowing** water pressure must be determined at the point of the PIRANHA dedicated waterline connection.

When determining accurate flowing water pressure, make certain to simulate the “highest normal domestic water usage anticipated for the food service facility.” Also, accurate measurements for lengths of pipe/tube and fittings must be taken.

5. Calculate the waterline pressure drop due to the difference in elevation between the water connection and the highest PIRANHA water valve connection:

Elevation **difference** (ft) x 0.43 psi/ft

(Elevation **difference** (m) x 0.01 bar/meter)

6. Calculate the total waterline pressure drop by adding the elevation pressure drop from Step No. 5 and the flow pressure drop from Step No. 4.

7. Compare the total waterline pressure drop from Step No. 6 with the maximum allowable pressure drop from Step 2 for the selected waterline size. If the total waterline pressure drop is greater than the maximum allowable pressure drop, then the selected pipe or tube size is too small and a larger size must be selected and recalculated until the total calculated waterline pressure drop is equal to or less than the maximum allowable pressure drop.

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**SIZING WATERLINE (Continued)**

**Waterline Sizing Procedure (Continued)**

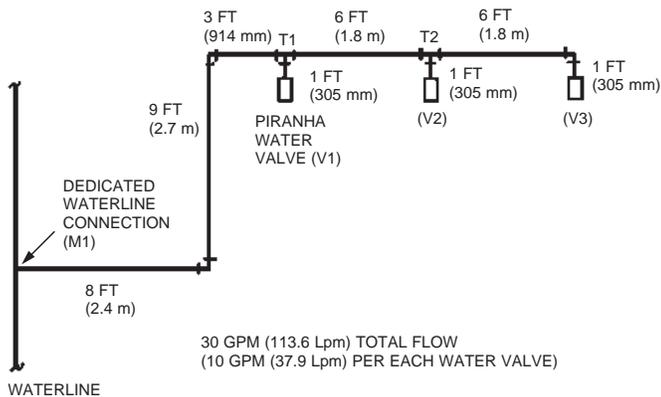
**Example: Waterline Sizing Calculations**

**Given:** Three tank PIRANHA-13 waterline system per Figure 4-40.

Available main water pressure = 45 psi (3.1 bar)

Waterline elevation difference, main connection to furthest water valve = 8 ft (2.4 m)

Minimum waterline size (from Waterline Requirements) = 1 1/4 in. copper tube



**FIGURE 4-40**  
001763

**Step No. 4** Calculate the pressure drop due to the difference in elevation from M1 to V3. See Figure 4-37.

9 ft rise – 1 ft drop x 0.43 psi/ft = 3.44 psi

**Step No. 5** Calculate the total pressure drop for 1 1/4 in. pipe system.

3.98 psi (flow drop) + 3.44 psi (elevation drop) = 7.42 psi drop

**Step No. 6** Compare the calculated total pressure drop (Step No. 5) with the allowable pressure drop (Step No. 1). Since the 7.42 psi calculated pressure drop is less than the 12 psi maximum allowable pressure drop, 1 1/4 in. tubing will be suitable for this system. If the calculated total pressure drop was greater than the allowable pressure drop, it will be necessary to recalculate using a larger size tube.

Refer to Pressure Drop Worksheet on next page and table below for calculations matching the above steps.

Step No.	Pressure Drop Worksheet Line No.
1	1 – 5
2	6 – 15
3	16 –17
4	18
5	19
6	19 and 5

**Step No.1** Calculate the maximum allowable pressure drop.

45 psi (3.10 bar) (available flowing pressure) – 33 psi (2.27 bar) (minimum water valve pressure) = 12 psi (0.83 bar)

**Step No. 2** Calculate the equivalent length of the waterline from the waterline connection (M1) to the furthest PIRANHA water valve (V3) excluding the two tees for the drops to valves V1 and V2.

Equivalent Length = 8 ft + 9 ft + 3 ft + 6 ft + 6 ft + 1 ft pipe length + 6 (connection tee) + 9 (3 elbows x 3 ft equivalent length per elbow) = 48 ft equivalent length

**Step No. 3** Calculate the system flow pressure drop for 1 1/4 in. tube. **Note:** From the pressure drop tables in Step 4 of the Waterline Sizing Procedure, page 4-25, the pressure drop for a 3 tank system is 0.083 psi per ft of 1 1/4 in. tube.

System flow pressure drop for 1 1/4 in. tube = 48 ft x 0.083 psi/ft = 3.98 psi drop

**SIZING WATERLINE (Continued)**

**Waterline Sizing Procedure (Continued)**

**Example: Waterline Sizing Calculations (Continued)**

**PIRANHA SYSTEM TRAINING PROGRAM PRESSURE DROP WORKSHEET – MULTIPLE VALVES**

**Water Pressure Requirements**

1	Valve Number	Valve V1	Valve V2	Valve V3
2	<b>System Type</b>	<i>PIRANHA-13</i>	<i>PIRANHA-13</i>	<i>PIRANHA-13</i>
3	Available Flowing Water Pressure	<i>45 psi</i>	<i>45 psi</i>	<i>45 psi</i>
4	– Minimum Flowing Water Pressure	<i>33 psi</i>	<i>33 psi</i>	<i>33 psi</i>
5	<b>= Maximum Allowable Pressure Loss</b>	<i>12 psi</i>	<i>12 psi</i>	<i>12 psi</i>

**Waterline Calculations**

Calculate Equivalent Length for Pipe That is Common to All Valves, M1 to T1

6	M1 to T1	
7	Linear Length	<i>20 ft</i>
8	+ Equivalent Length, Fittings	<i>12 ft</i>
9	<b>= Total Equivalent Length, M1 to T1</b>	<i>32 ft</i>

Use This Length in All 3 Boxes in Line 14

Calculate Equivalent Length from T1 to Each Valve, Then Add the Common Equivalent Length to Each Section

10	From T1 to ►	Valve V1	Valve V2	Valve V3
11	Linear Length	<i>1 ft</i>	<i>7 ft</i>	<i>13 ft</i>
12	+ Equivalent Length, Fittings	<i>6 ft</i>	<i>6 ft</i>	<i>3 ft</i>
13	<b>= Equivalent Length T1 to Valve</b>	<i>7 ft</i>	<i>13 ft</i>	<i>16 ft</i>
14	+ Equivalent Length M1 to T1 (from Line 9)	<i>32 ft</i>	<i>32 ft</i>	<i>32 ft</i>
15	<b>= Total Equivalent Length, M1 to Valve</b>	<i>39 ft</i>	<i>45 ft</i>	<i>48 ft</i>
16	* Friction Loss Factor/ft	<i>0.083 psi/ft</i>	<i>0.083 psi/ft</i>	<i>0.083 psi/ft</i>
17	<b>= Total Friction Pressure Loss</b>	<i>3.237 psi</i>	<i>3.735 psi</i>	<i>3.984 psi</i>
18	+ Elevation Pressure Loss	<i>3.44 psi</i>	<i>3.44 psi</i>	<i>3.44 psi</i>
19	<b>= Total Pressure Loss</b>	<i>6.677 psi</i>	<i>7.175 psi</i>	<i>7.424 psi</i>

**For Each Valve**, the Calculated Pressure Drop (Line 19) Cannot Exceed Maximum Allowed (Line 5)

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**SIZING WATERLINE (Continued)**

**Waterline Sizing Procedure (Continued)**

**PIRANHA SYSTEM TRAINING PROGRAM PRESSURE DROP WORKSHEET – MULTIPLE VALVES**

**Water Pressure Requirements**

1	Valve Number	Valve V1	Valve V2	Valve V3
2	System Type			
3	Available Flowing Water Pressure			
4	– Minimum Flowing Water Pressure			
5	<b>= Maximum Allowable Pressure Loss</b>			

**Waterline Calculations**

Calculate Equivalent Length for Pipe That is Common to All Valves, M1 to T1

6	M1 to T1	
7	Linear Length	
8	+ Equivalent Length, Fittings	
9	<b>= Total Equivalent Length, M1 to T1</b>	

Use This Length in All 3 Boxes in Line 14

Calculate Equivalent Length from T1 to Each Valve, Then Add the Common Equivalent Length to Each Section

10	From T1 to ►	Valve V1	Valve V2	Valve V3
11	Linear Length			
12	+ Equivalent Length, Fittings			
13	<b>= Equivalent Length T1 to Valve</b>			
14	+ Equivalent Length M1 to T1 (from Line 9)			
15	<b>= Total Equivalent Length, M1 to Valve</b>			
16	* Friction Loss Factor/ft.			
17	<b>= Total Friction Pressure Loss</b>			
18	+ Elevation Pressure Loss			
19	<b>= Total Pressure Loss</b>			

**For Each Valve**, the Calculated Pressure Drop (Line 19) Cannot Exceed Maximum Allowed (Line 5)

**SIZING WATERLINE (Continued)**

**Example: Waterline Sizing Calculations (Continued)**

**Alternate Long Form Calculation**

If the PIRANHA system includes two or three tanks and the calculated total PIRANHA dedicated waterline pressure drop is only slightly greater than the maximum allowable pressure drop for the selected pipe or tube size, then an alternate “long form” method of calculating the flow pressure drop may be used. Using this method may result in a lower calculated total pressure drop which may be less than the maximum allowable pressure drop.

This alternate method requires the flow pressure drop for each path from the water connection to each PIRANHA water valve be calculated separately.

**NOTICE**

Do not use the Alternate Long Form Calculation unless accurate **flowing** water pressure can be determined at the point of the PIRANHA dedicated waterline connection.

When determining accurate flowing water pressure, make certain to simulate the “highest normal domestic water usage anticipated for the food service facility.” Also, accurate measurements for equivalent lengths of pipe/tube and fittings must be taken.

The following steps must be completed when utilizing the Alternate Long Form Calculation:

1. Calculate the maximum allowable pressure drop. This is the difference between the available flowing water pressure and the minimum required pressure at the PIRANHA water valve located in the releasing device(s).
2. Calculate the pressure drop for each path due to the difference in elevation between the PIRANHA dedicated waterline connection and each PIRANHA water valve by multiplying the difference in feet (meters) of elevation by 0.43 psi/ft (0.01 bar/m).
3. Calculate the flow pressure drop for each path from the PIRANHA dedicated waterline connection to each PIRANHA water valve by multiplying the total equivalent length of pipe/tube and fittings for each path by the appropriate factor in the Pipe/Tube Size Pressure Drop Table(s).
4. Calculate the total pressure drop for each path by adding the pressure drop due to the difference in elevation (Step No. 2) to the flow pressure drop to each PIRANHA water valve (Step No. 3).
5. Determine which path has the greatest total combined pressure drop (Step No. 4) and compare it to the maximum allowable pressure drop (Step No. 1). If the greatest total pressure drop is less than the maximum allowable pressure drop, then the pipe size chosen for this system calculation is acceptable. If the greatest total pressure drop is larger than the maximum allowable pressure drop, then the system must be recalculated using a larger pipe/tube size.

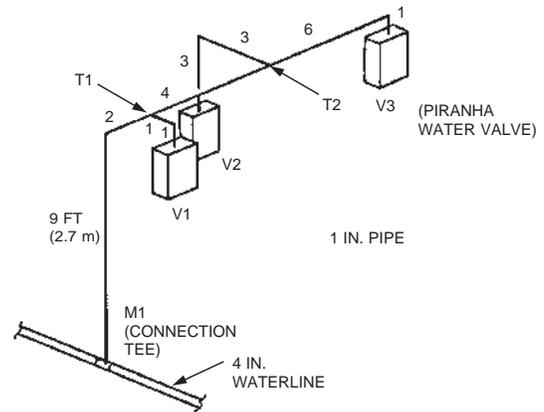
**Example: “Alternate Long Form” Waterline Sizing Calculations**

Given: Three PIRANHA-10 systems per Figure 4-41.

Available flowing water pressure at the dedicated PIRANHA waterline connection = 32 psi (2.21 bar)

1 in. pipe was chosen for system calculation.

Each PIRANHA-10 system has 10 nozzles, therefore, the minimum flowing pressure required to each PIRANHA water valve is 22 psi (1.52 bar)



**FIGURE 4-41**  
004207

When calculating the pressure drop the “Standard” way, it was determined the total pressure drop was 10.82 psi (0.75 bar). This drop is 0.82 psi (0.06 bar) over the maximum allowable of 10 psi (0.69 bar) for this system calculation. Because the drop is only slightly greater than the maximum allowable pressure drop for the selected pipe size, the “alternate long form” method of calculating the flow pressure drop may be used to determine if the selected pipe size can remain unchanged.

**Step No. 1** Calculate the maximum allowable pressure drop:

As mentioned above, the available flowing water pressure is 32 psi (2.21 bar). The PIRANHA-10 system requires a minimum water pressure of 22 psi (1.52 bar). The allowable pressure drop is 32 psi – 22 psi = 10 psi (2.21 bar – 1.52 bar = 0.69 bar) available.

**Step No. 2** Calculate each pressure drop due to the difference in elevation in each path:

V1 PATH

- a. M1 to V1: 9 ft (2.7 m) rise – 1 ft (0.3 m) drop = 8 ft (2.4 m) total rise. 8 ft (2.4 m) total rise x 0.43 psi/ft (0.03 bar/m) = 3.44 psi (0.24 bar) drop.

V2 PATH

- b. M1 to V2: 9 ft (2.7 m) rise – 3 ft (0.9 m) drop = 6 ft (1.8 m) total rise. 6 ft (1.8 m) total rise x 0.43 psi/ft (0.03 bar/m) = 2.58 psi (0.18 bar) drop.

V3 PATH

- c. M1 to V3: 9 ft (2.7 m) rise – 1 ft (0.3 m) drop = 8 ft (2.4 m) total rise. 8 ft (2.4 m) total rise x 0.43 psi/ft (0.03 bar/m) = 3.44 psi (0.24 bar) drop.

## SECTION 4 – SYSTEM DESIGN

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### SIZING WATERLINE (Continued)

#### Example: “Alternate Long Form” Waterline Sizing Calculations (Continued)

**Step No. 3** Calculate the flow pressure drop for each path.

#### V1 PATH

- a. M1 to T1 (30 gpm): 5 ft (1.5 m) (equivalent length of connection tee, M1) + 9 ft (2.7 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 2 ft (0.6 m) (pipe) = 18 ft (5.5 m)  
 $18 \text{ ft (5.5 m)} \times 0.238 \text{ psi/ft (0.05 bar/m)} =$   
4.3 psi (0.3 bar) drop for this section.
- b. T1 to V1 (10 gpm): 5 ft (1.5 m) (equivalent length of tee, T1) + 1 ft (0.3 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 1 ft (0.3 m) (pipe) = 9 ft (2.7 m)  
 $9 \text{ ft (2.7 m)} \times 0.03 \text{ psi/ft (0.007 bar/m)} =$   
0.27 psi (0.02 bar) drop for this section.
- c. 4.3 psi (0.3 bar) drop + 0.27 psi (0.02 bar) drop =  
4.57 psi (0.32 bar)

#### V2 PATH

- a. M1 to T1 (30 gpm): 5 ft (1.5 m) (equivalent length of connection tee, M1) + 9 ft (2.7 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 2 ft (0.6 m) (pipe) = 18 ft (5.5 m)  
 $18 \text{ ft (5.5 m)} \times 0.238 \text{ psi/ft (0.05 bar/m)} =$   
4.3 psi (0.3 bar) drop for this section.
- b. T1 to T2 (20 gpm): 4 ft (1.2 m) (pipe)  
 $4 \text{ ft (1.2 m)} \times 0.109 \text{ psi/ft (0.025 bar/m)} =$   
0.44 psi (0.03 bar) drop for this section.  
**Note:** T1 is used here as a through tee and is not considered in equivalent length calculations.
- c. T2 to V2 (10 gpm): 5 ft (1.5 m) (equivalent length of tee, T2) + 3 ft (0.9 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 3 ft (0.9 m) (pipe) = 13 ft (4 m)  
 $13 \text{ ft (4 m)} \times 0.03 \text{ psi/ft (0.007 bar/m)} =$   
0.39 psi (0.027 bar) drop for this section.
- d. 4.3 psi (0.3 bar) drop + 0.44 psi (0.03 bar) drop +  
0.39 psi (0.027 bar) drop = 5.13 psi (0.32 bar)

#### V3 PATH

- a. M1 to T1 (30 gpm): 5 ft (1.5 m) (equivalent length of connection tee, M1) + 9 ft (2.7 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 2 ft (0.6 m) (pipe) = 18 ft (5.5 m)  
 $18 \text{ ft (5.5 m)} \times 0.238 \text{ psi/ft (0.05 bar/m)} =$   
4.3 psi (0.3 bar) drop for this section.
- b. T1 to T2 (20 gpm): 4 ft (1.2 m) (pipe)  
 $4 \text{ ft (1.2 m)} \times 0.109 \text{ psi/ft (0.025 bar/m)} =$   
0.44 psi (0.03 bar) drop for this section.  
**Note:** T1 is used here as a through tee and is not considered in equivalent length calculations.

- c. T2 to V3 (10 gpm): 6 ft (1.8 m) (pipe) + 2 ft (0.6 m) (equivalent length of elbow) + 1 ft (0.3 m) (pipe) = 9 ft (2.7 m)

$$9 \text{ ft (2.7 m)} \times 0.03 \text{ psi/ft (0.007 bar/m)} =$$

0.27 psi (0.019 bar) drop for this section.

**Note:** T2 is used here as a through tee and is not considered in equivalent length calculations.

- d. 4.3 psi (0.3 bar) drop + 0.44 psi (0.03 bar) drop +  
0.27 psi (0.019 bar) drop = 5.01 psi (0.35 bar)

**Step No. 4** Calculate the total pressure drop for each path.

- a. M1 to V1: 3.44 psi (0.237 bar) elevation pressure drop +  
4.57 psi (0.32 bar) flow pressure drop = 8.01 (0.55 bar) total V1 path pressure drop.
- b. M1 to V2: 2.58 psi (0.178 bar) elevation pressure drop +  
5.13 psi (0.354 bar) flow pressure drop = 7.71 psi (0.532 bar) total V2 path pressure drop.
- c. M1 to V3: 3.44 psi (0.237 bar) elevation pressure drop +  
5.01 psi (0.345 bar) flow pressure drop = 8.45 psi (0.532 bar) total V3 path pressure drop.

**Step No. 5** Determine which path has the greatest combined pressure drop and compare it with the maximum allowable pressure drop.

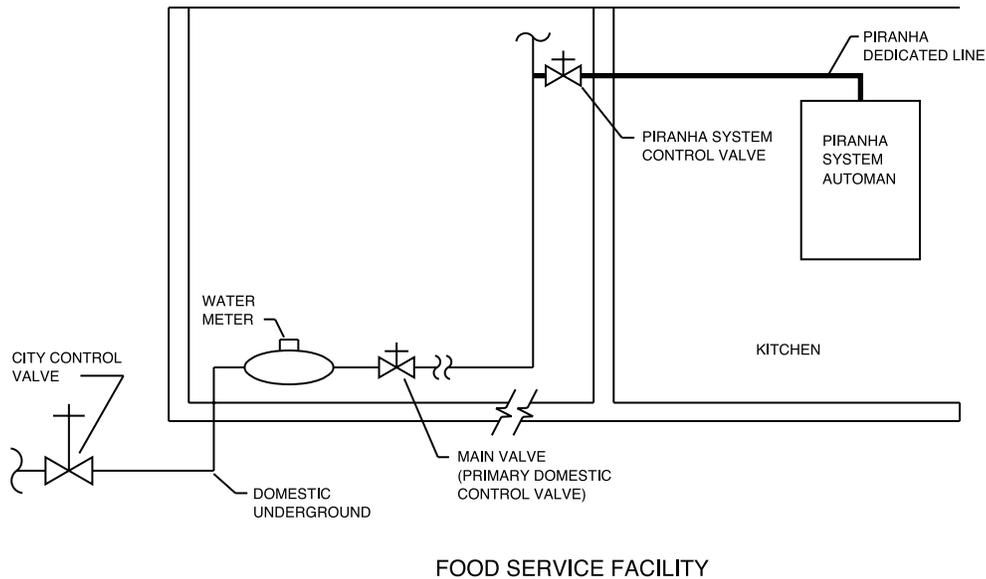
- a. The path with the greatest pressure drop is M1 to V3 (V1 path) which equals 8.45 psi (0.532 bar).
- b. Because the maximum allowable pressure drop is 10 psi (0.69 bar) and the greatest pressure drop is only 8.45 psi (0.532 bar), the use of 1 in. pipe for the three tank PIRANHA dedicated waterline will be acceptable.

**TYPICAL TIE-IN DRAWINGS (EXAMPLE ONLY) – For detailed design requirements, see pages 4-23 to 4-24**

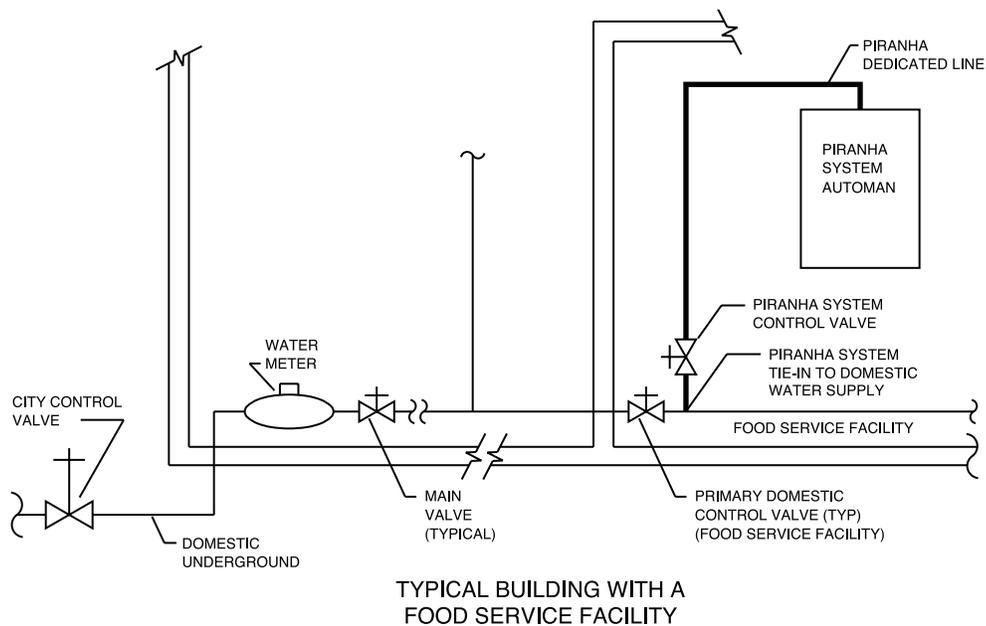
The following four drawings are typical examples of different types of water tie-in situations. The examples may help in designing the waterline connection.

The four examples are:

- Domestic tie-in (to Food Service Facility)
- Domestic tie-in (Building with Food Service Facility)
- Multi-story tie-in
- Strip mall tie-in (could also simulate a food court setup)



**FIGURE 4-42**  
003309



**FIGURE 4-43**  
003310

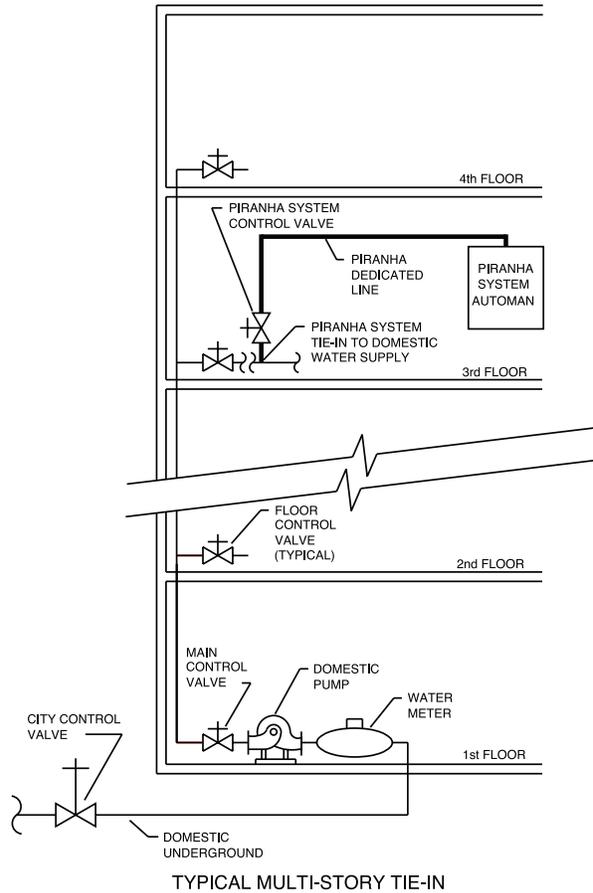
**SECTION 4 – SYSTEM DESIGN**

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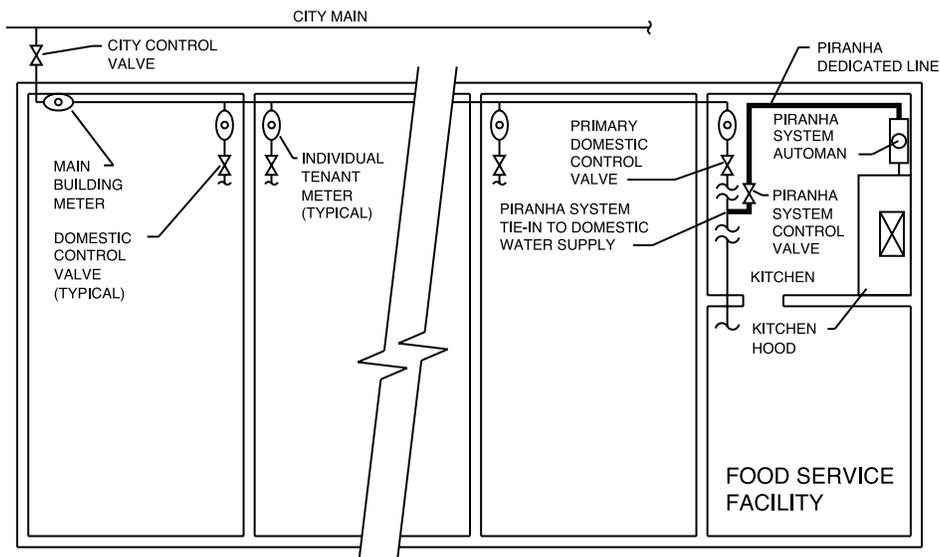
*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**TYPICAL MULTI-STORY TIE-IN (EXAMPLE ONLY) – For detailed design requirements, see pages 4-23 to 4-24**



**FIGURE 4-44**  
003307

**TYPICAL STRIP MALL TIE-IN (EXAMPLE ONLY) – For detailed design requirements, see pages 4-23 to 4-24**



**FIGURE 4-45**  
003308

**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 PIRANHA system must be trained, and hold a current ANSUL certificate in a PIRANHA training program.

Before attempting any installation, the entire system design must have been determined including: Nozzle Placement, Tank Quantity, Actuation and Expellant Gas Piping, Waterline 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). 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.

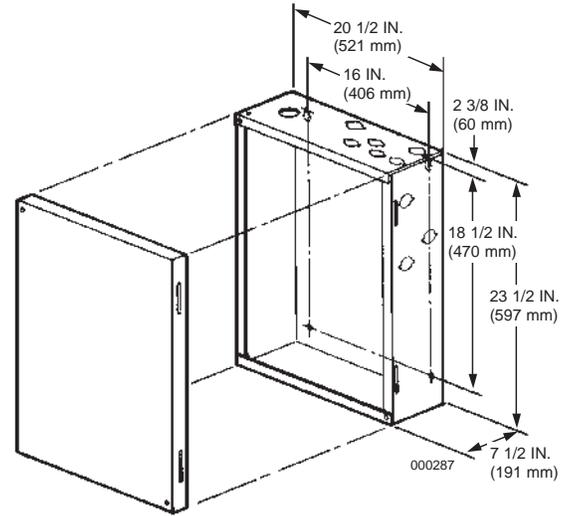
**CAUTION**

- ▶ Use only an AUTOMAN Regulated Release assembly. 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.

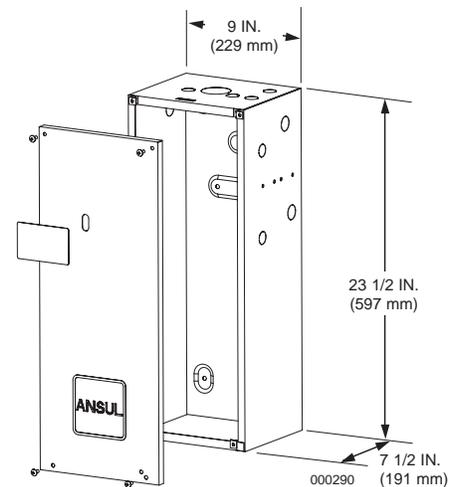
▶ Mount the regulated release assembly, each regulated actuator assembly, and each remote release by completing the following steps: See Figure 5-1.

- 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 gas line lengths and must be able to support the weight of the assembly(ies).
- b. Detach cover from the enclosure. Remove agent tank from enclosure and the expellant gas line hose and the water 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.

**▶ REGULATED RELEASE ASSEMBLY/REGULATED ACTUATOR ASSEMBLY**



**REMOTE RELEASE**

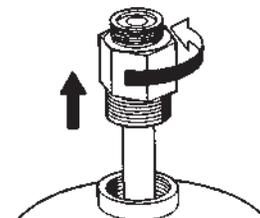


**FIGURE 5-1**

**CAUTION**

- ▶ Do not install cartridge at this time. Failure to comply may result in accidental system discharge.

2. 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 5-2.



**FIGURE 5-2**  
000291

**SECTION 5 – INSTALLATION INSTRUCTIONS**

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**INSTALLING RELEASE ASSEMBLY COMPONENTS**

**(Continued)**

b. **CAUTION**

Safety glasses should be worn during transfer operations of PRX 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.

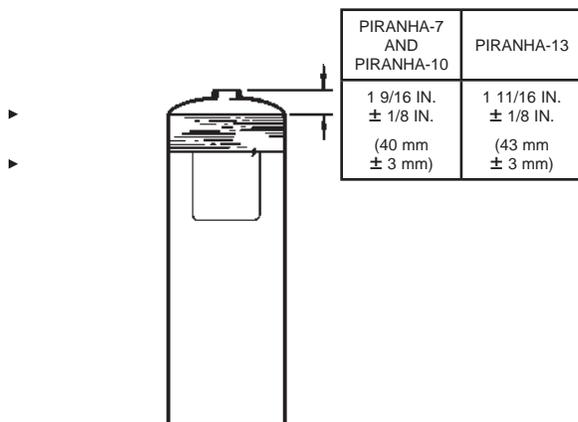
Place plastic funnel in fill opening and fill tank with PRX Liquid Fire Suppressant:

PIRANHA-7	PIRANHA-10	PIRANHA-13
gal (L)	gal (L)	gal (L)
1.5 (5.8)	2.25 (8.5)	3 (11.6)
Fill is complete when PRX liquid level is within the following measurement from top of tank collar:		
1 9/16 in. ± 1/8 in. (40 mm ± 3 mm)		1 11/16 in. ± 1/8 in. (43 mm ± 3 mm)

See Figure 5-3.

**CAUTION**

Make certain tank is filled to the proper level. 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 5-3**  
000292

**Note:** PRX agent will freeze if the storage temperature of the liquid falls below 10 °F (-12 °C). If you have container(s) of PRX agent which have or are suspected of having frozen, perform the following instructions.

Thaw container out at room temperature, 60 °F to 70 °F (15 °C to 21 °C). After thawing, a small amount of white colored material will remain on the bottom of the container. Invert or roll the pail for two to three minutes to re-suspend the material.

After this mixing motion, a small amount of the inorganic salts may remain out of solution. This is carbon dioxide, which has been dissolved in the water. After cooling, the gas forms an insoluble salt and falls from solution.

**While this product/material is not detrimental to PRX agent nor does it reduce the efficiency of the agent, care must be taken to avoid having larger insoluble pieces enter the agent tank assembly. Therefore, the use of a funnel with an integral filter screen is recommended when filling tank assemblies.**

**CAUTION**

Do not mix PRX agent with ANSULEX LPH agent. If mixed, suppression capability will not be performed properly.

- 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.
- 5. Reinstall expellant gas hose and water hose to adaptor/tube assembly. Wrench tighten.

**INSTALLING THE ACTUATION GAS LINE**

Before installing any actuation gas line, the piping design must be determined, and the regulated release assembly and each regulated actuator 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, 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 this could cause possible blockage of the gas pressure.

Thread sealant or compound must not be used.

- 4. When connecting actuation gas line piping, install a 1/4 in. union near the regulated actuator for easy disassembly later.

**INSTALLING THE ACTUATION GAS LINE (Continued)**

5. Check for leaks in the actuation line: Follow instructions in Section 8 – Maintenance Examination, step 5, page 8-1 to 8-2.

**CAUTION**

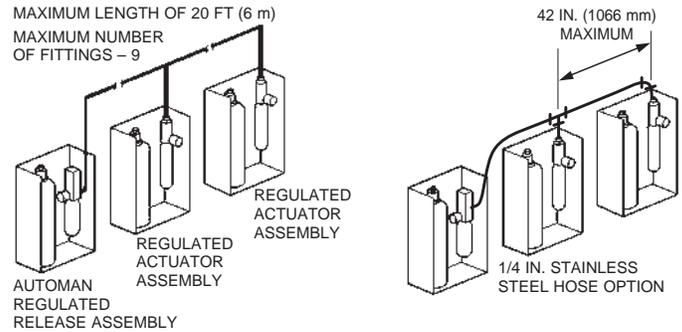
If the actuation line leaks pressure, the regulated actuator assembly(s) may not operate. A severe leak can render the entire system inoperable.

**Actuation Gas Line – 2 Additional Tanks Maximum**

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 1/4 in. plug from high pressure side outlet tee. Install the appropriate fitting for additional equipment attachment as required.
2. Run piping up through the regulated release assembly enclosure knockout to the inlet on top of each regulated actuator assembly used within the system.
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) of 1/4 in. piping when using an LT-20-R nitrogen cartridge or an LT-30-R nitrogen cartridge\*. See Figure 5-4.
4. A total of nine fittings may be used in the actuation line, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

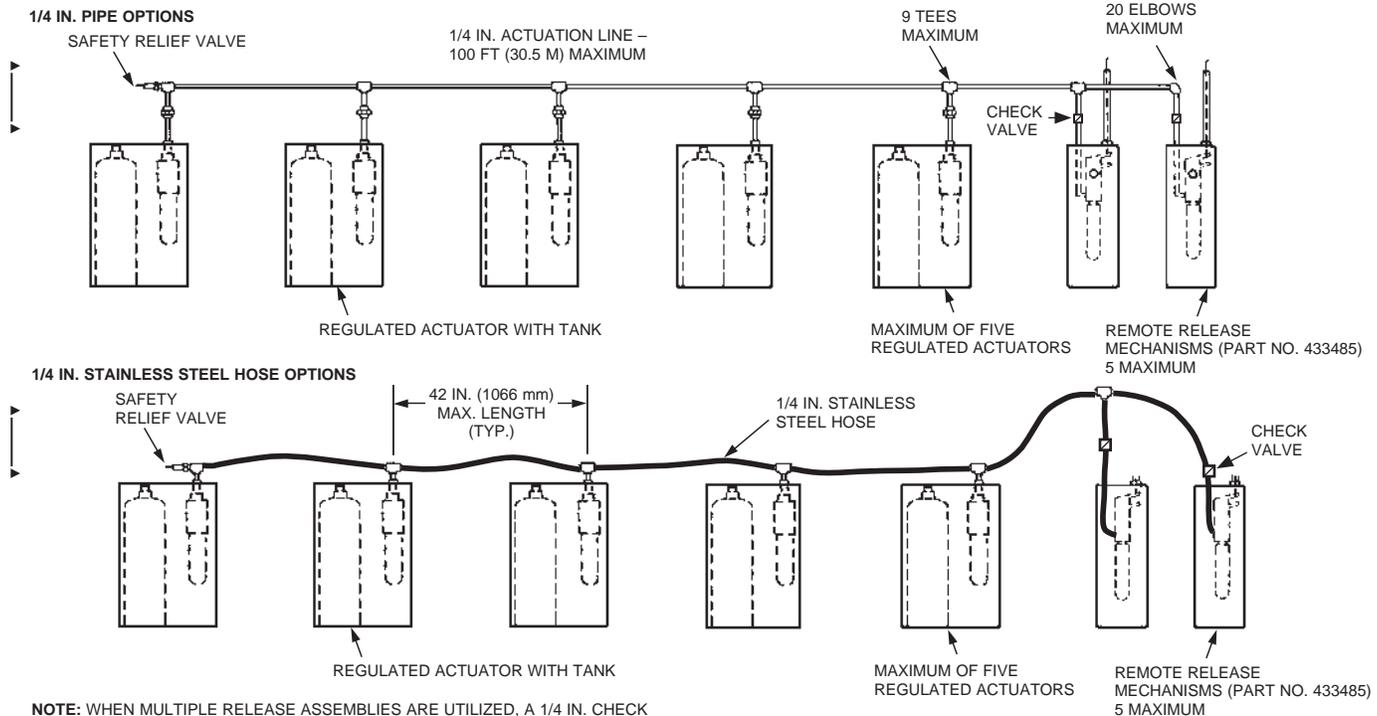
\* A maximum of 30 ft (9.1 m) of actuation gas line can be used if a double tank cartridge is used in the AUTOMAN Release Assembly.



**FIGURE 5-4**  
001640

**Actuation Gas Line – 5 Tanks Maximum**

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings or 1/4 in. stainless steel hose.
2. The actuation gas line is installed from the remote mechanical release to each 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 5-5.
4. Use only a 101-10 carbon dioxide cartridge in the 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.



**NOTE:** WHEN MULTIPLE RELEASE ASSEMBLIES ARE UTILIZED, A 1/4 IN. CHECK VALVE (PART NO. 25627) WILL BE REQUIRED AFTER EACH RELEASE.

**FIGURE 5-5**  
001641

## SIZING AND INSTALLING WATERLINE

## General

1. The water valve in each regulated release and regulated actuator must be connected to the food service facility water supply by a waterline sized to provide a simultaneous flowing water pressure at each PIRANHA Water Pressure Testing Assembly Gauge between the pressures stated in "Water Supply Requirements," listed in the Design section, when the waterline is flow tested. It is the ANSUL Distributor's responsibility to verify that the water supply to the protected hazard has been designed with the capacity and pressure to provide the minimum required flowing pressure to each PIRANHA System, when flowing simultaneously with the highest normal domestic water usage anticipated for the building.
2. When connected to a domestic waterline, it is recommended to use one release and two regulated actuators. See Figure 5-6.

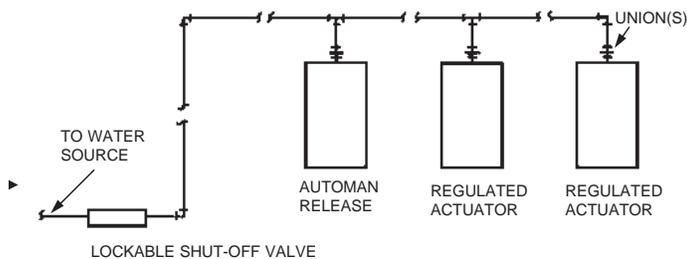


FIGURE 5-6  
001618

**Note:** If more than three tanks are utilized in a single system, the waterline will need to be sized for a water flow of 10 gpm (38 Lpm) x no. of tanks at a flowing pressure of 33 psi (2.3 bar) with all tanks discharging simultaneously.

3. Each PIRANHA waterline must meet the requirements stated in "Water Supply Requirements" listed in the Design section.
4. Piping and fittings must be Type M seamless copper water tubing per ASTM B88 as a minimum (Type L and Type K can also be used) with copper solder fittings; or CPVC plastic pipe, either Schedule 40 per ASTM F441 or SDR17 per ASTM F442 with adhesive-type socket fittings; or Schedule 40 galvanized steel pipe per ASTM A53 with galvanized steel or galvanized malleable iron threaded fittings. Always install a union in the waterline near the connection to the AUTOMAN Release or the regulated actuator.
5. In older systems, reduction of waterline to connect to the 1/2 in. NPT inlet at the releasing device(s) must be done immediately before the waterline enters the top of the release enclosure. Current systems utilize a 3/4 in. NPT inlet at the releasing device(s).

## Sizing the Waterline

The minimum waterline size must be a minimum of 3/4 in. pipe or tube for a single system or 1 in. pipe or tube for either a double or triple PIRANHA system. The actual size must be determined by pressure drop calculations to assure the total pressure drop in the dedicated waterline between the water supply connection and each PIRANHA water valve will not exceed the difference between the available water pressure

and the required minimum flowing water pressure at each PIRANHA water valve located in each AUTOMAN Release or regulated actuator. While the PIRANHA system may flow more than 10 gpm (37.9 Lpm) at inlet pressures greater than the minimum required, pressure drop calculations must assume a flow of 10 gal (37.9 L) per minute to each PIRANHA water valve and must include losses for waterline flow friction and the difference in waterline elevation between the water supply connection and the PIRANHA water valve(s).

**Note:** Conduct a flowing water pressure test of the water system immediately after installing to confirm the proper water pressure at the release assemblies. See "Pressure Testing the Water System" in Testing and Placing in Service, Section 6.

## CONNECTING TO WET PIPE SPRINKLER SYSTEM

PIRANHA dedicated water line can be connected to wet pipe sprinkler systems.

The piping requirements in NFPA 13 need to be followed when the PIRANHA dedicated waterline is connected to a wet pipe sprinkler system, and apply only to the waterline portion of the PIRANHA system. The requirements in NFPA 13 **DO NOT** apply to the PIRANHA system or the waterline connection when the dedicated waterline is connected to the domestic water supply.

The PIRANHA system has been tested, evaluated, and listed to be used **WITHOUT** any additional back-flow prevention needed. However, if the PIRANHA system is to be connected to an existing sprinkler system, or is to be included as an addition to a sprinkler system currently being designed or under construction, make certain all back-flow prevention, existing or intended, is reviewed and approved prior to PIRANHA system installation by the appropriate authority having jurisdiction.

- "ONLY" connections to wet pipe sprinkler systems are acceptable. Dry pipe and pre-action type sprinkler systems are NOT PERMITTED for use with PIRANHA.
- The dedicated PIRANHA system waterline tap to the sprinkler system must be made by an appropriately licensed sprinkler fitter/contractor. All pipe, fittings, and hangers from the sprinkler tap/connection to the PIRANHA system water valve in the AUTOMAN Regulated Release Assembly and/or Regulated Actuator Assembly(s) must be made in accordance with the "applicable" requirements of NFPA 13. Use of plastic pipe and fittings for this connection is not acceptable.
- For fire sprinkler system connection, the minimum PIRANHA dedicated waterline pipe or tube size must be 1 in. Multiple PIRANHA tank systems may require larger size pipe as required.
- For PIRANHA installations utilizing sprinkler systems in new construction, the PIRANHA water demand must be calculated as part of the sprinkler system demand (if the point of connection is to be in the hydraulically most remote area). The water demand for each PIRANHA system tank is normally 10 gpm (37.9 Lpm).

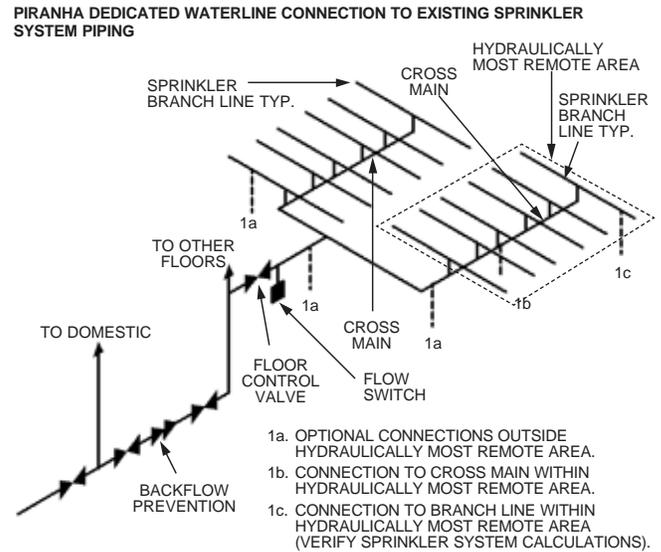
The pressure loss in the piping, valves, and fittings from the sprinkler connection to the AUTOMAN Regulated Release Assembly and/or Regulated Actuator Assembly(s) must be included in the hydraulic calculations. In new construction, the PIRANHA waterline piping can be connected to the nearest branch line provided the hydraulic calculations indicate an adequate water supply.

**CONNECTING TO WET PIPE SPRINKLER SYSTEM  
(Continued)**

- For PIRANHA waterline connection to existing sprinkler piping outside the hydraulically most remote area, connection can be made to either the nearest cross main or a sprinkler branch line (see Figure 5-6a). For PIRANHA waterline connection to existing sprinkler piping within the hydraulically most remote area, the PIRANHA dedicated waterline must be connected to the nearest “cross main” (see Figure 5-6a) unless the sprinkler system can be hydraulically recalculated to verify enough water pressure and flow to allow connection to a sprinkler branch line (see Figure 5-6a).
- ▶ The AUTOMAN Regulated Release Assembly and Regulated Actuator Assembly are listed for use with water pressures up to and including 100 psi (6.9 bar). When the calculated static pressure at the inlet to either the AUTOMAN Regulated Release or Regulated Actuator does not exceed 100 psi (6.9 bar), the PIRANHA dedicated waterline must include a lockable water shutoff valve (or listed monitored valve), wye strainer, and low point drain valve (1 in. minimum) (see Figures 5-6b and 5-6c).
- ▶ When the water pressure at the inlet to either the AUTOMAN Regulated Release Assembly or Regulated Actuator Assembly exceeds 100 psi (6.9 bar) static pressure, the PIRANHA dedicated waterline will require a primary shutoff valve, a pressure regulating (reducing) valve (to lower the pressure to below 100 psi (6.9 bar)), and a pressure relief valve piped to a drain, in addition to the ANSUL lockable shutoff valve, wye strainer, and low point drain valve (see Figures 5-6d and 5-7).

The ANSUL Lockable Ball Valve is available by ordering either the 1 in. valve (Part No. 423956), or the 1 1/4 in. valve (Part No. 423957), along with Padlock (Part No. 423727), and Water Valve I.D. Tag (Part No. 423678). **The ball valve must be installed in an accessible location that is clearly visible, if possible. If the valve is installed in an enclosure or above the ceiling, its location must be identified by an easily located nameplate or placard.**

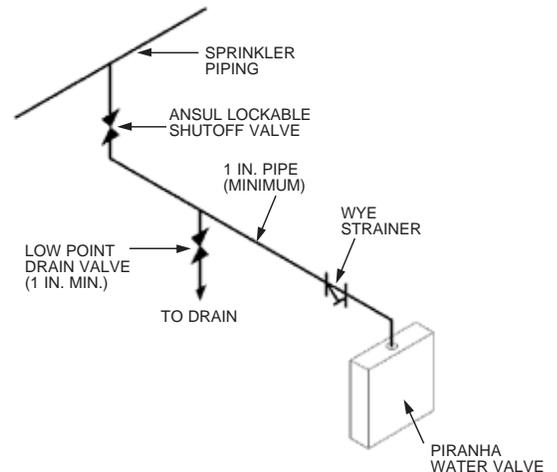
- ▶ You may also want to consider adding a 3/4 in. union above the AUTOMAN Regulated Release and each Regulated Actuator Assembly connected to the dedicated PIRANHA waterline, to facilitate servicing the system.



**FIGURE 5-6a**

004523

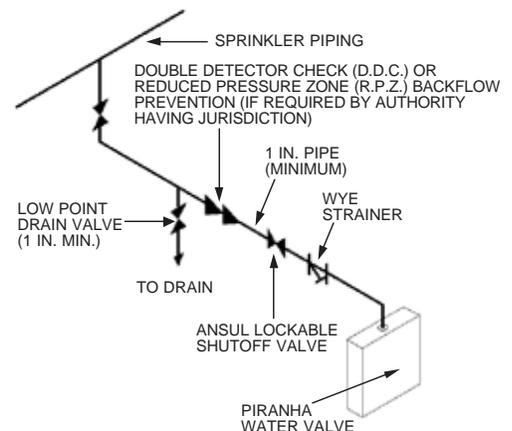
**WATER PRESSURE UP TO 100 PSI (6.9 bar) STATIC AT PIRANHA WATER VALVE (NO ADDITIONAL BACKFLOW PREVENTION REQUIRED)**



**FIGURE 5-6b**

004524

**▶ WATER PRESSURE UP TO 100 PSI (6.9 bar) STATIC AT PIRANHA WATER VALVE (WITH ADDITIONAL BACKFLOW PREVENTION, IF REQUIRED)**



**FIGURE 5-6c**

004525

## SECTION 5 – INSTALLATION INSTRUCTIONS

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### CONNECTING TO WET PIPE SPRINKLER SYSTEM (Continued)

WATER PRESSURE OVER 100 PSI (6.9 bar) STATIC AT PIRANHA WATER VALVE  
(NO ADDITIONAL BACKFLOW PREVENTION REQUIRED)

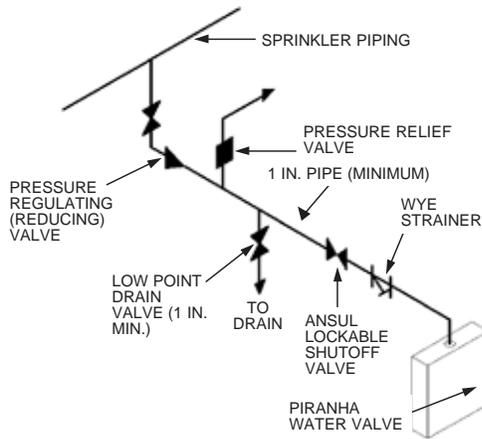


FIGURE 5-6d  
004526

WATER PRESSURE OVER 100 PSI (6.9 bar) STATIC AT PIRANHA WATER VALVE  
(WITH ADDITIONAL BACKFLOW PREVENTION, IF REQUIRED)

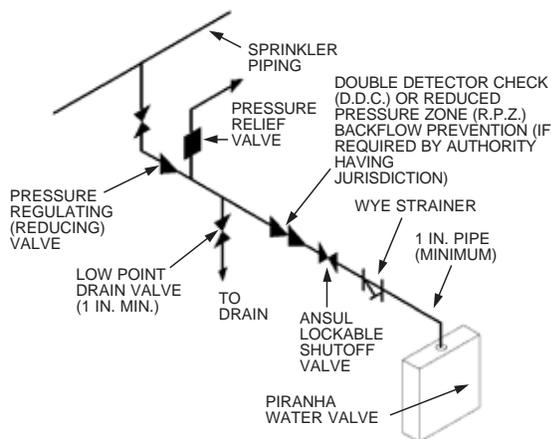


FIGURE 5-7  
004527

### INSTALLING THE DISTRIBUTION PIPING

The agent distribution system is pre-engineered and is designed and installed in accordance with the instructions in this manual and NFPA 17A. NFPA 13 only applies to the waterline piping when connected from a wet pipe sprinkler system to the releasing device(s).

Before the following procedures can be completed, the piping design must already be determined, and the actuation gas lines from the regulated release and each regulated actuator should already be installed.

### General Piping Requirements

1. Use Schedule 40 black iron, chrome-plated, or stainless steel pipe and fittings conforming to ASTM A120, A53, or A106.

#### 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 within the hood and the protected area, as a minimum, 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 must be run independently to the predetermined hazard area.

### Pipe Hanger Guidelines

1. Space hangers as follows:

Pipe Size	Maximum 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 nozzles must be installed.
3. Run all lines to the hazard area and connect each nozzle. (Make certain all fittings are tight and all piping is securely bracketed.)

## INSTALLING THE DISTRIBUTION PIPING (Continued)

### Piping Installation (Continued)

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. If Teflon tape is not used, 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. Aim the nozzles to a pre-determined aim point in accordance with the instructions in the "System Design" section.
  - ▶ Using the Nozzle Aiming Device (Part No. 439877) 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 Swivel Adapter (Part No. 418569), the nozzle with Aiming Device can be rotated to the exact aiming point and then tightened to hold that angle.
6. Before installing blow-off caps on nozzles, apply a thin coat of Dow Corning No. 111 silicone grease across the opening in the nozzle tip, and also a small amount on the exterior of the nozzle tip. This helps prevent cooking grease from wicking around the seal of the blow-off cap.

### CAUTION

Do not push silicone grease into the nozzle orifice. Failure to comply may result in the nozzle becoming plugged, or in non-effective agent discharge.

### NOTICE

When using old style metal blow-off cap, make certain the spring clip rotates freely on the metal cap and coat outside of cap and clip with Dow Corning No. 111 silicone grease. DO NOT pack silicone grease in the cap or into nozzle orifice.

7. 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.

## 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 PIRANHA 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.).

## SECTION 5 – INSTALLATION INSTRUCTIONS

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS

Before proceeding, **CAREFULLY** read all instructions, including all **CRITICAL INSTALLATION REQUIREMENTS**.

#### General Requirements

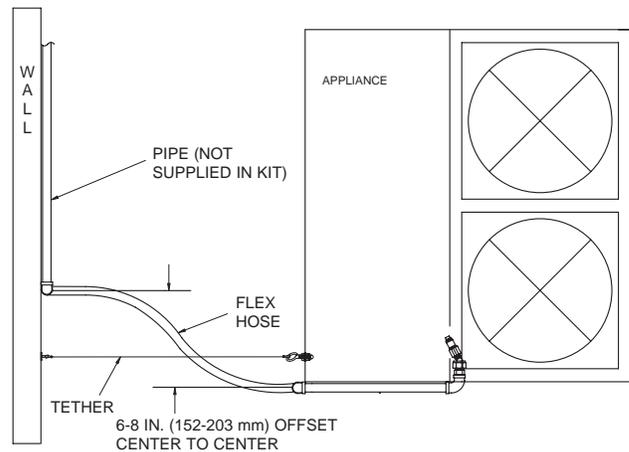
1. The Agent Distribution Hose (Part No. 434462) (which is part of Discharge Hose and Restraining Cable Kit (Part No. 435982)), is 1/2 in. (13 mm) diameter x 60 in. (1524 mm) long and is provided with two male NPT swivels for ease of installation.
2. Maximum of six Agent Distribution Hoses can be used in each agent distribution piping network.
3. Agent Distribution Hose can only be used for castered appliances or appliances setting on castered supports.
4. Maximum of two Agent Distribution Hoses is 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 is allowed per appliance drop 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.

#### 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. A 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 5-12.)
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 (ft (m)) of allowable distribution pipe.
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 5-8) 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 5-8**  
007828

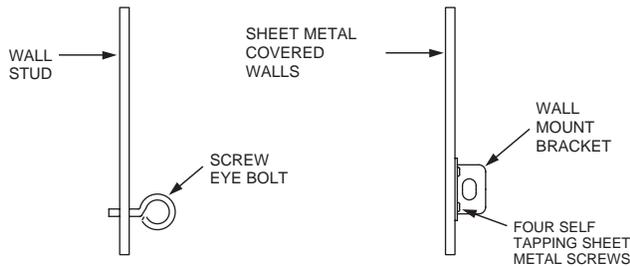
▶ **AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)**

**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.

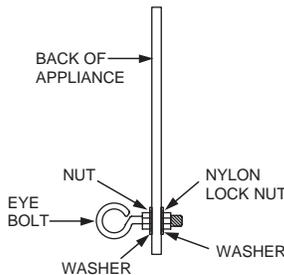
See Figure 5-9 for mounting the Restraining Cable to the wall. See Figure 5-10 for mounting the Restraining Cable to the back of an appliance.

RESTRAINING CABLE – WALL-MOUNTED OPTION



**FIGURE 5-9**  
008088

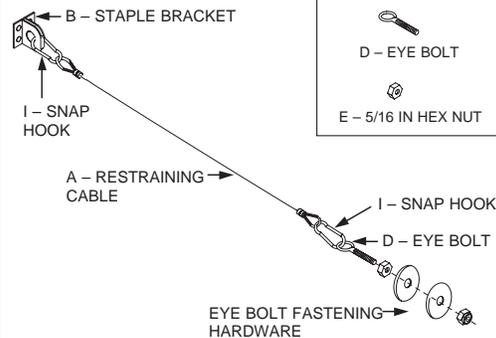
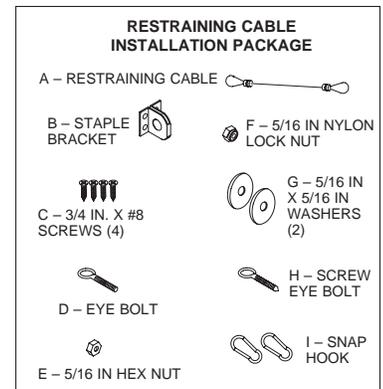
RESTRAINING CABLE – APPLIANCE-MOUNTED OPTION



**FIGURE 5-10**  
008089

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. (8 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 5-11). After snap-hooking the assembly, seal the Restraining Cable Loops to the wall bracketry and appliance connection hardware with ANSUL Lead Wire Seal (Part No. 197).



**FIGURE 5-11**  
007829

**Final Installation Guidelines and Checkout Procedures**

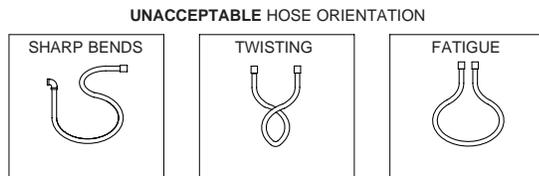
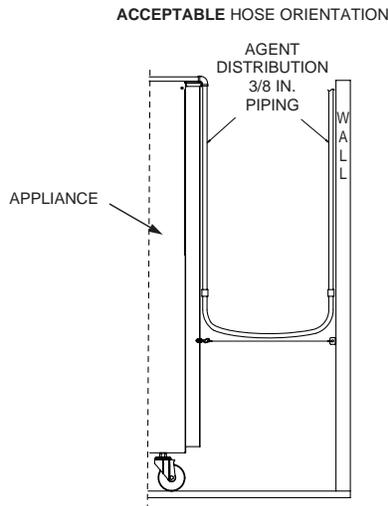
After the Agent Distribution Hose and the Restraining Cable is properly installed, carefully push the appliance back to its normal operating position. Check that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance.

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.

**AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)**

**Restraining Cable Installation (Continued)**

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 5-12.) If any of these conditions exist, the hose and/or hose connections will require installation modifications.



**FIGURE 5-12**  
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.

**LOCATING AND AIMING APPLIANCE PROTECTION NOZZLES**

For overlapping protection of appliances, the AP nozzles must be located relative to the appliance cooking hazards in accordance with the rules for Overlapping Appliance Nozzle and Hazard Zone Locations given in the System Design section of this manual. All overlapping appliance protection nozzles covering appliances from overhead must be aimed at the centerline of the selected hazard zone so that the aim line from each nozzle to the hazard zone centerline is perpendicular to that hazard zone centerline.

Attach the nozzle aiming device (Part No. 431992) to the nozzle and loosen the nut on the swivel adaptor. Aim the nozzle by projecting the laser point to the pre-determined centerline location on the hazard zone. Make certain the aiming point is also on the same line as the perpendicular line from the nozzle. Then, retighten the nut on the swivel adaptor.

For dedicated nozzle locating, refer to Section 4, System Design, for detailed information.

**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.

**Note:** For installation instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

**NOTICE**

Inform customer that fusible links should not be exposed to ammonia-based chemical cleaners or steam.

1. Based on the requirements listed in the “System Design” section, mount the detectors in their predetermined locations.
2. Run 1/2 in. EMT 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. The inside of pipe and fittings must be free of oil and dirt.

When changing the direction of 1/2 in. EMT conduit, use only ANSUL pulley elbows, except, at the top of the regulated release, it is acceptable to use the “Conduit Offset Assembly” (Part No. 436063).

**Note:** If stainless steel scissor linkage is used in the system while using conduit offset assembly, the following limitations must be observed:

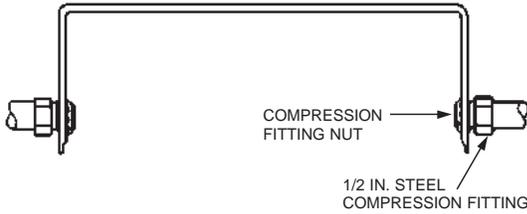
- Maximum number of elbows – 16
- Maximum number of detectors – 15
- Maximum length of 1/2 in. EMT Conduit – 150 ft (45.7 m)

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 stainless steel cable to be threaded through the linkage assembly while it is being fed through the detection system.

**INSTALLING THE DETECTION SYSTEM (Continued)**

**“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 5-13.

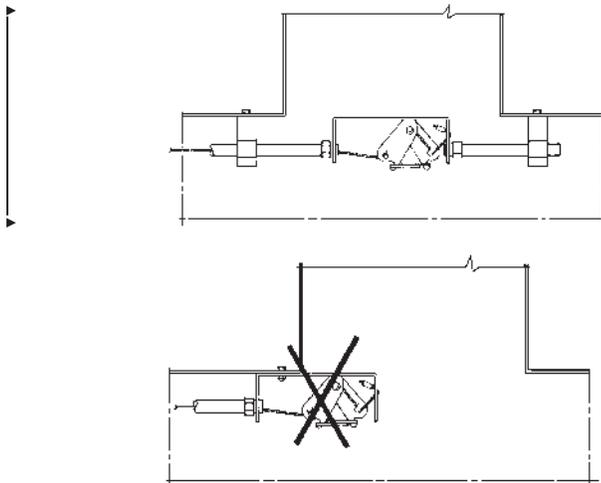


**FIGURE 5-13**  
000306

**NOTICE**

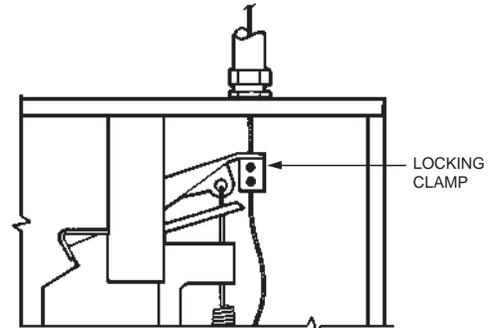
Do not use zinc die cast compression connectors on the detection conduit lines as these will not withstand the normally high temperatures experienced in the plenum area.

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 5-14.



**FIGURE 5-14**  
002463 / 002464

3. Starting at the release assembly, feed the stainless steel cable through the hole in the release mechanism locking clamp, allowing the excess stainless steel cable to hang down. (Do not tighten set screws in locking clamp at this time.) See Figure 5-15.

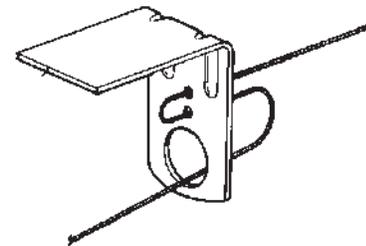


**FIGURE 5-15**  
000309

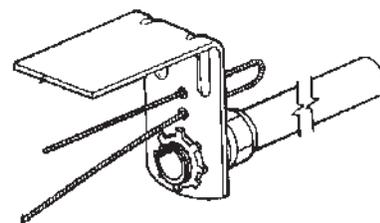
4. From the release assembly, run the stainless steel cable through the conduit, pulley elbows and detector brackets to the terminal detector.

**NOTICE**

- ▶ If stainless steel cable 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 stainless steel cable through the terminal detector bracket as shown in Figure 5-16 or as shown in Figure 5-17 if the terminal detector is mounted within a duct or header opening, and install the stop sleeve approximately 2 in. to 3 in. (51 mm to 76 mm) from the end of the stainless steel cable. See Figure 5-18. Use the National Telephone Supply Company Nicopress Sleeve Tool (Stock No. 51-C-887) or equivalent to properly crimp the stop sleeve.



**FIGURE 5-16**  
000310



**FIGURE 5-17**  
000311

**SECTION 5 – INSTALLATION INSTRUCTIONS**

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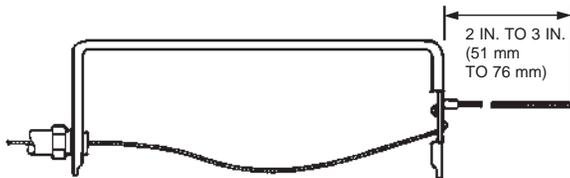
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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

**INSTALLING THE DETECTION SYSTEM (Continued)**

**“Scissor” Style Linkage Installation (Continued)**

Step 5 (Continued)



**FIGURE 5-18**  
000312

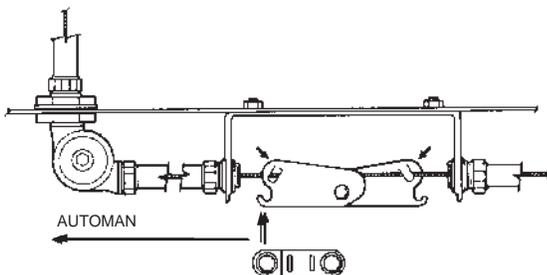
- ▶ 6. To give a constant tension on the stainless steel cable during installation of the detector linkage, hang a vice grip or other weighted device on the excess cable, leaving an adequate length of spare cable between the locking clamp and the weighted device.

**NOTICE**

When attaching the weighted device to the excess stainless steel cable, allow approximately 3 in. (76 mm) of cable for each detector linkage for proper installation.

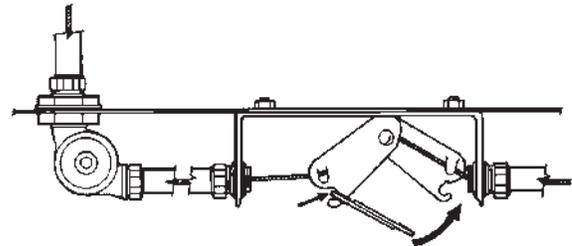
- ▶ **Example:** If the system has six detectors, there should be approximately 18 in. (457 mm) of excess stainless steel cable between the locking clamp and the weighted device, which will be utilized when the linkage is put in place.

- 7. Install detector scissor assembly as shown in Figure 5-19. Note that the AUTOMAN release 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. **Make certain the linkage assembly can still slide side to side on the cable.** Center the assembly in the detector bracket.

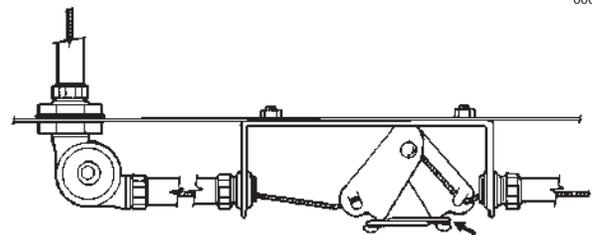


**FIGURE 5-19**  
000503

- 8. Hook the fusible link on the AUTOMAN release side of the hook assembly, then pull the fusible link to the opposite side and complete the hookup as shown in Figures 5-20 and 5-21. The top of the hook assembly must be inside the bracket stiffeners. The hook assembly with the fusible link in place must be located toward the terminal detector side of the bracket.

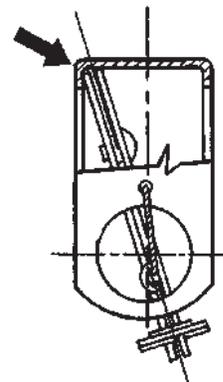


**FIGURE 5-20**  
000504



**FIGURE 5-21**  
000324

- 9. Install the linkage and the correct, 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 5-22.

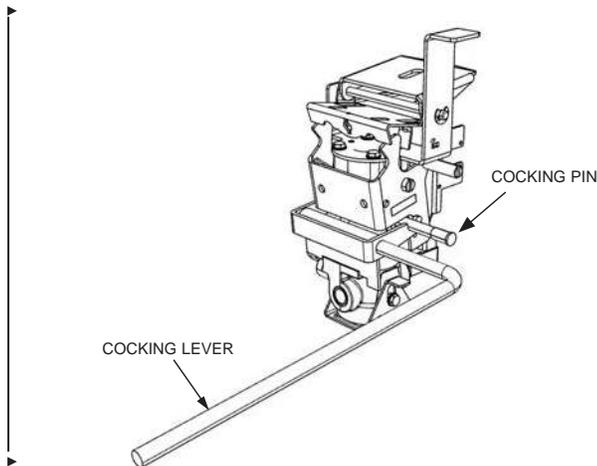


**FIGURE 5-22**  
004429

**INSTALLING THE DETECTION SYSTEM (Continued)**

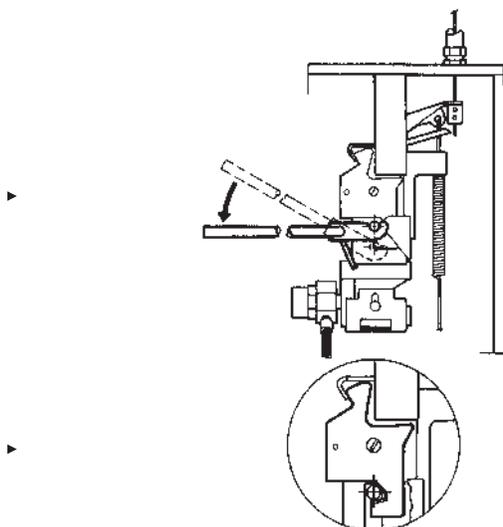
**“Scissor” Style Linkage Installation (Continued)**

- ▶ 10. Insert cocking lever (Part No. 441042 or 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 5-23.



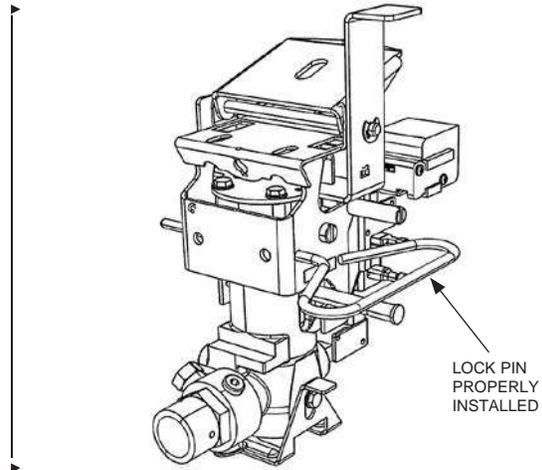
**FIGURE 5-23**  
009461

- ▶ 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 5-24.



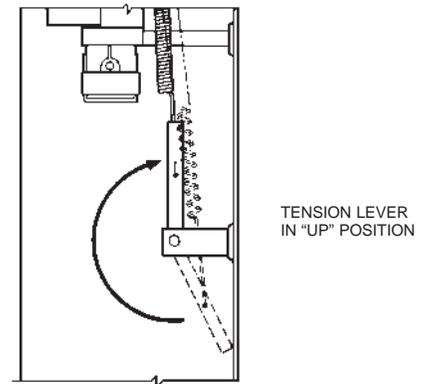
**FIGURE 5-24**  
000320

- ▶ 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 5-25.



**FIGURE 5-25**  
009462

- ▶ 13. Make certain tension lever is in the “UP” position. See Figure 5-26.



**FIGURE 5-26**  
000322

- ▶ 14. Verify each detector linkage assembly, with correct fusible link, is in the detector bracket, located fully toward the terminal detector side.

**NOTICE**

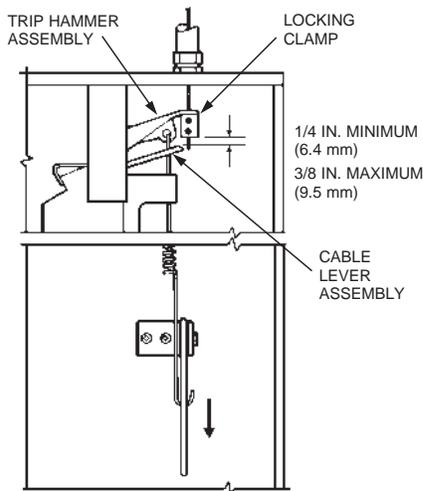
Due to the close adjustment between the trip hammer and cable lever assemblies, use only the particular fusible link(s) selected for installation in each detector, including terminal detector, to ensure correct adjustment when performing Steps 15 and 16.

- ▶ 15. Raise trip hammer 3/8 in. to 1/2 in. (9.5 mm to 12.7 mm), pull all slack out of stainless steel cable, and tighten set screws on locking clamp.

**INSTALLING THE DETECTION SYSTEM (Continued)**

**“Scissor” Style Linkage Installation (Continued)**

- ▶ 16. Lower tension lever to “DOWN” position and inspect the base of the stainless steel cable clamping device 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 5-27. (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.)



**FIGURE 5-27**  
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 of this manual.
- ▶ 18. When testing has been completed, cut off excess cable in the regulated release assembly, leaving approximately 2 in. (51 mm) of cable below the clamping device.

**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.

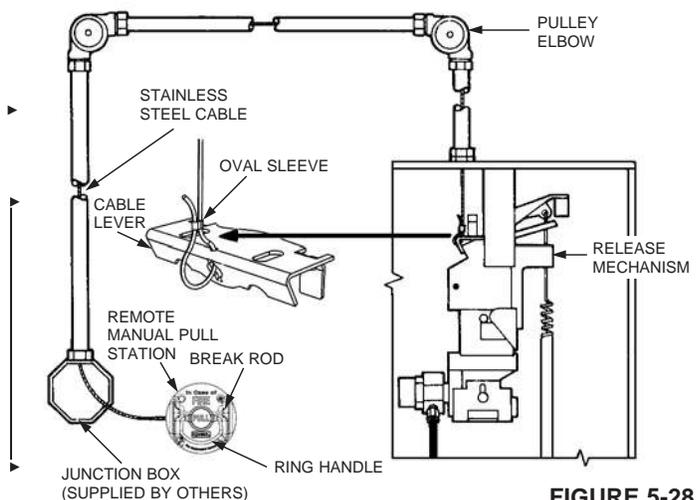
- ▶ 2. Verify that cartridge has been removed from regulated release assembly and that the regulated release assembly is in the cocked position.
- ▶ If regulated release assembly does not have lock pin inserted or cartridge removed, refer to the “Semi-Annual Maintenance,” page 8-1, in “Maintenance Examination” section, and complete Steps 2 and 3 before completing the following installation steps.
- ▶ 3. 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. Maximum limits:
    - ▶ Length of stainless steel cable for each manual pull station: 150 ft (45.7 m)
    - ▶ Number of pulley elbows per each: 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 in each pull station junction box to regulated release assembly as necessary. See Figure 5-28.
- See Figures 5-29, 5-30, and 5-31 for optional methods of installing stainless steel cable when utilizing a pulley tee.

REMOTE MANUAL PULL STATION SINGLE APPLICATION

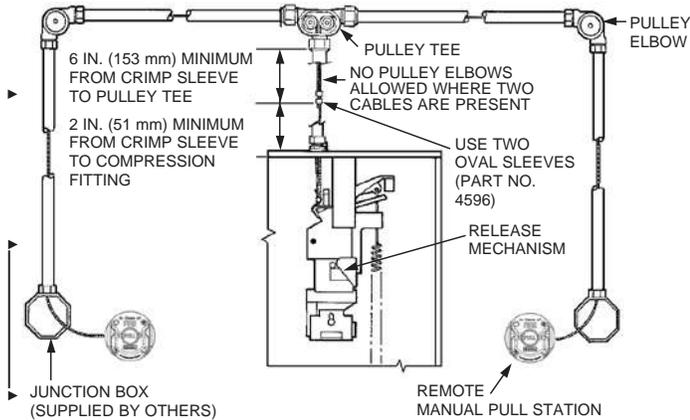


**FIGURE 5-28**  
009463

**INSTALLING REMOTE MANUAL PULL STATION  
(Continued)**

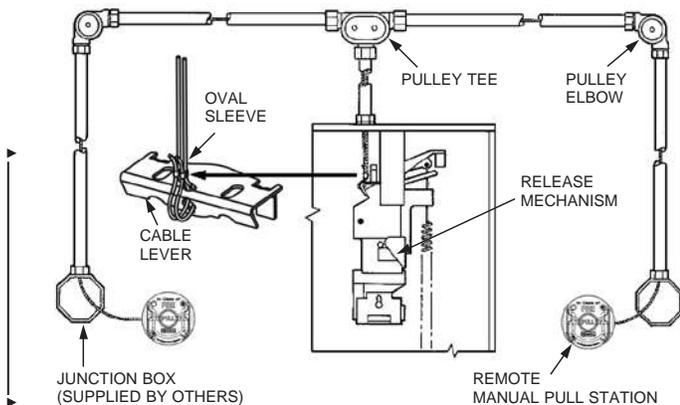
**INSTALLATION FOR REMOTE MANUAL PULL STATION  
UTILIZING EMT CONDUIT ONLY (Continued)**

▶ REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 1  
(ONE STAINLESS STEEL CABLE CONNECTED TO CABLE LEVER ASSEMBLY)



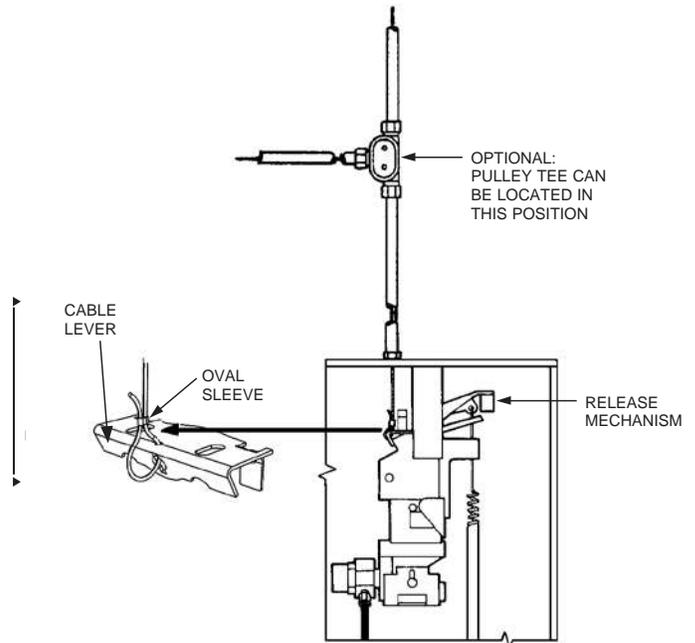
**FIGURE 5-29**  
009464

▶ REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 2  
(TWO CABLES CONNECTED TO CABLE LEVER ASSEMBLY)

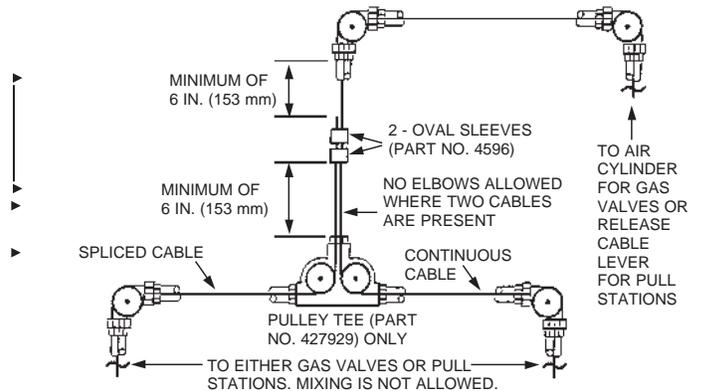


**FIGURE 5-30**  
009465

▶ REMOTE MANUAL PULL STATION APPLICATION – OPTION 3



**FIGURE 5-31**  
009466



**FIGURE 5-32**  
008393

- ▶ 4. Feed stainless steel cable 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 cable to the pull station pull knob (see Figures 5-64 through 5-79).

**NOTICE**

- ▶ Make certain that stainless steel cable rides on top and in center of pulley sheave. If the 50 ft (15 m) cable 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.

## SECTION 5 – INSTALLATION INSTRUCTIONS

UL EX 5174

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### INSTALLING REMOTE MANUAL PULL STATION (Continued)

5. Fasten pull station assembly to each junction box (if junction box is used).
- ▶ 6. Slide oval crimp sleeve onto stainless steel cable. Loop cable through cable lever guide holes and back through the oval crimp sleeve. See Figure 5-28.
- ▶ 7. Pull slack out of each stainless steel cable 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 5-28.

**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 5-20 through 5-32.

### INSTALLING MECHANICAL GAS VALVE

#### NOTICE

Mechanical gas valves are designed for indoor installations 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.

3. Remove plug from cartridge receiver. See Figure 5-33.

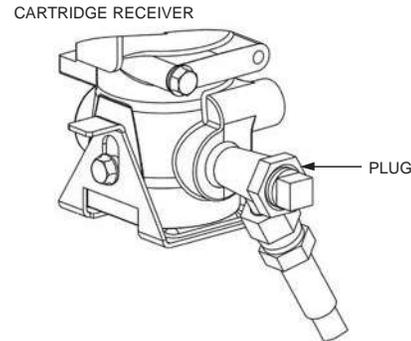


FIGURE 5-33  
009568

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 5-34. 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 5-35.

FOR MOUNTING ONE MECHANICAL GAS VALVE

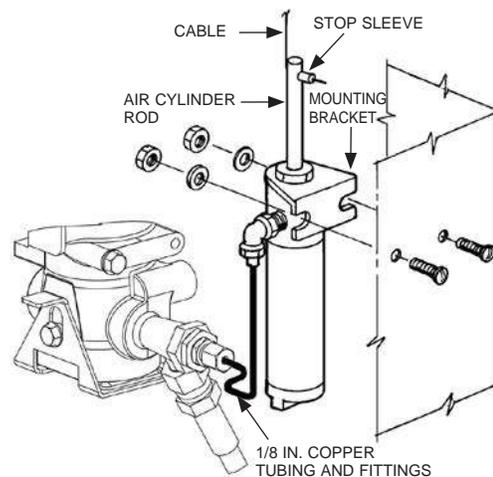


FIGURE 5-34  
009569

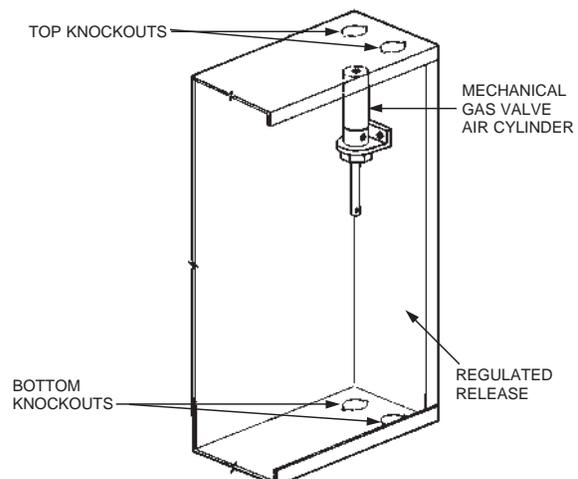


FIGURE 5-35  
000341

**INSTALLING MECHANICAL GAS VALVE (Continued)**

**Step 4 (Continued)**

**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 stainless steel cables can be run from each gas valve to a single air cylinder. See Figures 5-36 and 5-37.

- To install second mechanical gas valve shut-off system (maximum of two), locate second air cylinder and bracket assembly adjacent to first assembly and over the two remaining 7/32 in. (5.6 mm) holes provided on right side of the enclosure. Assemble second cylinder with screws, lockwashers, and nuts as required. Wrench tighten. See Figures 5-36 and 5-37.

SYSTEMS USING PULLEY TEE (PART NO. 15342)

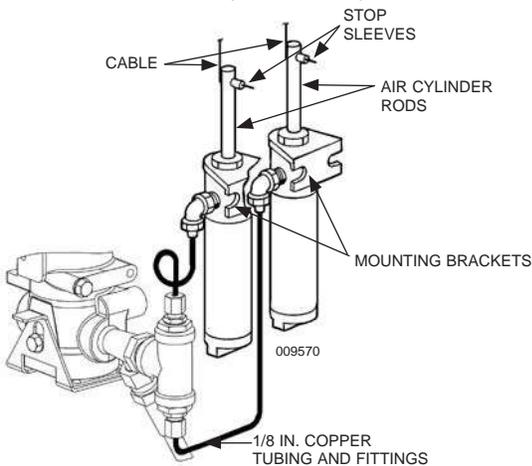


FIGURE 5-36

SYSTEMS USING PULLEY TEE (PART NO. 427929)

**NOTE: NO ELBOWS ARE ALLOWED BETWEEN AUTOMAN RELEASE AND PULLEY TEE**

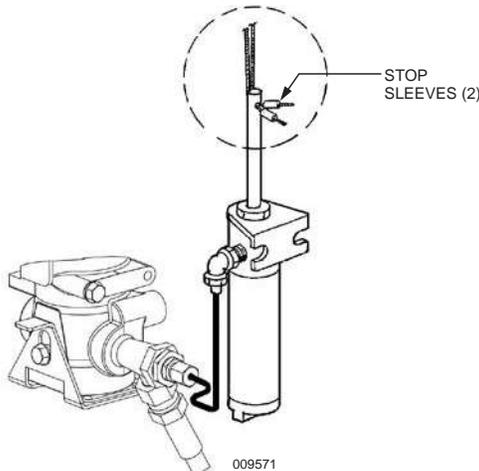


FIGURE 5-37

- 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 5-34 and 5-35.

**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.

**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 5-38 and 5-39.

- Use new pipe, properly reamed and cleaned of metal chips.
- 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.
- Wrench tighten pipe to gas valve. **DO NOT USE GAS VALVE AS A LEVER WHEN INSTALLING OR VALVE DAMAGE MAY OCCUR.** See Figures 5-38 and 5-39.
- If strainer is utilized, attach strainer ahead of gas valve.
- If necessary, install drip leg in gas line in accordance with the authority having jurisdiction.
- The total length of stainless steel cable allowed for each valve must not exceed 150 ft (45.7 m).
- The maximum number of pulley elbows allowed for each gas valve is 20.

## SECTION 5 – INSTALLATION INSTRUCTIONS

UL EX 5174

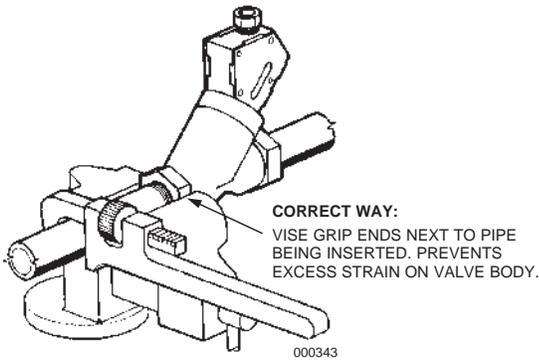
PAGE 5-18 REV. 07 2015-MAR-12

PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### INSTALLING MECHANICAL GAS VALVE (Continued)

#### Step 7 (Continued)

#### ANSUL MECHANICAL GAS VALVES



**CORRECT WAY:**  
WRENCH APPLIED NEXT TO PIPE BEING INSERTED PREVENTS EXCESS STRAIN ON VALVE BODY.

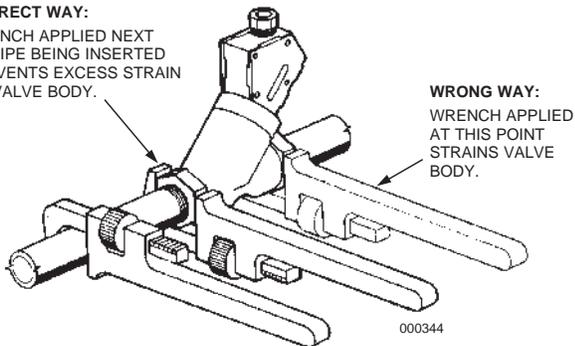
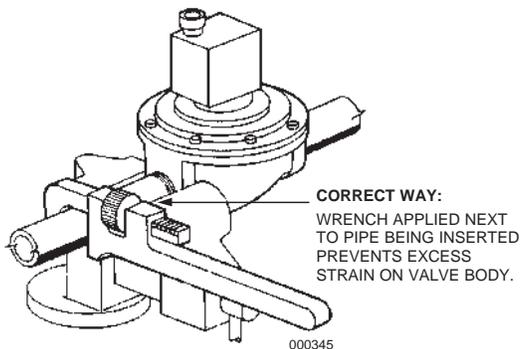


FIGURE 5-38

#### ASCO MECHANICAL GAS VALVES



**CORRECT WAY:**  
VISE GRIP ENDS NEXT TO PIPE BEING INSERTED. PREVENTS EXCESS STRAIN ON VALVE BODY.

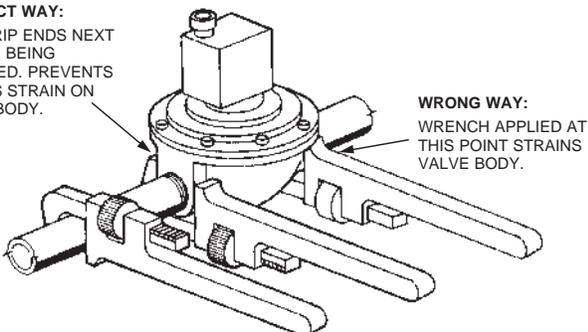


FIGURE 5-39

000346

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 stainless steel cable through hole provided in air cylinder rod. See Figure 5-34.
- ▶ 10. Feed end of stainless steel cable through conduit and each pulley elbow. Make certain that cable rides on top and in center of pulley sheave. If the 50 ft (15.2 m) cable 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 stainless steel cable through hole in cocking lever. Slide stop sleeve (Part No. 26317) on to cable 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 cocking lever, with cable curled under lever. See Figure 5-40.

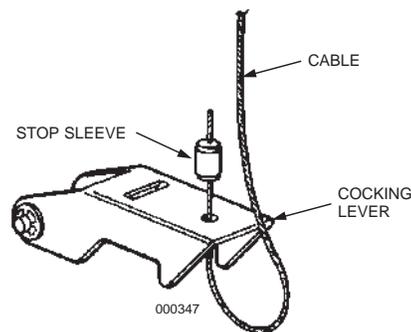


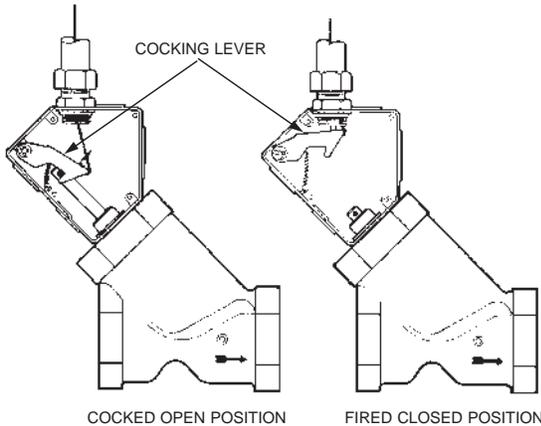
FIGURE 5-40

- ▶ 12. With the end of stainless steel cable already threaded through hole in air cylinder rod, slide stop sleeve (Part No. 26317) onto cable and leave loose. Do not crimp stop sleeve at this time. See Figure 5-34.

**INSTALLING MECHANICAL GAS VALVE (Continued)**

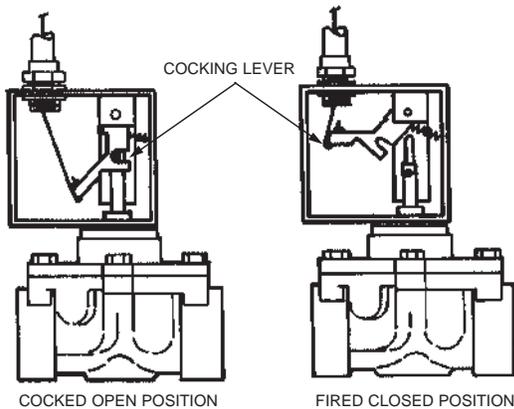
- 13. Cock mechanical gas valve as shown in Figures 5-41 and 5-42. **Note:** A valve cocking tool is available. Order Part No. 416018.

**ANSUL MECHANICAL GAS VALVE**



**FIGURE 5-41**  
000348

**ASCO MECHANICAL GAS VALVE**



**FIGURE 5-42**  
000349

- 14. Raise air cylinder rod "UP" to its maximum extended position. See Figure 5-34.
- ▶ 15. Manually pull stainless steel cable to remove excess slack.

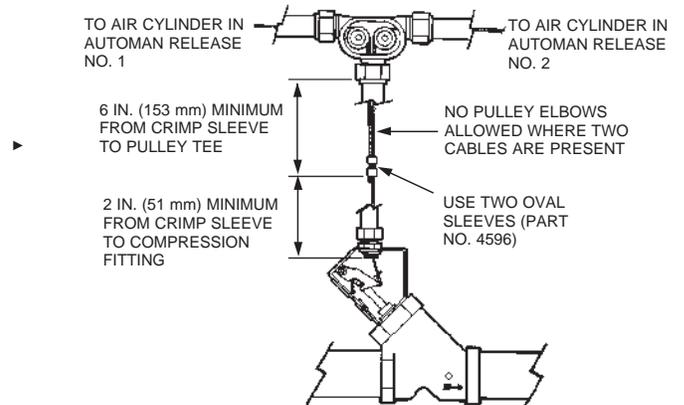
**NOTICE**

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 5-34.
- ▶ 17. Cut off any excess stainless steel cable approximately 3/4 in. (19 mm) from end of stop sleeve.

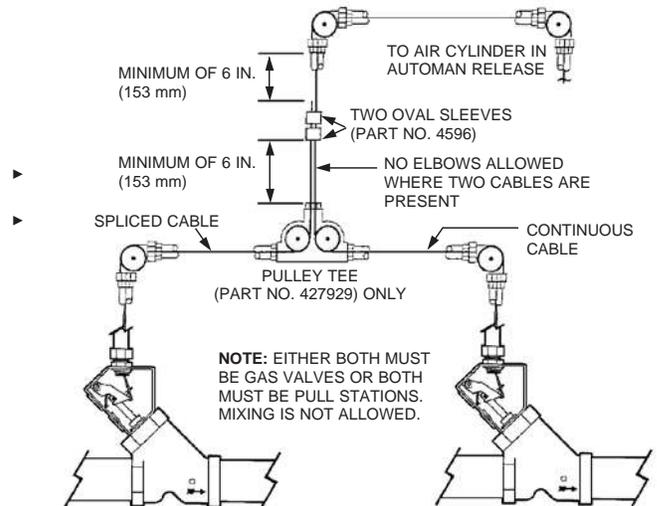
- 18. **Note:** If utilizing a pulley tee to operate either a single mechanical gas valve from two AUTOMAN releases or two mechanical gas valves from one air cylinder in an AUTOMAN release, see Figures 5-43 and 5-44 for installation instructions. Maximum length of stainless steel cable to each AUTOMAN 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 5-43**  
001091

**ONE AIR CYLINDER – TWO MECHANICAL GAS VALVES**



**FIGURE 5-44**  
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.

**Note:** When in the open position, it is acceptable to test the gas valves to a maximum of 50 psi (3.4 bar).

**SECTION 5 – INSTALLATION INSTRUCTIONS**

UL EX 5174

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**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 CANNOT be used in detection systems.
- 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.

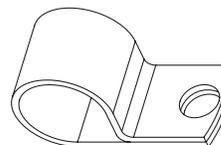
**Design Requirements**

- 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 (Part No. 434618) 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 pages 5-28 through 5-30 for detailed splicing instructions), two splices, and 15 pulley elbows.

**Note:** When installing flexible conduit, make sure to feed stainless steel cable through conduit directly from the spool. DO NOT pre-cut cable. Feeding pre-cut cable through flexible conduit will cause excessive kinks in the cable, 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 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 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 (Part No. 436063) 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 5-45.



**FIGURE 5-45**  
008141

	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 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 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 cable is clean and debris-free.

The flexible conduit should be routed along the same path that EMT conduit would normally be run. Stainless steel cable should be routed through the flexible conduit as it is in EMT conduit.

#### 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 (Part No. 434618) 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 5-46.

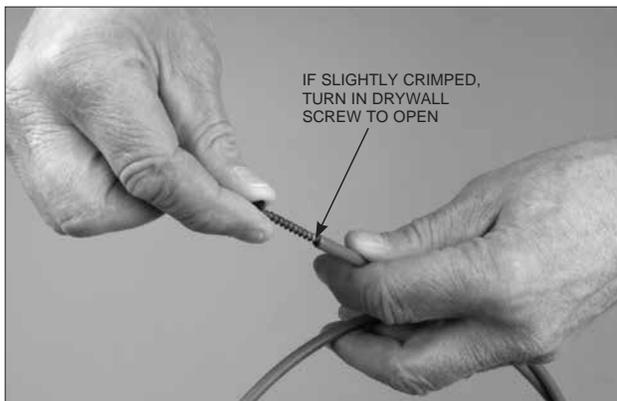


FIGURE 5-46  
007985

2. Starting at the AUTOMAN Release, connect the conduit connector using the supplied nut. Use only ANSUL conduit fittings (Part No. 55813). See Figure 5-47.

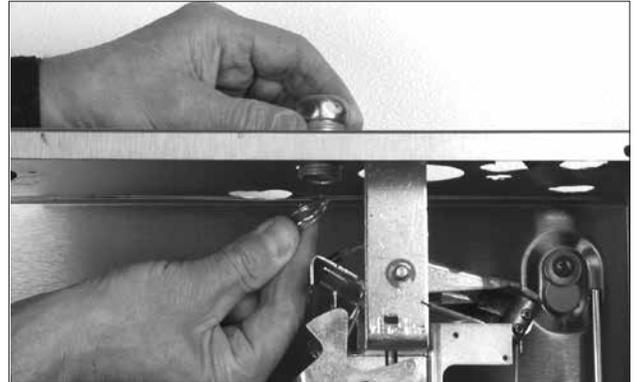


FIGURE 5-47  
007986

3. Unscrew the nut from the EMT conduit connector and remove the compression ring. Discard ring. See Figure 5-48.

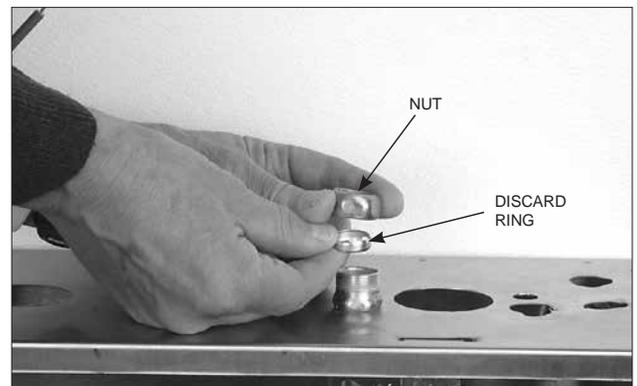


FIGURE 5-48  
007987

4. Thread the stainless steel cable 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 5-49.

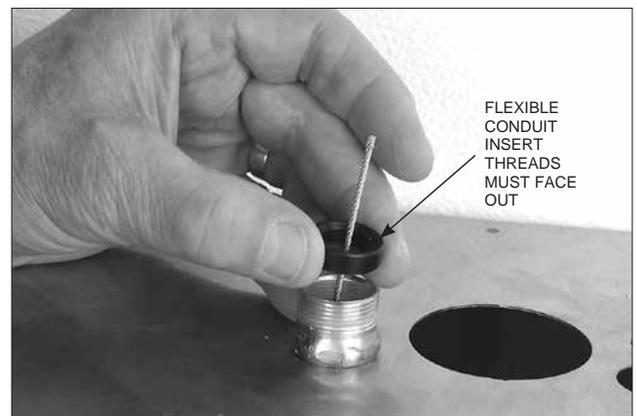


FIGURE 5-49  
007988

**SECTION 5 – INSTALLATION INSTRUCTIONS**

UL EX 5174

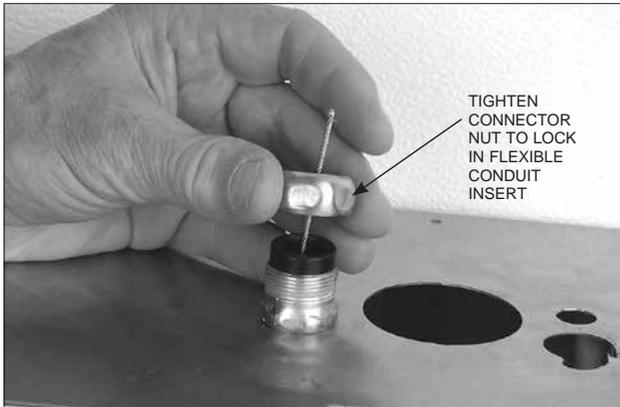
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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)**

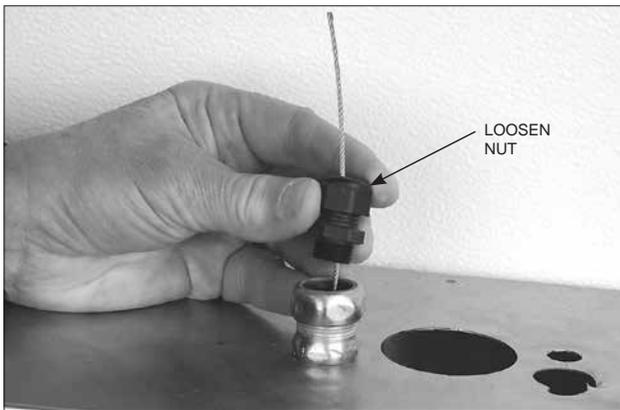
**Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Junction Box, or Mechanical Gas Valve (Continued)**

- 5. Tighten the nut to the connector body, locking the flexible conduit insert in place. See Figure 5-50.



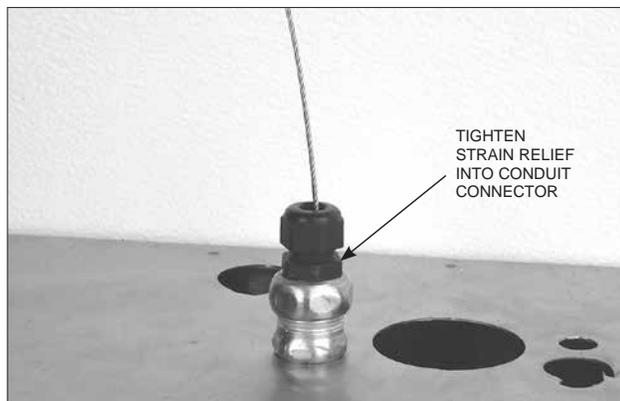
**FIGURE 5-50**  
007989

- ▶ 6. Loosen the nut on the strain relief and thread the stainless steel cable through a strain relief. See Figure 5-51.



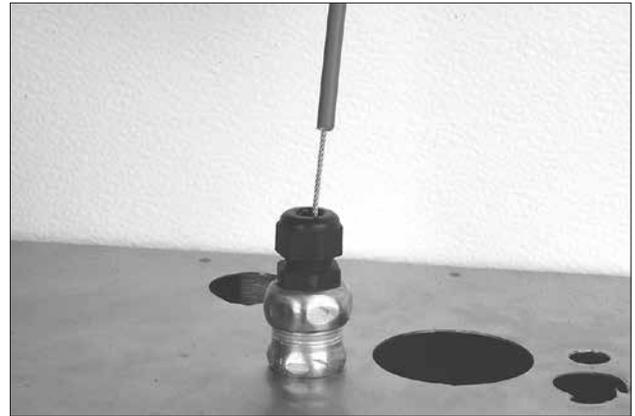
**FIGURE 5-51**  
007990

- 7. Tighten the body of the strain relief to the conduit connector. See Figure 5-52.



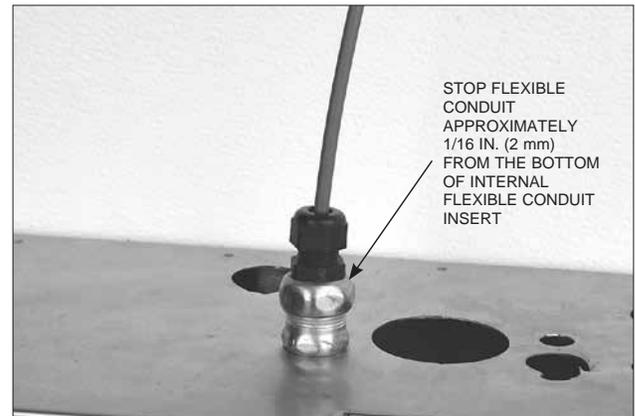
**FIGURE 5-52**  
007991

- ▶ 8. Thread the stainless steel cable through the flexible conduit. See Figure 5-53. (If a splice is required in the flexible conduit, proceed to "Splicing Installation Instructions.")



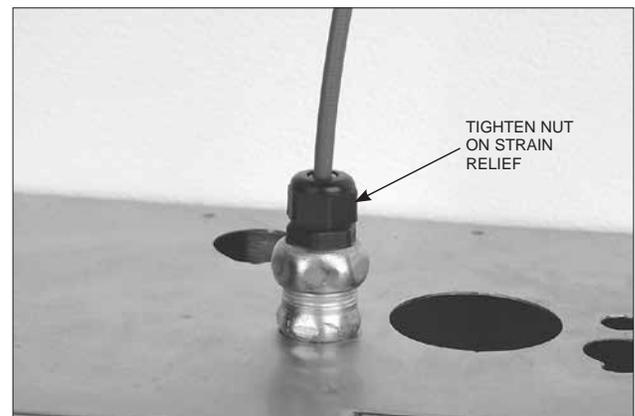
**FIGURE 5-53**  
007992

- 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 5-54.



**FIGURE 5-54**  
007993

- 10. Tighten the strain relief nut onto the strain relief. See Figure 5-55.

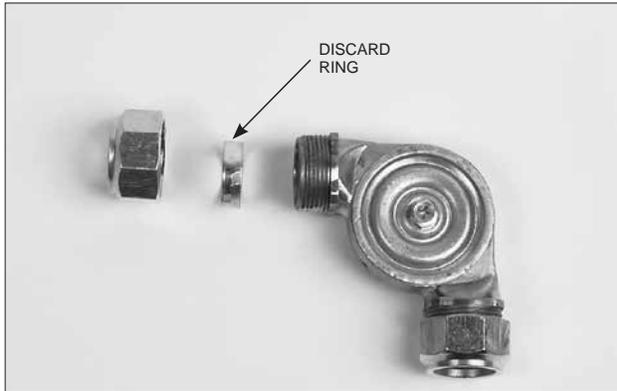


**FIGURE 5-55**  
007994

**INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)**

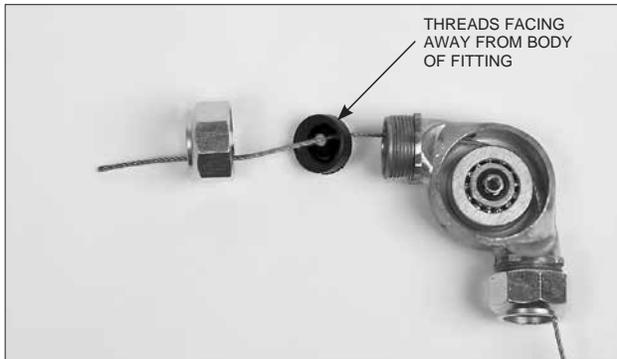
**Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings**

1. Unscrew the nut from pulley elbow, pulley tee, or EMT conduit connector and remove the compression ring. Discard ring. See Figure 5-56.



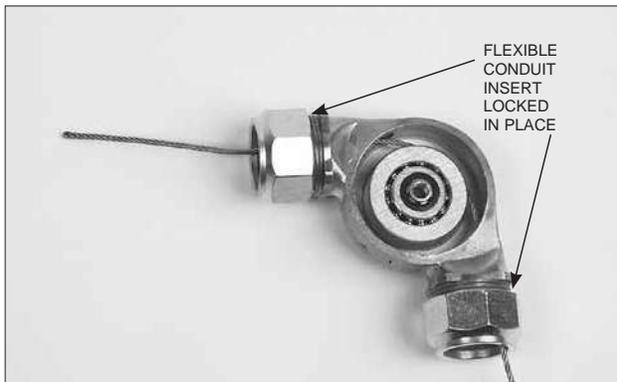
**FIGURE 5-56**  
007995

- ▶ 2. Thread the stainless steel cable 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 5-57.



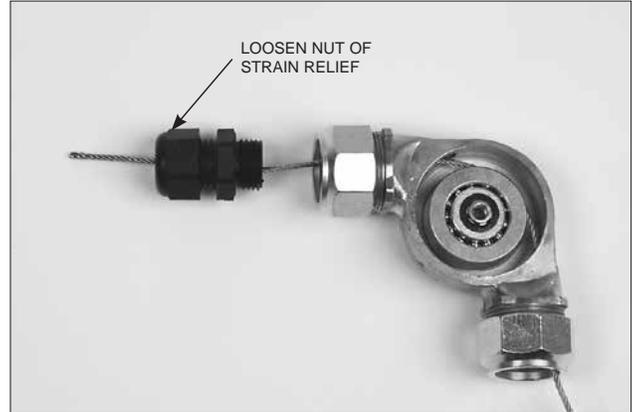
**FIGURE 5-57**  
007996

3. Tighten the nut to the connector conduit body, locking the flexible conduit insert in place. See Figure 5-58.



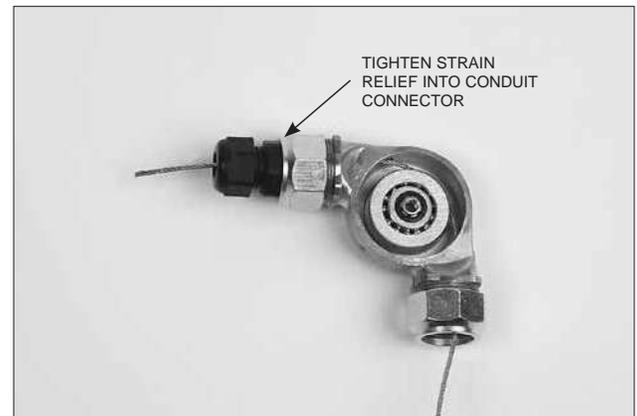
**FIGURE 5-58**  
007997

- ▶ 4. Loosen the nut on the strain relief and thread the stainless steel cable through the strain relief. See Figure 5-59.



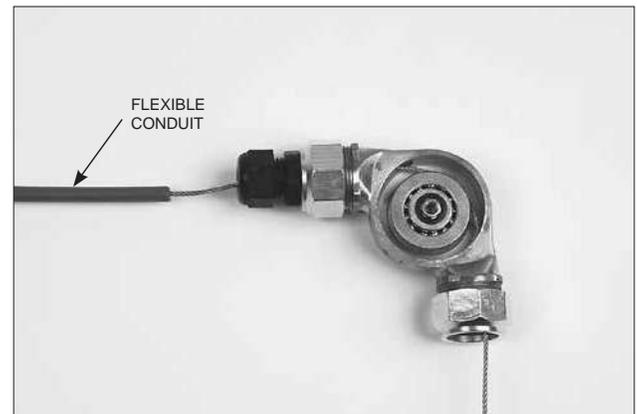
**FIGURE 5-59**  
007998

5. Tighten the body of the strain relief to the conduit connector. See Figure 5-60.



**FIGURE 5-60**  
007999

- ▶ 6. Push the stainless steel cable into the flexible conduit. See Figure 5-61.



**FIGURE 5-61**  
008000

## SECTION 5 – INSTALLATION INSTRUCTIONS

UL EX 5174

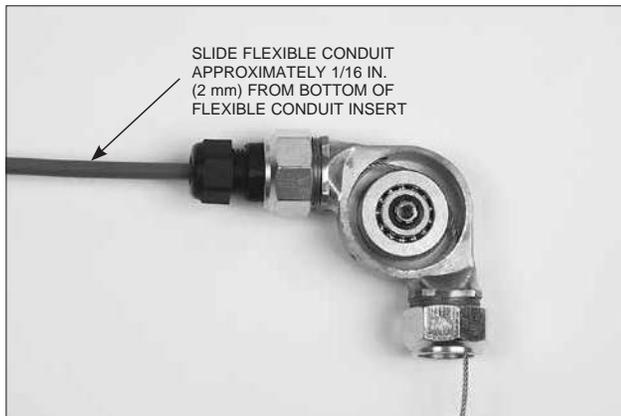
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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)

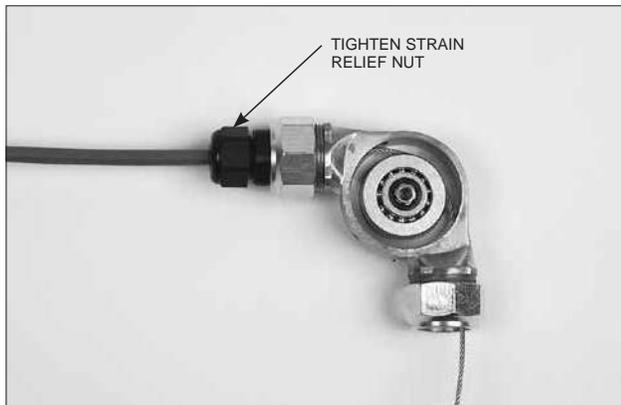
#### Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings (Continued)

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 5-62.



**FIGURE 5-62**  
008001

8. Tighten the strain relief nut onto the strain relief. See Figure 5-63.



**FIGURE 5-63**  
008002

9. Complete the same procedures on the other end of the conduit fitting as described in Steps 1 through Step 8 above.

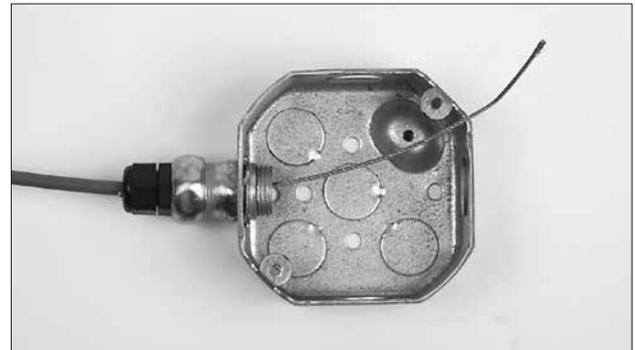
#### Assembling the Block

**Note:** For installations that do not require the tee block, refer to page 5-32 for instructions.

- ▶ 1. The flexible conduit and stainless steel cable 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 5-64.

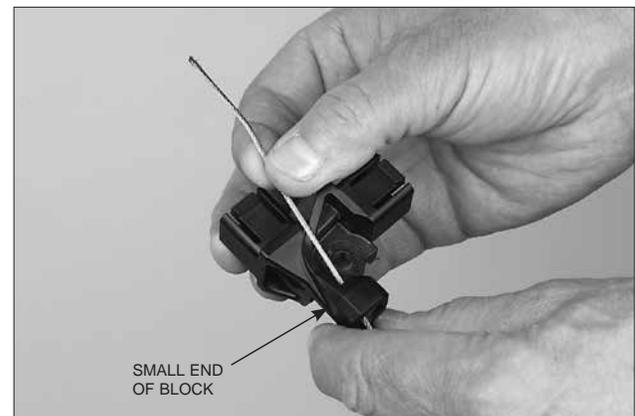
**Note:** For 1 1/2 in. (38 mm) deep electrical box, the bearing should be installed in the block's shallow box location.

For 2 1/8 in. (54 mm) deep electrical box, the bearing should be installed in the block's deep box location.



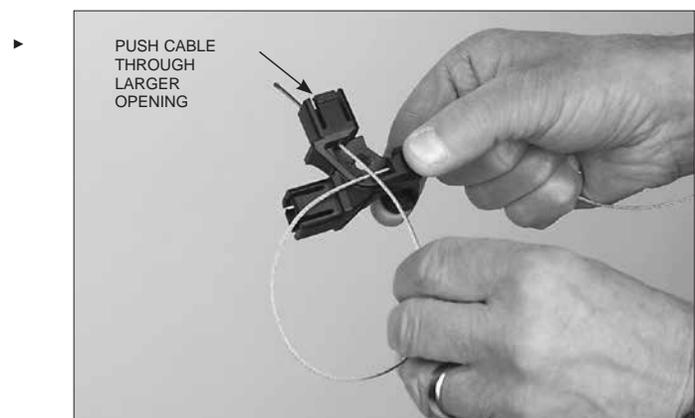
**FIGURE 5-64**  
008003

- ▶ 2. Thread the cable through the small end of the block into the bearing area to be used. See Figure 5-65.



**FIGURE 5-65**  
008004

- ▶ 3. Pull slack, make a loop and insert the cable through the larger opening in the bearing area. See Figure 5-66.



**FIGURE 5-66**  
008005

**INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)**

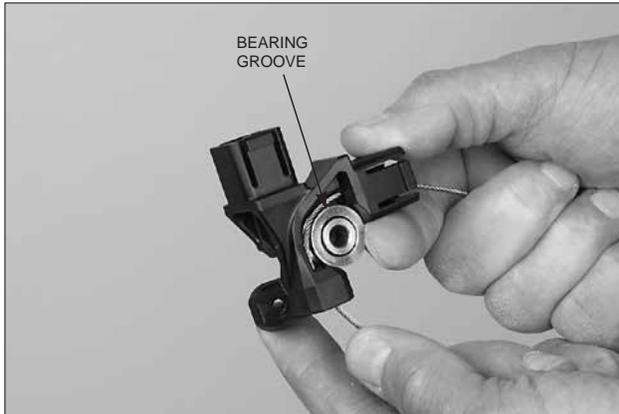
**Assembling the Block (Continued)**

- ▶ 4. Pull stainless steel cable out of the large end of the block. See Figure 5-67.



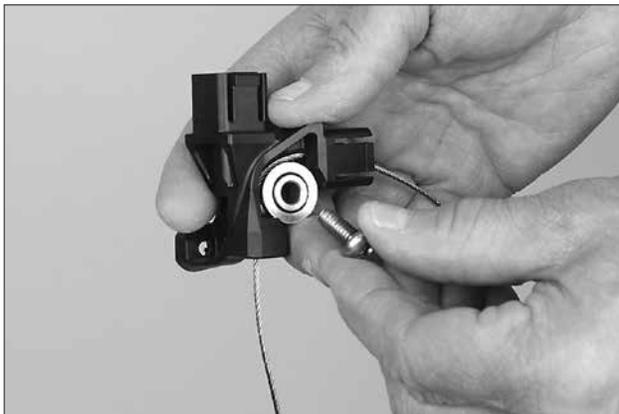
**FIGURE 5-67**  
008006

- ▶ 5. Place the bearing against the cable. Make certain cable is in the bearing groove. See Figure 5-68.



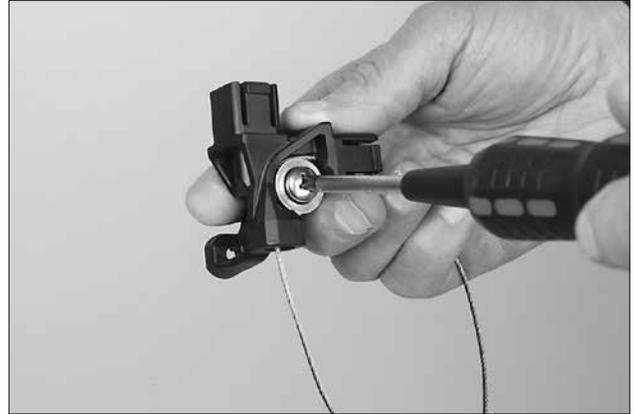
**FIGURE 5-68**  
008007

- ▶ 6. Align the bearing against the cable so that the bearing center and the hole in the block line up. See Figure 5-69.



**FIGURE 5-69**  
008008

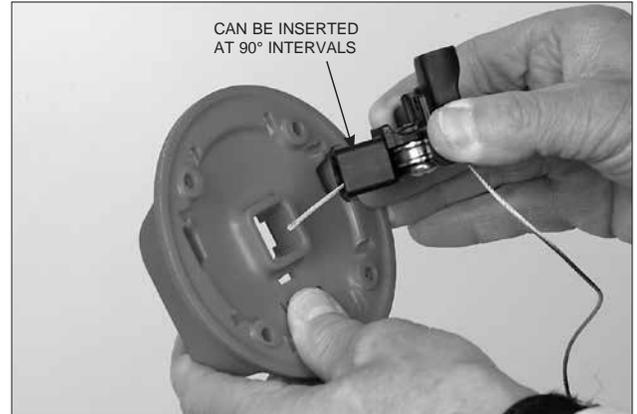
- 7. Insert the supplied bolt into the bearing and tighten securely. Take care not to strip the thread. See Figure 5-70.



**FIGURE 5-70**  
008009

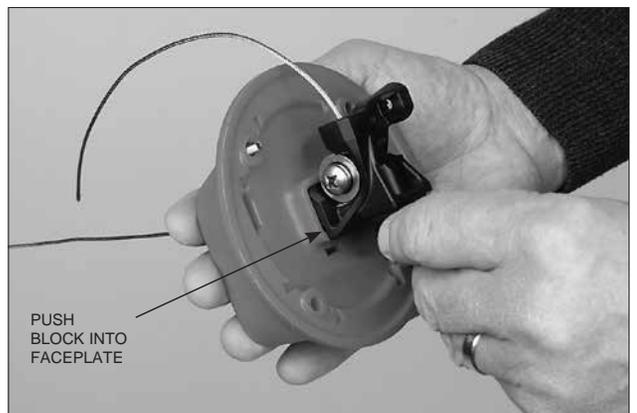
**Connecting the Block and the Faceplate**

- 1. The block can be inserted into the faceplate at 90° intervals. See Figure 5-71.



**FIGURE 5-71**  
008010

- ▶ 2. Thread the cable through the faceplate. Insert the block by depressing the tabs and pushing the block into the faceplate until it snaps in place. See Figure 5-72.



**FIGURE 5-72**  
008011

## SECTION 5 – INSTALLATION INSTRUCTIONS

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

### 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 5-73.



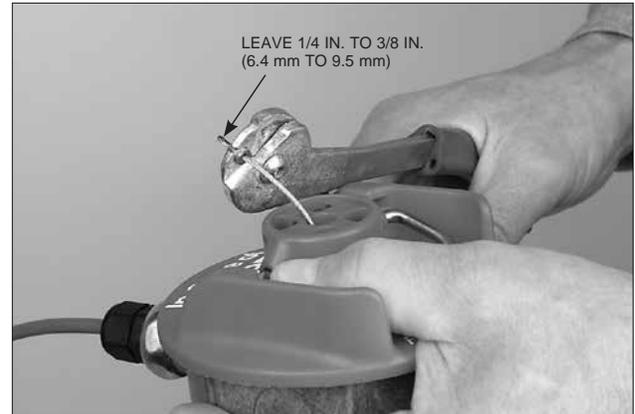
**FIGURE 5-73**  
008012

4. Thread the stainless steel cable through the pull knob. See Figure 5-74.



**FIGURE 5-74**  
008013

5. Thread the cable through stop sleeve and leave approximately 1/4 in. to 3/8 in. (6.4 mm to 9.5 mm) extended past sleeve. Crimp the stop sleeve twice using Crimping tool, National Telephone Supply Co. Nicopress Sleeve Tool (Stock No. 51-C-887) or equal. Verify the stop sleeve is secure on the cable. See Figure 5-75.



**FIGURE 5-75**  
008014

6. Insert the break rod into the two holes toward the top of the pull knob. See Figure 5-76.



**FIGURE 5-76**  
008015

7. Pull the excess slack back to the AUTOMAN Release. This will pull the pull knob assembly in place. See Figure 5-77.



**FIGURE 5-77**  
008016

**INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)**

**Connecting the Block and the Faceplate (Continued)**

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 5-78.

**Note:** Take care when snapping the ends of the break rod into the pull station side shields while rotating the entire assembly.



**FIGURE 5-78**  
008017

9. Snap the pull tab onto the pull knob so it is legible. See Figure 5-79.



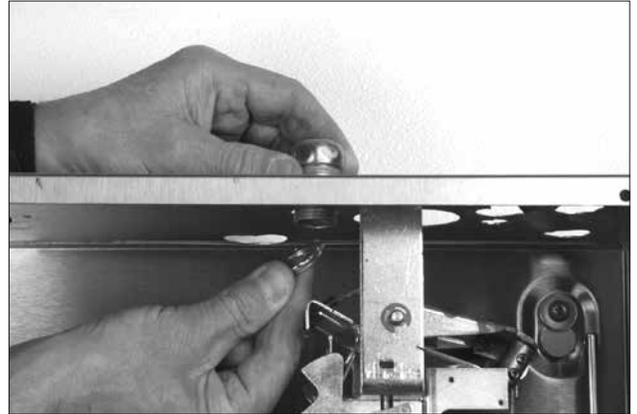
**FIGURE 5-79**  
008018

10. Refer to the manual Installation section 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 5-80.



**FIGURE 5-80**  
007986

2. Install Conduit Offset (Part No. 436063) into conduit connector and tighten nut. See Figure 5-81.



**FIGURE 5-81**  
008039

3. Install compression union to opposite end of conduit offset. Tighten securely. See Figure 5-82.



**FIGURE 5-82**  
008040

**SECTION 5 – INSTALLATION INSTRUCTIONS**

■ UL EX 5174

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**INSTALLATION OF REMOTE MANUAL PULL STATION OR  
MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT  
(Continued)**

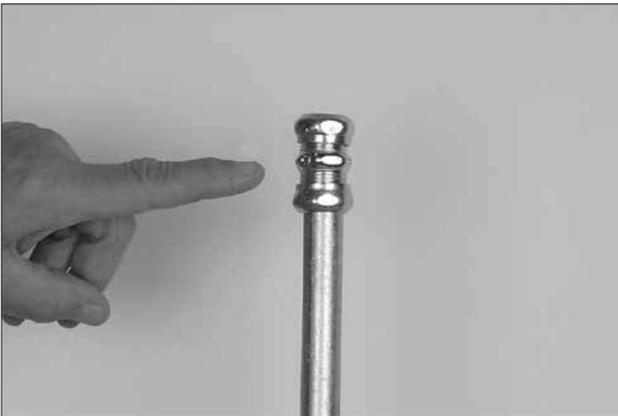
**Installing Flexible Conduit Through a Conduit Offset  
(Continued)**

4. Install the conduit required to get above the ceiling. See Figure 5-83.



**FIGURE 5-83**  
008041

5. Install compression union to top of conduit riser. See Figure 5-84.



**FIGURE 5-84**  
008042

6. Remove union nut and ring. Discard ring. Do not reinstall nut at this time. See Figure 5-85.



**FIGURE 5-85**  
008043

7. Remove strain relief nut and install strain relief body into compression union. See Figure 5-86.



**FIGURE 5-86**  
008044

8. Install union nut over strain relief body and tighten nut. See Figure 5-87.



**FIGURE 5-87**  
008045

9. Install strain relief nut onto strain relief body. Do not tighten nut at this time. See Figure 5-88.



**FIGURE 5-88**  
008046

**INSTALLATION OF REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE UTILIZING FLEXIBLE CONDUIT (Continued)**

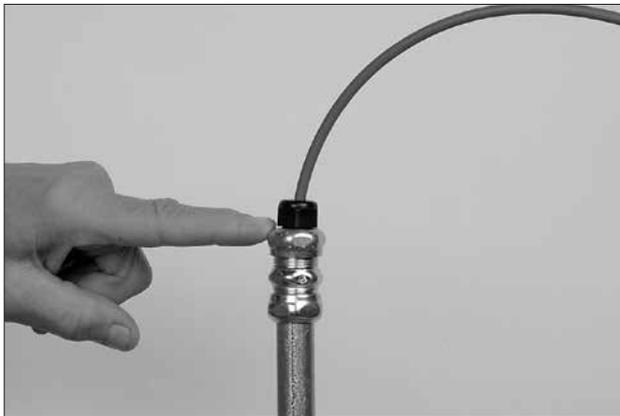
**Installing Flexible Conduit Through a Conduit Offset (Continued)**

10. Push flexible conduit completely through conduit offset. Flexible conduit should stop flush or  $\pm 1/2$  in. (13 mm) from bottom conduit fitting in AUTOMAN Release. See Figure 5-89.



**FIGURE 5-89**  
008047

11. Tighten nut on strain relief on top of conduit riser. See Figure 5-90.



**FIGURE 5-90**  
008048

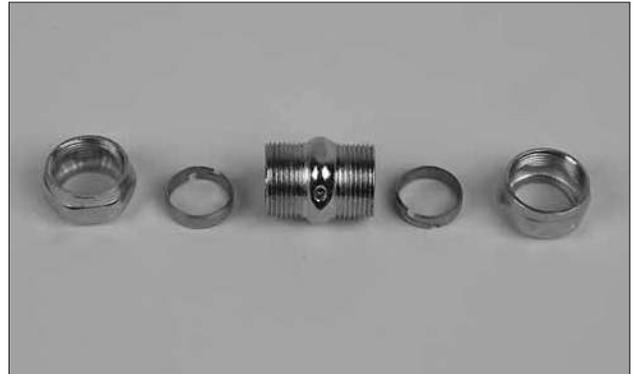
- ▶ 12. Complete the remainder of the flexible conduit and stainless steel cable installation to the pull station or the gas valve.

**Flexible Conduit Splicing (Allowed on Pull Station Installations Only)**

- ▶ **Note: Stainless steel cable 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 5-91.



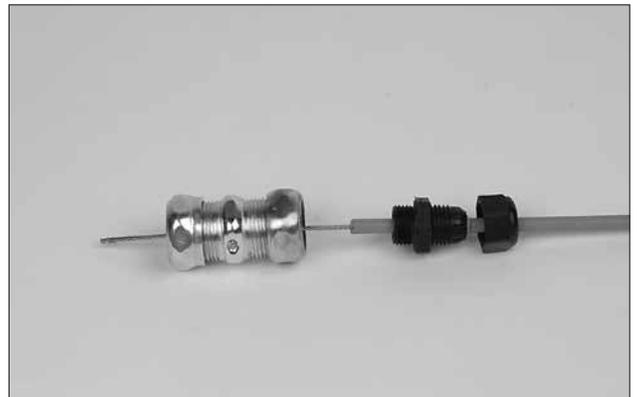
**FIGURE 5-91**  
008061

2. Install strain relief nut, strain relief, compression union nut, flexible conduit insert and compression union over the flexible conduit with cable installed. See Figure 5-92.



**FIGURE 5-92**  
008049

3. Tighten compression union nut onto union body, locking flexible conduit insert in place. See Figure 5-93.



**FIGURE 5-93**  
008050

**SECTION 5 – INSTALLATION INSTRUCTIONS**

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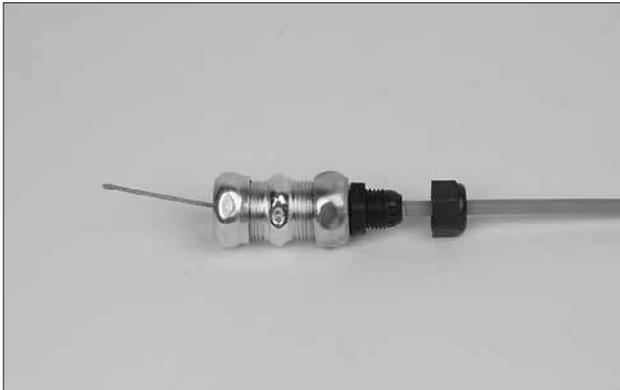
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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**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 5-94.



**FIGURE 5-94**  
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 5-95.



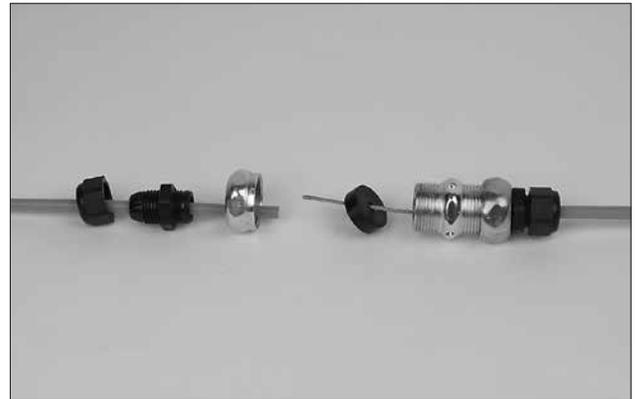
**FIGURE 5-95**  
008052

- 6. Starting on the opposite end of the compression union, remove the nut. See Figure 5-96.



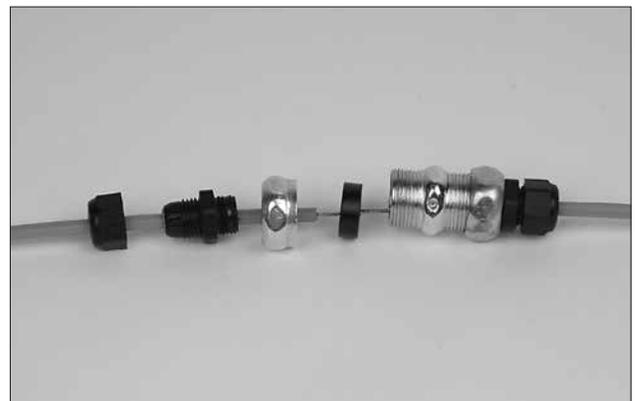
**FIGURE 5-96**  
008053

- 7. Install strain relief nut, strain relief, and compression union nut on remaining section of flexible conduit and install flexible conduit insert on stainless steel cable. See Figure 5-97.



**FIGURE 5-97**  
008054

- 8. Push cable completely through remaining section of flexible conduit. See Figure 5-98.



**FIGURE 5-98**  
008055

- 9. Tighten compression union nut onto union body, securing flexible conduit insert in place. See Figure 5-99.



**FIGURE 5-99**  
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 5-100.



**FIGURE 5-100**  
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 5-101.



**FIGURE 5-101**  
008058

▶ 12. Complete the remainder of the flexible conduit and cable 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 5-102.



**FIGURE 5-102**  
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 rod. See Figure 5-103.



**FIGURE 5-103**  
008059

**REMOVAL OF PULL CAP**

Using a small screwdriver or other blunt object, push on the backside of the pull cap. This will free the cap from the pull knob. See Figure 5-104.



**FIGURE 5-104**  
008060

## SECTION 5 – INSTALLATION INSTRUCTIONS

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### 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 stainless steel cable from the pull station, an octagonal junction box with a center knockout in the back of the junction box will be needed. See Figure 5-105. 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.

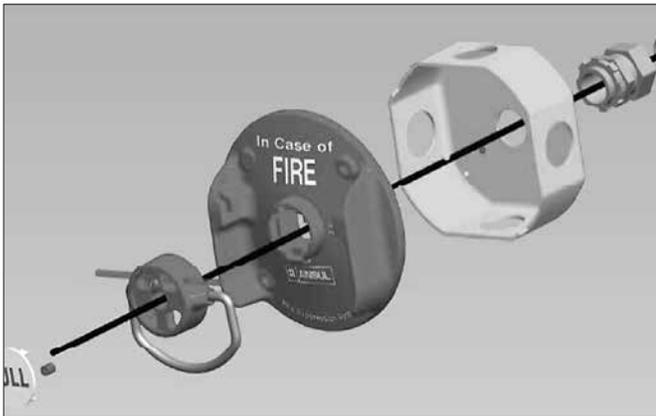


FIGURE 5-105  
008415

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 cable, 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 cable 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 cable through the stop sleeve (Part No. 26317) and leave approximately 1/4 in. to 3/8 in. (6 mm to 10 mm) extending past the sleeve.
4. Crimp the stop sleeve twice using the crimping tool National Telephone Supply Co. Nicopress Sleeve Tool (Stock No. 51-C-887) or equal. Verify the sleeve is secure on the cable.

### INSTALLING ELECTRICAL GAS VALVES

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” 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.

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 5-106.

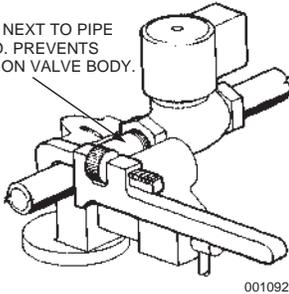
- a. Use new pipe properly reamed and clean of metal chips.
- b. Install valve so that the actuator is above the horizontal pipe line with no more than a five degree (5°) lean either way.
- c. Make certain gas flow is in the same direction as arrow shown on gas valve.
- d. If strainer is utilized, attach strainer ahead of gas valve.
- e. If necessary, install drip leg in gas line in accordance with authority having jurisdiction.

### INSTALLING ELECTRICAL GAS VALVES (Continued)

#### Step 3 (Continued)

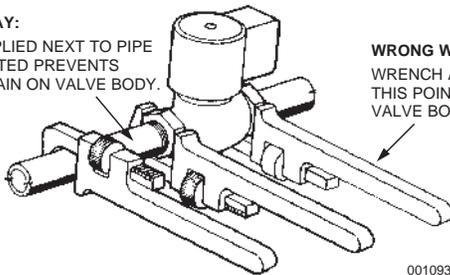
**CORRECT WAY:**

VICE GRIP ENDS NEXT TO PIPE BEING INSERTED. PREVENTS EXCESS STRAIN ON VALVE BODY.



**CORRECT WAY:**

WRENCH APPLIED NEXT TO PIPE BEING INSERTED PREVENTS EXCESS STRAIN ON VALVE BODY.



**WRONG WAY:**  
WRENCH APPLIED AT THIS POINT STRAINS VALVE BODY.

FIGURE 5-106

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 at the end of this section for typical wiring diagrams.

6.

### **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.

### **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.

**Note:** When in the open position, it is acceptable to test the gas valve to a maximum of 50 psi (3.4 bar).

### INSTALLING OPTIONAL WATER SHUTDOWN DEVICE

The Water Shutdown Device (Part No. 426294) must be installed in the AUTOMAN Release Assembly and the PIRANHA Regulated Actuator. The water shutdown device is mounted between the water flow valve and the 1/4 in. high pressure hose within the AUTOMAN Release. See Figure 5-107.

1. Remove the 1/4 in. high pressure hose at the bottom of the water flow valve. See Figure 5-107. **Note:** On older-style devices, remove the green pressure relief valve and the bottom of the water flow valve and install the water shutdown device.
2. Remove the valve core assembly and the 1/4 in. x 1/8 in. reducing bushing at the bottom of the water flow valve. See Figure 5-107.
3. Apply Teflon tape to the 1/4 in. male thread of the water shutdown device and install device into bottom of water flow valve. See Figure 5-107. Wrench tighten.

## SECTION 5 – INSTALLATION INSTRUCTIONS

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### INSTALLING OPTIONAL WATER SHUTDOWN DEVICE (Continued)

4. Reconnect the 1/4 in. high pressure hose to the valve core assembly located in the water shutdown device. See Figure 5-107.

### AUTOMAN REGULATED RELEASE ASSEMBLY (MECHANICAL)

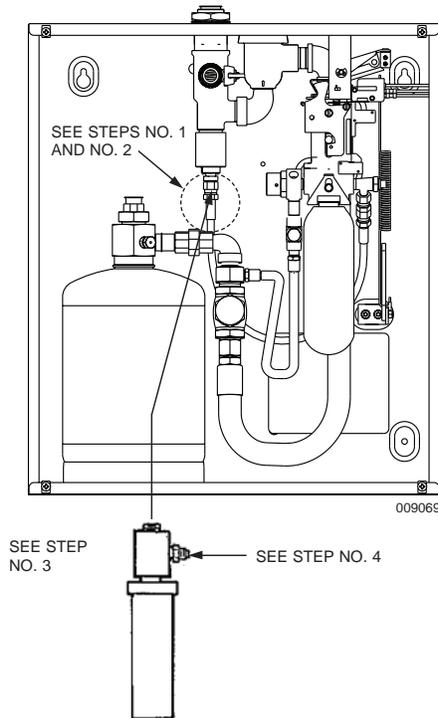


FIGURE 5-107

### INSTALLING ELECTRICAL SWITCHES

The procedure for field installing an electric (snap-action) switch is as follows:

#### **⚠ WARNING**

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, resulting in possible serious injury or death.

#### **⚠ WARNING**

Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power may 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 the “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.

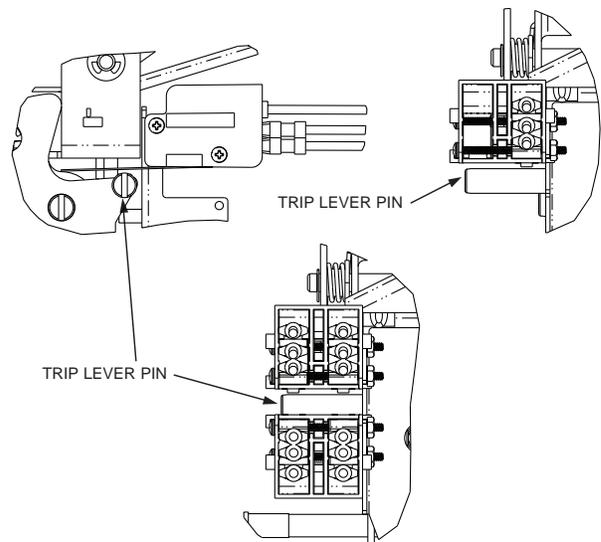


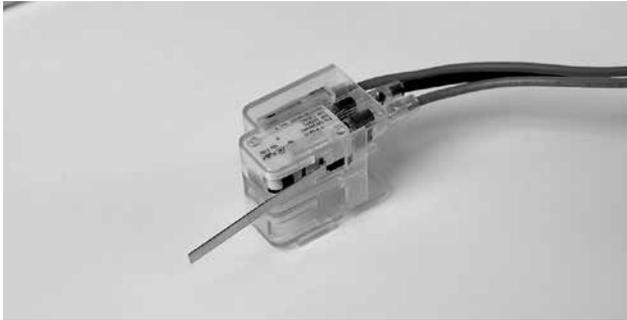
FIGURE 5-108

009467

**INSTALLING ELECTRICAL SWITCHES (Continued)**

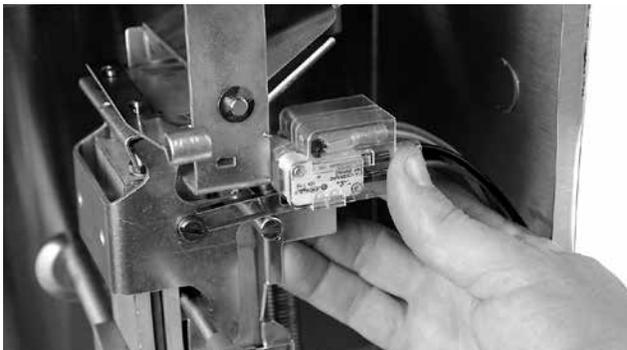
3. Install one or two of the electrical (snap-action) switches into the switch cover for the upper tab of the switch mounting bracket. See Figure 5-109.

**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 5-109**  
009128

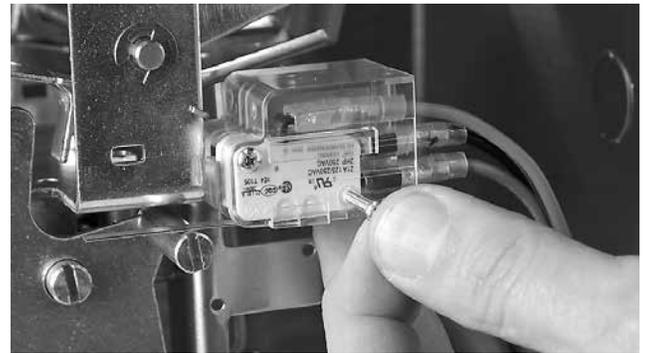
4. Slide switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5-110.



**FIGURE 5-110**  
009129

5. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, through the mounting holes in each of the switches, and through the holes in the mounting bracket tab. See Figure 5-111. Tighten screws securely.

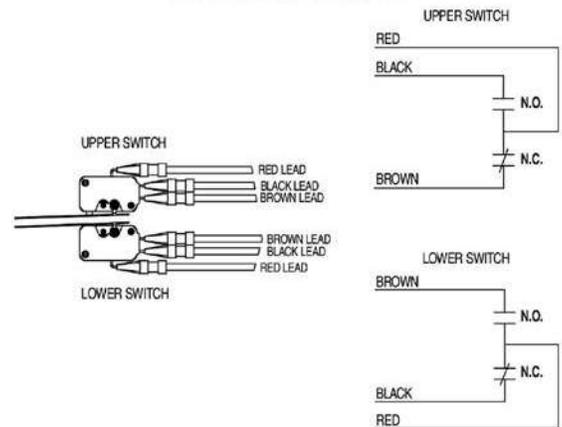
**Note:** To meet UL requirements, the screws and nuts must be installed. The switch cover is not intended to secure the switches to the bracket.



**FIGURE 5-111**  
009130

6. Wire the upper switch(es) according to the switch wiring diagram provided with each release mechanism. See Figure 5-112.

**SWITCH WIRING DIAGRAM**  
SHOWN IN COCKED POSITION



**NOTE:** EXCEPT FOR ALARM INITIATING SWITCH, NO WIRE CONNECTIONS ARE TO BE MADE INSIDE THIS CONTROL HEAD/RELEASING DEVICE. SWITCHES MUST BE SECURED WITH SCREWS TO MEET UL REQUIREMENTS.

21 A 125, 250 • 1 HP 125 VAC OR 2 HP 250 VAC

**FIGURE 5-112**  
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.

## SECTION 5 – INSTALLATION INSTRUCTIONS

UL EX 5174

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PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### ▶ INSTALLING ELECTRICAL SWITCHES (Continued)

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 5-113.

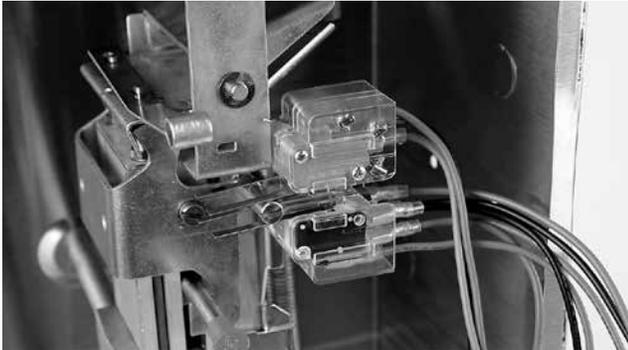


FIGURE 5-113  
009131

9. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, through 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 5-112.

**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 5-114.

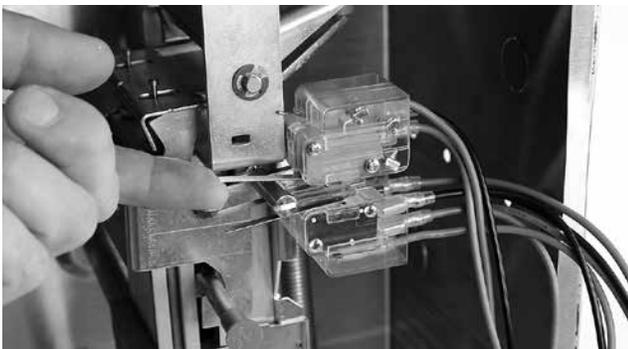


FIGURE 5-114  
009133

- 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.

- 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 and install lock pin.

---

#### NOTICE

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- ▶ 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.

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#### NOTICE

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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

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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.

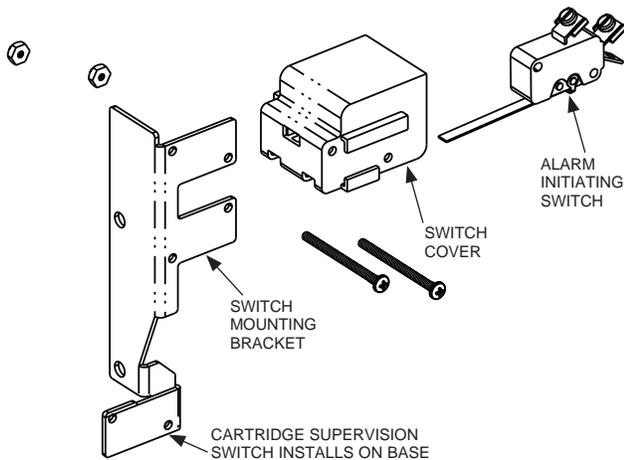
**INSTALLING ALARM INITIATING SWITCH**

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 5-115.



**FIGURE 5-115**  
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.

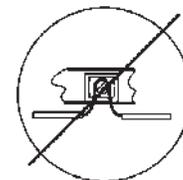
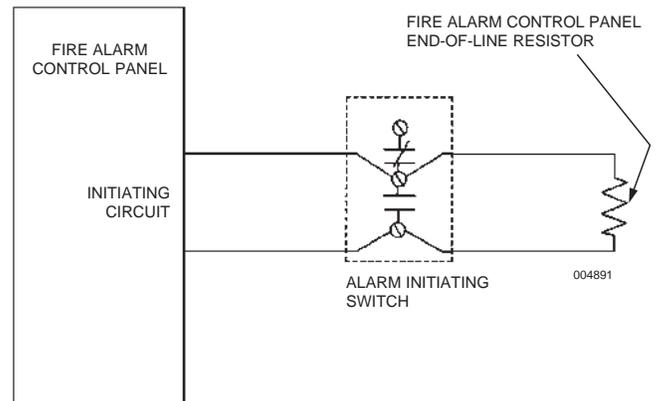
4. Install two switch mounting screws and nuts, ensuring that the screws pass through the holes in the cover, through the mounting holes in each of the switches, and through the holes in the mounting bracket tab. Tighten screws securely.

**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.

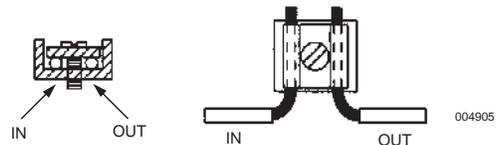
See NFPA 72, “National Fire Alarm Code,” Initiating Devices section, for the correct method of wiring connection to the fire alarm panel.

**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.



INCORRECT



CORRECT – SEPARATE INCOMING AND OUTGOING CONDUCTORS

**FIGURE 5-116**

**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.

**SECTION 5 – INSTALLATION INSTRUCTIONS**

UL EX 5174

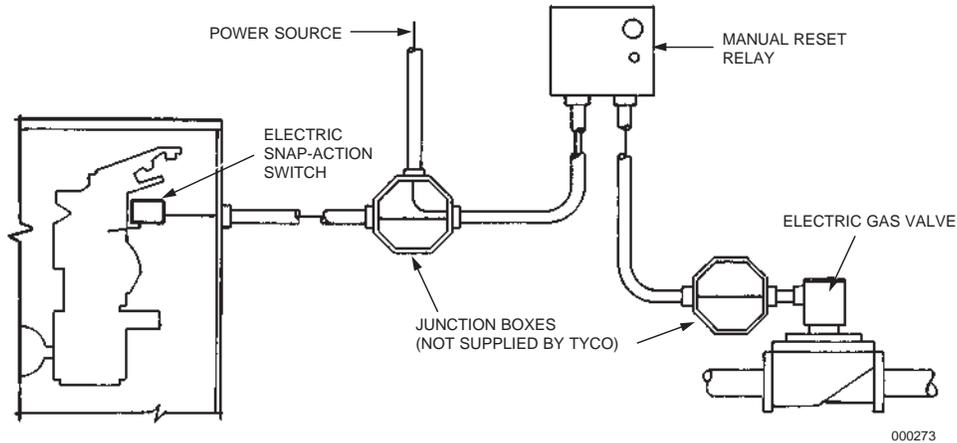
PAGE 5-38 REV. 07 2015-MAR -12

*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**ELECTRICAL SWITCH REQUIREMENTS**

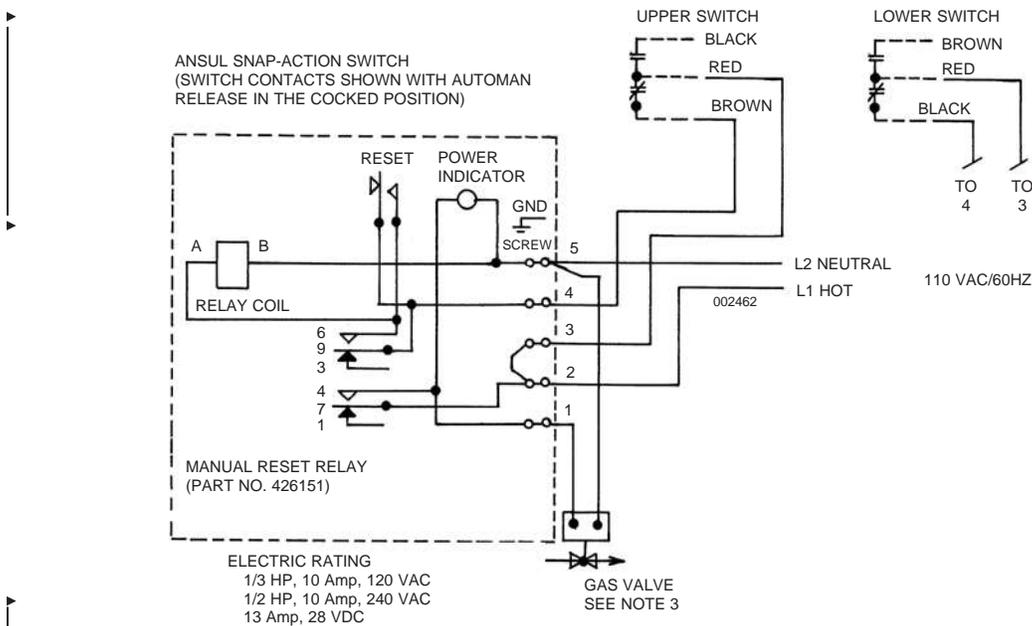
**Electric (110 VAC/60 Hz) Gas Shut-off Valve**

**INSTALLATION OVERVIEW**



000273

**WIRING SCHEMATIC – RELAY PART NO. 426151**



**NOTE:**

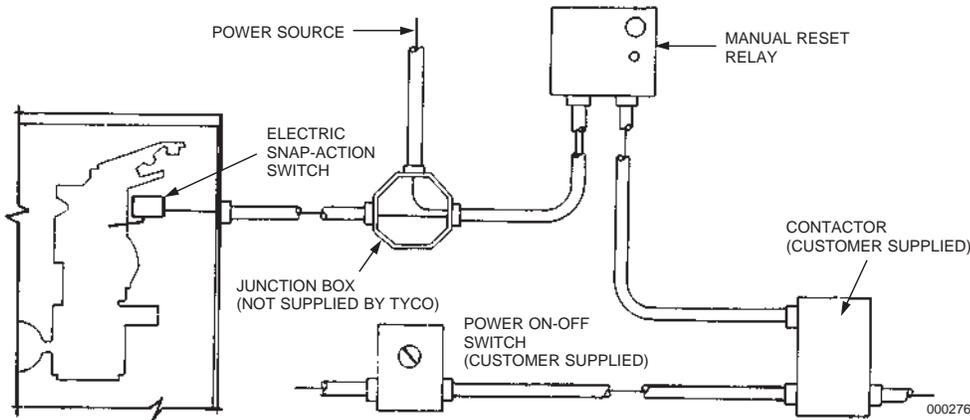
1. \_\_\_\_\_ DENOTES FIELD INSTALLATION.
2. \_\_\_\_\_ DENOTES FACTORY INSTALLATION.
3. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110V/60HZ."
4. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEIOUS ALARM, LIGHT CIRCUITS, ETC.

**FIGURE 5-117**

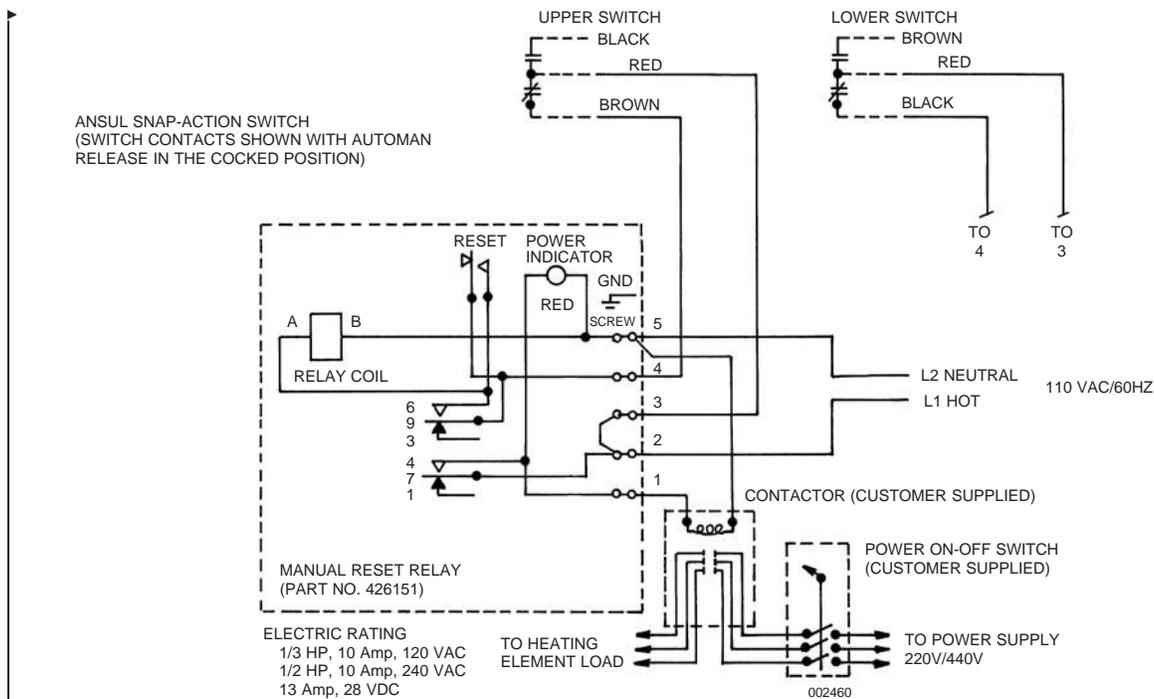
**ELECTRICAL SWITCH REQUIREMENTS (Continued)**

**Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load**

**INSTALLATION OVERVIEW**



**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 EXTRANEIOUS ALARM, LIGHT CIRCUITS, ETC.

**FIGURE 5-118**

**SECTION 5 – INSTALLATION INSTRUCTIONS**

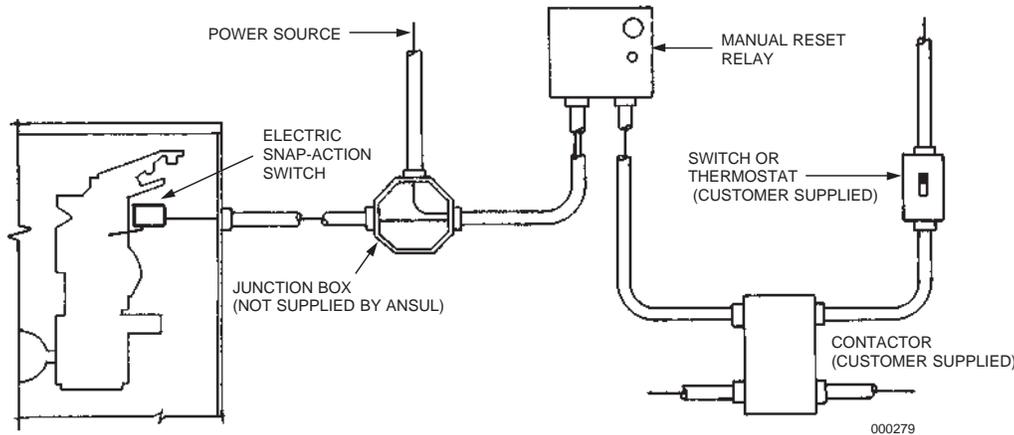
UL EX 5174

PAGE 5-40 REV. 07 2015-MAR-12

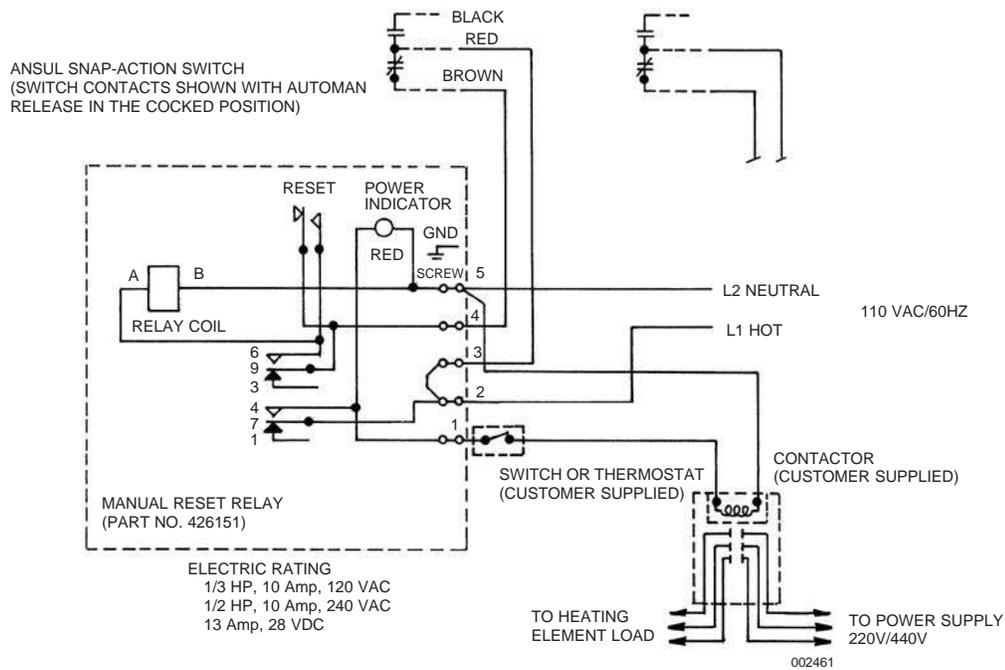
**ELECTRICAL SWITCH REQUIREMENTS (Continued)**

**Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load, and Power Supply Switch**

**INSTALLATION OVERVIEW**



**WIRING SCHEMATIC – 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 5-119**

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.

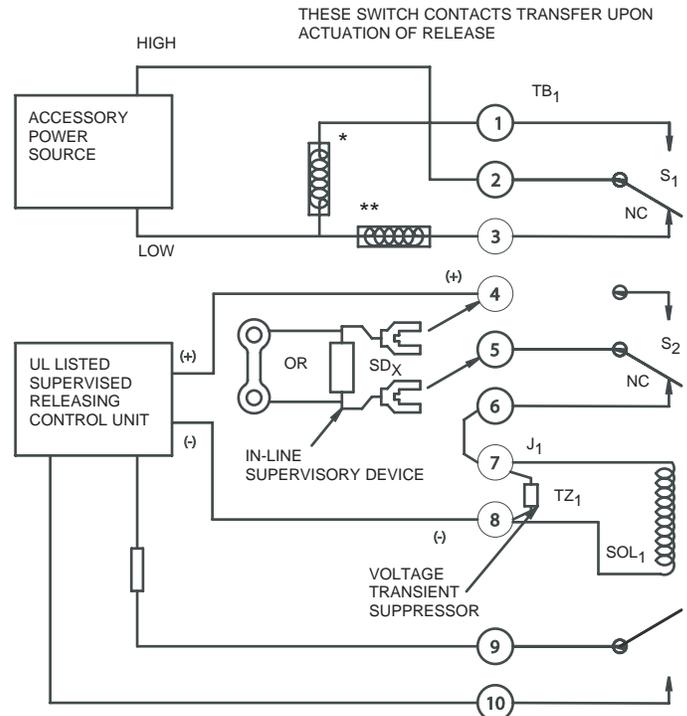
**WARNING**

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<sub>1</sub> and S<sub>2</sub> contact ratings: 20A, 125/250 VAC 2 HP, 250 VAC 1 HP, 125 VAC.
5. SOL<sub>1</sub> coil resistance: 28 OHMS ± 10% at 77 °F (25 °C).
6. Install the in-line supervisory device SD<sub>x</sub> 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<sub>2</sub> across terminals No. 4 and No. 5.
7. S<sub>3</sub> contact ratings: 24VDC, 240mA maximum.



\* AUXILIARY ALARMING DEVICES, SEE S<sub>1</sub> RATINGS

\*\* FUEL SHUT-OFF VALVE, BLOWER MOTOR, DOOR CLOSER, ETC., SEE S<sub>1</sub> RATINGS.

FIGURE 5-120

008468

**SECTION 5 – INSTALLATION INSTRUCTIONS**

UL EX 5174

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*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

**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 PIRANHA system must be trained and hold a current ANSUL certificate in a PIRANHA training program.

### PRESSURE TESTING THE WATER SYSTEM

After the Lockable Shut-Off Valve (or monitored valve) and waterline is completely installed, the water system must be tested to insure that the available water pressure at the release assemblies is above the minimum required for proper operation of the PIRANHA system. It is the ANSUL Distributor's responsibility to conduct the PIRANHA flowing pressure test during the highest domestic water usage, or during an off peak period while simultaneously flowing the equivalent highest domestic water usage for the food service facility.

The pressure range of the water system must be within the range stated in the "Water Supply Requirements" on Page 4-21 in the Design section.

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#### NOTICE

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Prior to conducting the pressure test, remove the 1/4 in. high pressure nitrogen hose to the bottom of the water flow valve located in each AUTOMAN Release and regulated actuator. Press valve core in water valve to verify that no residual pressure is trapped in the valve. Then, reinstall 1/4 in. hose back onto water valve. On releasing devices with water shutoff devices installed, valve core is located on side of shut-off device (removal of 1/4 in. high pressure hose is required). On older-style devices, press the green pressure relief valve located on the bottom of the water flow valve.

---

To test this, complete the following steps:

1. Attach water pressure tester (Part No. 423556) to test outlet in the AUTOMAN Release Assembly. Make certain valve on tester is closed.
2. If the system contains one or more Regulated Actuator Assemblies, each of these must also have a water pressure tester attached to it.
3. Attach a standard 5/8 in. garden hose to each tester and run it to a convenient drain. **Note:** Hose must not exceed 25 ft (7.6 m) long.
4. Open the test valve in the AUTOMAN Release and any Regulated Actuator.
5. Open valves on each water pressure tester.
6. Allow water to flow through all testers for approximately 30 seconds.

7. Note pressure on all test gauges. Pressure must be within the pressure ranges stated in "Water Supply Requirements," listed in the Design section. **Note:** While running the flow test, operate the water fixture(s) to simulate the highest normal water usage. This will confirm that adequate pressure is available at the release assembly.
8. After test is complete, close all water test outlets, and disconnect all pressure testers.
9. After testing is completed, lock OPEN the Lockable Shut-Off Valve (make certain ANSUL Tag (Part No. 423664) is attached to lock) and give the owner a key and also put one in the AUTOMAN Release.

Water pressure testing is now complete.

### TESTING MANUAL PULL STATION

To test each remote manual pull station, complete the following steps:

1. With the expellant gas cartridge removed, remove lock bar or 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 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 stainless steel cable 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 bar (Part No. 14985) or 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

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Take care when snapping the ends of the break rod into the pull station side shields while rotating the entire assembly.

---

---

#### NOTICE

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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.

Turn gas line on.

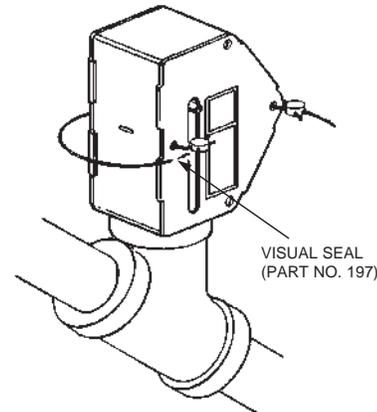
2. Manually push each air cylinder rod to full "DOWN" position. The gas valve should close. If mechanical gas valve does not trip, remove each pulley elbow cover to make certain stainless steel cable is resting on each pulley elbow sheave. If this does not correct the problem there may be too much slack in the line and it should be retightened.

**NOTICE**

If two gas valves are used on a single air cylinder, make sure both valves close properly.

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 re-lit 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 seals (Part No. 197) on ANSUL type valves. See Figure 6-1.



**FIGURE 6-1**  
000359

9. Make certain the regulated release mechanism is cocked with lock bar or 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 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.

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 Installation 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.

**TESTING ELECTRICAL GAS VALVES (Continued)**

- ▶ 6. Remove lock bar or lock pin from regulated release mechanism.

**CAUTION**

Do not install cartridge at this time or system may be accidentally actuated.

- 7. Manually actuate the system by operating the remote pull station. (It may be necessary to remove the 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 Installation section for typical wiring diagram.
- ▶ 8. If test is successful, recock regulated release mechanism using cocking lever and reinstall lock bar or lock pin. 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 bar or lock pin.

**CAUTION**

Do not install cartridge at this time or system may be accidentally actuated.

- 3. Manually actuate the system by operating the remote pull station. It may be necessary to remove the 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 Installation section for typical wiring diagram.
- ▶ 4. If test is successful, recock regulated release mechanism using cocking lever and reinstall lock bar or lock pin. 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.

**NOTICE**

If alarm initiating switch is utilized and connected to a fire alarm control panel, contact local AHJ for proper testing procedures.

**TESTING DETECTION SYSTEM**

**Note:** For testing instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

- 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. 15751). See Figure 6-2.



TEST LINK

**FIGURE 6-2**  
000363

## SECTION 6 – TESTING AND PLACING IN SERVICE

UL EX 5174

PAGE 6-4 REV. 07 2015-MAR-12

PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### TESTING DETECTION SYSTEM (Continued)

- c. Locate detector linkage and center in each bracket.
    - 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 bar or 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 stainless steel cable for knotting or jamming.
  - c. Check pulley elbows to confirm cable 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 bar or 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 bar or lock pin is inserted.
  - b. Raise the regulated release mechanism tension lever to the “UP” position.
  - c. Install a new test link (Part No. 15751) on the terminal detector.
  - d. Lower the regulated release mechanism tension lever to the “DOWN” position.
  - e. Check for 1/4 in. (6 mm) to 3/8 in. (10 mm) minimum clearance between the trip hammer assembly and the cable lever assembly.
  - f. Remove the lock bar or 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 and insert lock bar or lock pin.
  - 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 mm) to 3/8 in. (10 mm) minimum 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. If the alarm initiating switch is utilized, contact authorized personnel to reset.

- f. Make certain lockable shut-off valve in the dedicated waterline is locked in the “OPEN” position.
- g. To verify that the water valve in the AUTOMAN Release and any Regulated Actuators is closed tightly, disconnect the union fitting on the 1/2 in. water hose attached to the tank adaptor. Allow hose to hang out of AUTOMAN enclosure for several minutes. Valve is closed properly if no water drips out of hose. Reconnect union fitting and wrench tighten.
- h. Install appropriate cartridge into the regulated release mechanism receiver and each regulated actuator receiver. Hand tighten firmly.
- i. Remove the lock bar or lock pin.

### 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. Failure to comply may prevent the system from operating properly.

- j. Install cover on regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or visual seal. If applicable, insert seal (Part No. 197) in each upper and lower cover hole. If system is installed in an OEM enclosure, attach enclosure cover and secure with appropriate hardware or procedure.
- k. 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 PIRANHA system must be trained, and hold a current ANSUL certificate in a PIRANHA Training Program.

▶ **For continued fire protection, the PIRANHA 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 PRX agent, due to the alkaline nature of this agent, it 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.

### ⚠ WARNING

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.

▶ Failure to comply with any of the above may result in serious personal injury or death.

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 must 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 landfill site in accordance with local authorities. Note: Wear rubber gloves during cleanup as sensitive skin may become irritated. If the PRX 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. Note: Wear rubber gloves during cleanup as sensitive skin may become irritated. If the PRX agent or its residue comes in contact with skin or eyes, flush thoroughly with clean water.
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. If not already done, unlock and close lockable shut-off valve in the water line.
2. Remove the enclosure cover from the AUTOMAN Regulated Release Assembly and each regulated actuator assembly.
- ▶ 3. With lockable water valve closed, bleed any residual water pressure from the water line by opening the water pressure test outlet valve.
- ▶ 4. Remove 1/4 in. high pressure hose from bottom of water flow valve assembly or the side of the water shutdown device. Press valve core to relieve trapped pressure in water flow valve. This will allow the valve to close.
- ▶ Reconnect 1/4 in. hose. Do this in each assembly. **Note:** On older-style units, press the green pressure relief valve located on the bottom of the water flow valve.
- ▶ 5. Disconnect electrical power to all AUTOMAN Regulated Release Assemblies.
- ▶ 6. Disconnect the expellant gas hose and the water hose from each tank adaptor assembly.
- ▶ 7. Disconnect distribution piping union at each tank adaptor outlet line(s).
- ▶ 8. Remove used burst disc.
- ▶ 9. 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 vent plug for free movement and corrosion. Replace if necessary.
  - e. Reinstall vent plug into adaptor body.
  - f. Empty any water left in the agent tank.

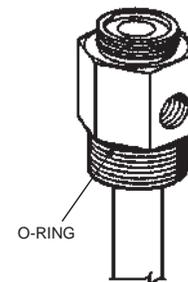


FIGURE 7-1  
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## SECTION 7 – RECHARGE AND RESETTING PROCEDURES

UL EX 5174

PAGE 7-2 REV. 06 2013-APR-02

PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)

### RECHARGE (Continued)

- ▶ 10. Piping system must be flushed with flushing concentrate to remove any water 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 PIRANHA agent tank. One complete bottle is used for any size tank, the 1.5 gallon, 2.25 gallon, or the 3.0 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.
  - d. Reinstall 1/4 in. gas hose and 1/2 in. water hose to tank adaptor.
- ▶ 11. To perform the flushing procedure, either secure heavy-duty plastic bags to each nozzle (see Figure 7-2) or remove each nozzle and attach plastic tubing (see Figure 7-3). (**Note:** Remove nozzle from swivel adaptor. DO NOT loosen nut on swivel adaptor. Swivel adaptor must remain in position so aiming angle does not change. If swivel adaptor is loosened or moved, nozzles must be re-aimed.)  
If using plastic bags, secure bags and proceed to Step 12.  
If using plastic tubing, proceed to Step 11.

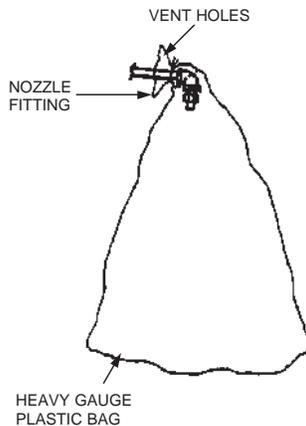


FIGURE 7-2

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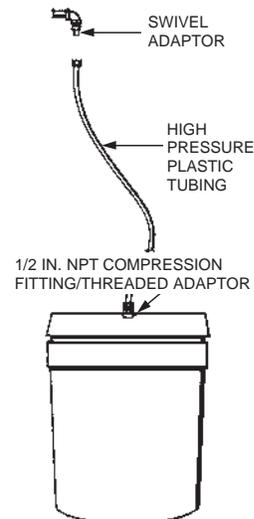


FIGURE 7-3

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- ▶ 12. If using the plastic tubing option, utilize 1/2 in. (13 mm) O.D. plastic tubing with wall thickness not to exceed 0.062 in. (1.6 mm), and make certain it can withstand the pressures of at least 90 psi (6.2 bar) expelled during the flushing and blowdown procedures.

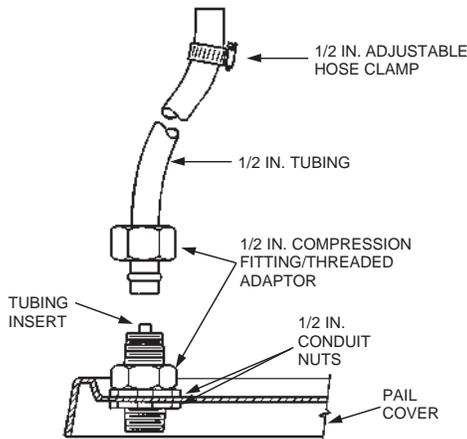
Also required is a container with some means of securing tubing to it such as a five-gallon plastic pail and cover that snaps onto the pail.

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. Slide a length of 1/2 in. (13 mm) plastic tubing over the swivel adaptor 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.

**RECHARGE (Continued)**

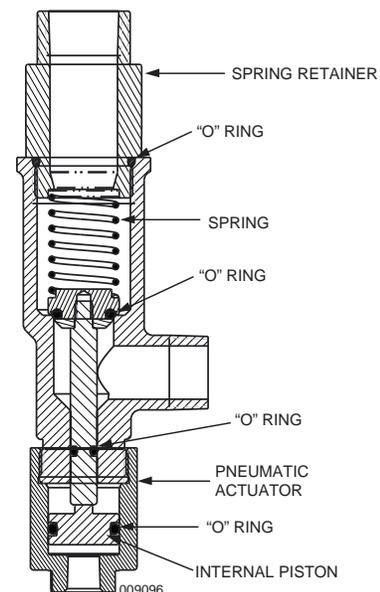
- d. Secure 1/2 in. compression fitting/threaded adaptors to the pail cover, using 1/2 in. conduit nuts. See Figure 7-4.



**FIGURE 7-4**  
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- e. Attach the tubing ends to the compression fittings. Tubing inserts will be required. See Figure 7-4.
  - f. Make certain each length of tubing is fastened to the pail cover with the cover snapped securely to the pail.
13. Complete the following steps in the flushing procedure:
- a. Connect discharge piping to agent tank adaptor.
  - b. Cock AUTOMAN Release Mechanism and insert lock bar or lock pin.
  - c. Install LT-30-R Cartridge; hand tighten.
  - d. Remove lock bar or 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. Press green pressure relief valve on bottom of water flow valve to relieve trapped pressure, or, on units with internal poppet valve, remove 1/4 in. high pressure hose from bottom of water flow valve and press valve core to relieve pressure. Make certain all residual pressure has been relieved from the pneumatic actuator assembly. Reconnect 1/4 in. hose.
  - i. Remove empty tank and rinse with water.
  - j. If installed, disassemble and drain agent distribution hose, behind appliance. Reassemble.
14. The water flow valve must be disassembled and cleaned after each discharge and at the 12-year maintenance schedule, whichever comes first.
- Complete the following steps:
- a. Unlock and close lockable water supply valve on PIRANHA system water line.
  - b. Attach garden hose to test port outlet in regulated release and regulated actuator(s). Open test port and drain all water out of water line.

- c. Close test port outlet(s) and disconnect drain hose(s).
- d. Disconnect 1/4 in. high pressure hose from pneumatic actuator at bottom of water valve.
- e. Disassemble pipe union above “Quik-Seal” on top of enclosure. Disconnect “Quik-Seal.”
- f. Disconnect 3/4 in. water hose from vacuum breaker inside enclosure.
- g. Remove water flow assembly from inside enclosure.
- h. Unscrew spring retainer from top of water valve. See Figure 7-5.
- i. Remove spring. See Figure 7-5.
- j. Unscrew pneumatic actuator from bottom of valve leaving green poppet valve and check valve or Schraeder valve attached. See Figure 7-5.
- k. Using air pressure into check valve port, pop out internal piston from pneumatic actuator. See Figure 7-5.
- l. Inspect and clean valve I.D.
- m. Lubricate “O” rings on valve stem, piston, and spring retainer with a good grade of silicone grease, such as Dow Corning No. 4. Replace “O” rings if necessary, using Rebuild Kit (Part No. 442633). See Figure 7-5.
- n. Reassemble valve components and reconnect back into enclosure assembly. **Note:** When reassembling spring retainer, apply Prolock Nut Type Sealant to male threads.
- o. Before pneumatic actuator is reinstalled, operate valve manually by depressing valve stem at bottom of valve assembly to ensure proper operation. Make certain pneumatic actuator is fully reset. To reset, it may be necessary to relieve trapped air below piston in pneumatic actuator by depressing poppet valve or pin in Schraeder valve core. Then install pneumatic actuator and high pressure hose assembly.



**FIGURE 7-5**

RECHARGE (Continued)

15. **CAUTION**

Safety glasses should be worn during transfer operations of PRX 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 PRX Liquid Fire Suppressant:

PIRANHA-7		PIRANHA-10		PIRANHA-13	
gal	(L)	gal	(L)	gal	(L)
1.5	(5.8)	2.25	(8.5)	3	(11.6)
Fill is complete when PRX liquid level is within the following measurement from top of tank collar:					
1 9/16 in. ± 1/8 in. (40 mm ± 3 mm)			1 11/16 in. ± 1/8 in. (43 mm ± 3 mm)		

**CAUTION**

Make certain tank is filled to the proper level. 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.

**CAUTION**

Do not mix PRX agent with ANSULEX LPH agent. If mixed, suppression capability will not be performed properly.

**Note:** PRX agent will freeze if the storage temperature of the liquid falls below 10 °F (-12 °C). If you have container(s) of PRX agent which have or are suspected of having frozen, please follow the instructions below.

Thaw container out at room temperature, 60 °F to 70 °F (15 °C to 21 °C). After thawing, a small amount of white colored material will remain on the bottom of the container. Invert or roll the pail for two to three minutes to re-suspend the material.

After this mixing motion, a small amount of the inorganic salts may remain out of solution. This is carbon dioxide, which has been dissolved in the water. After cooling, the gas forms an insoluble salt and falls from solution. **While this product/material is not detrimental to PRX agent nor does it reduce the efficiency of the agent, care must be taken**

to avoid having larger insoluble pieces enter the agent tank assembly. Therefore, the use of a funnel with an integral filter screen is recommended when filling tank assemblies.

16. Replace bursting disc (Part No. 423666) in adaptor assembly. Make certain silver side of disc is away from tank.
17. Replace adaptor/tube assembly and tighten into place. Return and secure each tank in regulated release assembly and Regulated Actuator Assembly. Reconnect expellant gas hose, water hose, and distribution piping as required. **Note:** Before reconnecting water hose to tank adaptor, allow end of hose to hang down, out of the enclosure, for a few minutes. Watch for water dripping out of hose. If water valve is properly set, no water will drip out of hose.
18. Raise tension lever to "UP" position.
19. Cock regulated release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441041 or 441042) and install lock bar (Part No. 14985) or lock pin (Part No. 438031).
20. 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 accidentally actuated.

21. 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.

22. Install test link (Part No. 15751) in terminal detector.
23. Lower tension lever to "DOWN" position.
- ▶ 24. Remove the lock bar or lock pin.
25. 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.

26. After successful actuation, raise the tension lever to "UP" position.
27. Install properly-rated and approved fusible link in terminal detector.
- ▶ 28. Cock the regulated release mechanism and install lock bar or lock pin.

### RECHARGE (Continued)

29. Locate detector linkage and correctly position in each bracket.
30. Lower tension lever to “DOWN” position.
- ▶ 31. Inspect the base of the cable 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.

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#### NOTICE

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If clearance is not 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum, raise tension lever to “UP” position, raise trip hammer 3/8 in. to 1/2 in. (10 mm to 13 mm), tighten set screws, and repeat Steps 27 and 28.

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- ▶ 32. Remove lock bar or lock pin.
33. Manually test the regulated release mechanism by operating the remote manual pull station.
34. Recock the regulated release mechanism and insert the lock bar or lock pin.
- ▶ 35. **OPEN lockable ball valve and re-lock in OPEN position.**
36. Attach garden hose to pressure test port in each AUTOMAN Release and Regulated Actuator.
37. Run hose(s) to proper drain.
38. Open each test port and let water flow for a few seconds.
39. Shut off all test ports and disconnect hoses.
40. Re-connect electrical power to system.
41. Reset all devices which were affected by the system actuation.

### RESETTING

#### Resetting Remote Manual Pull Station

##### Metal Stamped Style (Part No. 4835 or 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 “Cartridge Replacement,” page 7-6, and complete steps 1 through 5.

##### Molded Composite Style (Part No. 415255)

1. Position pull ring in vertical groove of pull station cover.

2. Insert break-away seal (Part No. 79029) through holes in cover and snap in place.

##### Molded Composite Style with Side Shields (Part No. 434618 and 435960)

1. Insert the break rod into the two holes toward the top of the pull knob.
2. Pull the excess slack back into the AUTOMAN Release. This will pull the pull knob assembly in place.

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#### NOTICE

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Take care when snapping the ends of the break rod into the pull station side shields while rotating the entire assembly.

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3. Hold the pull knob assembly against the faceplate. Rotate the pull knob assembly counterclockwise until the break rod and pull knob snap in place.
4. Snap the PULL tab onto the pull knob so it is legible.
5. If no other resetting is required, refer to “Cartridge Replacement,” Page 7-6, and complete steps 1 through 5.

#### 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 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 seal (Part No. 197).
7. If no other resetting is required, refer to “Cartridge Replacement,” Page 7-6, and complete steps 1 through 5.

**RESETTING (Continued)****Resetting Electrical Switch (Snap-Action)**

Reset the electric (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,” Page 7-6, and complete steps 1 through 5.

**NOTICE**

Reset any electrical equipment that may have been affected by the system actuation.

**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 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 “Cartridge Replacement,” Page 7-6, and complete steps 1 through 5.

**Note:** For resetting instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

**CARTRIDGE REPLACEMENT**

To complete the recharge and resetting procedures:

1. Remove shipping cap and weigh replacement cartridge. Replace if weight is 1/2 oz (14.2 g), or more, below weight stamped on cartridge.
2. Make certain regulated release mechanism is cocked and lock bar or lock pin is installed. Then, install replacement cartridge into the regulated release assembly and each regulated actuator receiver and hand tighten.
3. Remove lock bar or lock pin.

**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. Failure to comply may prevent the system from operating properly.

4. Install cover on regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or visual seal. If applicable, insert visual seal (Part No. 197) in each upper and lower cover hole. If system is installed in an OEM enclosure, attach enclosure cover and secure with appropriate hardware or procedure.
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 PIRANHA system must be trained, and hold a current ANSUL certificate in a PIRANHA Training Program.

Maintenance is required semi-annually. At the 12 year interval, along with the normal maintenance exam, the tank(s) and hoses must be hydro-tested and the regulator(s) must be flow tested.

**Note:** For service and maintenance instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

### NOTICE

Prior to performing the maintenance examination, review the hazard area to make certain nothing has been changed which would affect the proper coverage of the PIRANHA System.

## SEMI-ANNUAL MAINTENANCE EXAMINATION

### Fire Suppression Equipment

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 PIRANHA 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.

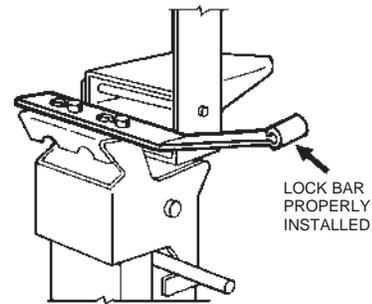


FIGURE 8-1

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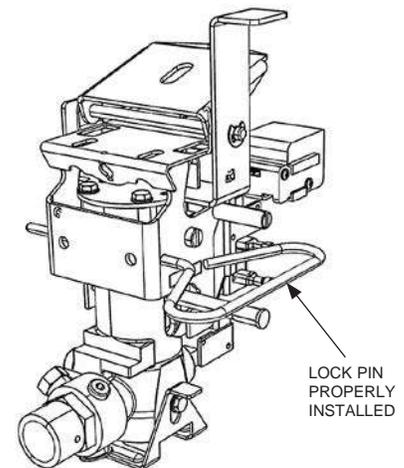


FIGURE 8-2

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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.

**SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)****Step 5 – Fire Suppression Equipment (Continued)**

- 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.

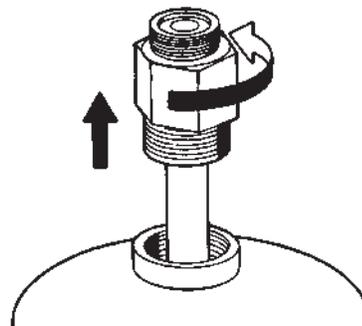
**Alternate Test Method:**

The actuation line can also be pressurized with either CO<sub>2</sub> or N<sub>2</sub> from a cartridge or with dry air, CO<sub>2</sub>, or N<sub>2</sub> 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 8-1 or Figure 8-2.
  - 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 8-14.
  - 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<sub>2</sub> or N<sub>2</sub> cylinder, instead of using a CO<sub>2</sub> or N<sub>2</sub> 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 in. 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.

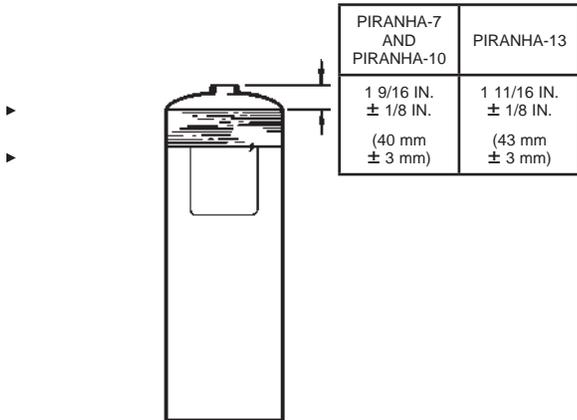
- k. Re-cock the AUTOMAN regulated release and remove the spent cartridge or pressure adaptor from the cartridge receiver.
  - l. If there were leaks in the actuation line or in the 1/8 in. copper gas tubing for the air cylinder(s), re-tighten the fittings or replace damaged components.
  - m. If the 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 (Part No. 181) from cartridge receiver in regulated release mechanism and each regulated actuator. Check gasket for elasticity or cuts and replace if necessary. Clean and coat gasket lightly with a good grade of extreme temperature grease. Reinstall gasket into cartridge receiver(s).
7. Disconnect the expellant gas hose and water hose from each tank adaptor assembly.
8. Disconnect distribution piping union at each tank adaptor outlet line.
9. Remove tank. Keep in upright position to avoid spilling the agent.
10. Remove tank adaptor/tube assembly from each tank. See Figure 8-3. If evidence of corrosion, replace assembly.



**FIGURE 8-3**  
000291

**SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)**  
**Fire Suppression Equipment (Continued)**

11. From the top of the tank collar, make certain each tank is filled to a level of 1 9/16 in. +/- 1/8 in. (40 mm +/- 3 mm) for the PIRANHA-7 and PIRANHA-10 tanks, and 1 11/16 in. +/- 1/8 in. (43 mm +/- 3 mm) for the PIRANHA-13 tank. See Figure 8-4.



**FIGURE 8-4**  
000292

**CAUTION**

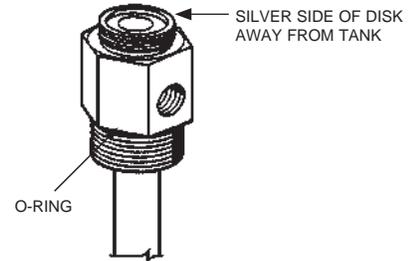
Make certain tank is filled to the proper level. During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **DO NOT FILL WITH COLD AGENT. DO NOT OVERFILL.** Overfilling may result in agent entering gas hoses and regulator, potentially causing system malfunction.

**CAUTION**

Do not mix PRX agent with ANSULEX LPH agent. If mixed, suppression capability will not be performed properly.

12. Check each tank adaptor by completing the following:
  - a. Examine threads on each tank adaptor and tank collar for nicks, burrs, or cross-threading.
  - b. Clean and coat o-ring with Dow Corning #4 (Part No 57593) or equal. See Figure 8-5.
  - c. Make certain bursting disc is in place and silver side is away from tank.
  - d. Remove 1/4 in. vent plug.
  - e. Clean and inspect vent plug for free movement and corrosion. Replace if necessary.
  - f. Reinstall vent plug into adaptor body.

- g. Clean seating surface and return adaptor/tube assembly to each tank.
- h. Tighten securely.



**FIGURE 8-5**  
000364

13. Place fully charged tanks in enclosures and secure.
14. Carefully assemble and wrench tighten all expellant gas hoses, water hoses, 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 metal blow-off caps, make certain 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 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.

**SECTION 8 – MAINTENANCE EXAMINATION**

UL EX 5174

PAGE 8-4 REV. 07 2015-MAR-12

*PIRANHA Restaurant Fire Suppression System  
(Part No. 423385)*

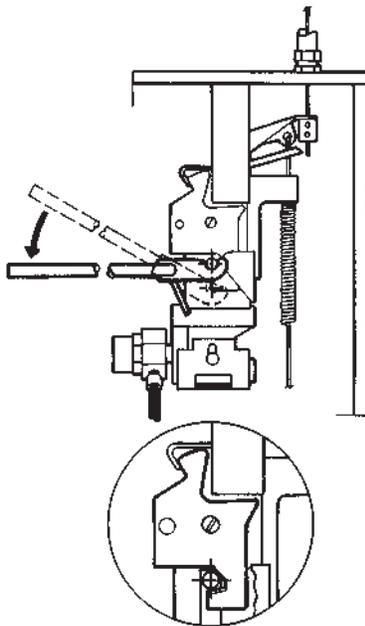
**SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)  
Fire Suppression Equipment (Continued)**

18. Cock the regulated release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041). See Figure 8-6.

Before proceeding with Step 18, test electric (snap-action) switches:

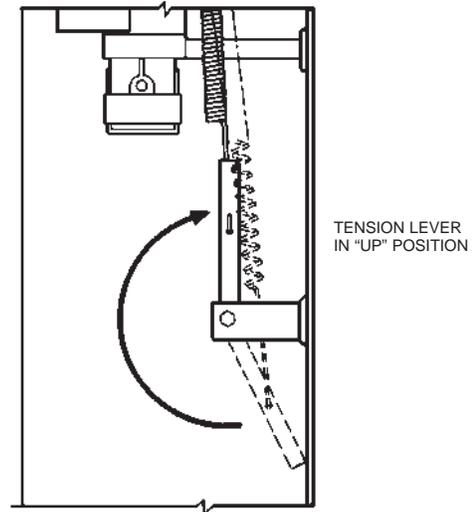
- a. With the AUTOMAN in the cocked or ready position, press the lever of each switch up. If the switch is working properly, there should be an audible click.
- b. With the AUTOMAN in the fired position, press the lever of each switch up, there should be no audible click.
- c. If an audible click is 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 8-6**  
000320

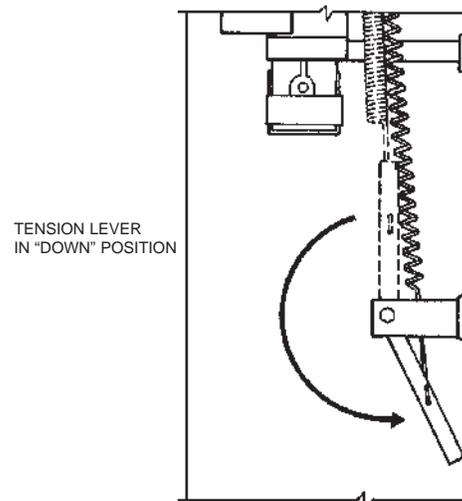
19. Raise tension lever to "UP" position. See Figure 8-7.



**FIGURE 8-7**  
000322

20. Install test link (Part No. 15751) in terminal detector.

21. Lower tension lever to "DOWN" position. See Figure 8-8.



**FIGURE 8-8**  
001096

22. Using wire cutter, cut test link at terminal detector to simulate automatic actuation.

**NOTICE**

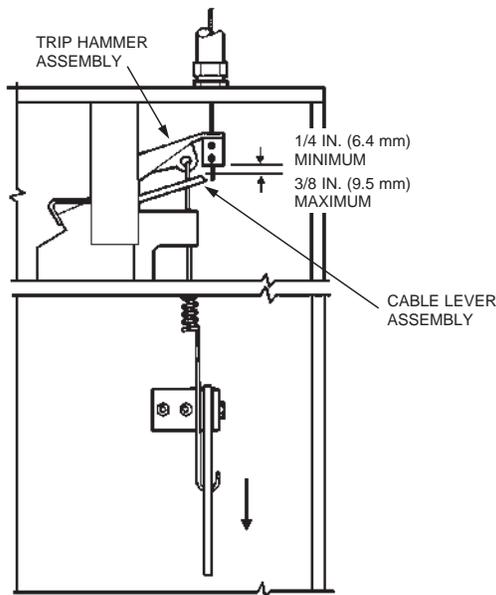
If regulated release mechanism does not actuate, refer to Steps 2 and 3 of "Testing Detection System" in "Testing and Placing in Service," Section 6.

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 and approved fusible links in accordance with NFPA 17A.

**SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)**  
**Fire Suppression Equipment (Continued)**

- ▶ 25. Inspect stainless steel cable at all detector locations, pulley elbows, pulley tee and at AUTOMAN release. If cable 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 stainless steel cable clamping device to make certain that 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. See Figure 8-9.



**FIGURE 8-9**  
000329

**NOTICE**

If clearance is not 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum, raise tension lever to “UP” position, raise trip hammer 3/8 in. to 1/2 in. (10 mm to 13 mm), tighten set screws, and repeat Steps 26 and 28.

- 29. Locate “scissor” style 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.
- 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 nitrogen cartridge. Replace if weight is 1/2 oz (14.2 g), or more, below weight stamped on cartridge. **Note:** If checking 101-10 Carbon Dioxide Cartridge in Remote Release, replace if weight is 1/4 oz (7.1 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.

**Note:** For resetting instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
  - AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
  - AUTOMAN II-C Manual (Part No. 17788)
  - AUTOPULSE Detection & Control Manual (Part No. 430261)
- 41. Secure cover on regulated release assembly and each regulated actuator assembly, insert visual seal (Part No. 197) in each upper and lower cover hole.
  - 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.

**SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)****Step 42 – Fire Suppression Equipment (Continued)**

- 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.

**Waterline Flow and Pressure Test**

The waterline should be flushed and the pressure verified during the semi-annual maintenance. It is the ANSUL Distributor's responsibility to conduct the PIRANHA flowing pressure test at the time of day when the building experiences the highest domestic water usage, or during an off peak period while simultaneously flowing the equivalent highest domestic water usage for the building.

The pressure range of the water system must be within the range stated in the "Water Supply Requirements" on page 4-21 in Section 4 – Design.

Complete the following steps:

1. Attach water pressure tester (Part No. 423556) to pressure test port in AUTOMAN Release and any additional regulated actuators.
2. Attach a 5/8 in. garden hose to each pressure tester and run to a drain or sink. **Note:** Hose must not exceed 25 ft (7.6 m) long.
3. Open test valve in the AUTOMAN Release and any regulated actuator and allow water to flow for approximately 30 seconds.
4. Read pressure on all test kit gauges to verify that it reads between the pressure ranges stated in Water Supply Requirements, listed in the Design Section.
5. Close all test port valves and remove test kits and hoses.
6. Visually inspect lockable shut-off valve in dedicated waterline to determine it is properly locked open and tag is in place.
7. Install cover on regulated release and each regulated actuator. Insert visual seal (Part No. 197) through holes in cover and box, and secure.
8. 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 twelve-year maintenance procedures for single, double, and multiple-tank systems are as follows.

**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.

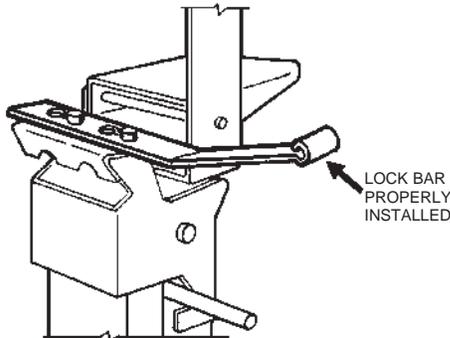
**Therefore, it is strongly recommended that the PIRANHA system be completely inspected and serviced by an authorized ANSUL distributor immediately following any such cleaning operations.**

At twelve-year intervals, the liquid agent tank(s) must be hydrostatically tested and refilled with a fresh charge of PRX Liquid Fire Suppressant. The date of manufacture is stamped on the bottom of the mild steel (red-painted) tanks. The hydrostatic date is on the nameplate for the stainless steel tanks.

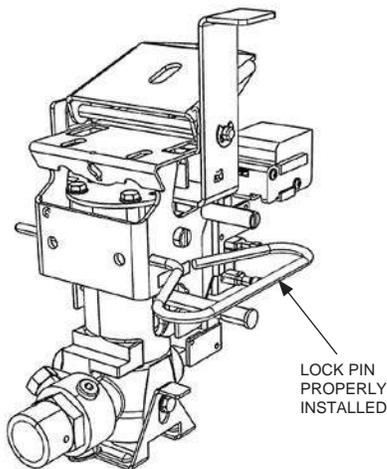
1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.

**12-YEAR MAINTENANCE EXAMINATION (Continued)**

2. Insert the lock bar (Part No. 14985) or lock pin (Part No. 438031) on the cocked regulated release mechanism. See Figure 8-10 or Figure 8-11.



**FIGURE 8-10**  
000321



**FIGURE 8-11**  
000321

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 accidentally 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 actuation gas hose and the water hose from each tank adaptor assembly.
6. Disconnect distribution piping union at each tank adaptor outlet line.
7. Remove tank.
8. Loosen tank adaptor/tube assembly and remove.

9.

**CAUTION**

Safety glasses should be worn during transfer operations of PRX 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 plastic container, and flush tank with clear water. Dispose of agent.

10. At this point, each liquid agent tank, including the 1/4 in. gas hose assembly and the 3/4 in. water discharge hose assembly, must be HYDROSTATICALLY TESTED to 450 psi (31.0 bar).

**NOTICE**

DO NOT hydrostatically test a red painted mild steel agent storage tank. Instead, replace the tank with a new stainless steel tank assembly (1.5 Gal (Part No. 438165), 2.25 Gal (Part No. 438166), or 3.0 Gal (Part No. 438167)).

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. The water flow valve must be disassembled and cleaned after each discharge and at the 12-year maintenance schedule.

Complete the following steps:

- a. Unlock and close lockable water supply valve on PIRANHA system water line.
- b. Attach garden hose to test port outlet in regulated release and regulated actuator(s). Open test port and drain all water out of water line.
- c. Close test port outlet(s) and disconnect drain hose(s).
- d. Disconnect 1/4 in. high pressure hose from bottom of water valve.
- e. Disassemble pipe union above "Quik-Seal" on top of enclosure. Disconnect "Quik-Seal."
- f. Disconnect 3/4 in. water hose from vacuum breaker inside enclosure.
- g. Remove water flow assembly from inside enclosure.
- h. Unscrew spring retainer from top of water valve. See Figure 8-12.
- i. Remove spring. See Figure 8-12.
- j. Unscrew pneumatic actuator from bottom of valve leaving poppet valve and check valve or Schraeder valve attached. See Figure 8-12.
- k. Using low air pressure into check valve port, pop out internal piston from pneumatic actuator. See Figure 8-12.

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 12 (Continued)

- i. Inspect and clean valve I.D.
- m. Lubricate "O" rings on valve stem, piston, and spring retainer with a good grade of silicone grease, such as Dow Corning No. 4 silicone. Replace "O" rings if necessary using Rebuild Kit (Part No. 442633). See Figure 8-12.
- n. Reassemble valve components and reconnect back into enclosure assembly. **Note:** When reassembling spring retainer, apply Prolock Nut Type Sealant to male threads.
- o. Before pneumatic actuator is reinstalled, operate valve manually by depressing valve stem at bottom of valve assembly to ensure proper operation. Make certain pneumatic actuator is fully reset. To reset, it may be necessary to relieve trapped air below piston in pneumatic actuator by depressing poppet valve or pin in Schraeder valve core. Then install pneumatic actuator and high pressure hose assembly.

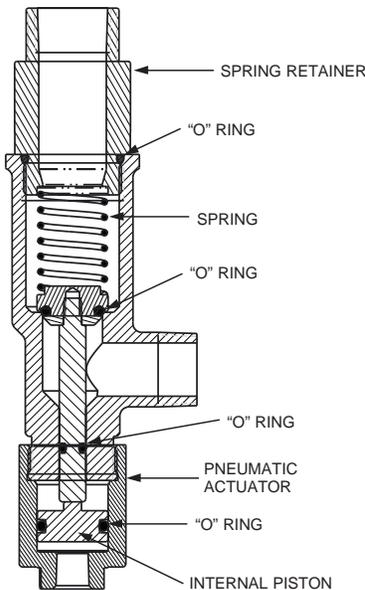


FIGURE 8-12  
009096

- 13. 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 and Authorized ANSUL cartridge refilling stations), and replaced with a charged, replacement cartridge.

**NOTICE**

Cartridge bleed down can be used to verify pneumatic accessories operation.

- 14. 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.

- 15. 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 Date Code Table). If regulator does not require testing, proceed to Step 16. Otherwise, flow test the regulator(s) per the following:

Date Code Table

UL 541L				UL 74FF			
Month <sup>1</sup>		Year <sup>1</sup>		Year <sup>2</sup>		Month <sup>2,3</sup>	
Jan	A	1981	K	2005	E	Jan	A
Feb	B	1982	L	2006	F	Feb	B
Mar	C	1983	M	2007	G	Mar	C
Apr	D	1984	N	2008	H	Apr	D
May	E	1985	P	2009	I	May	E
Jun	F	1986	R	2010	J	Jun	F
Jul	G	1987	S	2011	K	Jul	G
Aug	H	1988	T			Aug	H
Sep	J	1989	U			Sep	I
Oct	K	1990	V			Oct	J
Nov	L	1991	W			Nov	K
Dec	M	1992	Y			Dec	L
		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				

<sup>2</sup>STAMPED YEAR 1ST, MONTH 2ND

<sup>3</sup>STAMPED "I" FOR SEPTEMBER

UL 74FF			
Month <sup>4</sup>		Year <sup>4</sup>	
Jan	A	2011	T
Feb	B	2012	U1
Mar	C	2013	U2
Apr	D	2014	U3
May	E	2015	U4
Jun	F	2016	U5
Jul	G	2017	U6
Aug	H	2018	U7
Sep	J	2019	U8
Oct	K	2020	U9
Nov	L	2021	V1
Dec	M	2022	V2
		2023	V3
		2024	V4
		2025	V5

<sup>4</sup>STAMPED MONTH 1ST, YEAR 2ND

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 15 (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 8-13.

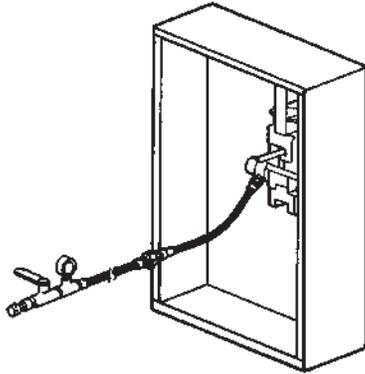


FIGURE 8-13  
000369

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 8-14.

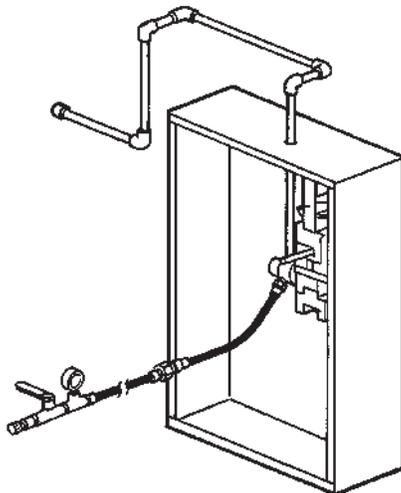


FIGURE 8-14  
000370

Pressure Switch: If an approved 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 8-15.

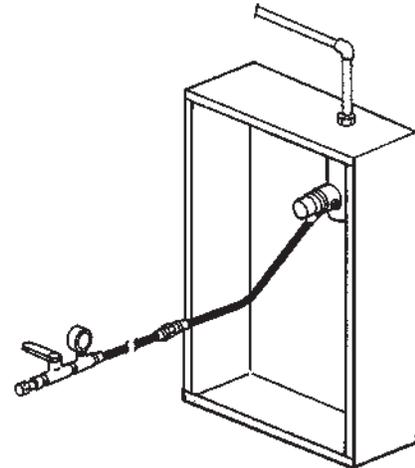


FIGURE 8-15  
000371

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 8-16.

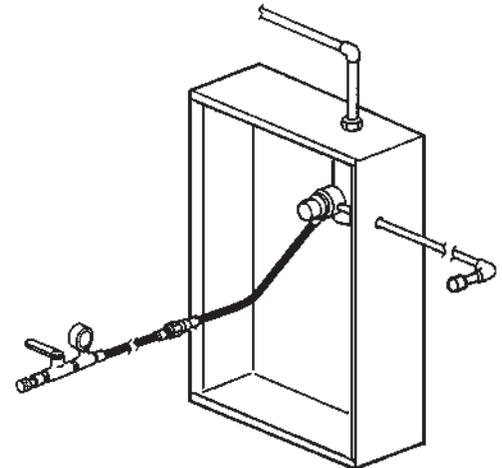


FIGURE 8-16  
000372

**NOTICE**

Make certain valve is **CLOSED** on regulator test kit or pressure will escape before test can be performed.

c. Install LT-30-R nitrogen cartridge(s) into release mechanism and each regulated actuator provided with the system. (Cartridge should be conditioned to approximately 70 °F (21 °C) before test.)

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 15 (Continued)

- ▶ 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.
  - e. Flow test each regulator by completing the following steps:
    - Open test kit valve fully and check gauge while pressure is bleeding off. Gauge reading should stabilize between 135 psi to 165 psi (9.3 bar to 11.4 bar) during the first 10 seconds of flow. Pressure will fall off as the cartridge is exhausted of nitrogen.
    - Allow cartridge pressure to completely bleed off.
    - If necessary, continue flow test at each additional regulated actuator. Test each regulated actuator by repeating Step e.
  - f. Cock release mechanism using cocking lever and insert lock bar or lock pin.
  - 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.
16. Check each tank adaptor by completing the following:
- a. Examine threads on each tank adaptor and tank collar for nicks, burrs, or cross-threading.
  - b. Clean and coat o-ring with a good grade of extreme temperature grease (Dow Corning #4 or #11). See Figure 8-17.
  - c. Make certain bursting disc is in place and silver side is away from tank.
  - d. Remove 1/4 in. vent plug.
  - e. Clean and inspect vent plug for free movement and corrosion. Replace if necessary.
  - f. Reinstall vent plug into adaptor body.

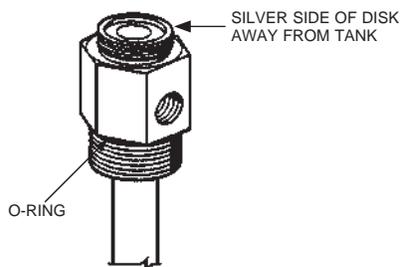


FIGURE 8-17  
000364

- ▶ g. Examine pick-up tube for signs of damage or corrosion.
- ▶ Replace assembly if needed.

17.

**CAUTION**

Safety glasses should be worn during transfer operations of PRX 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 PRX Liquid Fire Suppressant:

PIRANHA-7		PIRANHA-10		PIRANHA-13	
gal	(L)	gal	(L)	gal	(L)
1.5	(5.8)	2.25	(8.5)	3	(11.6)

Fill is complete when PRX liquid level is within the following measurement from top of tank collar:

1 9/16 in. ± 1/8 in. (40 mm ± 3 mm)	1 11/16 in. ± 1/8 in. (43 mm ± 3 mm)
--	---

**CAUTION**

Make certain tank is filled to the proper level. 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.

**CAUTION**

Do not mix PRX agent with ANSULEX LPH agent. If mixed, suppression capability will not be performed properly.

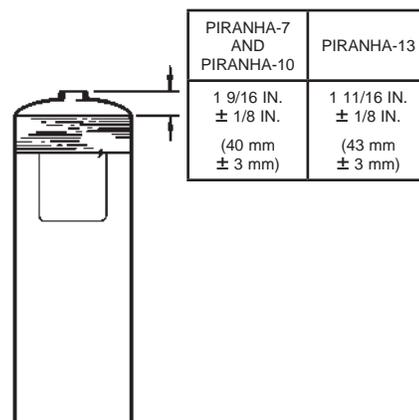


FIGURE 8-18  
000292

**12-YEAR MAINTENANCE EXAMINATION (Continued)**

- 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, make certain spring clip rotates freely on cap.
- ▶ On metal blow-off caps, make certain o-ring is intact and undamaged. Replace cap(s) if necessary.

**NOTICE**

Rubber blow-off caps that have been installed in the system for one year or more must be replaced.

- ▶ 20. 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.

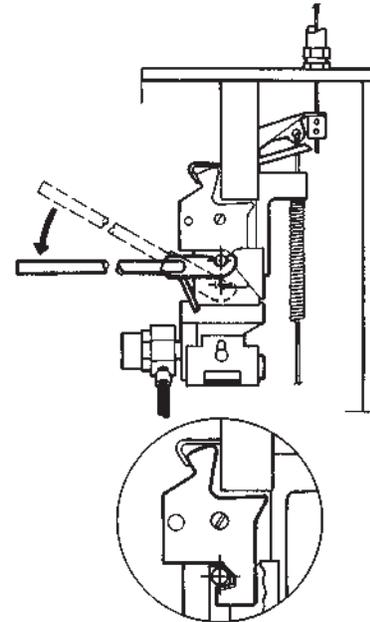
**Note:** Do not allow silicone grease to enter nozzle orifice.

**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 ensure that all nozzles are correctly aimed at the appropriate location on the appliance. 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.

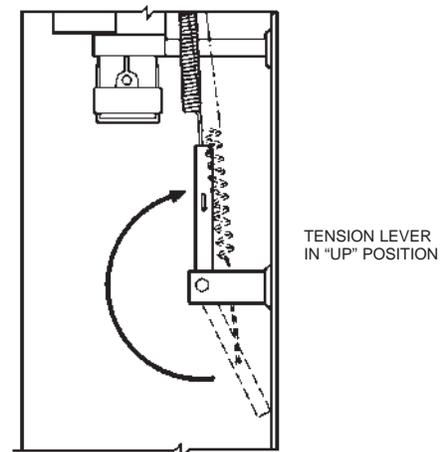
- 22. Cock the regulated release mechanism using cocking lever. See Figure 8-19.



**FIGURE 8-19**

000320

- 23. Raise the tension lever to “UP” position. See Figure 8-20.



**FIGURE 8-20**

000362

- 24. Install test link (Part No.15751) in terminal detector.

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### 12-YEAR MAINTENANCE EXAMINATION (Continued)

25. Lower tension lever to “DOWN” position. See Figure 8-21.

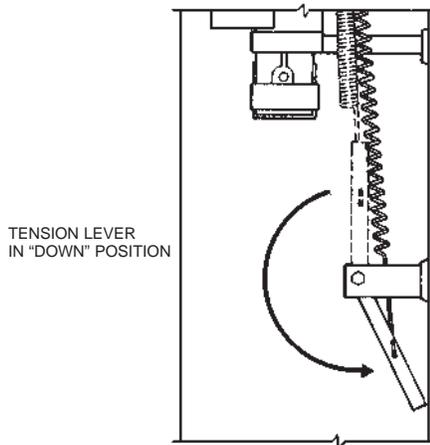


FIGURE 8-21  
001096

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 and 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.

▶ 31. Inspect the base of the stainless steel cable clamping device to make certain that 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. See Figure 8-22.

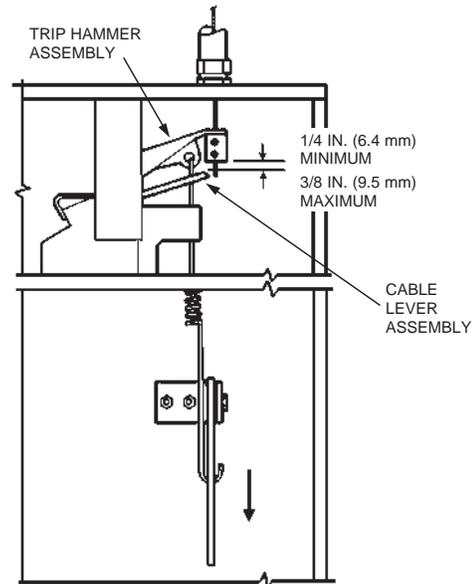


FIGURE 8-22  
000329

#### NOTICE

If clearance is not 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum, raise tension lever to “UP” position, raise trip hammer 3/8 in. to 1/2 in. (10 mm to 13 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, actuation hose and water hose as required. Wrench tighten.

37. Check each gas cartridge by removing shipping cap and weighing cartridge. Replace if weight is 1/2 oz (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.

**12-YEAR MAINTENANCE EXAMINATION (Continued)**

- 39. Remove lock bar or lock pin.

Note: For resetting instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R Control Panel – Design Installation and Maintenance Manual (Part No. 434496)
- AUTOPULSE Z-10 Control Panel – Design Installation and Maintenance Manual (Part No. 430545)
- AUTOMAN II-C Manual (Part No. 17788)
- AUTOPULSE Detection & Control Manual (Part No. 430261)

40. Place regulated release assembly and each regulated actuator assembly enclosure cover in-place.
41. Install cover on regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or visual inspection seal. If applicable, insert seal (Part No. 197) in each upper and lower cover hole. If system is installed in an OEM enclosure, attach enclosure cover and secure with appropriate hardware or procedure.
42. Record date of 12 year maintenance examination on tag attached to enclosure and/or in a permanent file.

**SECTION 8 – MAINTENANCE EXAMINATION**

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**NOTES:**