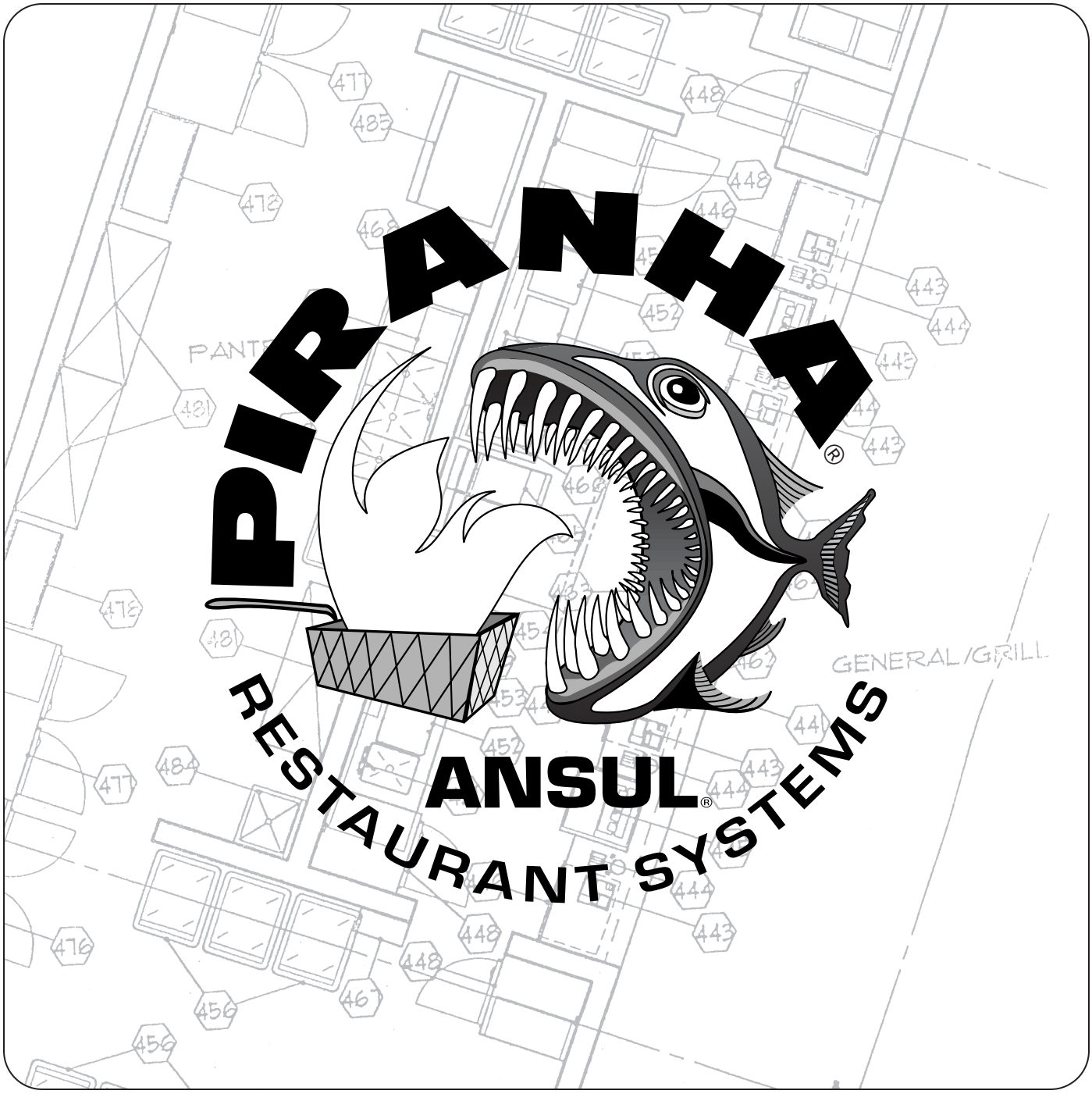
ANSUL®

DESIGN
INSTALLATION
RECHARGE AND
MAINTENANCE
MANUAL

PIRANHA® RESTAURANT FIRE SUPPRESSION SYSTEM



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This manual is intended for use with the 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 agent tank hydrostatic testing.

ANSUL PART NO. 423385-5

DESIGN AND APPLICATION

The PIRANHA™ Restaurant Fire Suppression System is designed to provide fire protection for restaurant cooking appliances, hoods, and ducts. It is a pre-engineered group of mechanical and electrical components for installation by an authorized Ansul distributor or OEM (original equipment manufacturer). The basic system consists of an ANSUL AUTOMAN regulated release assembly which includes a regulated release mechanism, an agent/water valve, and test outlet. Note: Self-contained option regulated release does not contain an agent/water valve or a 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 (used with domestic or sprinkler water supply systems only), 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.

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 (domestic or spinkler water supply systems only) changes position and allows water to flow onto the same hazard areas, continually refurbishing 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 recommended that make up or supply air fans, integral to the exhaust hood(s) being protected, should be shut down upon system actuation.

UL LISTING

The PIRANHA Restaurant Fire Suppression System has been tested and is listed by Underwriters Laboratories, Inc. as a pre-engineered system. 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 ANSUL 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.

ANSUL AUTOMAN Regulated Release Assembly (Electrical) (used with domestic or sprinkler water supply systems only): An 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.

ANSUL AUTOMAN Regulated Release Assembly (Mechanical) (used with domestic or sprinkler water supply systems only): 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 (used with domestic or sprinkler water supply systems only): 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 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.

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 wire rope 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.

DEFINITION OF TERMS (Continued)

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

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

Electrostatic Precipitator (ESP): A device used to aid in the cleaning of the exhaust air. This device may be installed at or near the base of the ventilation duct or it may be installed midway or at the end of the duct system.

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.

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 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_2 cartridge, mechanically unlatchs 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.

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.

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.

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 wire rope which runs between: the regulated release mechanism and the detectors, the regulated release mechanism and the mechanical gas valve, and/or the regulated release mechanism and the remote manual pull station.

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

DEFINITION OF TERMS (Continued)

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 (used with domestic or sprinkler water supply systems only).

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

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

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

Self-Contained Unit: The PIRANHA system option that is offered with its own water supply storage tank. The system is completely self-contained, requiring no domestic or sprinkler water supply hook-up. This option can be used in areas where the building water supply is not sufficient, because of either volume or pressure, to properly supply the PIRANHA system.

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 wire rope 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 (used with domestic or sprinkler water supply systems only): A specially-designed valve located within the ANSUL AUTOMAN Regulated Release and the Regulated Actuator which controls the flow of water following the agent discharge.

Water Shutdown Device (used with domestic or sprinkler water supply systems only): The Water Shutdown Device, Part No. 426294, is an optional component which can be field installed in the ANSUL 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.

NOTES:

TOTAL SYSTEM

The PIRANHA™ system has been tested in accordance with UL Standard 300 and is in compliance with NFPA 96 and NFPA 17A as a pre-engineered water assisted, wet chemical fire suppression system.

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.

For PIRANHA self-contained water supply systems, the water is supplied by a dedicated, Ansul supplied, 40 gallon (151 L) water storage tank.

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 (FOR DOMESTIC OR SPRINKLER WATER SYSTEMS ONLY)

The tank assembly is filled with a proprietary wet agent under atmospheric pressure. The system is equipped with a pneumatically controlled water flow valve (for domestic or sprinkler supply systems only). 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. See “Water Supply Requirements” in Section 5. 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 ANSUL 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.

NOTICE

On domestic or sprinkler water supply systems, 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.

SYSTEM OPERATION – BASIC UNIT (FOR DOMESTIC OR SPRINKLER WATER SYSTEMS ONLY)

When a fire is detected by the fire suppression system, the spring-loaded ANSUL 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 (on domestic or sprinkler water supply systems only) 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 (on domestic or sprinkler water supply systems only) 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. On domestic or sprinkler water supply systems, 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 ANSUL AUTOMAN Release.

DESCRIPTION OF SYSTEM (FOR SELF-CONTAINED WATER SUPPLY SYSTEM ONLY)

The self-contained PIRANHA system option utilizes a PIRANHA AUTOMAN Regulated Release without the integral water valve/ pneumatic actuator assembly. The self-contained option utilizes a factory supplied water tank with a pre-determined amount of water stored in the tank. When the PIRANHA system is activated, the water tank expellant gas assembly operates, pressurizing the water tank. The water tank is connected to the regulated release assembly with piping installed per the waterline guidelines. The water tank is pressurized by the expellant gas assembly. Nitrogen gas from the two LT-A-101-30 cartridges is piped through a 75 psi regulator (5.2 bar) and then to the headspace of the water tank. The expellant gas actuators are connected to the ANSUL AUTOMAN release high pressure port. The ANSUL AUTOMAN low pressure port is connected to the 150 psi (10.3 bar) agent tank regulator. The agent tank regulator receives its pressure from the cartridge located 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 piping.

SYSTEM OPERATION (FOR SELF-CONTAINED WATER SUPPLY SYSTEM ONLY)

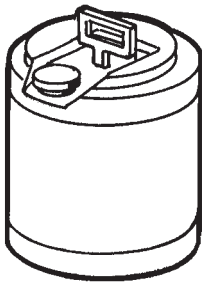
When a fire is detected by the fire suppression system, the spring loaded ANSUL AUTOMAN release assembly automatically actuates to puncture the seal of the expellant gas cartridge. This action allows the release of nitrogen gas under high pressure to both the high pressure inlet of the water expellant gas actuators and the high pressure inlet of the pressure regulator for the PIRANHA agent tank. The high pressure nitrogen gas operates the water expellant gas actuators, which punctures the seal of two LT-A-101-30 nitrogen cartridges. The cartridges simultaneously release their nitrogen supply through the water tank expellant gas regulator and hose to the water tank pick-up tube adaptor. The expellant gas pressurizes the headspace of the water tank, which forces the water to flow to the ANSUL AUTOMAN wet agent tank assembly. The low pressure gas from the PIRANHA agent tank regulator within the release assembly enters the top of the agent tank to expel the wet chemical agent from the tank discharge outlet, into the discharge piping and out the discharge nozzles. Once the low pressure gas is flowing, the regulator will feed gas into the tank at a constant regulated 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 water pressure is applied to the swing check valve in the ANSUL AUTOMAN release assembly at the time of system actuation, water will not flow until the water supply overcomes the decaying gas pressure from the low pressure gas in the top of the agent tank, at which time the water will automatically commence flowing through the tank, into the discharge piping, and out the discharge nozzles. Water will continue to flow until the entire content of the water tank has been expelled.

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.

PRX LIQUID FIRE SUPPRESSANT



5.0 GALLON (18.9 L) PAIL

FIGURE 1
001606

REGULATED RELEASE ASSEMBLY (MECHANICAL)

The ANSUL 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 knock-outs 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.

NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-Contained Option, see Section IX.

ANSUL AUTOMAN REGULATED RELEASE ASSEMBLY (MECHANICAL)

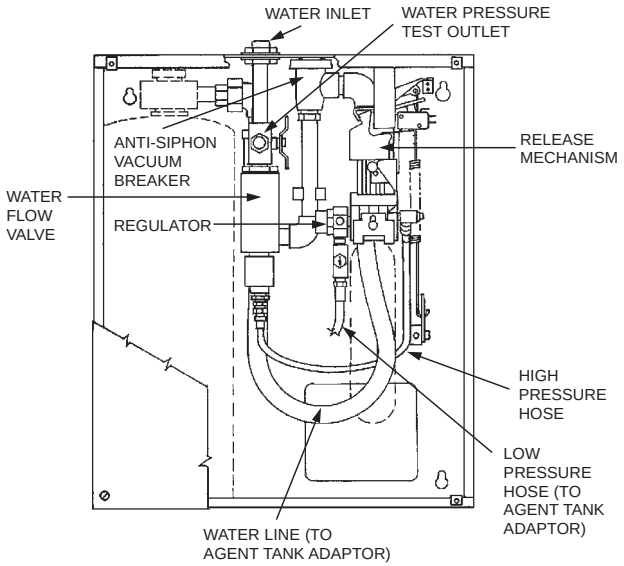


FIGURE 2
001693

REGULATED RELEASE ASSEMBLY (ELECTRICAL)

The ANSUL AUTOMAN Regulated Electrical Release Assembly, Part No. 423386, is identical to the mechanical version except it contains a factory installed 120 VAC 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.

NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-Contained Option, see Section IX.

"ANSUL AUTOMAN" REGULATED RELEASE ASSEMBLY (ELECTRICAL)

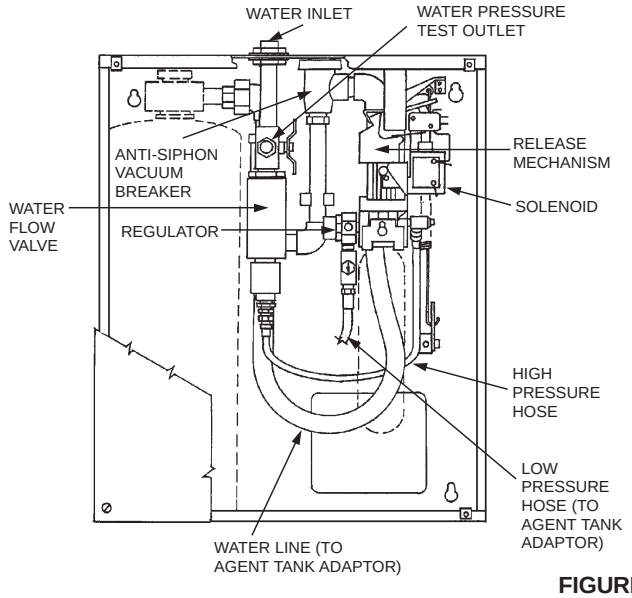


FIGURE 3
001694

▸REMOTE MECHANICAL RELEASE

▸The Remote Mechanical Release, Part No. 32381, is used to actuate up to five (5) PIRANHA regulated actuators. The 101 remote mechanical release utilizes a 101-10 carbon dioxide cartridge as the actuation pressure to operate the PIRANHA regulated actuators. The remote release assembly contains an external strike button for manual actuation.

▸NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-▸Contained Option, see Section IX.

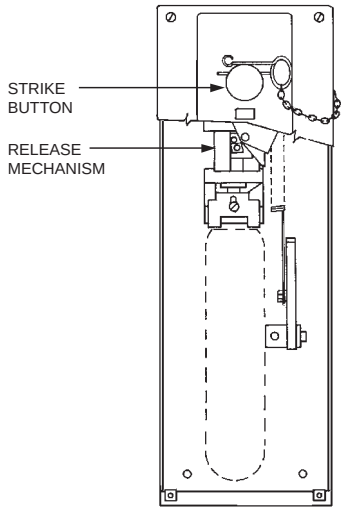


FIGURE 4
004205

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.

▸NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-▸Contained Option, see Section IX.

REGULATED ACTUATOR ASSEMBLY

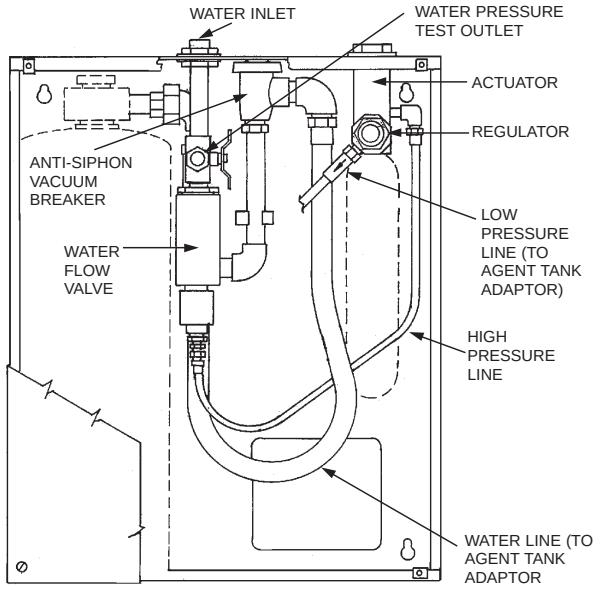


FIGURE 5
001695

MECHANICAL REGULATED RELEASE ASSEMBLY 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.

▸NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-▸Contained Option, see Section IX.

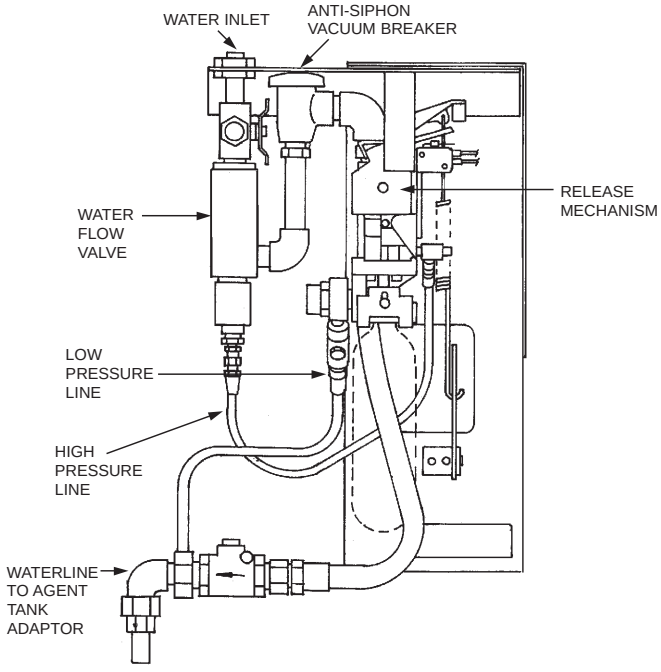


FIGURE 6
003403

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.

NOTE: This Regulated Release Assembly (mechanical) cannot be used with a PIRANHA self-contained design option. For Self-Contained Option, see Section IX.

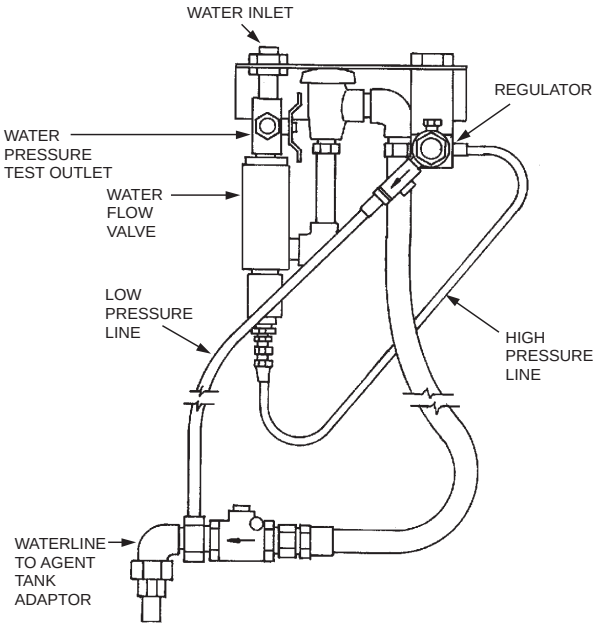
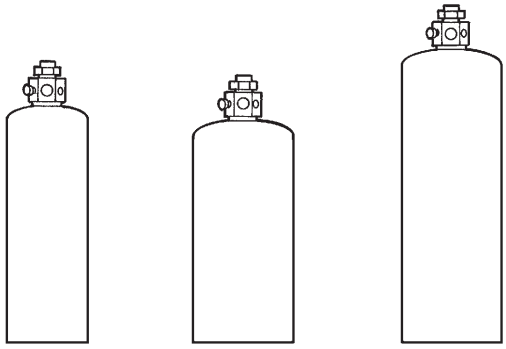


FIGURE 7
003404

AGENT TANKS

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

The tank is constructed of mild 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.



PIRANHA-7
1.5 GALLON
(PART NO. 422816)
19 IN. HIGH X
5 5/8 IN. DIA.
21 LB. (9.5 kg) CHARGED

PIRANHA-10
2.25 GALLON
(PART NO. 422877)
18 IN. HIGH X
7 IN. DIA.
31 LB. (14 kg) CHARGED

PIRANHA-13
3.0 GALLON
(PART NO. 422810)
23 IN. HIGH X
7 IN. DIA.
38 LB. (17 kg) CHARGED

FIGURE 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.

Two nitrogen gas cartridges are available.

The LT-20-R Cartridge, Part No. 423429 (TC/DOT), is used with the PIRANHA-7 and the LT-30-R Cartridge, Part No. 423435 (TC/DOT), is used with the PIRANHA-10 and PIRANHA-13.

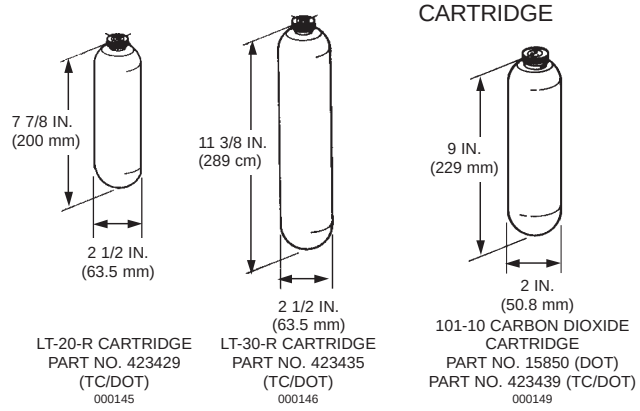
One carbon dioxide cartridge is available.

The 101-10 carbon dioxide cartridge, Part No. 423439 (TC/DOT), or Part No. 15850 (DOT), is utilized in the remote mechanical release assembly.

See Section IX for Self-Contained Option cartridge.

NITROGEN GAS CARTRIDGES

CARBON DIOXIDE CARTRIDGE



LT-20-R CARTRIDGE
PART NO. 423429
(TC/DOT)
000145

LT-30-R CARTRIDGE
PART NO. 423435
(TC/DOT)
000146

101-10 CARBON DIOXIDE
CARTRIDGE
PART NO. 15850 (DOT)
PART NO. 423439 (TC/DOT)
000149

FIGURE 9

APPLIANCE/PLENUM NOZZLE

The Appliance/Plenum Nozzle, Part No. 423480, is a one piece nozzle body. The nozzle is chrome plated. The nozzle assembly contains a stainless steel strainer and retaining spring.

Nozzle tip is stamped with “AP” indicating this is a PIRANHA Appliance/Plenum nozzle.

Nozzle is shipped with a silicone rubber blow-off cap.

“AP” nozzles must be ordered as Nozzle Shipping Assembly, Part No. 423482, which contains 50 nozzles.

Replacement blow-off caps are available.

This nozzle is used for all high proximity appliance nozzle protection and plenum protection.

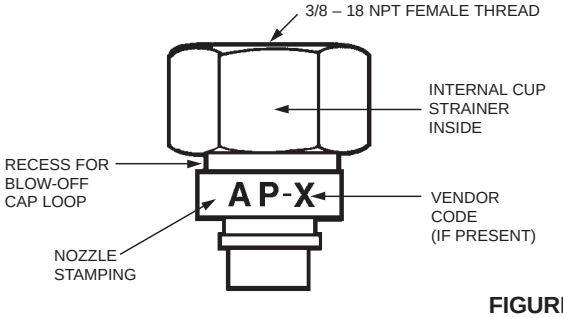


FIGURE 10
001690

DUCT/LOW PROXIMITY NOZZLE

The Duct/Low Proximity Nozzle, Part No. 426093, is a one-piece nozzle body. The nozzle is chrome plated. The nozzle assembly contains a stainless steel strainer and retaining spring.

The nozzle tip is stamped with “DL” indicating this is a PIRANHA Duct/Low Proximity nozzle.

Nozzle is shipped with a silicone rubber blow-off cap.

“DL” nozzles must be ordered as Nozzle Shipping Assembly, Part No. 426092, which contains 25 nozzles.

Replacement blow-off caps, strainers and retaining springs are available.

This nozzle is used for all duct protection and low proximity appliance protection.

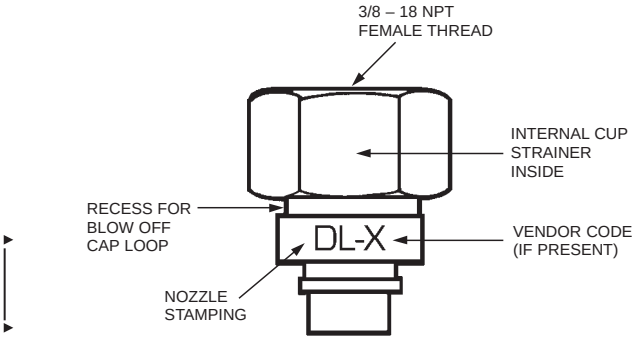


FIGURE 11
001691

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.

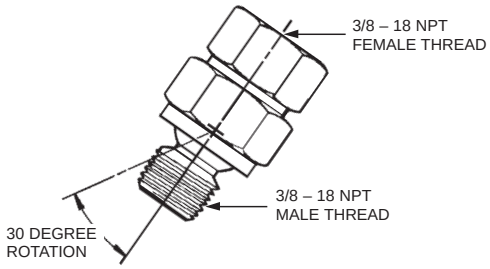


FIGURE 12
000003

RUBBER BLOW-OFF CAPS

The Rubber Blow-Off Cap, Part No. 77676, helps keep the orifice of the nozzle free of grease or other substances that could interfere with agent distribution. A retaining strap attaches the blow-off cap to the nozzle. Rubber Blow-Off Caps must be ordered as a Shipping Assembly, Part No. 77695, which contains 50 blow-off caps, or Part No. 77411, which contains 12 blow-off caps.

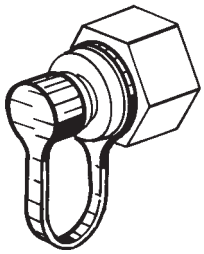


FIGURE 13
000009

METAL BLOW-OFF CAP

Metal blow-off caps are available as options to the standard rubber caps. The metal cap can be used in unusually high heat conditions, generally over 400 °F (204 °C). The metal blow-off cap is attached to the nozzle by means of a stainless steel wire which prevents it from falling into the appliance during discharge. Shipping Assembly Part No. 79745 contains 10 metal blow-off caps.

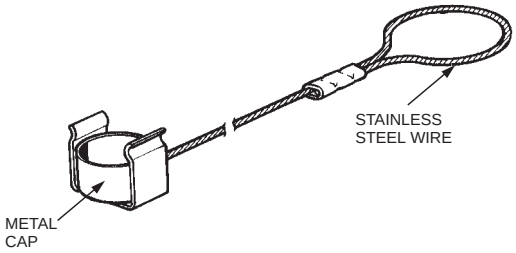


FIGURE 14
000152

CONDUIT OFFSET ASSEMBLY

The Conduit Offset Assembly is used to change direction of the wire rope on detection, mechanical gas valve, and remote pull station lines. The conduit offset assembly can only be used in the area where the conduit attaches to the regulated release assembly. When using the conduit offset assembly, the maximum number of pulley elbows is still allowed. The Conduit Offset Shipping Assembly, Part No. 79825, consists of 6 conduit offsets.

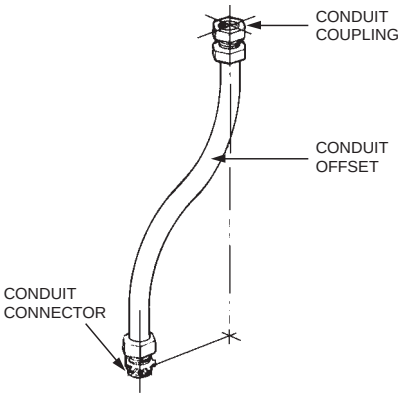


FIGURE 15
000153

"QUIK-SEAL" ADAPTOR

The "Quik-Seal" adaptor is a listed mechanical bulkhead fitting that produces a liquid-tight seal around both distribution piping and detection conduit which runs through restaurant hoods and ducts. The "Quik-Seal" adaptor accepts threaded pipe or conduit. The adaptor is available for 1/4 in. (Part No. 78195), 3/8 in. (Part No. 77284), 1/2 in. (Part No. 77286), or 3/4 in. (Part No. 77288) pipe or conduit sizes. When using with EMT conduit, a conduit connector must be installed in each end of the adaptor. The "Quick-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.

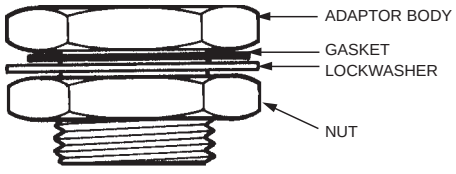


FIGURE 16
000154

"COMPRESSION-SEAL" ADAPTOR

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around pipe and conduit when installing distribution piping and detection conduit through restaurant hoods and ducts. The "Compression-Seal" adaptor is a straight-through design requiring no cutting or threading of conduit or pipe. The adaptor is available for pipe sizes of 1/4 in. (Part No. 79148), 3/8 in. (Part No. 79150), 1/2 in. (Part No. 79146), and EMT conduit size of 1/2 in. (Part No. 79152). 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.

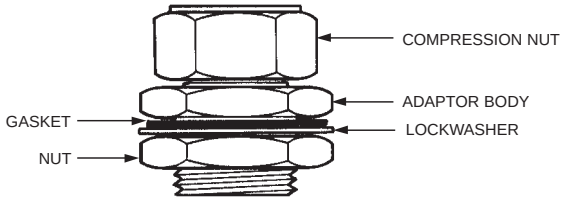


FIGURE 17
000155

"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.

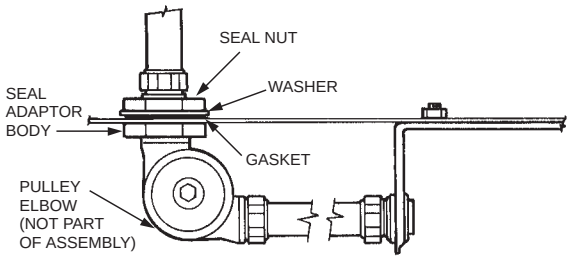


FIGURE 18
000156

DETECTORS

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

There are two styles of detectors available: the hinged style, and the scissor style.

The hinged style detector requires the wire rope to be strung to the detector bracket, and then "threaded" through the linkage assembly before continuing to the next detector bracket.

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

Each style of detector consists of two types of assemblies:

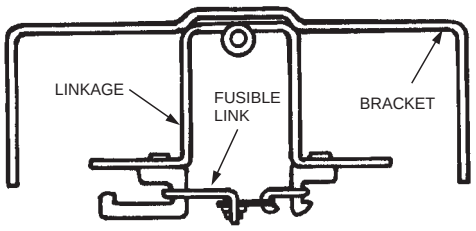
The Terminal Detector (Part No. 15375, or 417368) includes a test link and is placed last in a series of detectors. This detector is sometimes referred to as the end-of-line detector and is thus named because it is at the point at which the wire rope "terminates," or is anchored at the detector bracket. Only one terminal detector is required per detection system.

The Series Detector (Part No. 15373, or 417369) is any detector located in-line between the regulated release assembly and the terminal detector.

When using Part No. 15373 and 15375 style detectors, a total of 5 detectors can be in one detection system: 4 series detectors, Part No. 15373 and 1 terminal detector, Part No. 15375.

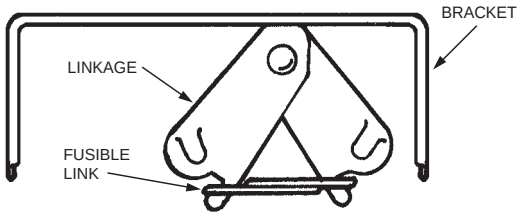
When using Part No. 417368 and 417369 style detectors, a total of 15 detectors can be in one detection system: 14 series detectors, Part No. 417369 and 1 terminal detector, Part No. 417368.

HINGED STYLE – PART NO. 15373 AND 15375



000158

SCISSOR STYLE – PART NO. 417368 AND 417369



000159

FIGURE 19

FUSIBLE LINK

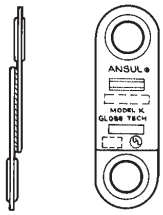
Select correct UL Listed fusible link(s) for installation in detector(s) according to the temperature condition chart below:

K STYLE

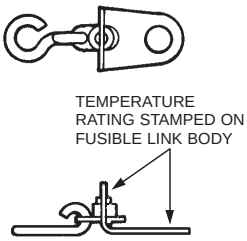
Fusible Link Part No.	Fusible Link Shipping Assembly Part No.	Temperature Rating	To Be Used Where Temperature Does Not Exceed
415739 (1)	415739 (1)	165 °F (74 °C)	100 °F (38 °C)
415740 (1)	415740 (1)	212 °F (100 °C)	150 °F (66 °C)
415741 (1)	415744 (25)	280 °F (138 °C)	225 °F (107 °C)
415742 (1)	415745 (25)	360 °F (182 °C)	300 °F (149 °C)
415743 (1)	415746 (25)	450 °F (232 °C)	375 °F (191 °C)

ML STYLE

Fusible Link Part No.	Fusible Link Shipping Assembly Part No.	Temperature Rating	To Be Used Where Temperature Does Not Exceed
550368 (1)	551522 (10)	165 °F (74 °C)	100 °F (38 °C)
550365 (1)	551523 (10)	212 °F (100 °C)	150 °F (66 °C)
550366 (1)	551524 (10)	280 °F (138 °C)	225 °F (107 °C)
550009 (1)	551525 (10)	360 °F (182 °C)	300 °F (149 °C)
550367 (1)	551526 (10)	450 °F (232 °C)	375 °F (191 °C)
56816 (1)	551527 (10)	500 °F (260 °C)	475 °F (246 °C)
56816 (1)	73867 (25)	500 °F (260 °C)	475 °F (246 °C)



K STYLE
000170



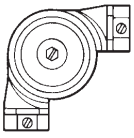
ML STYLE
500 °F (260 °C) ONLY
000171

FIGURE 20

PULLEY ELBOWS

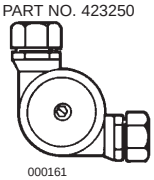
There are two types of pulley elbows used to change the direction of the wire rope by 90°. Ansul recommends for temperatures not in excess of 700 °F (371 °C). Part No. 415670 has socket ends with set screws for 1/2 in. conduit, and Part No. 423250 has compression ring ends also for 1/2 in. conduit. Pulley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

PART NO. 415670



000160

PART NO. 423250



000161

FIGURE 21

PULLEY TEE

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

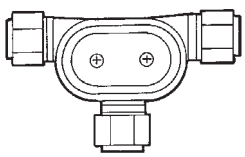


FIGURE 22
000447

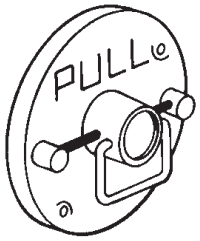
STAINLESS STEEL CABLE

The 1/16 in. stainless steel cable is run from the terminal detector, through conduit, all series detectors and pulley elbows, and into the regulated release mechanism trip lever. When any fusible link separates, the tension on the cable is relaxed, and the trip lever actuates the regulated release mechanism. The cable can also be used for mechanical gas valves and remote manual pull stations. The cable is available in 50 ft. (15 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. 4835 or Part No. 54011) is required for manual actuation of the regulated release assembly. The remote manual pull station should be mounted at a point of egress and positioned at a height determined by the authority having jurisdiction. A brushed aluminum trim ring is available for installation between the recessed junction box and the pull station. A package of 10 trim rings is available as Part No. 427074.

PART NO. 4835 (WITHOUT CABLE)
PART NO. 54011) (WITH 50 FT. OF CABLE)



METAL STAMPED

FIGURE 23
000163

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 (.69 bar)
55601	1 in. Gas Valve (ANSUL)	10 psi (.69 bar)
55604	1 1/4 in. Gas Valve (ANSUL)	10 psi (.69 bar)
55607	1 1/2 in. Gas Valve (ANSUL)	10 psi (.69 bar)
55610	2 in. Gas Valve (ANSUL)	10 psi (.69 bar)
25937	2 1/2 in. Gas Valve (ASCO)	5 psi (.35 bar)
25938	3 in. Gas Valve (ASCO)	5 psi (.35 bar

	A		B		C	
Valve Size	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)

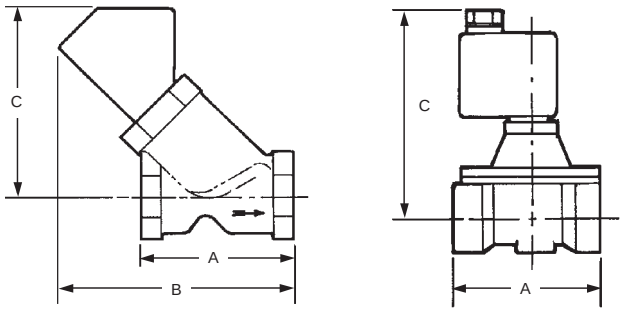


FIGURE 24

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 1/2 in., 2 in., and 3 in. The valve is held open by an energized solenoid and upon system actuation, the switch contacts in the regulated release assembly open, thus de-energizing the circuit to the gas valve solenoid, causing the valve to close. Valves are available in 120 VAC and are UL Listed.

Part No.	Description	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)
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)
17643	3 in. Solenoid Gas Valve (ASCO)	5 psi (.35 bar)

	A		B	
Valve Size	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)

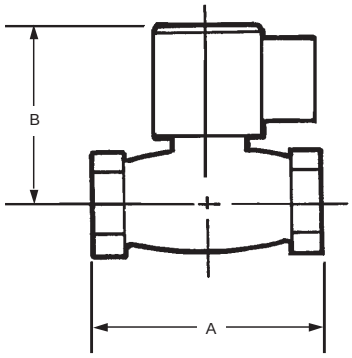


FIGURE 25
004210

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 120 VAC. The manual reset relay is also recommended for electrical shut down.

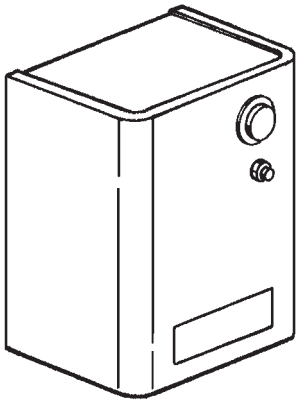


FIGURE 26
000087

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. Each switch has a set of single-pole, double-throw contacts rated at 21 amp, 1 HP, 125, 250, 277 VAC or 2 HP, 250, 277 VAC. Mounting hardware and 12 in. (305 mm) long wire leads are provided with each kit.

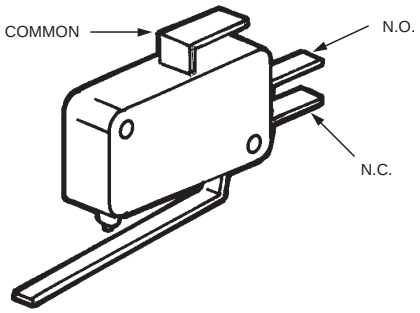


FIGURE 27
001612

ALARM INITIATING SWITCH

The Alarm Initiating Switch Kit, Part No. 428311, can be field mounted within the ANSUL AUTOMAN release. This switch must be used to close a supervised circuit to the building main fire alarm panel when the ANSUL 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.

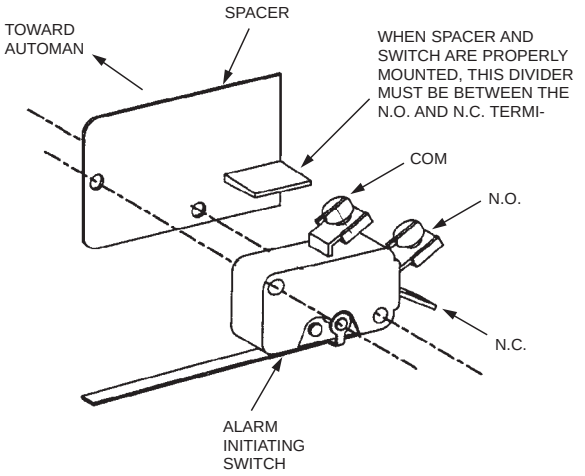


FIGURE 28
004890

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 29
000172

REGULATOR TEST KIT

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

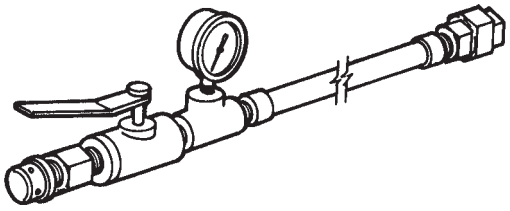


FIGURE 30
000169

WATER PRESSURE TESTING ASSEMBLY

The Ansul 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 ANSUL 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. Not required with self-contained design option.

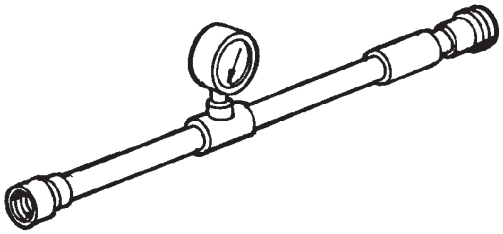


FIGURE 31
001688

NOZZLE AIMING DEVICE

The Nozzle Aiming Device, Part No. 431992, is required to properly aim each nozzle to the correct aiming point. The device clamps to the nozzle and emits a small laser light that reflects on the surface that it is aiming at. The nozzle can then be rotated to point at a predetermined aiming point and then tightened to hold that angle.

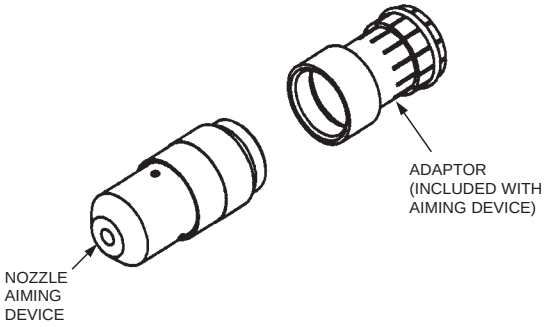


FIGURE 32
006520

WATER SHUTDOWN DEVICE

The Water Shutdown Device, Part No. 426294, is an optional component which can be field-installed in the ANSUL 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. Not required with PIRANHA self-contained design option.

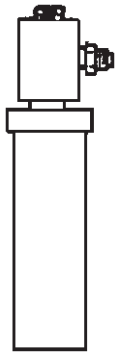


FIGURE 33
003405

STAINLESS STEEL ACTUATION HOSE

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

Hose Part No.	Length
31809	16 in. (41 cm)
32335	20 in. (51 cm)
32336	24 in. (61 cm)
430815	42 in. (107 cm)

Fitting Part No.	Description
31810	Male Elbow (7/16-20 x 1/4 in. NPT)
31811	Male Tee (7/16-20 x 7/16-20 x 1/4 in. NPT)
32338	Male Straight Connector (7/16-20 x 1/4 in. NPT)

FIGURE 34
000433

LOCKABLE FULL FLOW INDICATING SHUT-OFF VALVE

A UL listed lockable (open-position) 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 (required for domestic and sprinkler water supply systems only). Ansul 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 is locked open in the 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. (Not required with PIRANHA Self-Contained design option).

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

Part No.	Description
423955	3/4 in. Lockable Shut-Off Valve
423956	1 in. Lockable Shut-Off Valve
423957	1 1/4 in. Lockable Shut-Off Valve

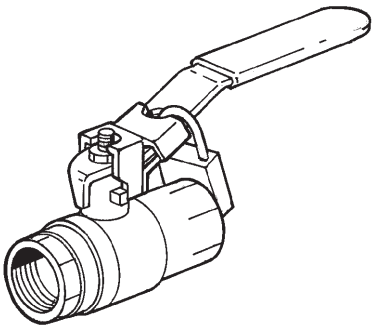


FIGURE 35
001752

FLUSHING CONCENTRATE KIT

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

▸ SYSTEM DESIGN (DOMESTIC AND SELF-CONTAINED ▸ WATER SUPPLY OPTIONS)

The PIRANHA and the R-102 systems use common components and compatible agents, therefore, they may be used together for cooking appliance, hood, and duct protection. The primary ANSUL AUTOMAN Release can be either a PIRANHA or an R-102 ANSUL AUTOMAN 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 (5) 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 PIRANHA nozzles.
- 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, suppression system will not perform properly.

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 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 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

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

Full hood continuous protection is defined as overlapping nozzle appliance protection that covers the complete appliance lineup 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 3 (full hood continuous protection) and Figure 4 (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 (2001 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 pro- ▸ tected by fire extinguishing equipment.”

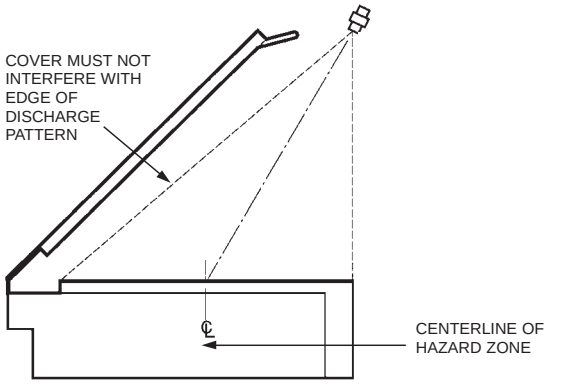
Cooking appliances tested and approved include fryers, griddles, ranges, broilers, woks, tilt skillets and tilt braising pans. The PIRANHA system provides two types of appliance protection: overlapping and dedicated appliance protection. Following is a list of cooking appliances, along with their maximum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

APPLIANCE PROTECTION (Continued)

Overlapping Nozzle Coverage – High Proximity

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (864 mm) Deep x 5.8 sq. ft. (.54 sq. m)
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 1 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 1

000071

Overlapping Appliance Nozzle and Hazard Zone Locations – High Proximity

1. All overlapping high proximity appliance nozzles must be the "AP" nozzle, Part No. 423480, 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 high proximity appliance nozzles must be located 40 in. to 48 in. (1 m to 1.2 m) above the top surface of the protected appliances. See Figure 2a. Exception No. 1: Nozzle dimensions for wok protection are measured to bottom of wok. Exception No. 2: When using overlapping high proximity appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 2. Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone or be less than 18 in. (457 mm) above the hazard zone. See Figure 2.

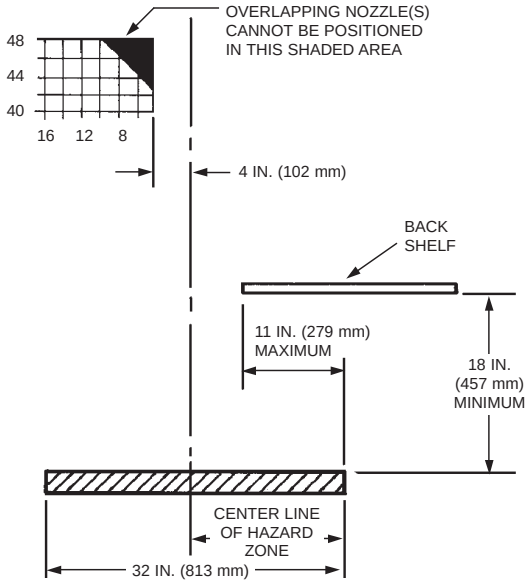


FIGURE 2

001758

3. The overlapping high 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 2a.

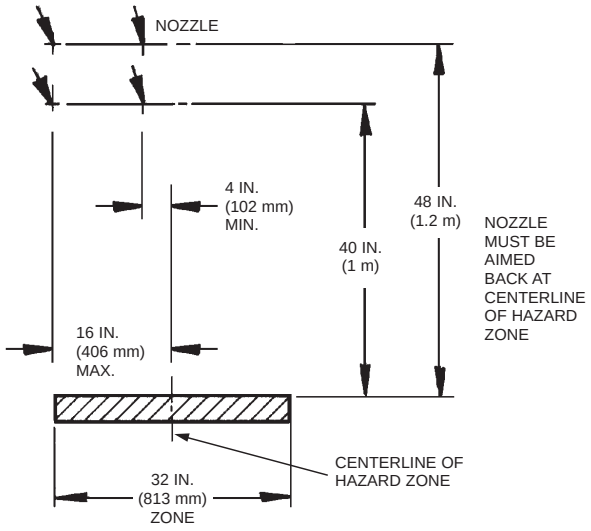


FIGURE 2a

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 chart in Figure 1).

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.

APPLIANCE PROTECTION (Continued)

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

5. 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. (648 mm). See Figures 3 and 4.

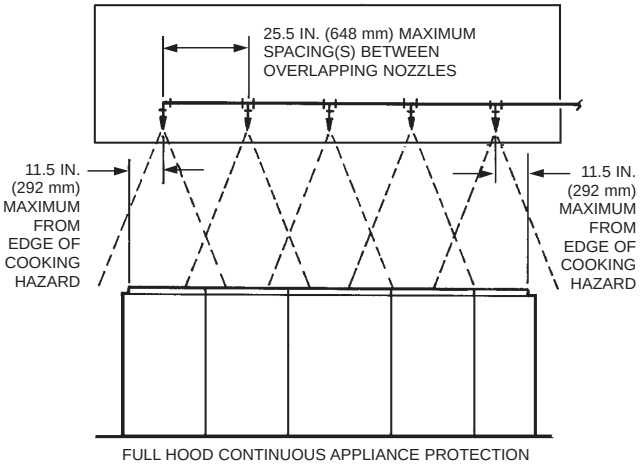


FIGURE 3
001710

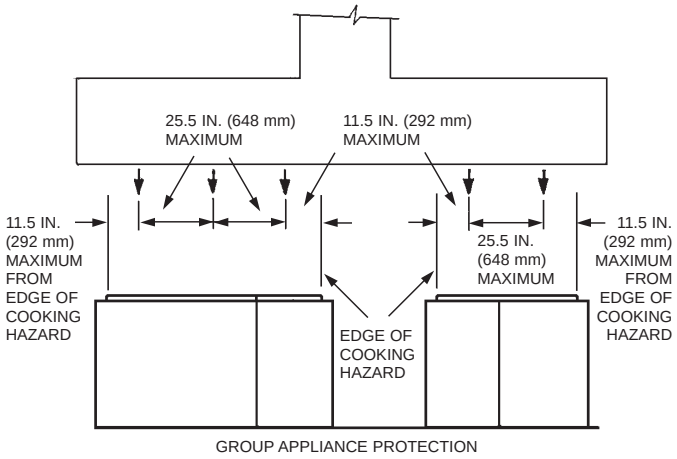


FIGURE 4
001720

6. 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 5.

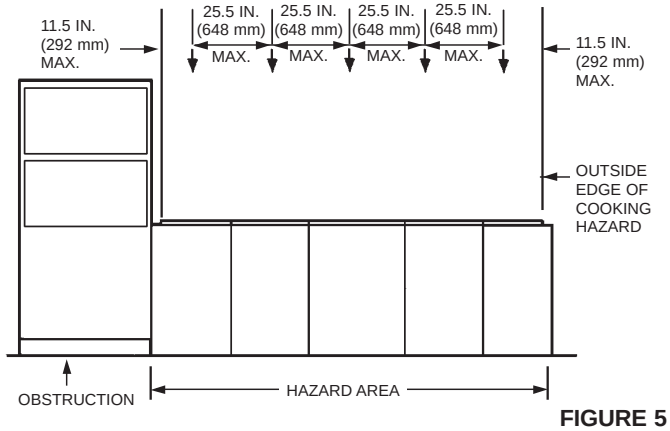


FIGURE 5
001713

7. 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 5a.

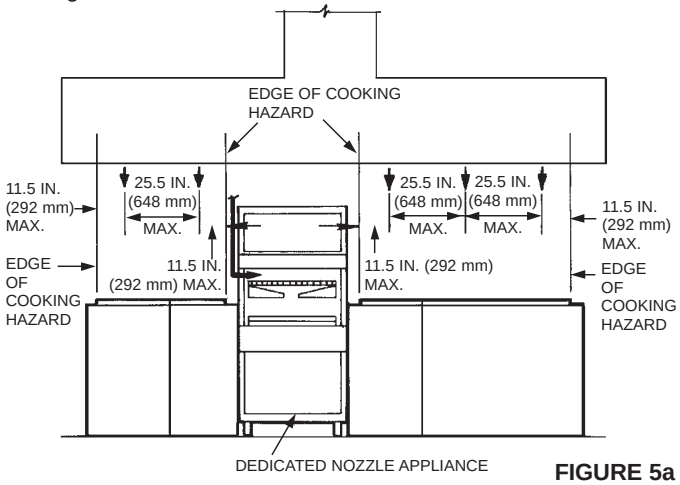


FIGURE 5a
001756

8. On protected appliances, all hazard surfaces located in a group must be within 40-48 in. (1 m-1.2 m) for high proximity or 13-24 in. (330-610 mm) for low proximity from the nozzle(s). Once that dimension is exceeded, a new group must be started. See Figure 5b.

   Note: The supply pipe feeding nozzle groups is to be at the same elevation. Adjust height for each group only by varying lengths of nozzle drops.

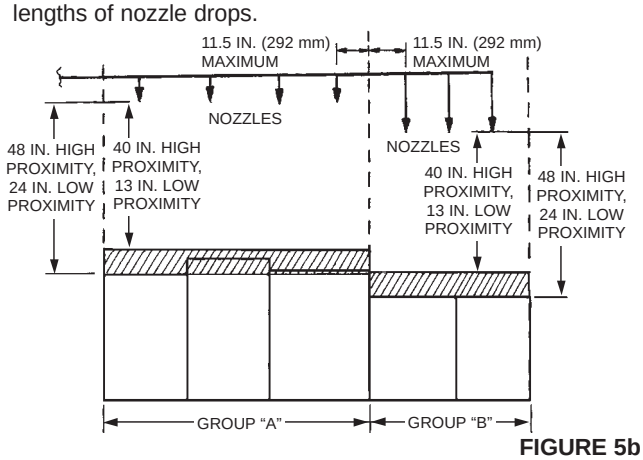


FIGURE 5b
006917

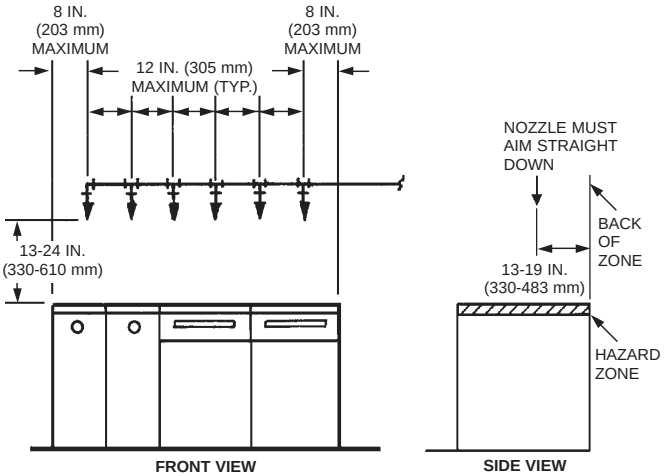
APPLIANCE PROTECTION (Continued)

Overlapping Nozzle Coverage – Low Proximity

Appliance Type	Maximum Cooking Hazard
Fryer	27 5/8 in. (702 mm) x 4 sq. ft. (.37 sq. m)
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 5c. ►
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 5c. ►
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 5c. ►
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 5c. ►

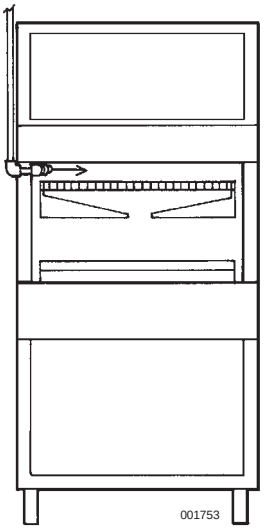


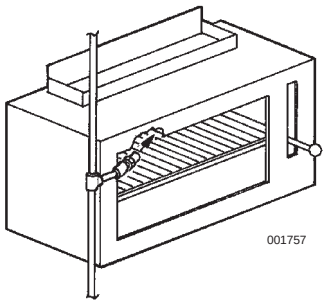
► **FIGURE 5c**
004206

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	"AP" Nozzle Location
Upright Broilers, Salamanders	27 1/2 in. (699 mm) depth x 35 1/2 in. (902 mm) width (inside cooking chamber)	See Figure 6
Chain Broiler (Under or Over Burner)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	See Figure 6a
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)	See Figure 6b

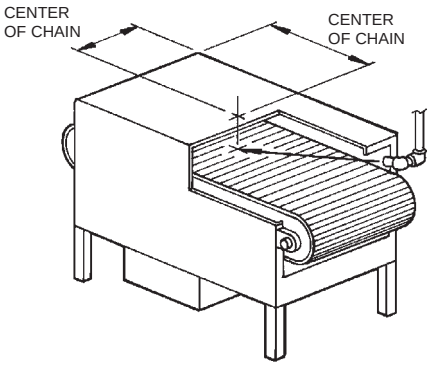




LOCATE NOZZLE OUTSIDE IN EITHER OF THE UPPER CORNERS OF BROILER CHAMBER AND AIM AT CENTER OF GRATE WHEN GRATE IS IN THE HIGHEST POSITION. NOZZLE TIP MUST BE FLUSH WITH THE FRONT EDGE OF BROILING CHAMBER

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

FIGURE 6

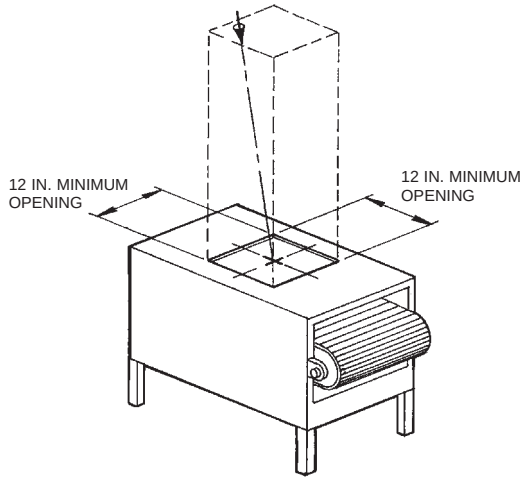


LOCATE NOZZLE OUTSIDE IN EITHER OF THE UPPER CORNERS OF BROILER CHAMBER, ABOVE CHAIN, AND AIM AT CENTER OF CHAIN. NOZZLE TIP MUST BE FLUSH WITH THE FRONT EDGE OF BROILING CHAMBER.

FIGURE 6a
001712

APPLIANCE PROTECTION (Continued)

Dedicated Nozzle Coverage (Continued)



OPEN TOP CHAIN BROILER
(UNDER BURNER ONLY)

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

FIGURE 6b

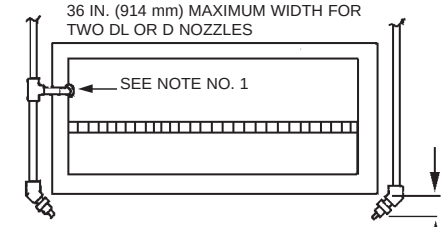
001759

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.

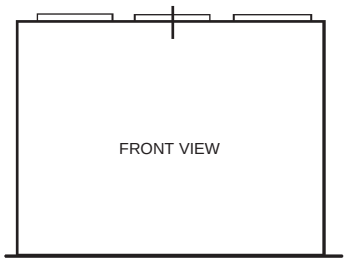
- **Appliance Types Under Obstruction:** Ranges – 32 in. (813 mm) deep, Griddles – 36 in. (914 mm) deep.
- **Obstruction Types:** Salamander broilers, cheese melters, plate shelves, etc.
- **Obstruction:** Obstruction cannot fall below nozzle height.
- **Obstruction Depth:** 22 in. (559 mm) maximum depth 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” or “D” 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” or “D” nozzles are required.

PROTECTION UNDER OBSTRUCTIONS RANGES: 32 IN. (813 mm) DEEP X 42 IN. (1.1 m) WIDE PER EACH SET OF NOZZLES
GRIDDLE: 36 IN. (914 mm) DEEP X 36 IN. (.9 m) WIDE PER EACH SET OF NOZZLES

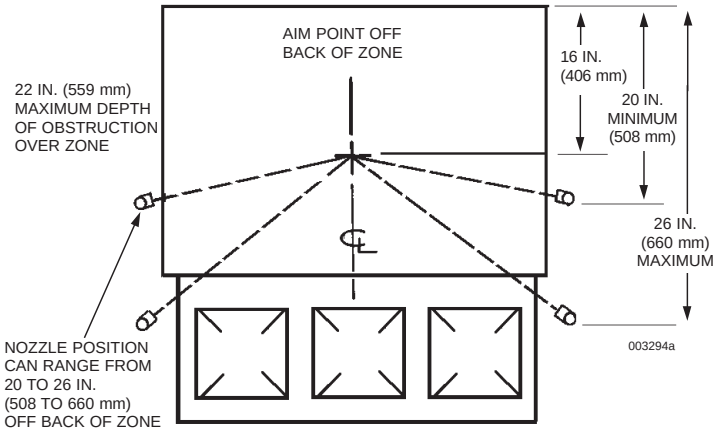


NOZZLE HEIGHT = EVEN WITH TO 1 IN. (25.4 mm) BELOW OBSTRUCTION

OBSTRUCTION HEIGHT =
15 IN. MINIMUM TO 24 IN. MAXIMUM
(381 TO 610 mm) ABOVE COOKING SURFACE



003294



TOP VIEW

NOTE NO. 1: WHEN THE OBSTRUCTION IS AN APPLIANCE THAT REQUIRES PROTECTION, SUCH AS A SALAMANDER BROILER, THIS APPLIANCE CAN BE PROTECTED BY TEEING OFF THE BRANCH LINE DROP AND ADDING THE REQUIRED NOZZLE.

FIGURE 6c

DUCT PROTECTION

1. Single Nozzle Duct Protection:

   One "DL" nozzle, Part No. 426093, will protect rectangular, square, or round ducts with a maximum perimeter of 100 in. (2.5 m). The nozzle must be installed 0-8 in. (0-203 mm) into the duct opening and 0-3 in. (0-76 mm) from the front edge, and aimed at the center of the opening. See Figure 7.

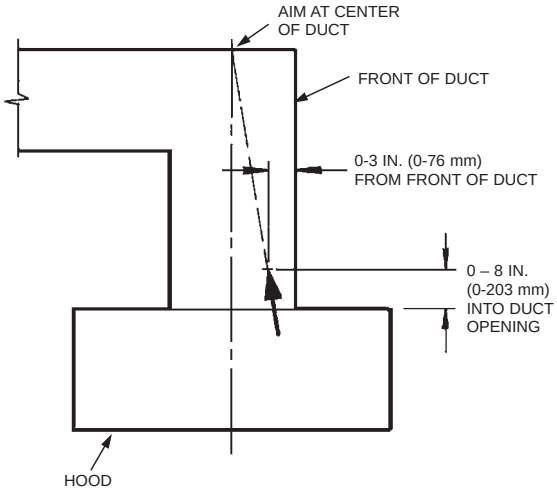


FIGURE 7
001639

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

   When rectangular or square ducts exceed 100 perimeter in. (2540 mm), 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 8.

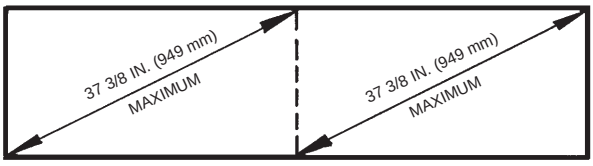


FIGURE 8
001610

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

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.

ELECTROSTATIC PRECIPITATOR PROTECTION (ESP)

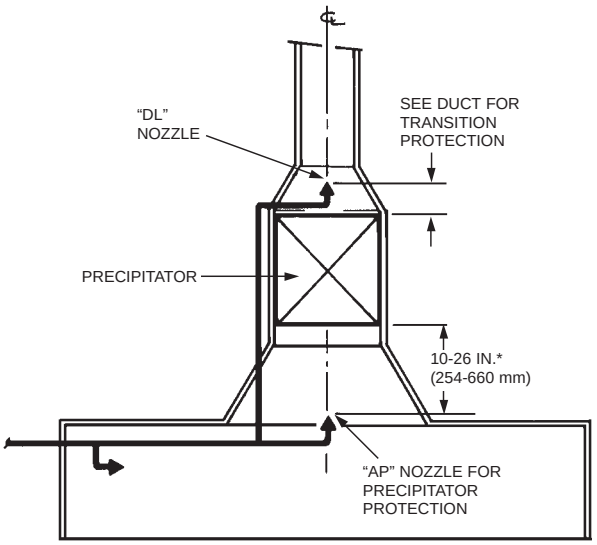
Some restaurant ventilating ducts have an electrostatic precipitator installed at or near the base or it may be installed midway or at the end of the duct system. These precipitators are used to aid in the cleaning of exhaust air.

Normally electrostatic precipitators do not require protection but should the "authority having jurisdiction" require protection, use the following guidelines.

Ducts with precipitators located at or near the base can be protected using a "DL" nozzle above the precipitator and an "AP" nozzle (Part No. 423480) for the precipitator. One "AP" nozzle must be used for each cell being protected.

If the area above the precipitator is a duct, the nozzle(s) must be positioned according to duct protection guidelines.

The "AP" nozzle (Part No. 423480) must be centered 10 to 26 in. (254 to 660 mm) below the precipitator and aimed to discharge at the center of each precipitator cell. However, if it is physically impossible to mount the nozzle at 10 to 26 in. (254 to 660 mm) due to precipitator placement, the nozzle may be mounted closer than 10 in. (254 mm). See Figure 9.



* IF PHYSICALLY IMPOSSIBLE AT 10 TO 26 IN. (254 TO 60 mm), NOZZLE MAY BE MOUNTED CLOSER THAN 10 IN. (25 cm).

FIGURE 9
000196

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 10, and aimed down the length of the plenum. The filter height **must not** exceed 25 in. (63.5 cm).

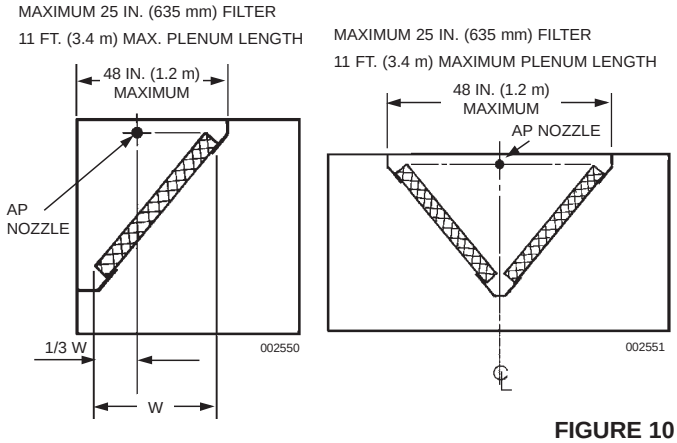


FIGURE 10

For a plenum, either single or "V" bank, with a linear extension longer than 11 feet (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 11. 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 12. The nozzle positioning shown in Figure 13 is not an acceptable method of protection because the plenum area directly under the tee is not within the discharge pattern of either nozzle.

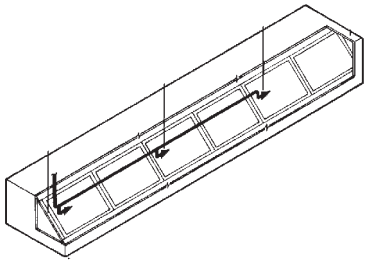


FIGURE 11
000206

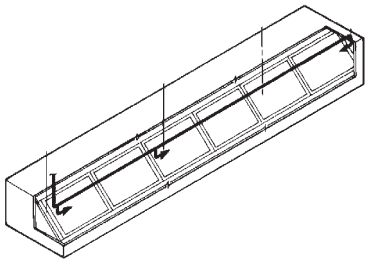


FIGURE 12
000207

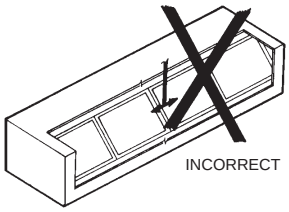


FIGURE 13
000208

NOZZLE PLACEMENT SUMMARY CHART

Overlapping Coverage

Appliance Hazard (Overlapping Protection) High Proximity

Nozzle Type	Height	Maximum Spacing	Location
"AP," Part No. 423480	40-48 in. (1-1.2 m) above top of appliance	11.5 in. (292 mm) from edge of hazard zone 25.5 in. (648 mm) center to center of nozzles	4 to 16 in. (102 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," Part No. 426093	13-24 in. (330-610 mm) above top of appliance	8 in. (203 mm) from edge of hazard zone 12 in. (305 mm) center to center	13 to 19 in. (330 to 483 mm) from back of hazard zone. Nozzle must be aimed straight down.

Dedicated Nozzle Coverage

Appliance Type	Maximum Cooking Hazard	"AP" Nozzle Location
Upright Broilers, Salamanders	27 1/2 in. (699 mm) depth x 35 1/2 in. (902 mm) width (inside cooking chamber)	See Figure 6
Chain Broiler (Under or Over Burner)	Maximum chain width of 21 in. (533 mm) and a maximum chamber depth of 26 in. (660 mm)	See Figure 6a
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)	See Figure 6b

Plenum and Duct Coverage

Plenum Hazard

Nozzle Type	Height	Maximum Spacing	Location
"AP," Part No. 423480	Even with top of filter(s)	11 ft. (3.4 m) per nozzle	Aimed horizontal

Duct Hazard

"DL," Part No. 426093	0-8 in. (0-203 mm) into duct	100 in. (2.5 m) perimeter or circumference per nozzle unlimited length	0-3 in. (0-76 mm) from front edge of duct aimed into center of duct

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	(Part No.)
7	(1) PIRANHA-7	LT-20-R	(7032)
10	(1) PIRANHA-10	LT-30-R	(5373)
13	(1) PIRANHA-13	LT-30-R	(5373)
14	(1) PIRANHA-7	LT-20-R	(7032)
	(1) PIRANHA-7*	LT-20-R	(7032)
17	(1) PIRANHA-7	LT-20-R	(7032)
	(1) PIRANHA-10*	LT-30-R	(5373)
20	(1) PIRANHA-10	LT-30-R	(5373)
	(1) PIRANHA-10*	LT-30-R	(5373)
23	(1) PIRANHA-10	LT-30-R	(5373)
	(1) PIRANHA-13*	LT-30-R	(5373)
26	(1) PIRANHA-13	LT-30-R	(5373)
	(1) PIRANHA-13*	LT-30-R	(5373)
27	(1) PIRANHA-7	LT-20-R	(7032)
	(1) PIRANHA-10*	LT-30-R	(5373)
	(1) PIRANHA-10*	LT-30-R	(5373)

Additional combinations are available up to a maximum system size of 39 nozzles (three 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.

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 14.

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 14.

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 14.

Split System: A split distribution piping system contains a bull tee between the agent tank and first nozzle. See Figure 14.

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.

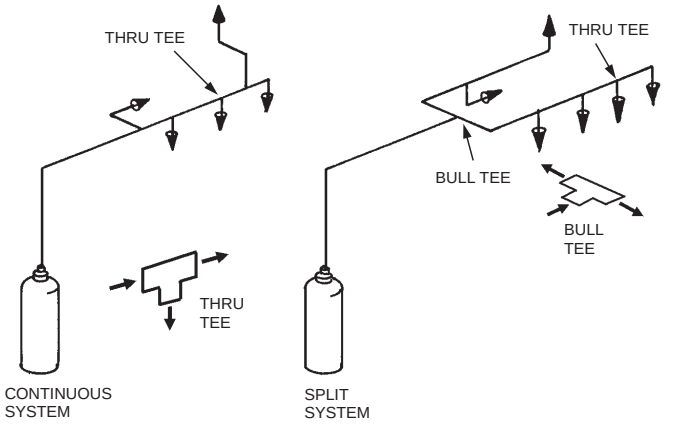


FIGURE 14
001685

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 = 8 ft. (2.4 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 15.
5. Linear pipe lengths are measured center to center of fittings.

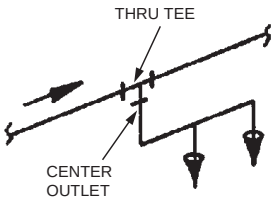


FIGURE 15
001686

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).

SYSTEM DISTRIBUTION PIPING RULES
(For Each Size System)

PIRANHA 7 System – High and Low Proximity

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°	.8 ft. (254 mm)	.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.
2. Maximum nozzles elevated above line = 4

Split System:

1. Maximum 45 equivalent ft. (13.7 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) = 45 ft. (13.7 m)
3. Maximum nozzles per line with duct nozzle = 3
4. Maximum nozzles per line without 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 = 15 ft. (4.6 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 – High and Low Proximity

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°	.8 ft. (254 mm)	.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 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.
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) – High and Low Proximity

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°	.8 ft. (254 mm)	.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.

ACTUATION GAS LINE REQUIREMENTS – DOMESTIC WATER SUPPLY OPTION ONLY

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 16.

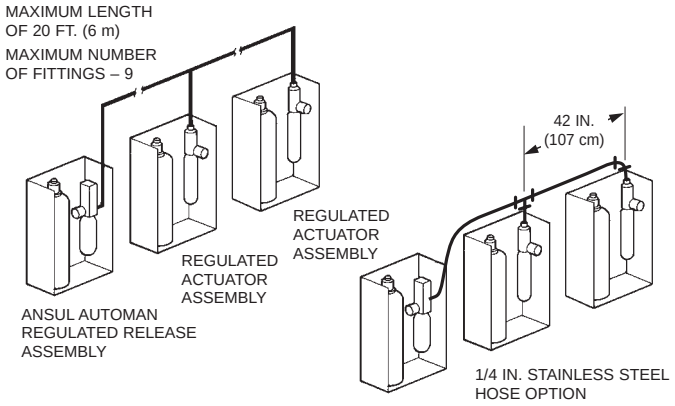


FIGURE 16
001640

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 17.
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.

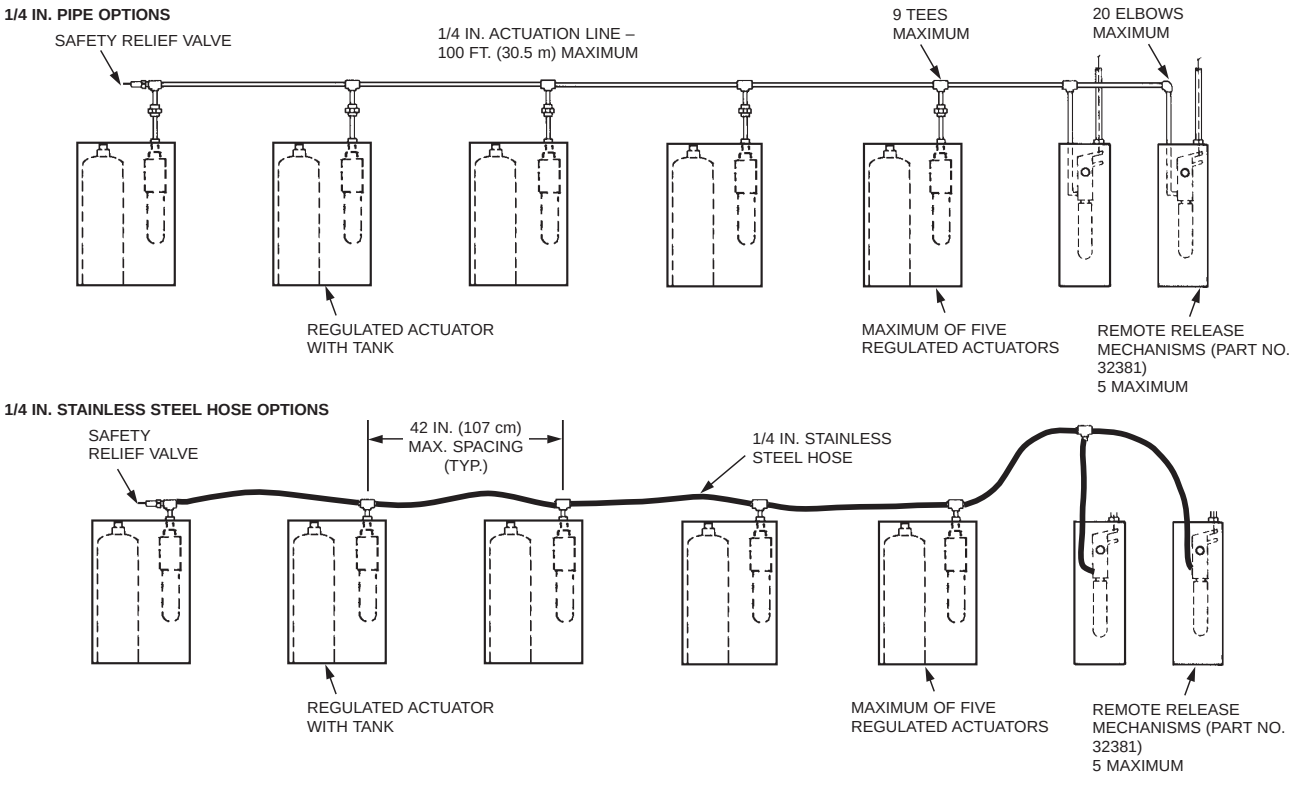


FIGURE 17
001641

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

The two types of detectors are distinguished from each other by their location in the detection system.

1. The Terminal Detector (Part No. 15375, or 417368) is the last in a series of detectors, or the only detector used in a single-detector system. This detector is thus named because it is at the point at which the wire rope ends, or "terminates."
2. A Series Detector (Part No. 15373, or 417369) is any detector located in-line between the regulated release mechanism and the terminal detector.

Detector/Pulley Elbow Quantity

The quantity of detectors used in the system will vary depending on the style of detector used.

1. Conduit runs, pulley elbows, and number of detectors per system must be within the approved system parameters. 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
Hinge Style Detector	5	8	103 ft. (31.3 m)
Scissors Style Detector	15	20	150 ft. (45.7 m)

2. If hinge style detectors are mixed in a system with scissor style, 4 series and 1 terminal is the maximum number allowed.
3. If hinge style detectors are mixed in a system with scissor style, the maximum length of wire rope must not exceed 103 ft. (31.4 m) and the maximum number of pulley elbows must not exceed 8.
4. If the hazard requires more than 15 detectors, up to five 101 Remote Releases (Part No. 32381) can be used for system actuation. Each 101 remote release allows the use of a maximum of 15 "scissor" style detectors (14 series and 1 terminal) for a total of 75 detectors if needed.

Detector Placement Requirements

EXHAUST DUCTS

Each exhaust duct must have at least one detector installed in the duct entrance, located in the airstream of the cooking vapors, or at a maximum of 20 ft. (6.1 m) into the duct opening. See Figure 18.

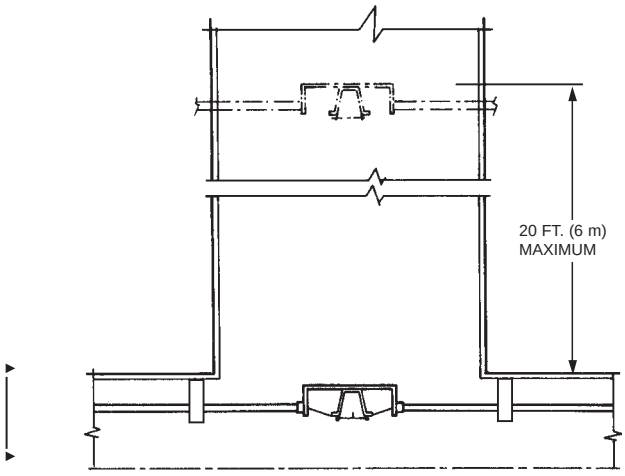


FIGURE 18
000271

NOTICE

When gas appliances are used and the flue gases from the burner are exhausted into the duct, the detector must be kept out of the air stream of these exhaust gases. These gases can be very hot and could actuate the system unnecessarily.

Duct openings that are long and narrow or large enough to require multiple duct nozzles may require additional detectors.

ELECTROSTATIC PRECIPITATOR

If an electrostatic precipitator is located at or near the base of the exhaust duct, it is necessary to locate a detector below the precipitator, at the base of the duct, and also locate one in the duct, just above the precipitator. See Figure 19.

When installing the detector bracket and system conduit, make certain they do not interfere with the operation of the precipitator.

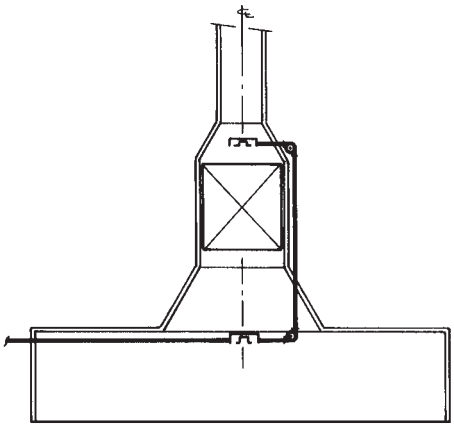


FIGURE 19
000268

DETECTOR SYSTEM REQUIREMENTS (Continued)

Detector Placement Requirements (Continued)

COOKING APPLIANCES

Fusible link detectors must be installed on a maximum of 2 ft. (.61 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. (.61 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. (.61 m) from end of plenum.

Detection Line Requirements

CONDUIT

Rigid conduit or 1/2 inch EMT thin-wall conduit may be used. Standard steel conduit fittings (compression type are recommended) must be employed to properly install the detection system. All conduit or pipe must be firmly supported. When using pipe, make certain that all ends are carefully reamed, deburred and blown clear of chips and scale before assembly.

NOTICE

The conduit offset can be used at the top or bottom of the regulated release to change direction of the conduit. The conduit offset cannot be used with pulley tees. All other changes in direction must be made by using Ansul approved pulley elbows, Part No. 423254 or 415670. See Figure 20.

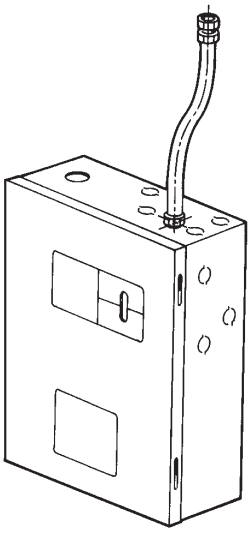


FIGURE 20
000270

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 21. See Component Section for detailed temperature ratings.

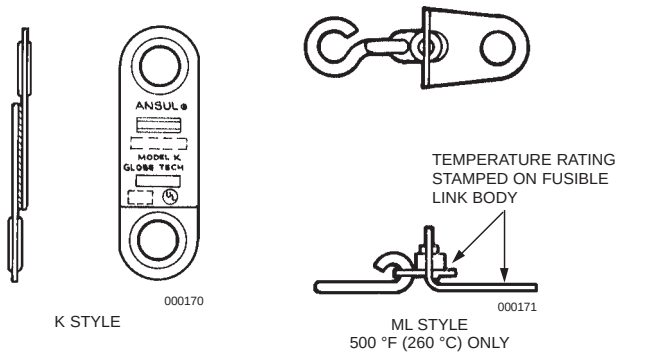


FIGURE 21

WATER SUPPLY REQUIREMENTS – DOMESTIC WATER SUPPLY OPTION ONLY

The water flow valve located in each ANSUL AUTOMAN Regulated Release and each Regulated Actuator assembly must be connected to the food service water supply. 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, tamperproof shut-off valve.
- A maximum of three (3) (one release and two regulated actuators) devices can be connected to a common PIRANHA dedicated waterline when all operate simultaneously. See Figure 22.
- 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 that 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.
- All continuous type systems and all PIRANHA-13 systems with 11 or more nozzles require a minimum flowing calculated 33 psi (2.27 bar) water pressure at the ANSUL AUTOMAN release and a minimum of 30 psi (2.06 bar) water pressure at the pressure tester gauge. NOTE: There is a 2 to 3 psi (.14 to .21 bar) pressure drop through the tester.
- Maximum water pressure at the Pressure Test Gauge must not exceed 100 psi (6.90 bar).

WATER SUPPLY REQUIREMENTS (Continued)

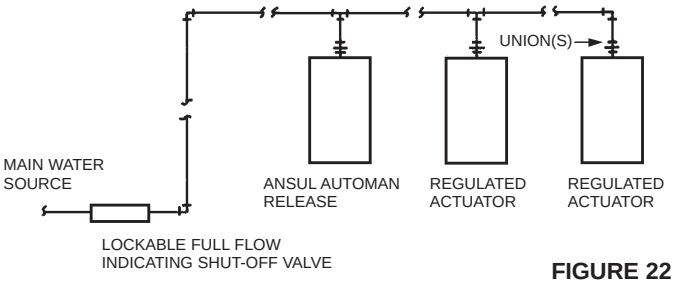


FIGURE 22
001618

Minimum Water Supply Pressure Requirements

For all PIRANHA systems utilizing 10 nozzles or less, the following lower water pressure requirements may be utilized:

Number of Nozzles	Calculated Minimum Water Pressure at AUTOMAN Release or Actuator	Minimum Water Pressure Tester Gauge Reading
10	22 psi (1.52 bar)	19 psi (1.31 bar)
9	21 psi (1.45 bar)	18 psi (1.24 bar)
8	21 psi (1.45 bar)	18 psi (1.24 bar)
7	17 psi (1.17 bar)	15 psi (1.03 bar)
6	17 psi (1.17 bar)	15 psi (1.03 bar)
5	17 psi (1.17 bar)	15 psi (1.03 bar)
4	17 psi (1.17 bar)	15 psi (1.03 bar)
3	17 psi (1.17 bar)	15 psi (1.03 bar)
2	17 psi (1.17 bar)	15 psi (1.03 bar)

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 DEVICE* – DOMESTIC WATER ▸ SUPPLY OPTION ONLY

Each ANSUL 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 – DOMESTIC WATER SUPPLY ▸ OPTION ONLY

A water shutdown device, Part No. 426294, is available to automatically shut down the flow of water through the system for a minimum of 10 minutes after system actuation. This device is field installed in the ANSUL AUTOMAN Release. See Section V, Installation, for detailed mounting instructions.

▸ SIZING WATERLINE – DOMESTIC WATER SUPPLY OPTION ▸ ONLY

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. A maximum of three PIRANHA water flow valves can be connected to a common waterline when all the valves are actuated simultaneously. See Figure 23.

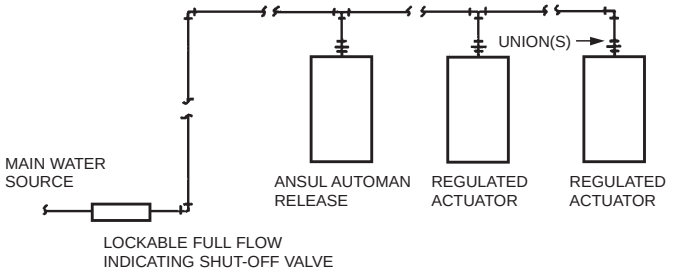


FIGURE 23
001618

▸ 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 @ 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; 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.

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 ANSUL AUTOMAN Release or regulated actuator from the available water pressure.

3. Calculate the waterline pressure drop due to the difference in elevation between the water connection and the highest PIRANHA water valve connection by multiplying the **difference** in feet of elevation by 0.43 psi per foot (.1 bar per meter).

SIZING WATERLINE (Continued)

Waterline Sizing Procedure (Continued)

4. 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)

5. 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 – Pipe Sizes

No. of Tanks	Waterline Pipe Size 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.

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

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.

6. Calculate the total waterline pressure drop by adding the elevation pressure drop from Step No. 3 and the flow pressure drop from Step No. 5.
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.

Example: Waterline Sizing Calculations

Given: Three tank PIRANHA-13 waterline system per Figure 24.

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

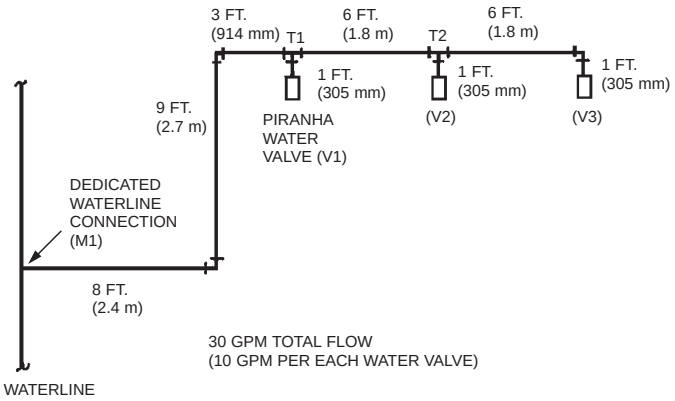


FIGURE 24
001763

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 (.83 bar)

Step No. 2

Calculate the pressure drop due to the difference in elevation from M1 to V3. See Figure 24.

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

Step No. 3

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. 4

Calculate the system flow pressure drop for 1 1/4 in. tube. NOTE: From the pressure drop tables, 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)

Example: Waterline Sizing Calculations (Continued)

Step No. 5

Calculate the total pressure drop for 1 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.

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. (0.1 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 24a.

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)

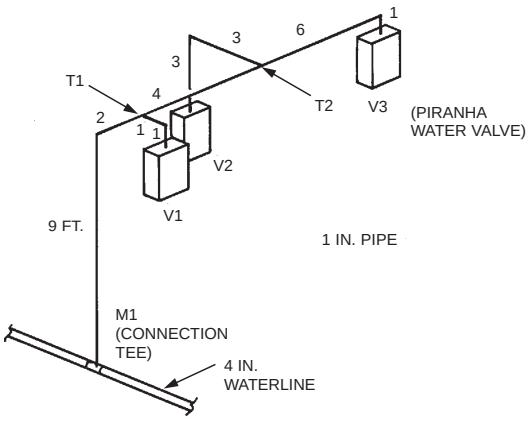


FIGURE 24a
004207

When calculating the pressure drop the "Standard" way, it was determined the total pressure drop was 10.82 psi (.75 bar). This drop is .82 psi (.06 bar) over the maximum allowable of 10 psi (.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 = .69 bar) available.

SIZING WATERLINE (Continued)

Example: "Alternate Long Form" Waterline Sizing Calculations (Continued)

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. (.3 m) drop = 8 ft. (2.4 m) total rise. 8 ft. (2.4 m) total rise x 0.43 psi/ft (.1 bar/m) = 3.44 psi (.24 bar) drop.

V2 Path

b. M1 to V2: 9 ft. (2.7 m) rise – 3 ft. (.9 m) drop = 6 ft. (1.8 m) total rise. 6 ft. (1.8 m) total rise x 0.43 psi/ft. (.1 bar/m) = 2.58 psi (.18 bar) drop.

V3 Path

c. M1 to V3: 9 ft. (2.7 m) rise – 1 ft. (.3 m) drop = 8 ft. (2.4 m) total rise. 8 ft. (2.4 m) total rise x 0.43 psi/ft. (.1 bar/m) = 3.44 psi (.24 bar) drop.

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. (.6 m) (equivalent length of elbow) + 2 ft. (.6 m) (pipe) = 18 ft. (5.5 m)

   18 ft. (5.5 m) x 0.238 psi/ft. (.05 bar/m) = 4.3 psi (.3 bar) drop for this section.

b. T1 to V1 (10 gpm): 5 ft. (1.5 m) (equivalent length of tee, T1) + 1 ft. (.3 m) (pipe) + 2 ft. (.6 m) (equivalent length of elbow) + 1 ft. (.3 m) (pipe) = 9 ft. (2.7 m)

   9 ft. (2.7 m) x 0.03 psi/ft. (.007 bar/m) = .27 psi (.02 bar) drop for this section.

c. 4.3 psi (.3 bar) drop + .27 psi (.02 bar) drop = 4.57 psi (.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. (.6 m) (equivalent length of elbow) + 2 ft. (.6 m) (pipe) = 18 ft. (5.5 m)

   18 ft. (5.5 m) x 0.238 psi/ft. (.05 bar/m) = 4.3 psi (.3 bar) drop for this section.

b. T1 to T2 (20 gpm): 4 ft. (1.2 m) (pipe)

   4 ft. (1.2 m) x 0.109 psi/ft. (.025 bar/m) = .44 psi (.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. (.9 m) (pipe) + 2 ft. (.6 m) (equivalent length of elbow) + 3 ft. (.9 m) (pipe) = 13 ft. (4 m)

   13 ft. (4 m) x 0.03 psi/ft. (.007 bar/m) = .39 psi (.027 bar) drop for this section.

d. 4.3 psi (.3 bar) drop + .44 psi (.03 bar) drop + .39 psi (.027 bar) drop = 5.13 psi (.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. (.6 m) (equivalent length of elbow) + 2 ft. (.6 m) (pipe) = 18 ft. (5.5 m)

   18 ft. (5.5 m) x 0.238 psi/ft. (.05 bar/m) = 4.3 psi (.3 bar) drop for this section.

b. T1 to T2 (20 gpm): 4 ft. (1.2 m) (pipe)

   4 ft. (1.2 m) x 0.109 psi/ft. (.025 bar/m) = .44 psi (.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. (.6 m) (equivalent length of elbow) + 1 ft. (.3 m) (pipe) = 9 ft. (2.7 m)

   9 ft. (2.7 m) x 0.03 psi/ft. (.007 bar/m) = .27 psi (.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 (.3 bar) drop + .44 psi (.03 bar) drop + .27 psi (.019 bar) drop = 5.01 psi (.35 bar)

Step No. 4

Calculate the total pressure drop for each path.

a. M1 to V1: 3.44 psi (.237 bar) elevation pressure drop + 4.57 psi (.32 bar) flow pressure drop = 8.01 (.55 bar) total V1 path pressure drop.

b. M1 to V2: 2.58 psi (.178 bar) elevation pressure drop + 5.13 psi (.354 bar) flow pressure drop = 7.71 psi (.532 bar) total V2 path pressure drop.

c. M1 to V3: 3.44 psi (.237 bar) elevation pressure drop + 5.01 psi (.345 bar) flow pressure drop = 8.45 psi (.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 (.532 bar).

b. Because the maximum allowable pressure drop is 10 psi (.69 bar) and the greatest pressure drop is only 8.45 psi (.532 bar), the use of 1 in. pipe for the three tank PIRANHA dedicated waterline will be acceptable.

Also available to determine waterline sizes is the PIRANHA Design Calculation Program. The program is available through Ansul Customer Service Department.

MANUAL PULL STATION REQUIREMENTS

A remote manual pull station allows the PIRANHA system to be manually operated at some point distant from the regulated release assembly. The pull station should be installed at a maximum height of 60 in. (152 cm) and located in the path of exit. The pull station is the only source of manual actuation of the regulated release assembly.

The total length of the cable used for each manual pull station within a system must not exceed 150 ft. (46 m).

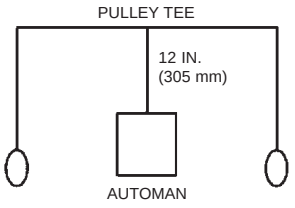
The maximum number of pulley elbows that may be used per pull station is 20.

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.

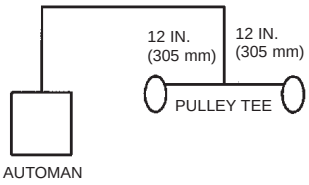
Example: If 10 pulley elbows are placed between the AUTOMAN and the pulley tee, the maximum available pulley elbows left for use on each side of the tee is 10 per side. See Figure 24b for three different examples. **Note: Gas valves and pull stations cannot be mixed on the same pulley tee system.**

TEE CLOSE TO AUTOMAN (EXAMPLE)



149 FT. (45.4 m) AND 20 PULLEY ELBOWS MAXIMUM PER EACH SIDE OF TEE

TEE CLOSE TO EITHER TWO GAS VALVES OR TWO MANUAL PULLS (EXAMPLE)



149 FT. (45.4 m) AND 20 PULLEY ELBOWS BETWEEN AUTOMAN AND TEE

TEE HALFWAY BETWEEN AUTOMAN AND EITHER TWO GAS VALVES OR TWO MANUAL PULLS (EXAMPLE)

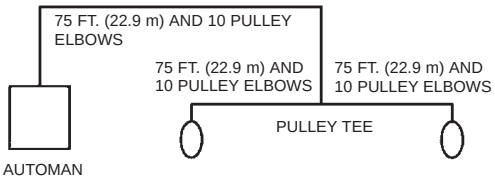


FIGURE 24B
004907

Metal Stamped Style – Part No. 4835 or 54011

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

Description	Part No.
Remote Manual Pull Station Assembly*	54011
Remote Manual Pull Station Assembly	4835
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
Glass Break Rod (1)	4834

* Assembly includes parts listed below:

MECHANICAL GAS VALVE REQUIREMENTS

An Ansul or Ansul approved mechanical gas shut-off valve system can be attached to the PIRANHA system. The system works both mechanically and pneumatically by use of an air cylinder located inside the regulated release assembly. Upon actuation of the fire suppression system, a pneumatically-operated air cylinder assembly will mechanically close the gas shut-off valve.

The total length of the cable for each mechanical gas valve must not exceed 150 ft. (46 m). 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 (2) gas valves can be connected to a single air cylinder.

A maximum of four (4) 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 24b for three different examples. **Note: Gas valves and pull stations cannot be mixed on the same pulley tee system.**

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 m) or 500 ft. (152 m) roll	79653
Oval Press-To-Crimp Sleeve	4596
Stop Sleeve (2)	26317

* Assembly includes parts listed below:

Air Cylinder Assembly	15733
Air Cylinder	15521
Tubing Assembly	15529
Copper Tubing, 1/8 in.	15525
Male Elbow	15523
Male Connector	15522
Machine Screw (2)	15421
Hex Nut (2)	15527
Lockwasher (2)	4141
Visual Inspection Seal (2)	197

MECHANICAL GAS VALVE REQUIREMENTS (Continued)

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."

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 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 Ansul Incorporated, Marinette, Wisconsin 54143-2542.

If other gas valves are used, they shall be "UL listed electrically-operated safety valves for natural or LP gas as required, of appropriate pressure and temperature rating, 110 VAC/60 Hz." The information on temperature and type of gas that the valves are suitable for may be found in the Gas and Oil Equipment List of Underwriters Laboratories, Inc. under "Electrically Operated Valves Guide No. 440 A5."

The electrically operated gas valve must be of the type that needs to be energized to remain open.

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 1/2 in. NPT*	13709
Electric Solenoid Valve, 2 in. NPT*	13710
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 can be used to connect to alarm circuits in a building fire alarm panel, when provided in the building. The switch(es) has both Normally Open (N.O.) and Normally Closed (N.C.) dry contacts rated at 21 amp. The switches are also 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 25 through 27 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 PIRANHA AUTOMAN Regulated Release Assembly includes two (2) 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.

CAUTION

Unused wire leads will become "hot" when the system is operated. Failure to adequately cover exposed wire end(s) will cause electric shock if touched.

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

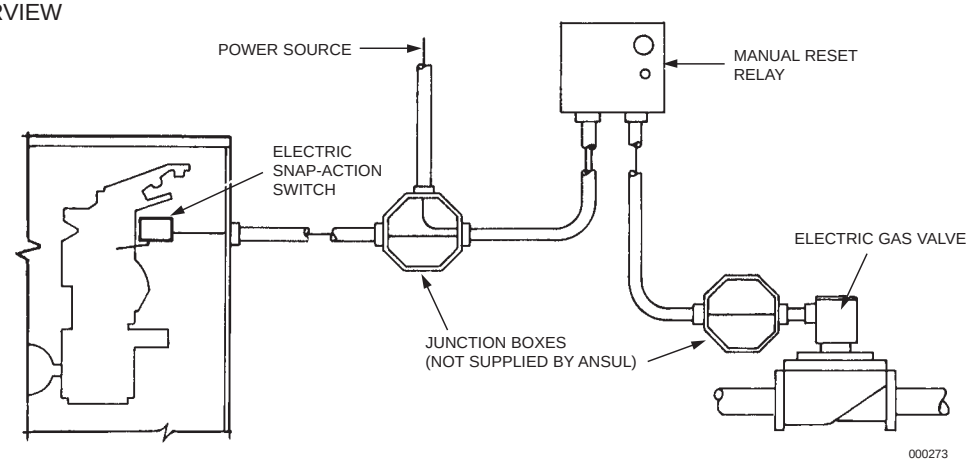
If a fire alarm system is provided, the fire extinguishing system shall be connected to the alarm system in accordance with the requirements of NFPA 72, National Fire Alarm Code, so that the actuation of the extinguishing system will sound the fire alarm as well as provide the extinguishing function of the system.

There is no way to supervise electrical actuation of the system. Therefore, make certain that fuse link detection is used as well as electrical actuation to provide operation in cases of lack of power.

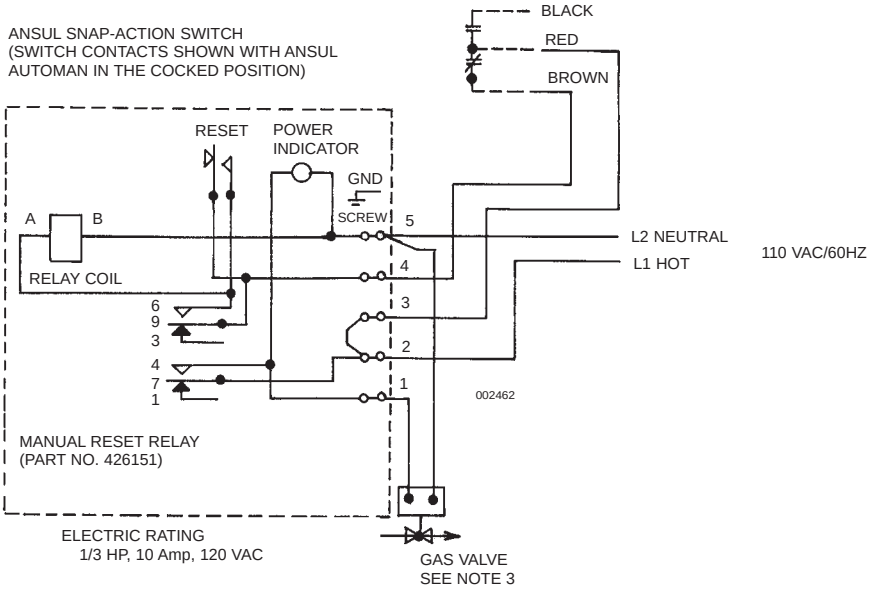
ELECTRICAL SWITCH REQUIREMENTS (Continued)

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

INSTALLATION OVERVIEW



WIRING SCHEMATIC – RELAY PART NO. 426151



NOTE:

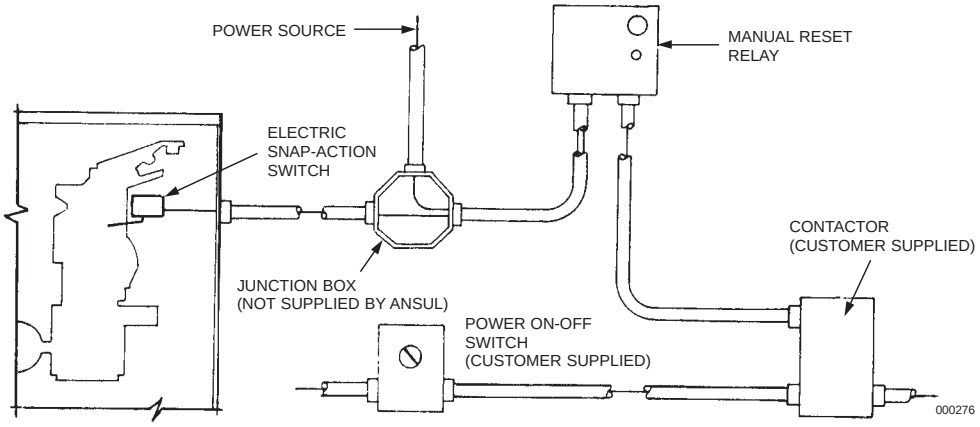
1. GAS VALVES: "UL LISTED ELECTRICALLY-OPERATED SAFETY VALVE FOR NATURAL, OR LP GAS AS NEEDED OF APPROPRIATE PRESSURE AND TEMPERATURE RATING, 110V/60 HZ" OR ANSUL GAS VALVES,
   PART NUMBERS 13707, 13708, 13709, 13710, AND 17643.
2. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARMS, LIGHT CIRCUITS, ETC.
3. IF BLACK WIRE IS NOT USED, WIRE NUT AND TAPE WIRE END TO AVOID SHOCK POTENTIAL.

FIGURE 25

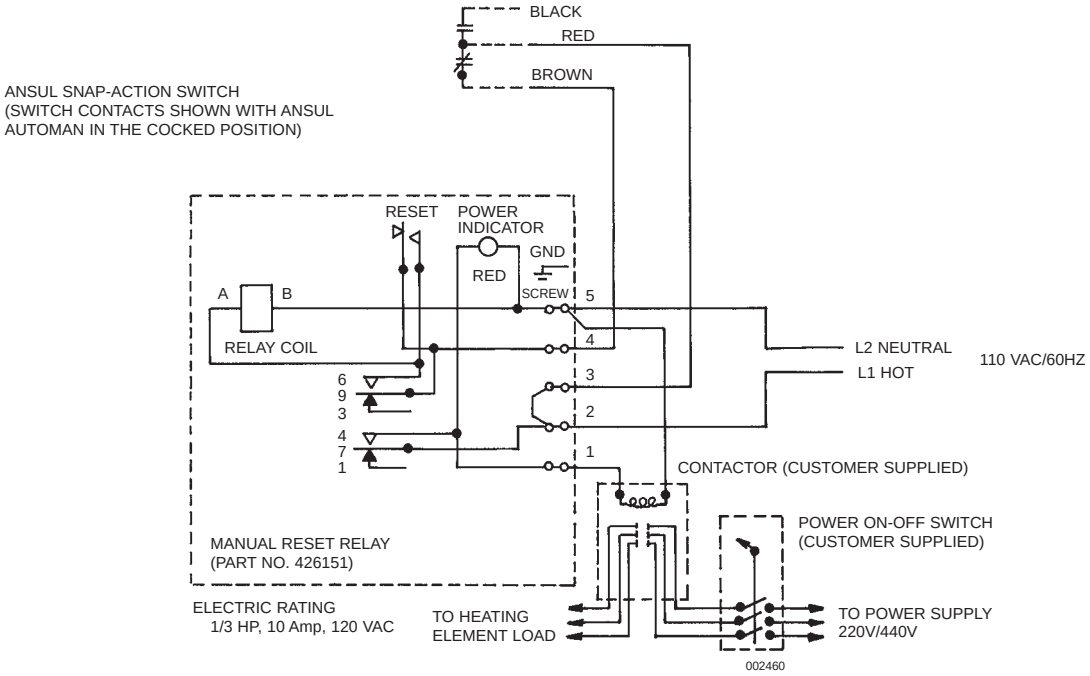
ELECTRICAL SWITCH REQUIREMENTS (Continued)

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

INSTALLATION OVERVIEW



WIRING SCHEMATIC – RELAY PART NO. 426151



NOTE:

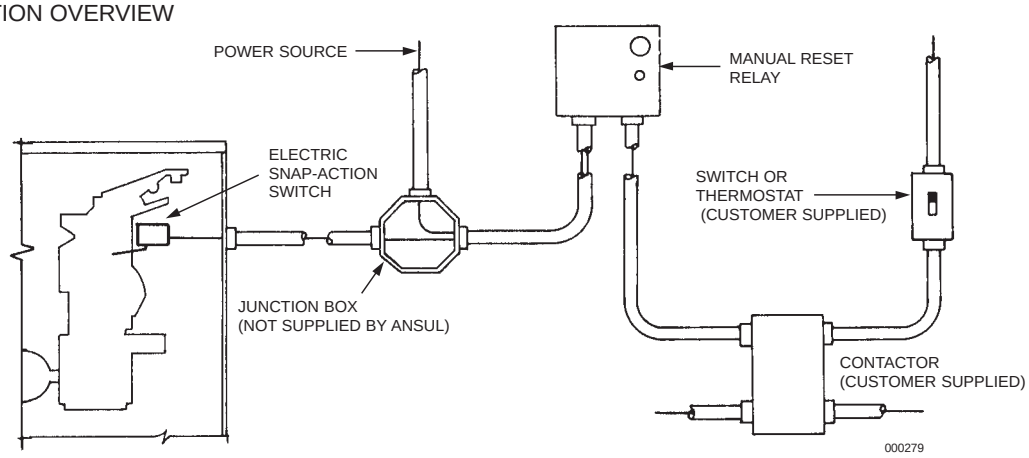
1. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110V/60HZ."
2. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARMS, LIGHT CIRCUITS, ETC.
3. IF BLACK WIRE IS NOT USED, WIRE NUT AND TAPE WIRE END TO AVOID SHOCK POTENTIAL.

FIGURE 26

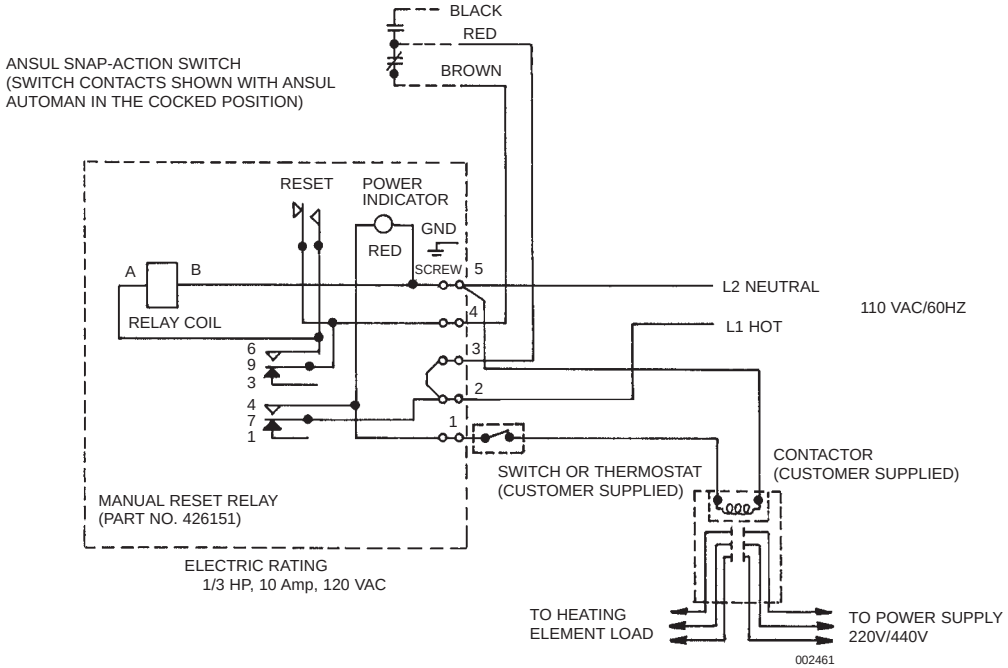
ELECTRICAL SWITCH REQUIREMENTS (Continued)

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. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110V/60HZ."
2. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARMS, LIGHT CIRCUITS, ETC.
3. IF BLACK WIRE IS NOT USED, WIRE NUT AND TAPE WIRE END TO AVOID SHOCK POTENTIAL.

FIGURE 27

SPECIFIC APPLICATION BY MODEL

Nieco Broiler – Model 9025 (With Catalytic Converters)

- **Nozzle Quantity/Type:** (1) one "DL" nozzle, Part No. 426093.
- **Nozzle Height:** 14 in. (356 mm) above top of converter. See Figure 28.
- **Nozzle Location:** 3 in. (76 mm) back from front edge of converters. See Figure 28.
- **Nozzle Aiming Point:** Aimed at center of broiler top. See Figure 28.

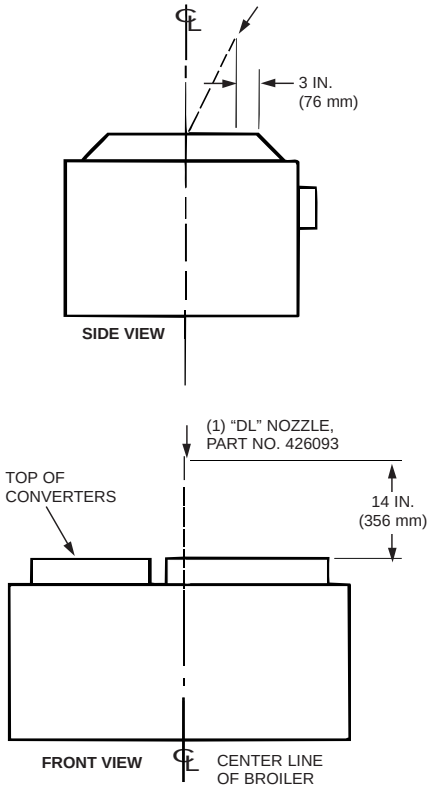


FIGURE 28
004352

Nieco Broiler – Model 9025 (Without Catalytic Converters)

- **Nozzle Quantity/Type:** (1) one "DL" nozzle, Part No. 426093.
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 29.
- **Nozzle Location:** 7 1/2 in. (191 mm) back from front edge of appliance. See Figure 29.
- **Nozzle Aiming Point:** Aimed at center of broiler top. See Figure 29.

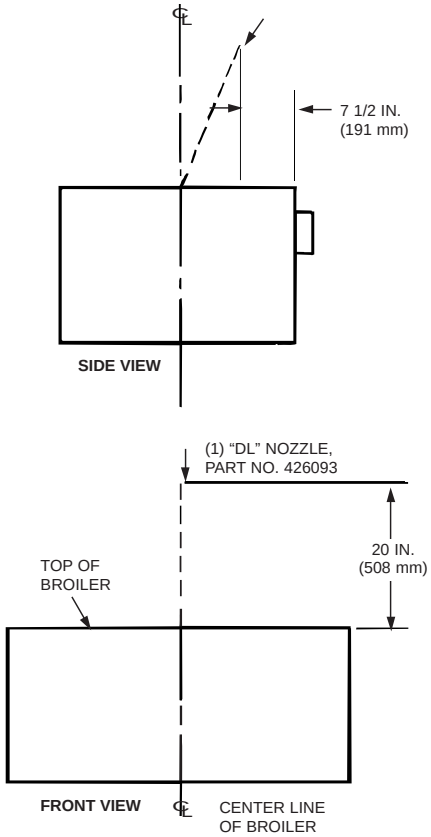
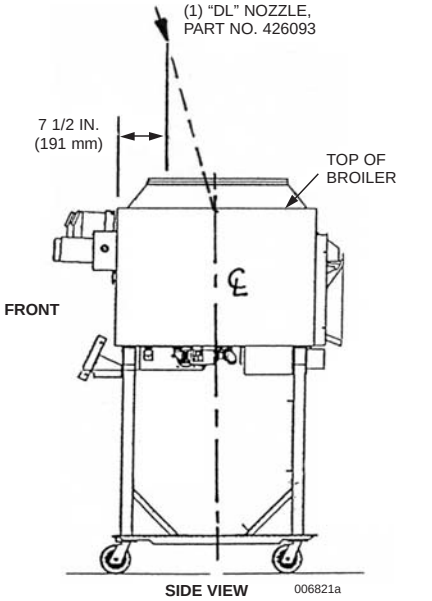


FIGURE 29
004353

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model 9015 (With or Without Catalytic Converter)

- **Nozzle Quantity/Type:** One (1) "DL" nozzle, Part No. 426093
- **Nozzle Height:** 20 in. (508 mm) above top of appliance. See Figure 30.
- **Nozzle Location:** 7 1/2 in. (191 mm) back from front edge of appliance. See Figure 30.
- **Nozzle Aiming Point:** Aim at center of broiler top. See Figure 30.



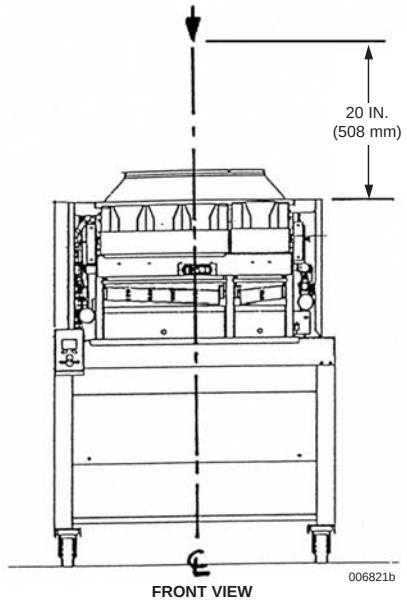
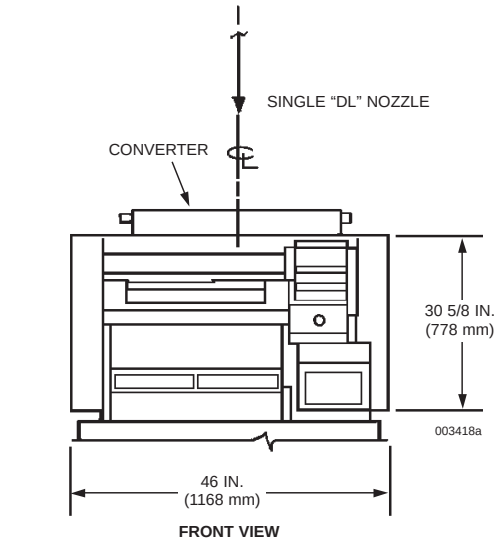
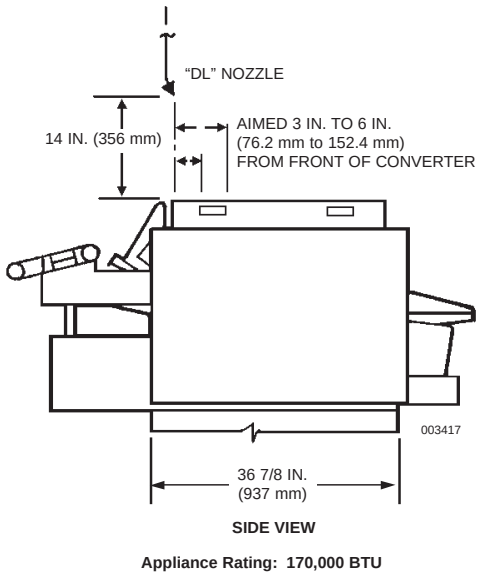


FIGURE 30

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 catalytic converter. The aim point must be 3 in. to 6 in. (76.2 mm to 152.4 mm) behind the front edge of the converter on the centerline. See Figure 31.





Appliance Rating: 170,000 BTU

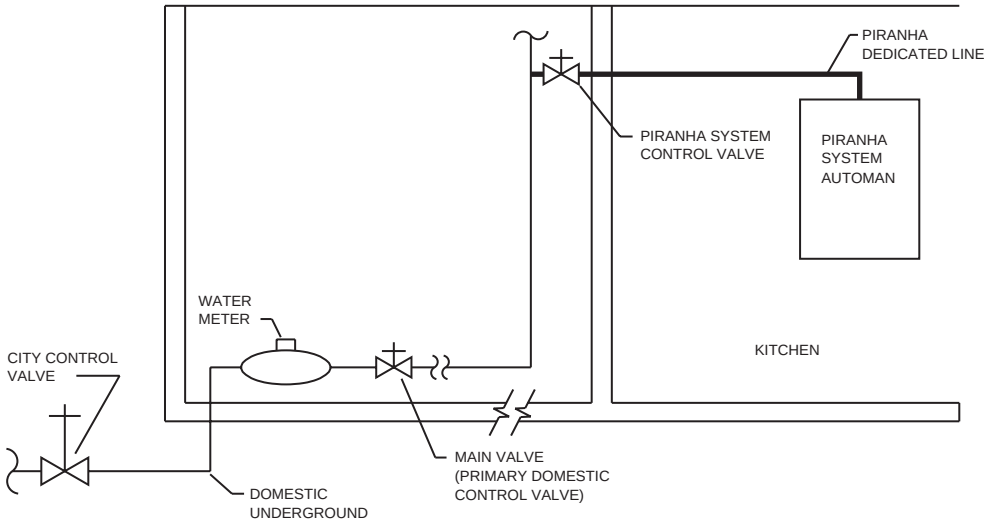
FIGURE 31

▸ **TYPICAL TIE-IN DRAWINGS (EXAMPLE ONLY) – For detailed**
▸ **design requirements, see Pages 4-12 and 4-13**

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

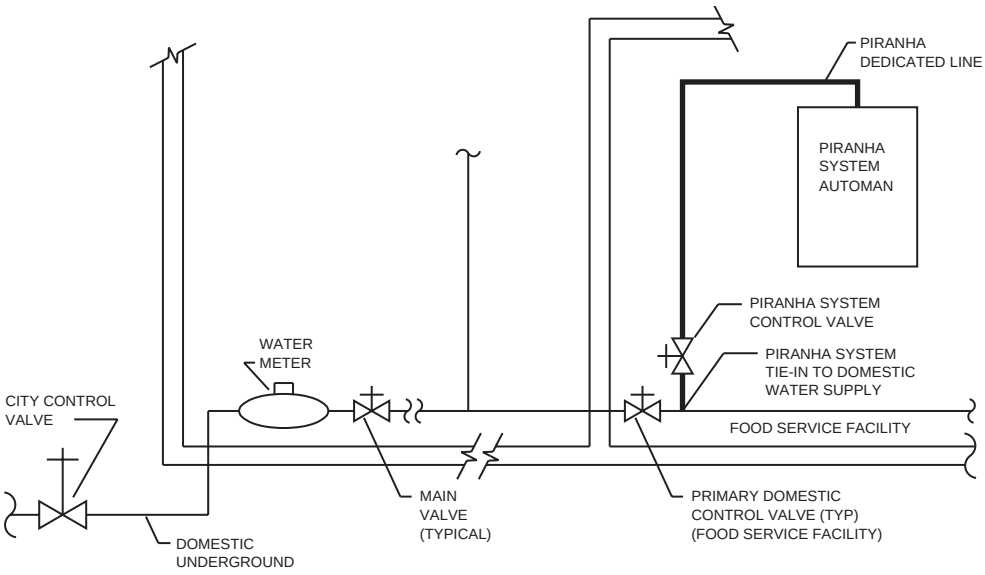
The four examples are:

- 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)



FOOD SERVICE FACILITY

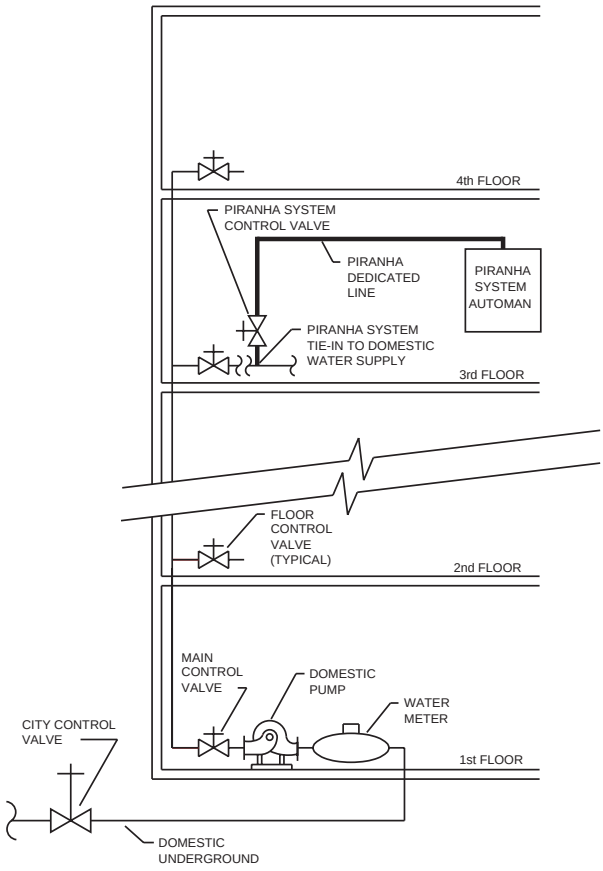
▸ **FIGURE 32**
003309



TYPICAL BUILDING WITH A
FOOD SERVICE FACILITY

▸ **FIGURE 33**
003310

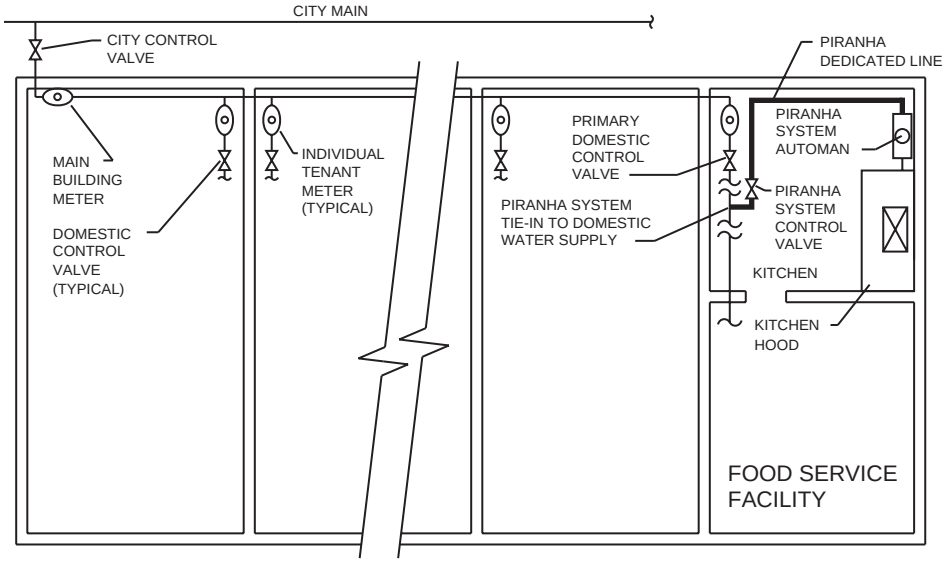
▸ **TYPICAL MULTI-STORY TIE-IN (EXAMPLE ONLY) – For detailed design requirements, see Pages 4-12 and 4-13**



TYPICAL MULTI-STORY TIE-IN

▸ **FIGURE 34**
003307

▸ **TYPICAL STRIP MALL TIE-IN (EXAMPLE ONLY) – For detailed design requirements, see Pages 4-12 and 4-13**



▸ **FIGURE 35**
003308

NOTES:

INSTALLATION INSTRUCTIONS

The installation information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the installation of the 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.

NOTICE

Various installation instructions in this section will also be used for the PIRANHA self-contained design option detailed in Section IX. Refer back to these installation instructions when utilizing the self-contained option.

MOUNTING THE 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 a PIRANHA ANSUL 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.

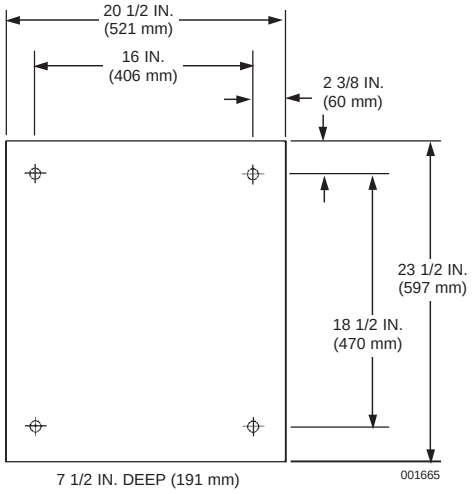
Mount the regulated release assembly, each regulated actuator assembly, each remote release, and, in self-contained systems, the water tank expellant gas assembly required by completing the following steps: See Figure 1.

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).

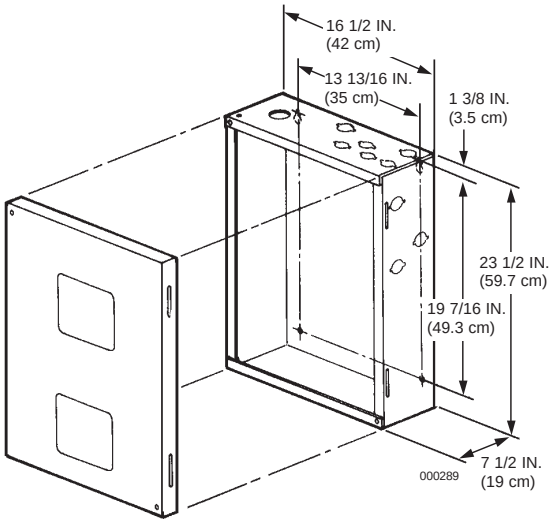
b. Detach cover from the enclosure. Remove agent tank from enclosure and the expellant gas line hose and the water hose from the tank/adaptor assembly.

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/
SELF-CONTAINED REGULATED RELEASE ASSEMBLY/
REGULATED ACTUATOR ASSEMBLY



WATER TANK EXPELLANT GAS ASSEMBLY



REMOTE RELEASE

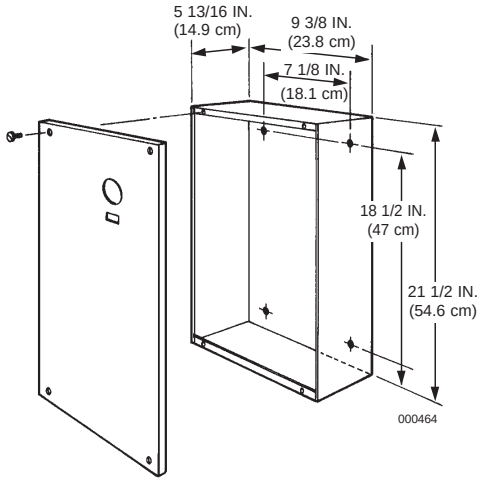


FIGURE 1

MOUNTING THE COMPONENTS (Continued)

⚠ CAUTION

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

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 2.

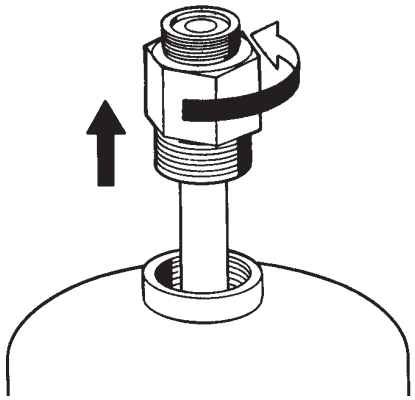


FIGURE 2
000291

   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 1.5 gallons (5.8 L) PIRANHA-7, 2.25 gallons (8.5 L) PIRANHA-10, or 3 gallons (11.6 L) PIRANHA-13 of only PRX Liquid Fire Suppressant. When the tank contains a complete charge, the liquid level should be 1 – 1 1/8 in. (25.4 – 28.6 mm) from the bottom of the fill opening. See Figure 3.

⚠ CAUTION

Make certain tank is filled to 1 – 1 1/8 in. (25.4 – 28.6 mm). 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.

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.**

⚠ CAUTION

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

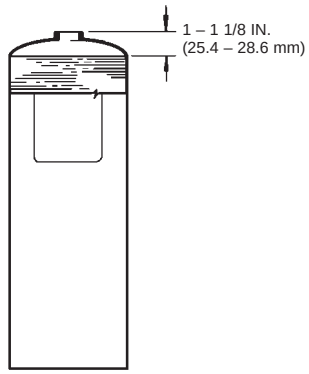


FIGURE 3
000292

   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)

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 1/8 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 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. of actuation gas line can be used if a double tank cartridge is used in the AUTOMAN Release Assembly.

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 101 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).
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.
4. Use only a 101-10 carbon dioxide cartridge in the 101 remote mechanical release.
5. A safety vent relief valve (Part No. 15677) is required in the actuation gas line to relieve residual pressure after actuation.

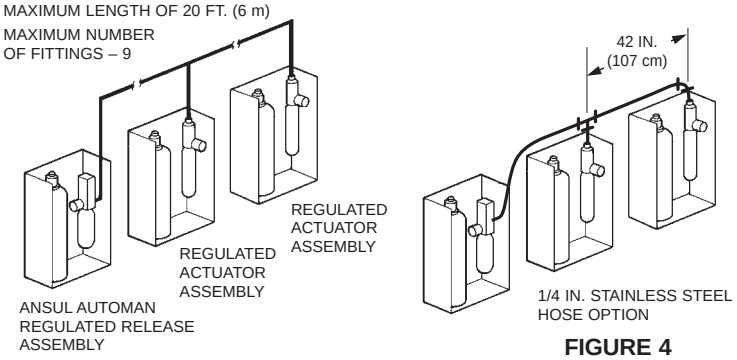


FIGURE 4
001640

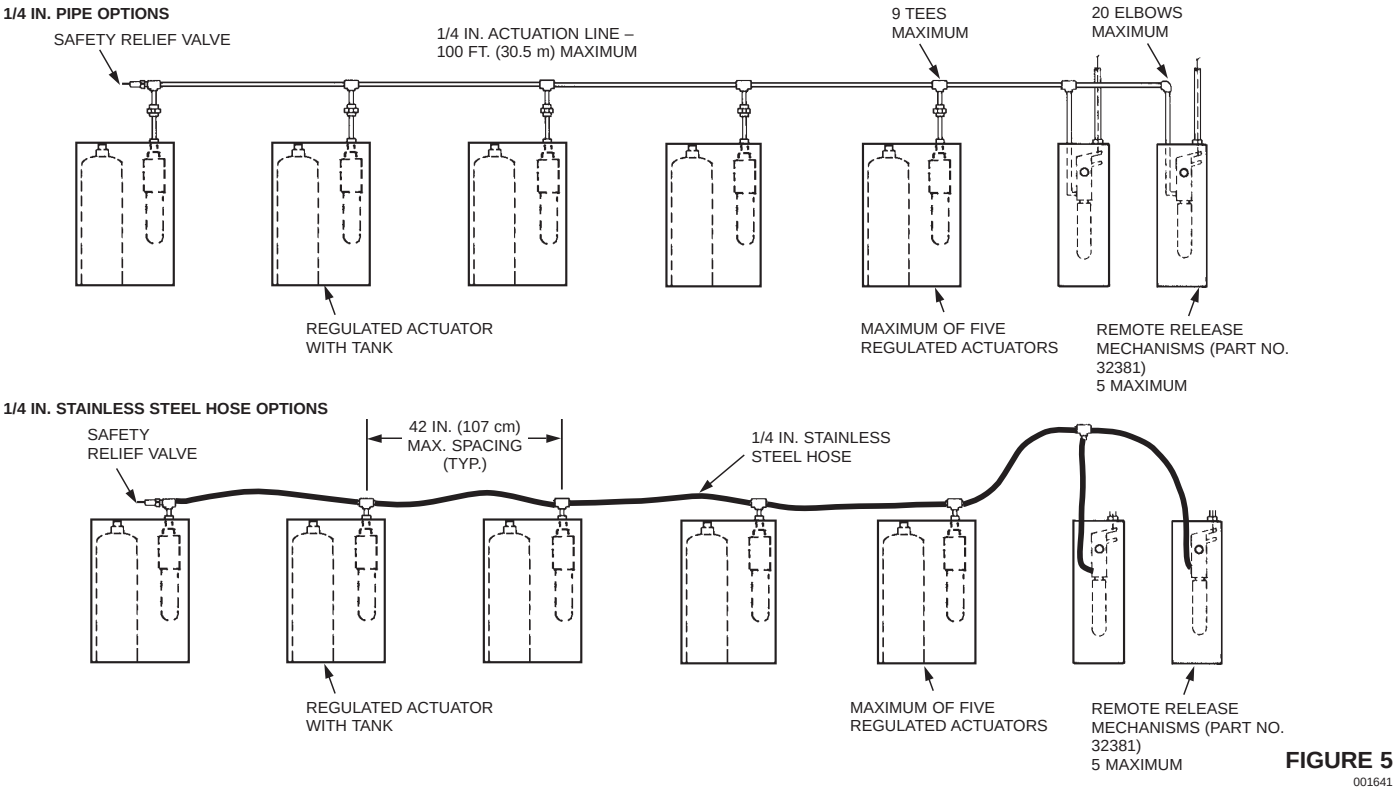


FIGURE 5
001641

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. A maximum of three PIRANHA water flow valves can be connected to a common waterline when all the valves are actuated simultaneously. See Figure 6.

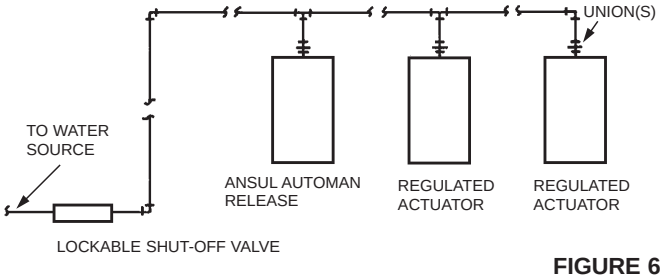


FIGURE 6
001618

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 @ 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 ANSUL 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 ANSUL AUTOMAN Release or regulated actuator. While the PIRANHA system may flow more than 10 gpm at inlet pressures greater than the minimum required, pressure drop calculations must assume a flow of 10 gallons per minute (GPM) 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 VI.

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 ANSUL 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 ANSUL 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.
- 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 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 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 6a).

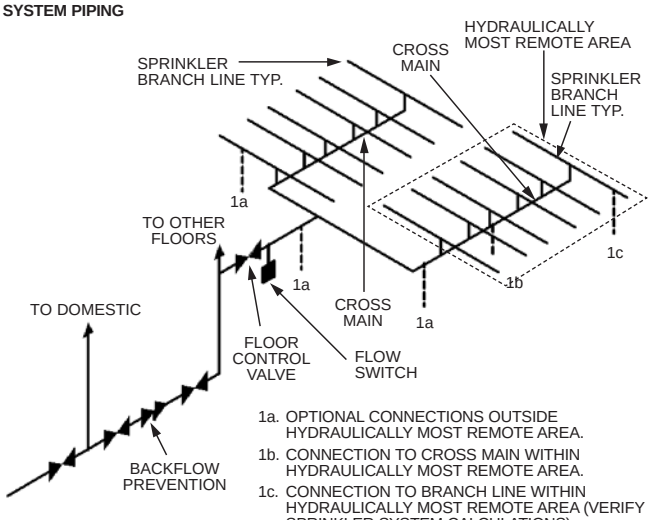
CONNECTING TO WET PIPE SPRINKLER SYSTEM (Continued)

- The PIRANHA ANSUL 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 ANSUL 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 6b and 6c).
- When the water pressure at the inlet to either the ANSUL 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 6d and 6e).

  The ANSUL Lockable Ball Valve is available by ordering either the 1 in. valve (P/N 423956), or the 1 1/4 in. valve (P/N 423957), along with Padlock (P/N 423727), and Water Valve I.D. Tag (P/N 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 ANSUL AUTOMAN Regulated Release and each Regulated Actuator Assembly connected to the dedicated PIRANHA waterline, to facilitate servicing the system.

PIRANHA DEDICATED WATERLINE CONNECTION TO EXISTING SPRINKLER SYSTEM PIPING



1a. OPTIONAL CONNECTIONS OUTSIDE HYDRAULICALLY MOST REMOTE AREA.
1b. CONNECTION TO CROSS MAIN WITHIN HYDRAULICALLY MOST REMOTE AREA.
1c. CONNECTION TO BRANCH LINE WITHIN HYDRAULICALLY MOST REMOTE AREA (VERIFY SPRINKLER SYSTEM CALCULATIONS).

FIGURE 6A
004523

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

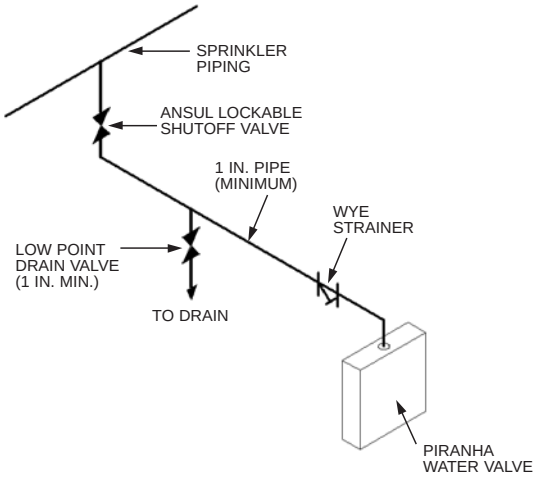


FIGURE 6B
004524

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

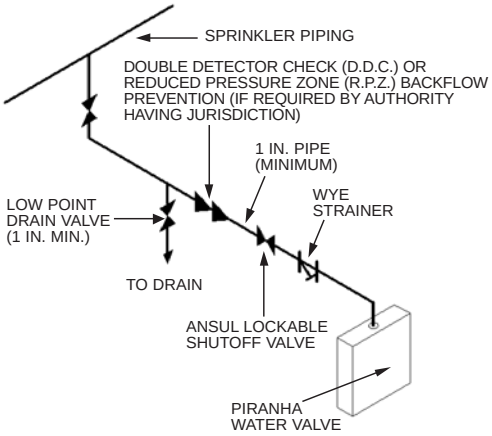


FIGURE 6C
004525

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

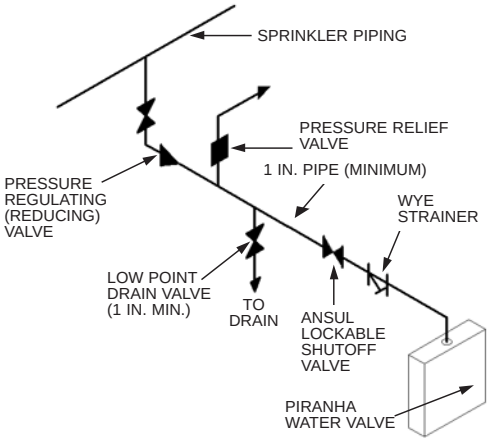


FIGURE 6D
004526

CONNECTING TO WET PIPE SPRINKLER SYSTEM (Continued)

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

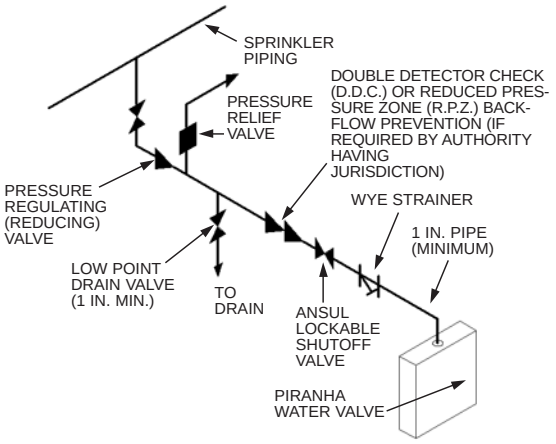


FIGURE 6E
004527

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.

   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.

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. See Figure 7.

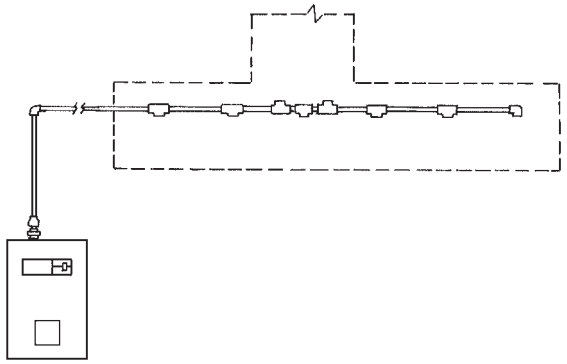


FIGURE 7
001683

3. Run all lines to the hazard area and connect each nozzle. (Make certain all fittings are tight and all piping is securely bracketed.)
4. Before installing blow-off caps on nozzles, apply a small amount of Dow Corning No. 111 silicone grease across the opening in the nozzle tip and also a small amount coating the exterior of the blow-off cap. This will help keep cooking grease from building up on the cap.

   NOTICE

   When using a 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.

   NOTICE

   DO NOT pack silicone grease in the cap or into nozzle orifice.

5. 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.

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 IV, 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.

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.

   When changing the direction of conduit, use only Ansul pulley elbows, except, at the top of the regulated release, it is acceptable to use the "Conduit Offset Assembly" (Part No. 79825).

   Ansul offers two styles of detector bracket assemblies. Part No. 15373 and 15375 are the "hinged" style series and terminal detector assemblies. These detector assemblies use a detector linkage assembly which **requires** the wire rope to be threaded through each linkage assembly while the rope is being fed through the detection system.

   Part No. 417368 and 417369 are the "scissor" style series and terminal detector assemblies. These detector assemblies use a detector linkage assembly which does not require the wire rope to be threaded through the linkage assembly while it is being fed through the detection system.

"Scissor" Style Linkage Installation

1. Secure the conduit to the detector bracket using the two 1/2 in. steel compression fittings on the series detector bracket or the single 1/2 in. steel compression fitting on the terminal detector bracket. See Figure 8.

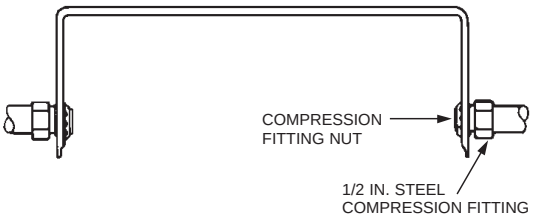


FIGURE 8
000306

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 9.

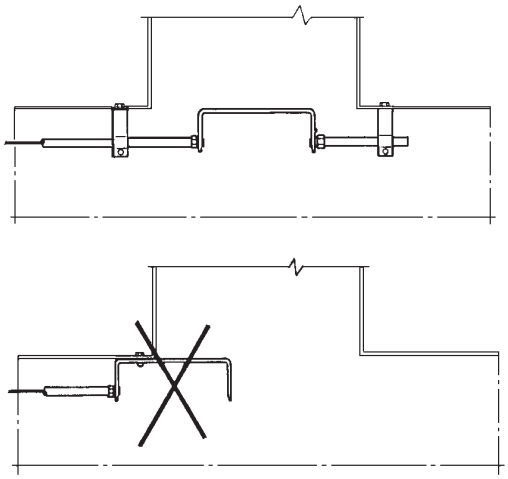


FIGURE 9
000307

3. Starting at the release assembly, feed the wire rope through the hole in the release mechanism locking clamp, allowing the excess wire rope to hang down. (Do not tighten set screws in locking clamp at this time.) See Figure 10.

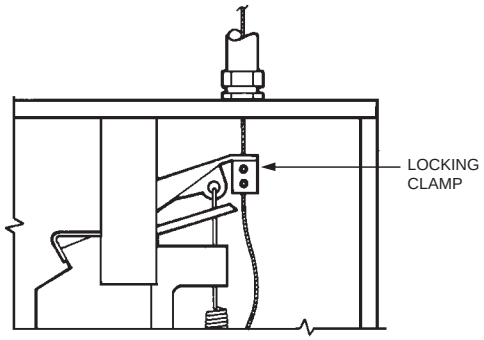


FIGURE 10
000309

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

NOTICE

If wire rope requires splicing, make certain splice is at least 12 in. (305 mm) away from any pulley elbow or conduit adaptor to avoid interference.

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

5. Feed the wire rope through the terminal detector bracket as shown in Figure 11 or as shown in Figure 12 if the terminal detector is mounted within a duct or header opening, and install the stop sleeve approximately 2 to 3 in. (51 to 76 mm) from the end of the wire rope. See Figure 13. Use the National Telephone Supply Company Nicopress Sleeve Tool (Stock No. 51-C-887) or equal to properly crimp the stop sleeve.

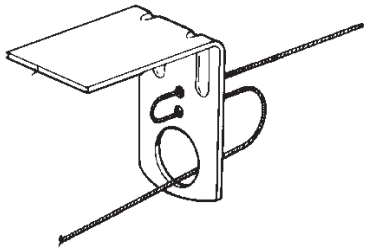


FIGURE 11
000310

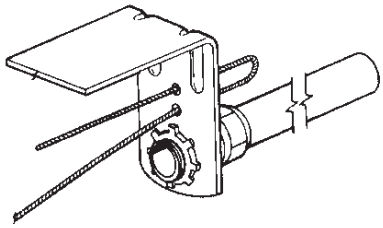


FIGURE 12
000311

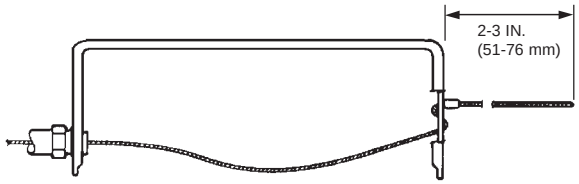


FIGURE 13
000312

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

NOTICE

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

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

7. Install detector scissor assembly as shown in Figure 14. Note that the ANSUL 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.

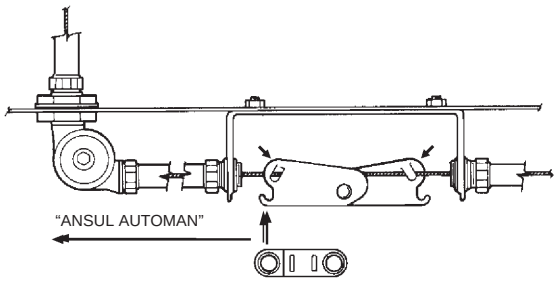


FIGURE 14
000503

8. Hook the fusible link on the ANSUL AUTOMAN release side of the hook assembly, then pull the fusible link to the opposite side and complete the hookup as shown in Figure 15 and 16. 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.

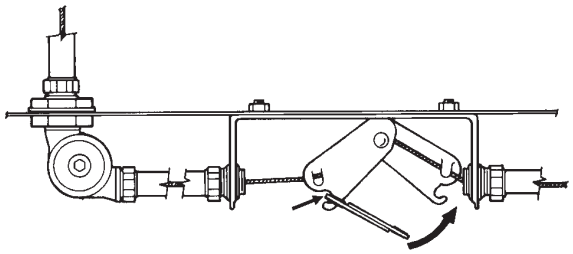


FIGURE 15
000504

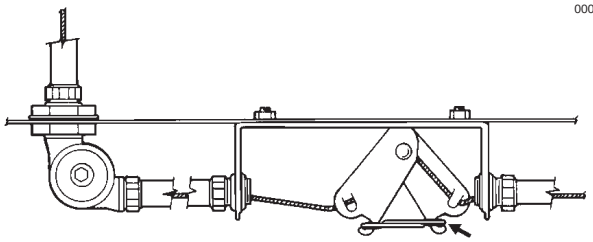


FIGURE 16
000324

9. Install the linkage and the correct Ansul approved fusible link in the remainder of the detector brackets. Make certain all detector linkages are positioned against either the front or back upper lip of the formed detector bracket. See Figure 16a.

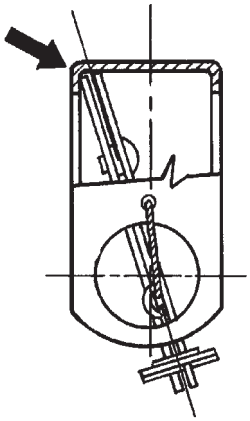


FIGURE 16a
004429

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

10. Insert cocking lever (Part No. 14995) 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 17.

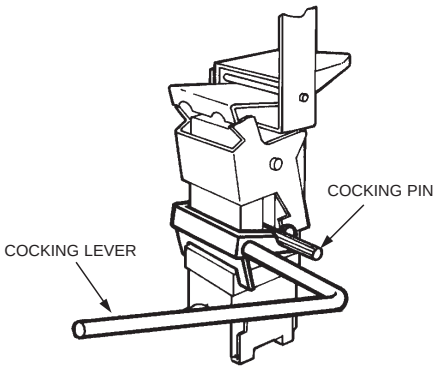


FIGURE 17
000319

11. With a downward motion of the cocking lever, raise cocking pin until the trip lever indented surface moves underneath the pin and locks the pin in the up position. See Figure 18.

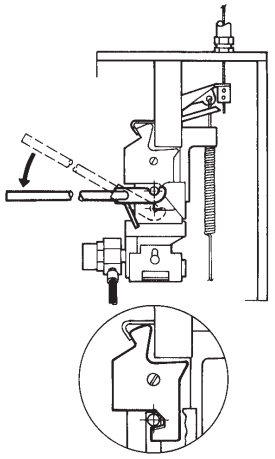


FIGURE 18
000320

12. Remove cocking lever and insert lock bar (Part No. 14985) on left side of the cable lever, over the two shouldered projecting stud extensions, and slide bar forward into locking position. (The release mechanism cannot be actuated, nor can enclosure cover be replaced until the lock bar is removed.) See Figure 19.

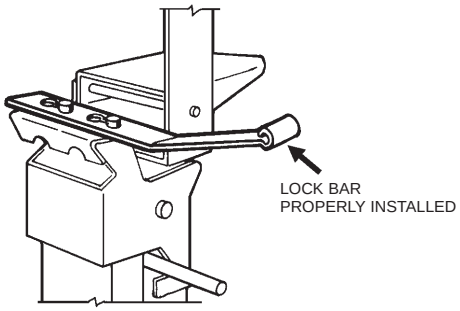


FIGURE 19
000321

13. Make certain tension lever is in the "UP" position. See Figure 20.

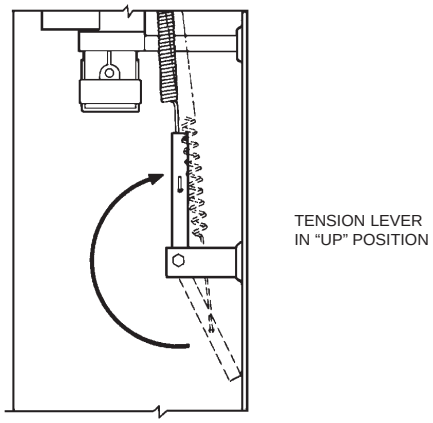


FIGURE 20
000322

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

NOTICE

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

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

16. Lower tension lever to "DOWN" position and inspect the base of the wire rope 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 assembly and the cable lever assembly. See Figure 21. (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.)

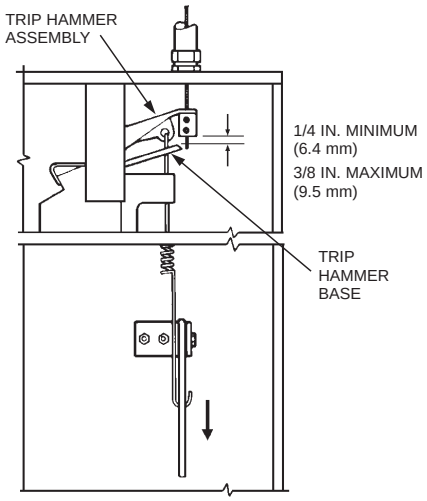


FIGURE 21
000323

INSTALLING THE DETECTION SYSTEM (Continued)

"Scissor" Style Linkage Installation (Continued)

⚠ 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 wire rope in the regulated release assembly, leaving approximately 2 in. (51 mm) of wire rope below the clamping device.

Installing "Hinged" Style Linkage

1. Secure the conduit to the detector bracket using 1/2 in. steel compression fittings. Thread the compression fitting into the detector bracket and then secure by using the lock nut supplied with the fitting. See Figure 22.

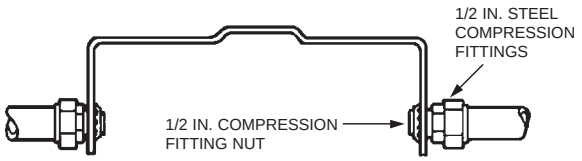


FIGURE 22
000330

NOTICE

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

2. Starting at the regulated release assembly, feed wire rope up through hole in regulated release mechanism locking clamp, allowing excess wire rope to hang down. (Do not tighten set screws in locking clamp at this time.) See Figure 23.

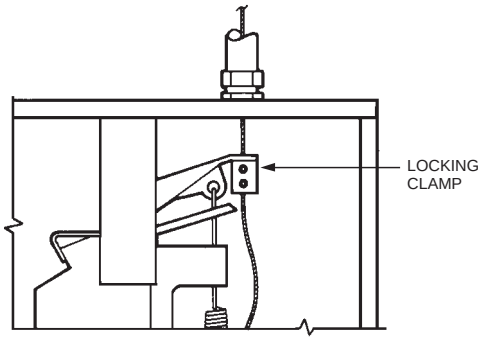


FIGURE 23
000309

3. From the regulated release assembly, run the stainless steel wire rope through the conduit, pulley elbows and to the first detector.
4. Before continuing on past the detector bracket, feed the wire rope through the detector linkage assembly. See Figure 24.
5. Continue running the wire rope through the conduit and pulley elbows and feed it through each detector linkage assembly at each additional bracket.
6. At the terminal detector, feed wire rope through the terminal detector clamping device. Allow 2-3 in. (51-76 mm) of wire rope to extend beyond the clamping device and wrench tighten the set screws. See Figure 24.

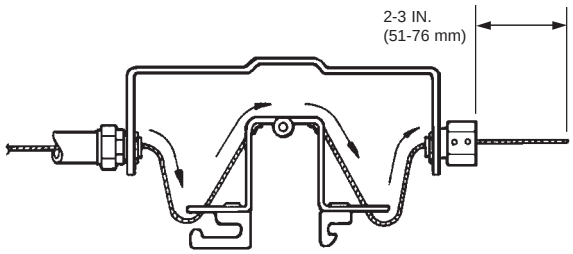


FIGURE 24
000332

7. To give a constant tension on the wire rope during positioning of the detector linkage(s), hang a vise grip or other weighted device on the excess stainless steel wire rope, leaving an adequate length of spare wire rope between the locking clamp and the weighted device.

NOTICE

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

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

8. Starting at the terminal detector, squeeze the linkage together and place the correctly rated Ansul approved fusible link over both detector hooks. For optimum detection, make certain the solder joint is in the down position. Locate the linkage in the center of the detector bracket. See Figure 25.

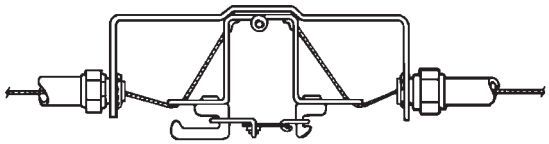


FIGURE 25
000333

9. Proceed to install the remainder of the Ansul approved fusible links on the detector hooks and position the linkage in the center of each bracket.

INSTALLING THE DETECTION SYSTEM (Continued)

Installing "Hinged" Style Linkage (Continued)

10. Insert cocking lever (Part No. 14995) on left side of regulated release mechanism with the movable flange resting securely against the corner of cartridge receiver and spring housing, with the notched lever portion engaging the cocking pin on both sides of the regulated release. See Figure 26.

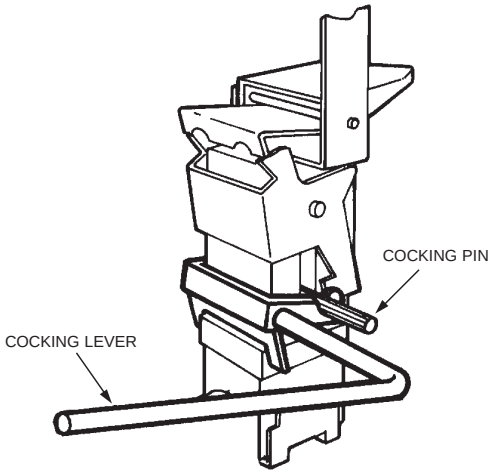


FIGURE 26
000319

11. With a downward motion of the cocking lever, raise the cocking pin until trip hammer indented surface moves underneath the pin. See Figure 27.

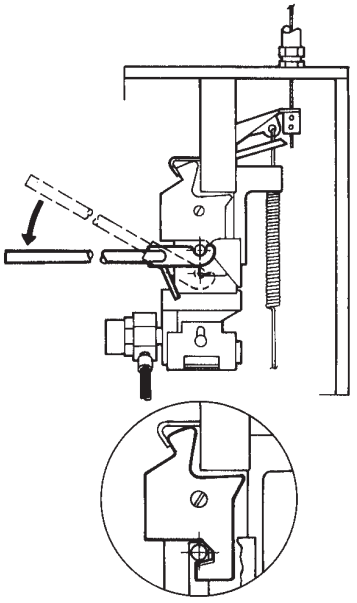


FIGURE 27
000320

12. Remove the cocking lever and insert lock bar (Part No. 14985) on left side of cable lever, over the two shouldered projecting stud extensions, and slide the bar forward into the locking position. (The regulated release mechanism cannot be actuated, nor can enclosure cover be replaced until the lock bar is removed.) See Figure 28.

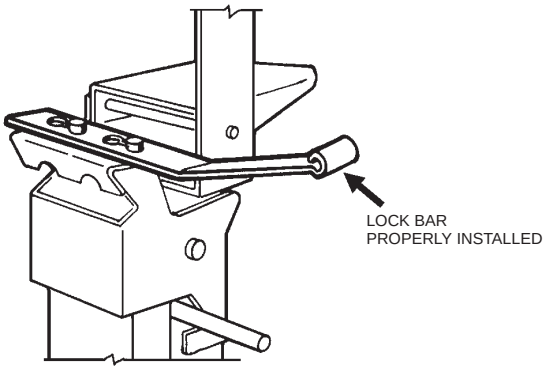


FIGURE 28
000321

13. Make certain tension lever is in the "UP" position. See Figure 29.

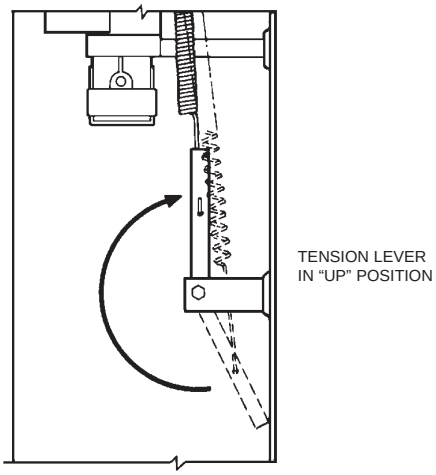


FIGURE 29
000322

14. Verify each detector linkage assembly, with correct fusible link, is approximately centered in the detector bracket.

NOTICE

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

15. Raise trip hammer 3/8 in. to 1/2 in. (95 to 127 mm), pull all slack out of wire rope, and tighten set screw on locking clamp.

INSTALLING THE DETECTION SYSTEM (Continued)

Installing "Hinged" Style Linkage (Continued)

16. Lower tension lever to "DOWN" position and inspect the base of wire rope 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 trip hammer assembly and cable lever assembly. See Figure 30. (If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever, loosen set screws on locking clamp and repeat Steps 15 and 16.)

⚠ CAUTION

Make certain the hook assembly with the fusible link in place is located toward the terminal detector side of each bracket. Failure to do so may restrict travel of detection line, causing system to malfunction.

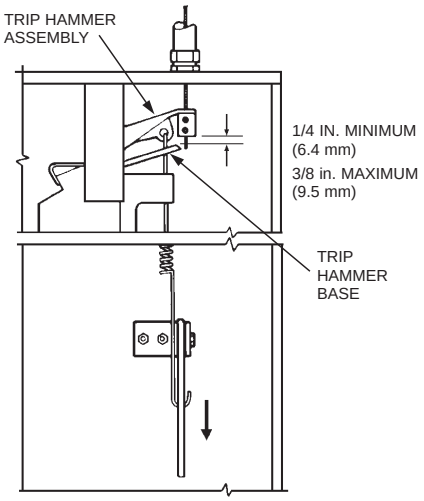


FIGURE 30
000323

⚠ CAUTION

Do not install cartridge or do not remove lock bar at this time as an accidental actuation could cause system discharge.

17. Test detection system in accordance with the "Testing and Placing in Service," Testing Detection System section of this manual.
18. When all testing has been completed in the "Testing and Placing in Service" section, cut off excess wire rope in the regulated release assembly, leaving approximately 2 in. (51 mm) of wire rope below the clamping device.

INSTALLING REMOTE MANUAL PULL STATION

To install a remote manual pull station complete the following steps:

1. Make certain that regulated release assembly enclosure cover is detached and lock bar 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 bar 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 exit for mounting the pull station(s) to the wall. Height and location of pull station should be determined in accordance with authority having jurisdiction.

   The total length of the wire rope used for each manual pull station within a system must not exceed 150 ft. (46 m).

   The maximum number of pulley elbows that may be used per each manual pull station is 20 of Part No. 423250 or 415670.

   A maximum of two (2) manual pull stations can be connected to each AUTOMAN Release.

4. 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.

   ALTERNATE METHOD OF CONNECTION:

   a. Thread 3/4 x 1/2 in. reducing coupling to bushing on back of each cover assembly. See Figure 30a.

   b. Mount pull station cover(s) directly to wall at selected location so that printing is right side up and readable.

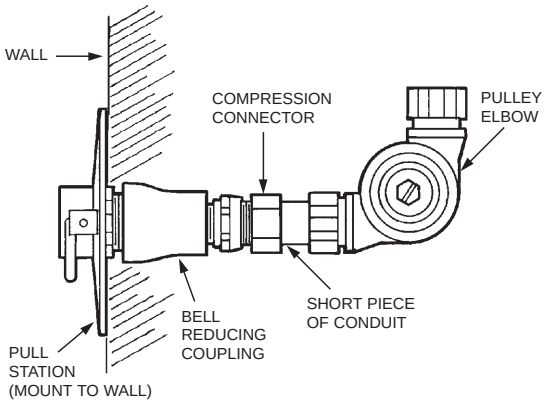


FIGURE 30a
002465

INSTALLING REMOTE MANUAL PULL STATION (Continued)

5. Install and secure 1/2 in. conduit, pulley tee (if required), and pulley elbows from each pull station to regulated release assembly as necessary. See Figure 31 or 32.

   See Figure 32a for optional methods of installing wire rope when utilizing a pulley tee, Part No. 427929.

REMOTE MANUAL PULL STATION SINGLE APPLICATION

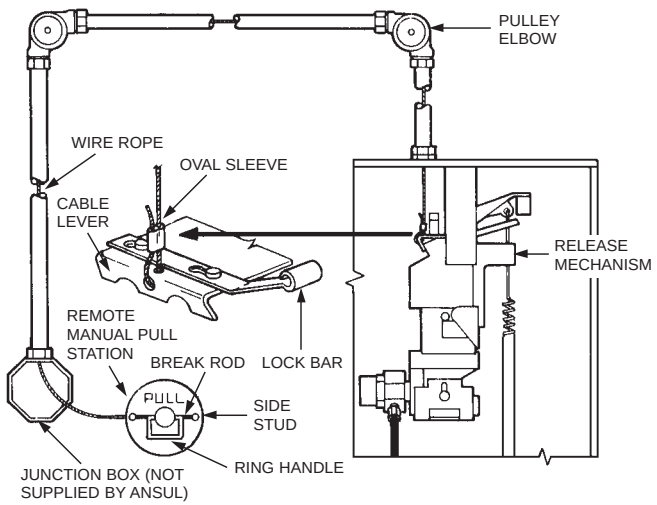


FIGURE 31
001090

REMOTE MANUAL PULL STATION DUAL APPLICATION

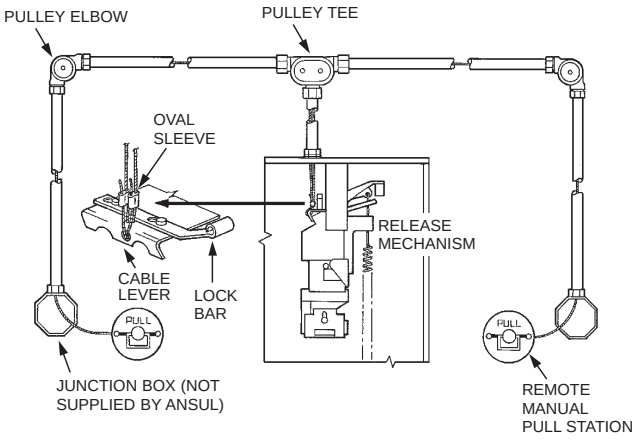


FIGURE 32
000335

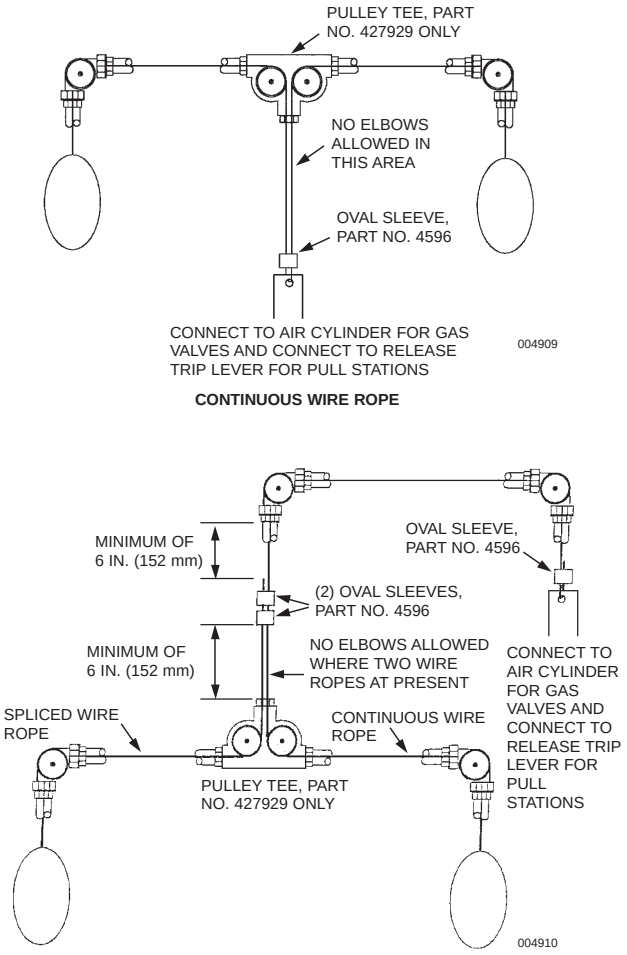


FIGURE 32A

6. Feed wire rope from each pull station through conduit and each pulley elbow to cable lever located at regulated release assembly.

   NOTICE

   Make certain that wire rope rides on top and in center of pulley sheave. If the 50 ft. (15 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 6 in. (152 mm) of any pulley elbow or conduit adaptor.

7. Fasten pull station assembly to each junction box (if junction box is used).
8. Slide oval crimp sleeve onto wire rope. Loop wire rope through cable lever guide holes and back through the oval crimp sleeve. See Figure 31.
9. Pull slack out of each wire rope and crimp sleeve. (Use the National Telephone Supply Company Nicopress Sleeve Tool Stock No. 51-C-887 or equal to properly crimp stop sleeve.) See Figure 31.

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 bar 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 bar 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 33.

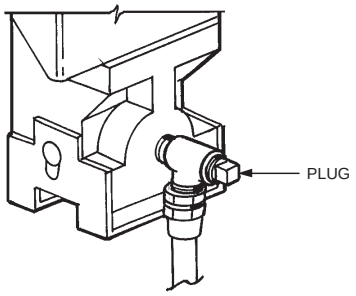


FIGURE 33
001684

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 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 35.

FOR MOUNTING ONE MECHANICAL GAS VALVE

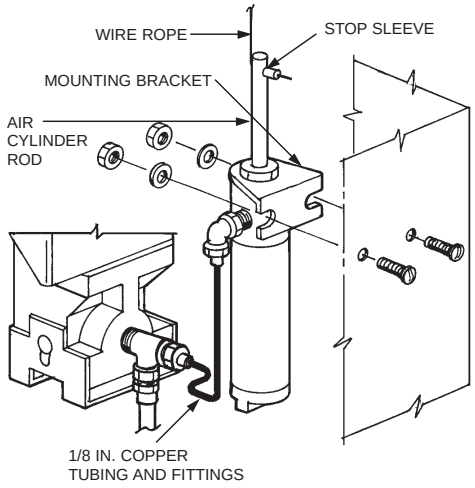


FIGURE 34
001619

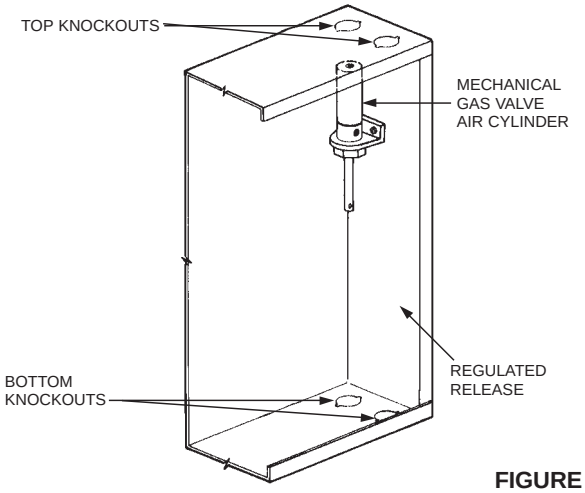


FIGURE 35
000341

NOTE: Two air cylinders are necessary only if the old style pulley tee, Part No. 15342, is utilized. If new style pulley tee, Part No. 427929, is utilized, only one air cylinder is required. Individual wire ropes can be run from each gas valve to a single air cylinder. See Figure 36.

5. If necessary, 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 Figure 36.

INSTALLING MECHANICAL GAS VALVE (Continued)

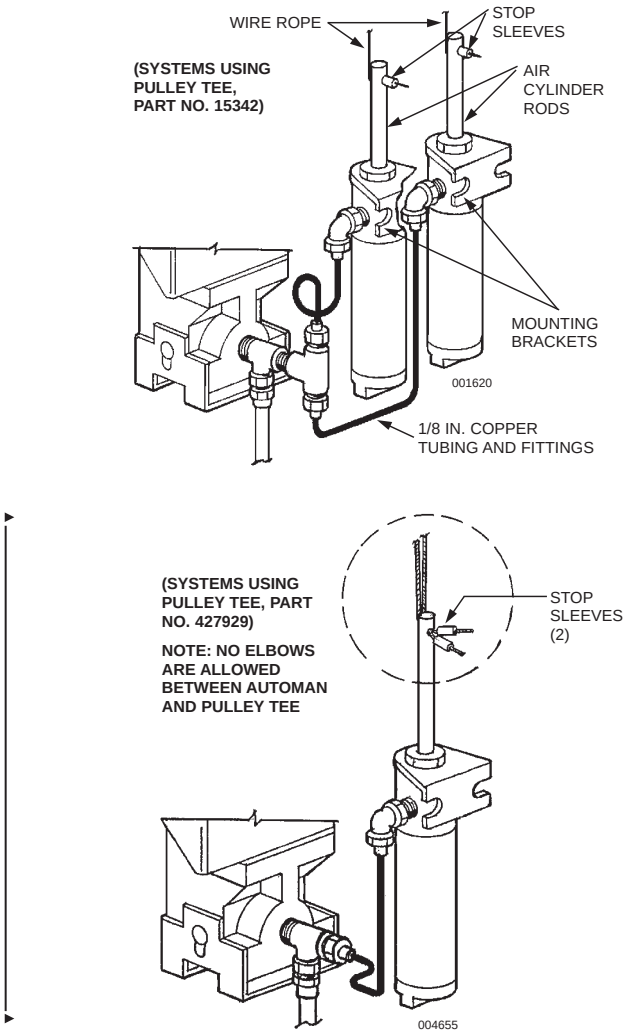


FIGURE 36

6. Install the necessary 1/8 in. copper tubing and fittings for each air cylinder to the accessories piping arrangement on the regulated release mechanism. See Figures 34 and 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.

7. **⚠ CAUTION**

To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve.

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 37.

a. Use new pipe, properly reamed and cleaned of metal chips.

INSTALLING MECHANICAL GAS VALVE (Continued)

b. Make certain gas flow is in the same direction as arrow shown on gas valve. To avoid cracking the gas valve casting, do not overtighten pipe connections. If pipe tape, paste, spray, or similar lubricant is used, extra care should be taken to avoid overtightening. Apply lubricant to male threads only.

c. Wrench tighten pipe to gas valve. **DO NOT USE GAS VALVE AS A LEVER WHEN INSTALLING OR VALVE DAMAGE MAY OCCUR.** See Figure 37.

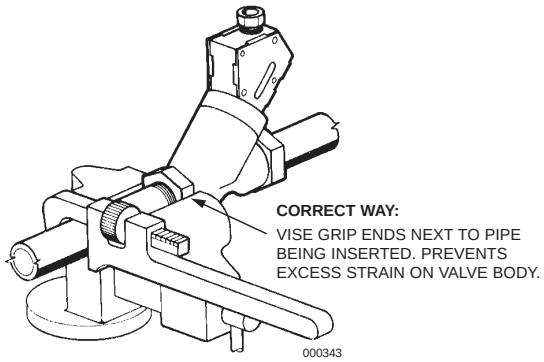
d. If strainer is utilized, attach strainer ahead of gas valve.

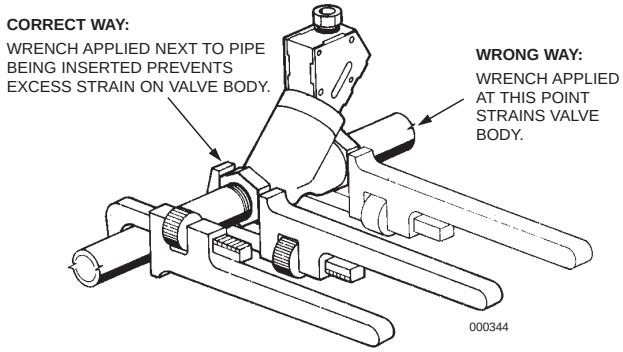
e. If necessary, install drip leg in gas line in accordance with the authority having jurisdiction.

f. The total length of wire rope allowed for each valve must not exceed 150 ft. (46 m).

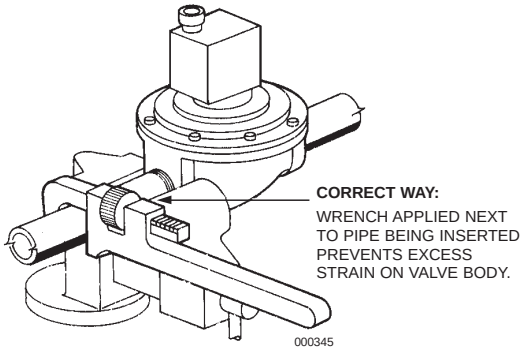
g. The maximum number of pulley elbows allowed for each gas valve is 20.

ANSUL MECHANICAL GAS VALVES





ASCO MECHANICAL GAS VALVES



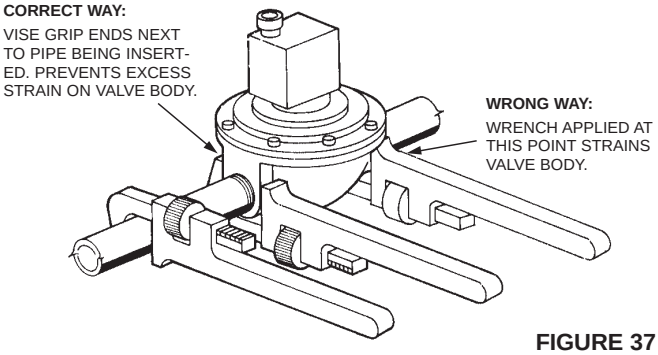


FIGURE 37
000346

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 wire rope through hole provided in air cylinder rod. See Figure 34.

10. Feed end of wire rope through conduit and each pulley elbow.

    Make certain that wire rope rides on top and in center of pulley sheave. If the 50 ft. (15 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 12 in. (305 mm) of any pulley elbow or conduit adaptor.

11. Remove side cover on gas valve and thread end of wire rope through hole in cocking lever. Slide stop sleeve (Part No. 26317) on to wire rope and crimp. (Use the National Telephone Supply Company Nicopress Sleeve Tool Stock No. 51-C-887 or equal to properly crimp stop sleeve.) Make certain crimp is on top of cocking lever, with wire rope curled under lever. See Figure 38.

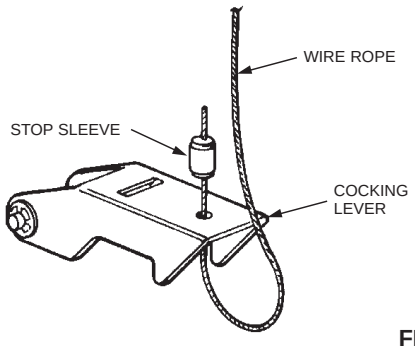


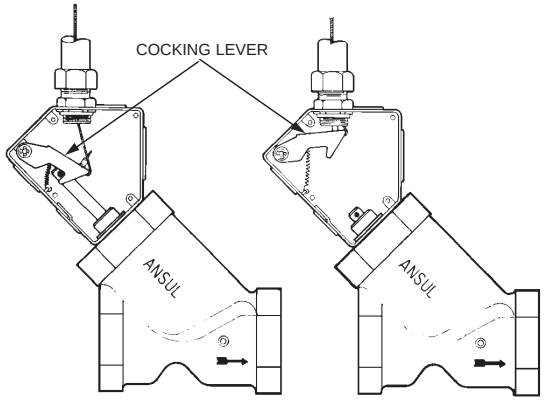
FIGURE 38
000347

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

INSTALLING MECHANICAL GAS VALVE (Continued)

13. Cock mechanical gas valve as shown in Figure 39.

ANSUL MECHANICAL GAS VALVE



ASCO MECHANICAL GAS VALVE

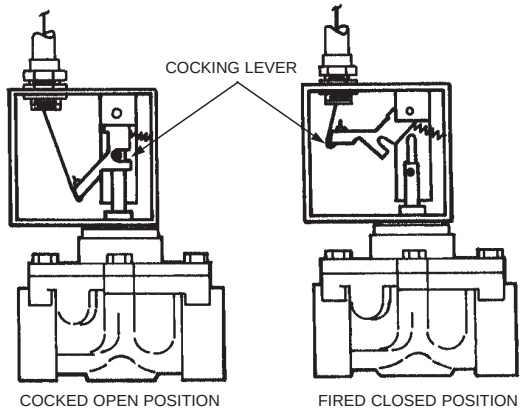


FIGURE 39

14. Raise air cylinder rod “UP” to its maximum extended position. See Figure 34.
15. Manually pull wire rope to remove excess slack.

NOTICE

DO NOT ACTUATE THE MECHANICAL GAS VALVE. Each Mechanical Gas Valve System must have gas valve cocked and air cylinder rod extended “UP” to its maximum extension before completing next step.

16. Slide stop sleeve against air cylinder rod, make certain all slack is removed from wire, and crimp stop sleeve. See Figure 39.
17. Cut off any excess wire rope approximately 3/4 in. (19 mm) from end of stop sleeve.
18. **NOTE:** If utilizing a pulley tee to operate a single mechanical gas valve from two (2) ANSUL AUTOMAN releases, see Figure 40 for installation instructions. Maximum length of wire rope to each ANSUL AUTOMAN release must not exceed 150 ft. (45.7 m) and maximum number of elbows must not exceed 20.

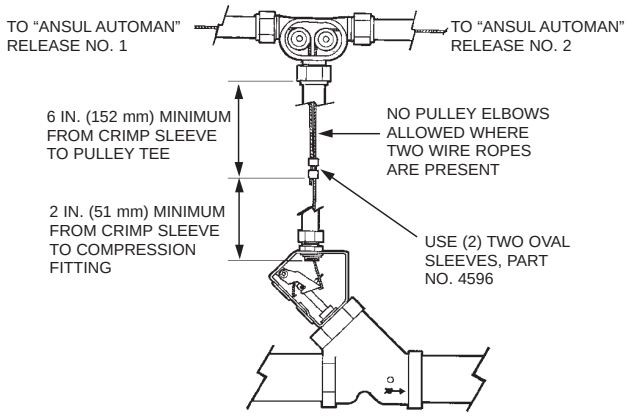


FIGURE 40

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 bar 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 bar 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. **⚠ CAUTION**

   To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve.

   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 41.

   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)

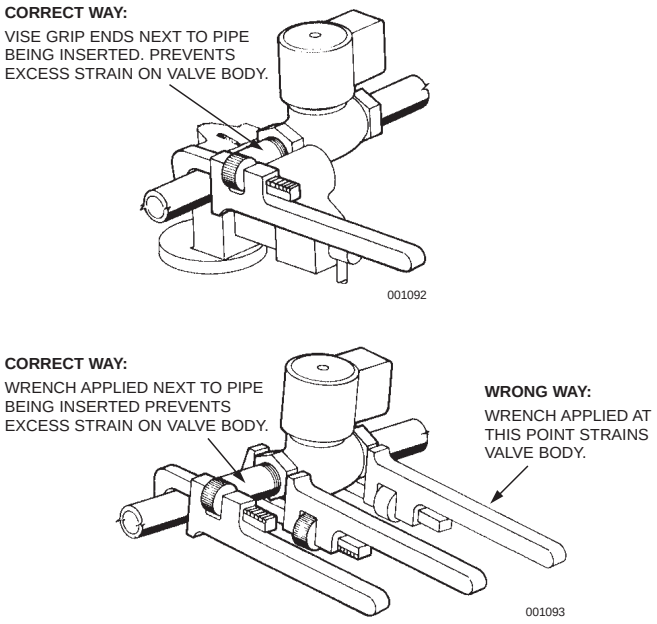


FIGURE 41

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 in "Design" section for typical wiring diagrams.
6. **⚠ CAUTION**

   Before working on any electrical wiring, make certain main power has been disconnected. Failure to disconnect main power could cause personal injury or death if contact is made with energized wires.

   Connect electrical wiring to manual reset relay along with any contactor, or contractor supplied devices needed. Refer to manufacturer's instructions and proper figure listed for assistance.
7. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.
8. Install and secure 1/2 in. conduit from the regulated release assembly enclosure to manual reset relay enclosure.

   If snap-action switches have not been attached, go to "Electric Switch" section and install them at this time by completing Steps 3 through 8.
9. Tag and connect electrical wiring to each electric (snap-action) switch. Then, feed wire through conduit to manual reset relay.
10. Connect wiring from each electric (snap-action) switch to manual reset relay terminals. Refer to manufacturer's instructions (if provided) and proper figure for assistance.
11. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.
12. Properly return electrical power to the system.

▸ INSTALLING OPTIONAL WATER SHUTDOWN DEVICE – ▸ DOMESTIC WATER SUPPLY OPTION ONLY

The Water Shutdown Device, Part No. 426294, must be installed in the PIRANHA 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 PIRANHA AUTOMAN Release. See Figure 42.

1. Remove the 1/4 in. high pressure hose at the bottom of the water flow valve. See Figure 42. Note: On units manufactured before March 1999, 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 42.
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 42. Wrench tighten.
4. Reconnect the 1/4 in. high pressure hose to the valve core assembly located in the water shutdown device. See Figure 42.

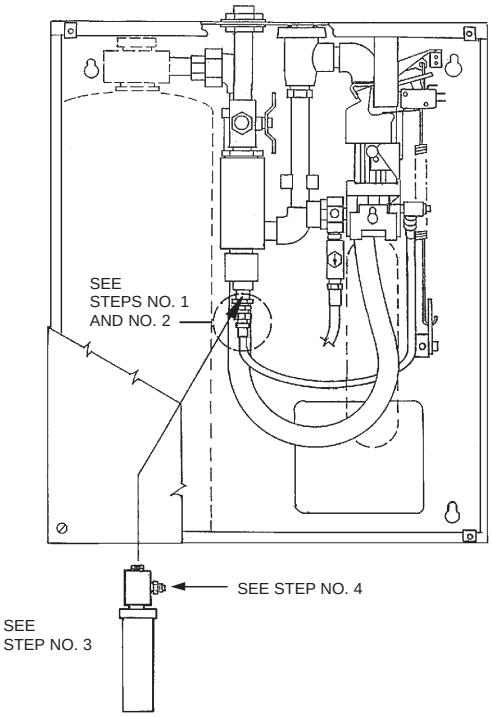


FIGURE 42
004235

INSTALLING ELECTRICAL SWITCHES

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

⚠ CAUTION

Unused wire leads will become "hot" when the system is operated. Failure to adequately cover exposed wire end(s) will cause electric shock if touched.

1. Make certain that regulated release assembly enclosure cover is detached with lock bar 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 bar 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 a factory installed switch.

3. Press each wire assembly onto the 3-terminals located on the switch(s). Be sure that the connector is pressed tight against the switch. See Figure 43.

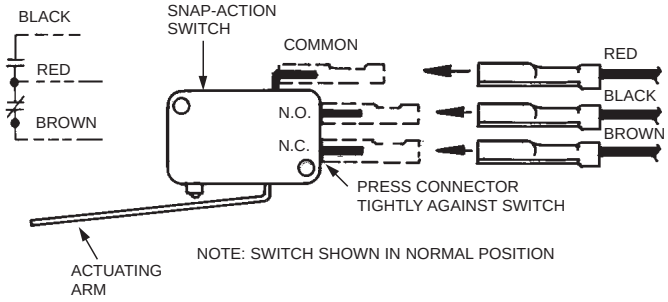


FIGURE 43
001621

4. Install switch(s) to the mounting bracket using provided fasteners and tighten securely.
5. If more than one switch is being installed, it is necessary to attach the trip lever extension stud to the trip lever. See Figure 44. Using the provided fasteners, securely install the extension stud.
6. Raise switch actuating arm squarely over the cam surface of the trip lever. This will allow the trip lever, when actuated, to force the actuating arm "UP," thus reversing the normal condition of the switch. See Figure 44.

   For multiple switch installations, make certain switch actuating arms are positioned on trip lever extension stud.

   Before proceeding with Step 7, test electric (snap-action) switches:

   a. Remove lock bar. With the ANSUL 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 ANSUL AUTOMAN 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 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 ANSUL AUTOMAN and install lock bar.

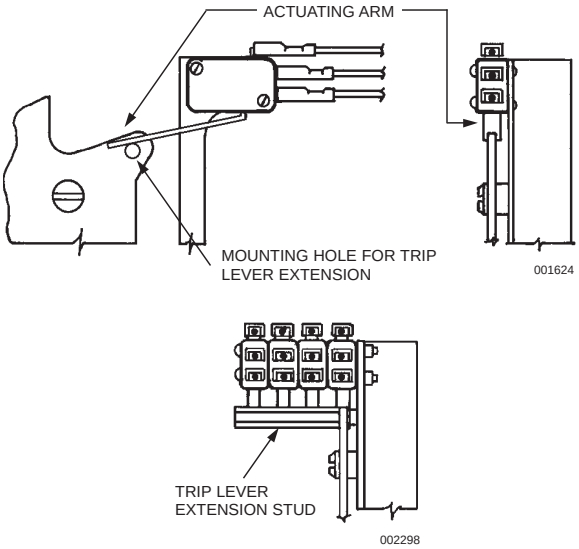


FIGURE 44

7. 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.
8. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction.

   NOTICE

   Do not connect power source to any relay, contactor, or contractor supplied devices until all other electrical connections are made. Refer to proper section or manufacturer supplied instructions for recommended installation procedures for these devices.

9. 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
- Spacer
- Mounting Screw with Nut (2)
- Extension Pin
- Extension Pin Nut
- Instruction Sheet

The Alarm Initiating Switch is mounted in the ANSUL AUTOMAN Release on the same mounting plate where the current snap-action switches are mounted. If the alarm initiating switch is used alone, the enclosed extension pin and pin nut are not needed.

When mounting the switch, the spacer must be installed first, between the ANSUL AUTOMAN mounting plate (or existing switches) and the alarm initiating switch.

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

After the switch is properly mounted, follow the steps listed in the installation section of the Design, Installation, Recharge, and Maintenance Manual for correct positioning of the switch lever on the ANSUL AUTOMAN cam surface.

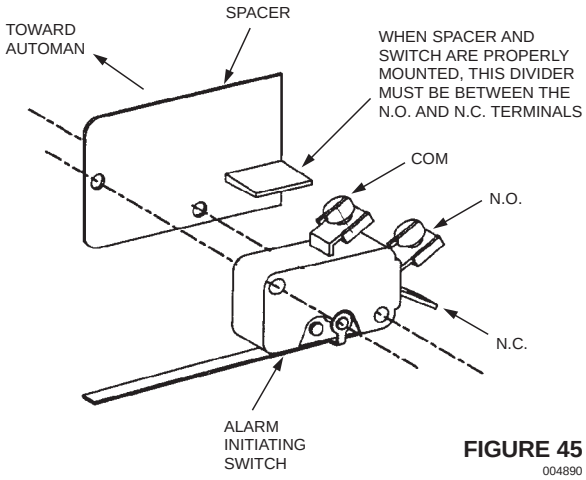
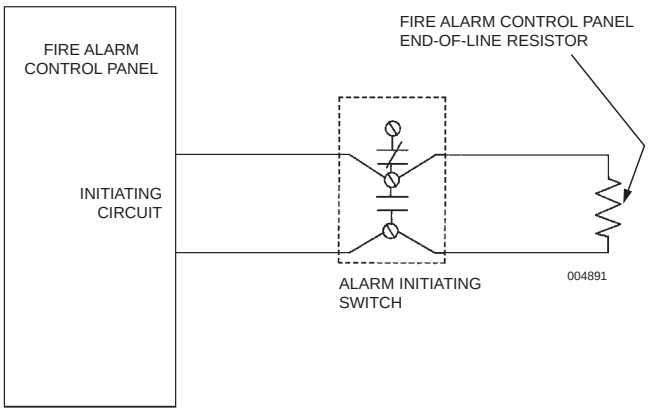
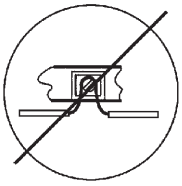
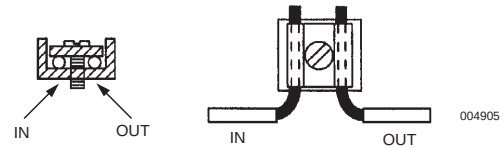


FIGURE 45





INCORRECT



CORRECT – SEPARATE INCOMING AND OUTGOING CONDUCTORS

FIGURE 46

After the system has been completely installed, and **BEFORE INSTALLING THE CARTRIDGE,** the system must be tested at the regulated release assembly.

NOTICE

Various Testing and Placing in Service instructions in this section will also be used for the PIRANHA self-contained design option detailed in Section IX. Refer back to these installation instructions when utilizing the self-contained option.

PRESSURE TESTING THE WATER SYSTEM – DOMESTIC WATER SUPPLY OPTION ONLY

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 12-13 in the Design section.

NOTICE

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 ANSUL 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 releasing devices manufactured before March 1995, 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 ANSUL 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. long.
4. Open the test valve in the ANSUL 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 from regulated release assembly cable lever.
2. On metal stamped pull station, remove glass break rod from pull station by removing set screw on side of stud and slide glass break rod out. On molded plastic pull station, seal will be broken during test and must be replaced.
3. Pull ring handle on pull station. If the regulated release assembly is tripped easily, the remote manual pull station is properly installed.

   If the regulated release assembly does not trip, remove pulley tee (if provided) and each pulley elbow cover to make certain wire rope is resting on the pulley sheave. If this does not correct the problem, there is too much slack in the line and it must be retightened.
4. Cut off any excess wire rope 3/4 in. (19 mm) above oval sleeve.
5. Recock regulated release assembly using cocking lever (Part No. 14995) and reinstall lock bar (Part No. 14985)
6. On metal stamped pull station, slide glass break rod through stud and ring handle. Tighten set screw into stud. On molded plastic pull station, replace seal.

NOTICE

If no other devices are being attached, proceed to Page 6-3, Step No. 1, and test the detection system.

TESTING MECHANICAL GAS VALVES

To test each mechanical gas shut-off valve complete the following steps:

1. **⚠ CAUTION**

   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 wire rope is resting on each pulley elbow sheave. If this does not correct the problem there may be too much slack in the line and it should be retightened.
3. Test for gas leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear and repeat test again to make certain no other gas leaks exist.
4. If no gas leak is found, pull air cylinder rod to full "UP" position.
5. Recock mechanical gas valve.
6. Check burners for gaseous odor. **IF GASEOUS ODOR EXISTS, MANUALLY PUSH THE AIR CYLINDER ROD TO THE FULL "DOWN" POSITION IMMEDIATELY.** This will cause the mechanical gas valve to shut the gas line off.

TESTING MECHANICAL GAS VALVES (Continued)

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 inspection seals (Part No. 197) on Ansul type valves. See Figure 1.

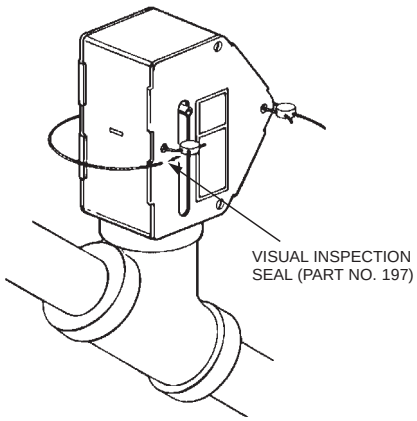


FIGURE 1
000359

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

NOTICE

If no other devices are being attached, proceed to Page 6-4, 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. **⚠ CAUTION**

   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 “Design” section.
4. Test for gas leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear. Repeat test again to make certain no other gas leaks exist.
5. If no gas leaks are found, turn power source on and depress the reset button on the manual reset relay (RED LIGHT ON) to energize (OPEN) electric gas valve.
6. Remove lock bar from regulated release mechanism.

   ⚠ CAUTION

   Do not install cartridge at this time or system may be actuated.
7. Manually actuate the system by operating the remote pull station. (It may be necessary to remove the glass break rod prior to operating pull station.) Manual reset relay (RED LIGHT OUT) will de-energize (CLOSE) the electric gas valve, thus shutting off the gas line. If this does not happen, turn power source off. Then re-examine all wiring connections for proper hookup. Refer to “Design” section for typical wiring diagram.
8. If test is successful, recock regulated release mechanism using cocking lever (Part No. 14995) and reinstall lock bar (Part No. 14985). 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 6-4, 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.

   ⚠ CAUTION

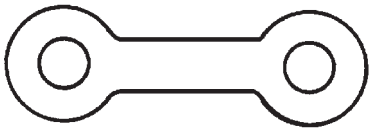
   Do not install cartridge at this time or system may be actuated.
3. Manually actuate the system by operating the remote pull station. It may be necessary to remove the glass break rod prior to operating pull station. (If installed, the manual reset relay will de-energize the electric gas valve, thus shutting off the gas line.) All electrically-operated devices predetermined to shut off or turn on should do so. If this does not occur, turn power source off and make sure all wiring is properly connected and retest. Refer to “Design” section for typical wiring diagram.
4. If test is successful, recock regulated release mechanism using cocking lever (Part No. 14995) and reinstall lock bar (Part No. 14985). 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 6-4, Step No. 1, and test the detection system.

TESTING DETECTION SYSTEM

1. Test detection system by completing the following steps:
   a. Raise the regulated release mechanism tension lever to the “UP” position.
   b. Remove the fusible link from the terminal detector and install a test link (Part No. 15751). See Figure 5.



TEST LINK

FIGURE 5
000363

   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.
   e. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
   f. If system actuates successfully, go to Step 4.
2. If the regulated release mechanism does not actuate, check the following components and remedy any disorder as follows:
   a. Check the detector linkage for correct positioning.
   b. Check the wire rope for knotting or jamming.
   c. Check pulley elbows to see that wire rope is free and centered in pulley sheaves. If any evidence of pulley elbow deformation is found, replace the pulley elbow.
   d. Make certain that lock bar 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 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. (6.4 mm) minimum clearance between the trip hammer assembly and the cable lever assembly.
   f. Remove the lock bar.
   g. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
4. Upon successful actuation of the system, complete the following steps:
   a. Raise tension lever to “UP” position and install a properly-rated fusible link in the terminal detector.
   b. Cock regulated release mechanism using cocking lever (Part No. 14995) and insert lock bar (Part No. 14985).
   c. Lower tension lever to “DOWN” position.
   d. 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.

   e. Make certain the 1/4 in. (6.4 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.

   f. Make certain lockable shut-off valve in the dedicated water-line 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.
   j. 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.
   k. Record installation date on tag attached to unit and/or in a permanent file.

NOTES:

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.

NOTICE

Various Recharge and Resetting instructions in this section will also be used for the PIRANHA self-contained design option. Refer back to these installation instructions when utilizing the self-contained option.

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.

⚠ CAUTION

Before attempting any cleanup, make certain that all fuel sources to the equipment to be cleaned have been shut off. Make certain that the exhaust hood and all appliance electrical controls have been de-energized to avoid any chance of electrical shock resulting from the cleaning process or from electrically conductive alkaline liquid agent and/or its residue.

Make certain all surfaces to be cleaned have cooled down to room temperature.

Do not use water to clean any appliances that contain hot grease or cooking oils. Doing so may result in violent steaming and/or spattering.

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 ANSUL AUTOMAN Regulated Release Assembly and each regulated actuator assembly.
3. 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:** In units manufactured before March 1999, press the green pressure relief valve located on the bottom of the water flow valve.
4. Disconnect electrical power to all AUTOMAN Regulated Release Assemblies.
5. Disconnect the expellant gas hose and the water hose from each tank adaptor assembly.
6. Disconnect distribution piping union at each tank adaptor outlet line(s).
7. Remove used burst disc.
8. 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 1.
   c. Remove 1/4 in. vent plug.
   d. Clean and inspect for free movement and corrosion. Replace if necessary.
   e. Reinstall vent plug into adaptor body.
   f. Empty any water left in the agent tank.

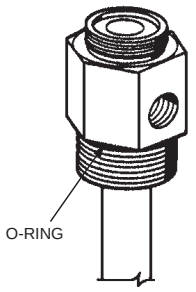


FIGURE 1
000364

9. 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. (2.5 cm) 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.

RECHARGE (Continued)

10. To perform the flushing procedure, either secure heavy-duty plastic bags to each nozzle (see Figure 2) or remove each nozzle and attach plastic tubing (see Figure 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 reaimed.)

    If using plastic bags, secure bags and proceed to Step 12.

    If using plastic tubing, proceed to Step 11.

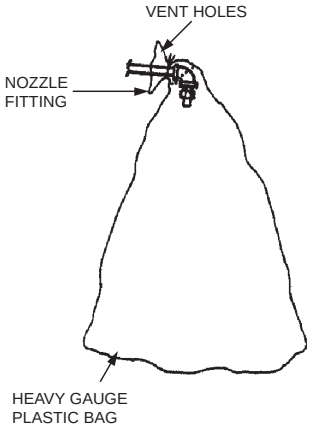


FIGURE 2
001739

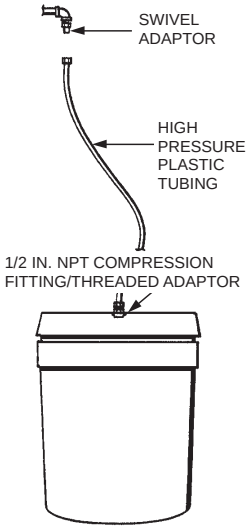


FIGURE 3
001740

11. If using the plastic tubing option, utilize 1/2 in. (12.7 mm) O.D. plastic tubing with wall thickness not to exceed .062 in. (1.6 mm), and make certain it can withstand the pressures of at least 90 PSI (620.6 kPa) 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. (12.7 mm) plastic tubing over the swivel adaptor and secure with a 1/2 in. (12.7 mm) adjustable hose clamp. See Figure 4.

    c. In the pail cover, drill the number of holes required, large enough to insert 1/2 in. NPT fittings, with one additional hole that can be used for venting.

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

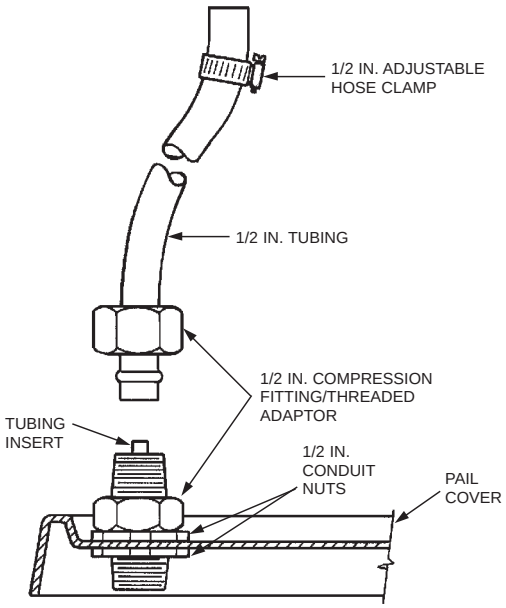


FIGURE 4
001642

    e. Attach the tubing ends to the compression fittings. Tubing inserts will be required. See Figure 4.

    f. Make certain each length of tubing is fastened to the pail cover with the cover snapped securely to the pail.

12. 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.

    c. Install LT-30-R Cartridge; hand tighten.

    d. Remove lock bar.

    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 manufactured after March 1999, remove 1/4 in. high pressure hose from bottom of water flow valve and press valve core to relieve pressure. Reconnect 1/4 in. hose.**

    i. Remove empty tank.

RECHARGE (Continued)

13. The water flow valve must be disassembled and cleaned after each discharge or 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. Disassemble pipe union above “Quik-Seal” on top of enclosure. Disconnect “Quik-Seal”.

    e. Disconnect 3/4 in. water hose from vacuum breaker inside enclosure.

    f. Disconnect 1/4 in. high pressure hose from bottom of water valve.

    g. Remove water flow assembly from inside enclosure.

    h. Unscrew spring retainer from top of water valve. See Figure 5.

    i. Remove spring. See Figure 5.

    j. Unscrew pneumatic actuator from bottom of valve leaving green poppet valve and check valve attached. See Figure 5.

    k. Using air pressure into check valve port, pop out internal piston from pneumatic actuator. See Figure 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. See Figure 5.

    n. Reassemble valve components and reconnect back into enclosure assembly. **NOTE:** When reassembling spring retainer, apply Prolock Nut Type Sealant to male threads.

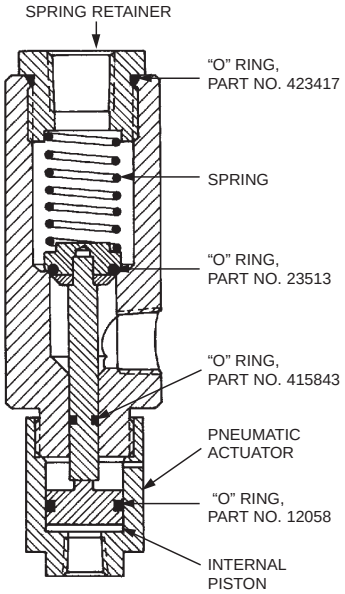


FIGURE 5
001744

14. Fill each tank with 1.5 gallons (5.8 L) PIRANHA-7, 2.25 gallons (8.5 L) PIRANHA-10, or 3.0 gallons (11.6 L) PIRANHA-13 of only PRX Liquid Fire Suppressant.

> **⚠ CAUTION**
>
> Make certain tank is filled to 1 – 1 1/8 in. (25.4-28.6 mm) from bottom of fill opening. 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.**

15. Replace bursting disc, Part No. 423666, in adaptor assembly. Make certain silver side of disc is away from tank.

16. 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.

17. Raise tension lever to “UP” position.

18. Cock regulated release mechanism using cocking lever (Part No. 14995) and install lock bar (Part No. 14985).

19. Remove empty cartridge from regulated release assembly and each regulated actuator assembly as required.

> **⚠ CAUTION**
>
> Do not install replacement cartridge at this time or system may be actuated.

20. 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.

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

RECHARGE (Continued)

22. Lower tension lever to "DOWN" position.
23. Remove the lock bar.
24. 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.

25. After successful actuation, raise the tension lever to "UP" position.
26. Install properly-rated, Ansul approved, fusible link in terminal detector.
27. Cock the regulated release mechanism and install lock bar (Part No. 14985).
28. Locate detector linkage and correctly position in each bracket.
29. Lower tension lever to "DOWN" position.
30. Inspect the base of the wire rope clamping device to make certain there is a minimum of 1/4 in. (6.4 mm) to a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer assembly and the cable lever assembly.

NOTICE

If clearance is not 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum, raise tension lever to "UP" position, raise trip hammer 3/8-1/2 in. (9.5-12.7 mm), tighten set screws, and repeat Steps 26 and 27.

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

RESETTING

Resetting Remote Manual Pull Station

Metal Stamped Style

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 7-5, and complete steps 1 through 5.

Molded Plastic Style

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.

Resetting Mechanical Gas Shut-Off Valve

Reset each mechanical gas shut-off valve by completing the following steps:

⚠ CAUTION

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.

1. Remove side cover from gas valve housing.
2. Extend air cylinder rod to full "UP" position. Air cylinder is located inside the regulated release assembly enclosure.
3. Recock gas valve by pulling valve stem up so pin in stem engages in cocking lever.
4. Check burners for gaseous odor. **IF GASEOUS ODOR EXISTS, MANUALLY PUSH THE AIR CYLINDER ROD TO THE FULL "DOWN" POSITION IMMEDIATELY.** This will cause the mechanical gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
5. If no gaseous odor exists, pilot light may be ignited at this time.
6. Reinstall side cover to gas valve housing. On Ansul type valve, make certain roll pin is positioned within both sides of the valve housing slot and secure visual inspection seal (Part No. 197).
7. If no other resetting is required, refer to "Cartridge Replacement," Page 7-5, and complete steps 1 through 5.

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 7-5, and complete steps 1 through 5.

RESETTING (Continued)

Resetting Electrical Gas Shut-Off Valve

Reset each electric gas shut-off valve by completing the following steps:

⚠ CAUTION

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.

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 7-5, and complete steps 1 through 5.

Resetting Pressure Switch

Reset the pressure switch by completing the following:

1. Depress the reset button(s) on the pressure switch cover. The pressure switch assembly(ies) is located on the right side of the regulated release enclosure. An audible click will be heard to verify the pressure switch has resumed its normal (non-actuated) condition.
2. If no other resetting is required, refer to "Cartridge Replacement," Page 7-5, and complete steps 1 through 5.

CARTRIDGE REPLACEMENT

To complete the recharge and resetting procedures:

1. Remove shipping cap and weigh replacement cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge. NOTE: If replacing the 101-10 Carbon Dioxide Cartridge, make certain weight is not more than 1/4 oz. below the weight stamped on cartridge.
2. Make certain regulated release mechanism is cocked and lock bar is installed. Then, install replacement cartridge into the regulated release assembly and each regulated actuator receiver and hand tighten.
3. Remove lock bar.
4. 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.
5. Record recharge date on tag attached to unit and/or in a permanent file.

NOTES:

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) must be hydro-tested and the regulator(s) must be flow tested.

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.

NOTICE

Various Maintenance instructions in this section will also be used for the PIRANHA self-contained design option. Refer back to these installation instructions when utilizing the self-contained option.

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 PIRANHA distributor immediately following any such cleaning operations.**

1. Remove the enclosure cover from the ANSUL AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) on the cocked regulated release mechanism. See Figure 1.

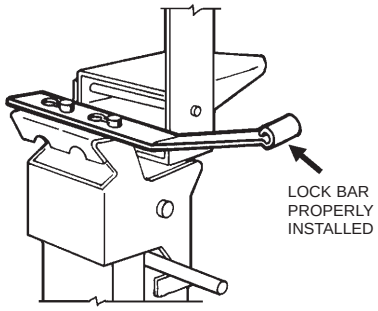


FIGURE 1
000321

3. Remove cartridge from regulated release assembly and each regulated actuator assembly, install safety shipping cap, and set aside in a safe location.
4. Remove gasket 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).
5. Disconnect the expellant gas hose and water hose from each tank adaptor assembly.
6. Disconnect distribution piping union at each tank adaptor outlet line.
7. Remove tank. Keep in upright position to avoid spilling the agent.
8. Remove tank adaptor/tube assembly from each tank. See Figure 2. If evidence of corrosion, replace assembly.

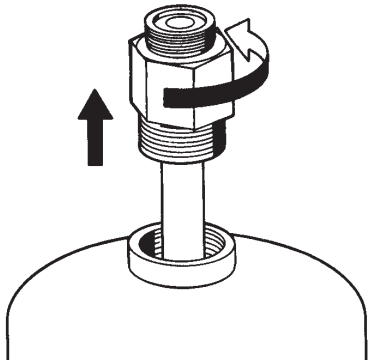


FIGURE 2
000291

9. Make certain that each tank is filled to a level of 1 – 1 1/8 in. (25.4-28.6 mm) from the bottom of the fill opening. See Figure 3.

⚠ CAUTION

Make certain tank is filled to 1 – 1 1/8 in. (25.4-28.6 mm) from bottom of fill opening. 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.**

⚠ CAUTION

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

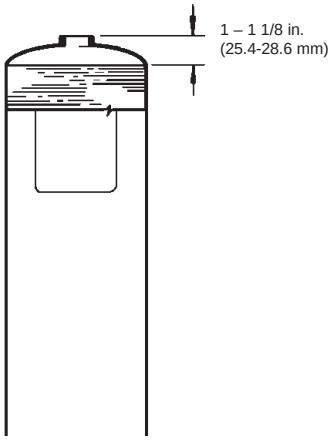


FIGURE 3
000292

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

10. 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. See Figure 4.
    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 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.

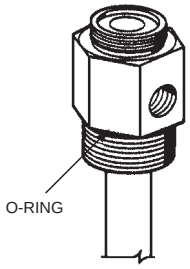


FIGURE 4
000364

11. Place fully charged tanks in enclosures and secure.
12. Carefully assemble and wrench tighten all expellant gas hoses, water hoses, and agent distribution piping.
13. Remove blow-off caps from nozzles. Inspect each blow-off cap and replace if deteriorated. On metal blow-off caps, make certain spring clip rotates freely on cap.

NOTICE

Rubber blow-off caps that have been installed in the system for one year or more must be replaced.

14. Check all nozzles to ensure that they are free of cooking grease build-up and have a covering of clean silicone grease on the orifice. Reinstall blow-off caps.
15. Remove the lock bar 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.
16. Cock the regulated release mechanism using cocking lever (Part No. 14995). See Figure 5.

    Before proceeding with Step 18, test electric (snap-action) switches:
    a. With the ANSUL 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 ANSUL 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 ANSUL AUTOMAN and insert lock bar.

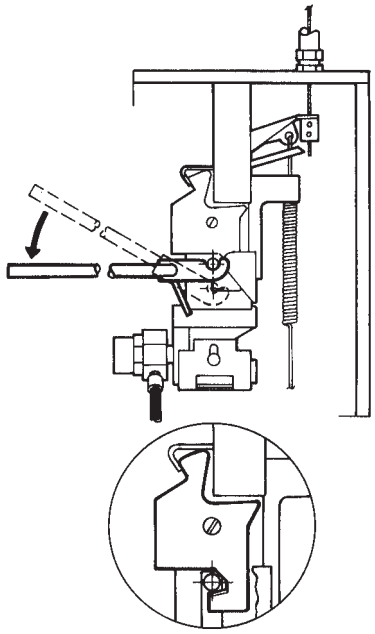


FIGURE 5
000320

17. Raise tension lever to "UP" position. See Figure 6.

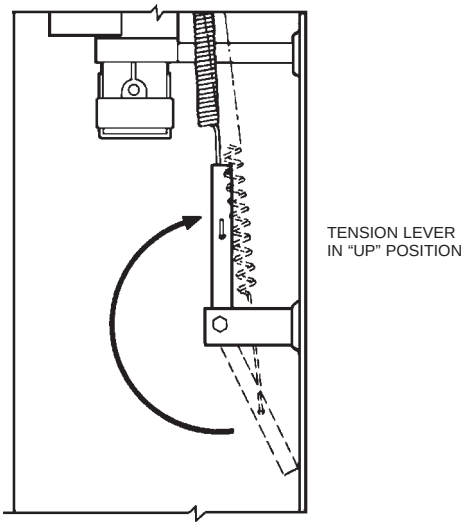


FIGURE 6
000322

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

18. Install test link (Part No. 15751) in terminal detector.
19. Lower tension lever to “DOWN” position. See Figure 7.

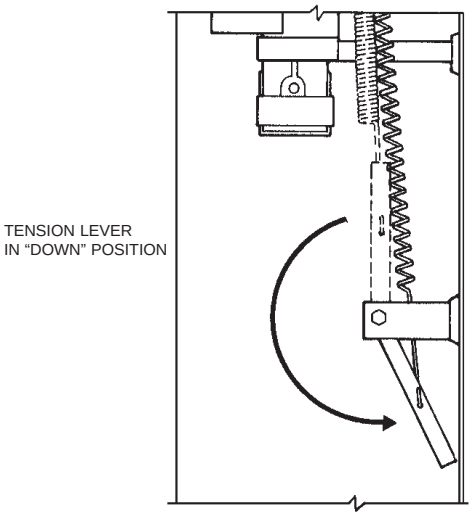


FIGURE 7
001096

20. 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 VI.

21. After successful actuation, raise the tension lever to “UP” position.
22. Clean and return properly-rated, Ansul approved, fusible link to terminal detector.

NOTICE

Fusible links installed in system for one year or more must be replaced. Ansul recommends replacement of links every six months.

23. Remove, clean, and return additional fusible links to series detector linkage(s). (Fusible links loaded with grease and other extraneous material can result in excessive delays in actuation. If links cannot be properly cleaned, they must be replaced.)
24. Inspect wire rope at all detector locations, pulley elbows, pulley tee and at ANSUL AUTOMAN release. If wire rope shows signs of wear or fraying, replace entire length.
25. Lower the tension lever to “DOWN” position.
26. Recock the regulated release mechanism and insert the lock bar.
27. Inspect the base of the wire rope 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.

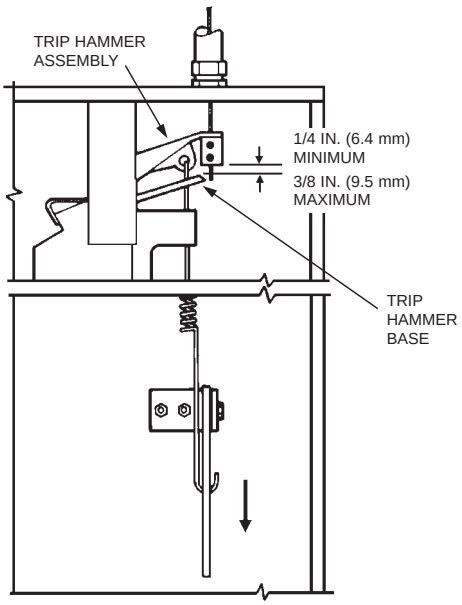


FIGURE 8
000329

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 3/8-1/2 in. (9.5-12.7 mm), tighten set screws, and repeat Steps 25 and 27.

28. Locate detector linkage and properly position in each bracket. For “scissor” style linkage, locate linkage in bracket all the way toward termination end of detection run.
29. If a mechanical gas valve is installed, begin the test procedure by removing both side covers.
30. At the regulated release, push the air cylinder rod fully down.
31. The gas valve should operate.
32. Pull the air cylinder rod to its fully extended position.
33. Re-cock the gas valve by pulling the valve stem up until the pin in the stem engages the cocking lever.
34. Reinstall side covers on the gas valve and connect the visual indication seal.
35. Before reinstalling cartridge, reset all additional equipment by referring to appropriate section of “Recharge and Resetting Procedures,” Section VII.
36. Remove shipping cap and weigh each nitrogen cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge. NOTE: If checking 101-10 Carbon Dioxide Cartridge in 101 Remote Release, replace if weight is 1/4 oz. (7.1 g), or more, below weight stamped on cartridge.
37. Make certain regulated release mechanism is cocked and lock bar is installed, then screw replacement cartridge into regulated release mechanism and each regulated actuator receiver(s) and hand tighten.
38. Remove lock bar.
39. Secure cover on regulated release assembly and each regulated actuator assembly, insert visual seal (Part No. 197) in each upper and lower cover hole.
40. Record installation date on tag attached to unit and/or in a permanent file.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

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 12-13 in the Design section.

Complete the following steps:

1. Attach water pressure tester, Part No. 423556, to pressure test port in ANSUL AUTOMAN Release and any additional Regulated Actuators. Make certain valve on tester is closed.
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. long.
3. Open test valve in the ANSUL AUTOMAN Release and any regulated actuator.
4. Open valves on each water pressure tester and allow water to flow for approximately 30 seconds.
5. 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.
6. Close all test port valves and remove test kits and hoses.
7. Visually inspect lockable shut-off valve in dedicated waterline to determine it is properly locked open and tag is in place.
8. Install cover on regulated release and each regulated actuator. Insert visual seal, Part No. 197, through holes in cover and box, and secure.
9. Record semi-annual maintenance date on tag attached to unit and/or in a permanent file.

12-YEAR MAINTENANCE EXAMINATION

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 agent tank.

1. Remove the enclosure cover from the ANSUL AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) on the cocked regulated release mechanism. See Figure 9.

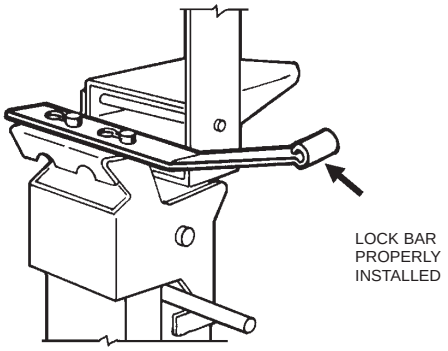


FIGURE 9
000321

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 actuated.

4. Remove gasket 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).
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). Verify date stamped on cartridge. The cartridge must be hydrotested at intervals not greater than 12 years. If cartridge date indicates the need for hydrotesting, the cartridge must be bled down through normal ANSUL AUTOMAN release operation, returned to Ansul for credit, and replaced with a charged, replacement cartridge.

NOTICE

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

12-YEAR MAINTENANCE EXAMINATION (Continued)

11. 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 12. Flow test the regulator(s) per the following:

Date Code Table

Month – Code		Year – Code	
January	A	1997	D
February	B	1998	E
March	C	1999	F
April	D	2000	G
May	E	2001	H
June	F	2002	J
July	G	2003	K
August	H	2004	L
September	J	2005	M
October	K	2006	N
November	L	2007	O
December	M	2008	P
		2009	Q
		2010	R

a. Regulated Release Mechanism

For First Tank: Disconnect expellant gas hose from tank. Connect regulator test kit (Part No. 56972) to hose. See Figure 10.

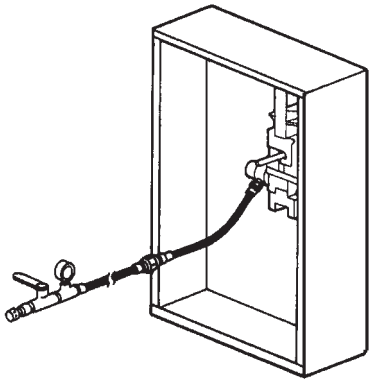


FIGURE 10
000369

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 11.

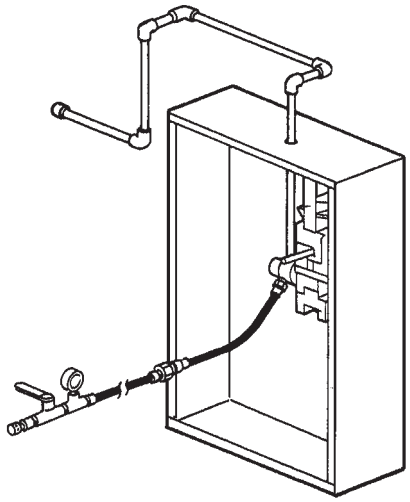


FIGURE 11
000370

Pressure Switch: If pressure switch is provided, 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 12.

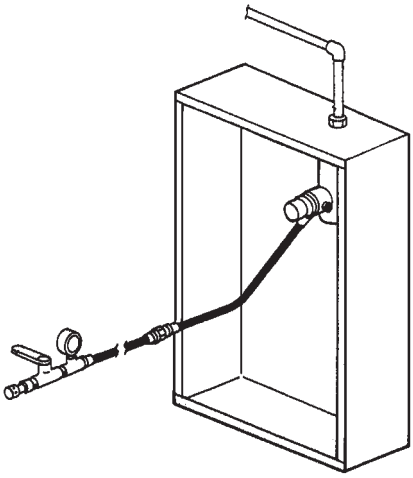


FIGURE 12
000371

12-YEAR MAINTENANCE EXAMINATION (Continued)

11. b. (Continued)

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 13.

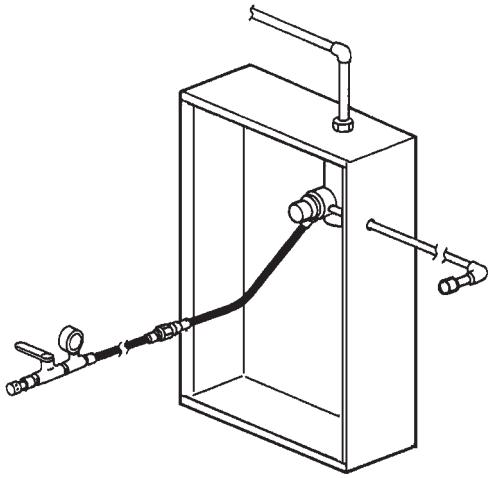


FIGURE 13
000372

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.)

d. Remove lock bar 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 135-165 psi 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 (Part No. 14995) and insert lock bar (Part No. 14985).

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.

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 a good grade of extreme temperature grease. See Figure 14.

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 for free movement and corrosion. Replace if necessary.

f. Reinstall vent plug into adaptor body.

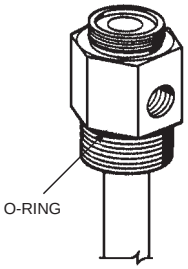


FIGURE 14
000364

13. Refill each tank with 1.5 gallons (5.8 L), 2.25 gallons (8.5 L), or 3.0 gallons (11.6 L) of new PRX Liquid Fire Suppressant. When filled, level of liquid should be 1 – 1 1/8 in. (25.4-28.6 mm) from bottom of fill opening. See Figure 15.

⚠ CAUTION

Make certain tank is filled to 1 – 1 1/8 in. (25.4-28.6 mm) from bottom of fill opening. 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.**

⚠ CAUTION

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

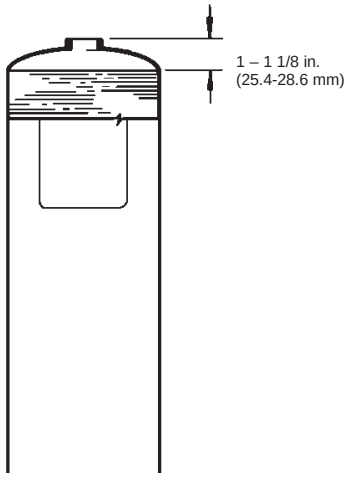


FIGURE 15
000292

12-YEAR MAINTENANCE EXAMINATION (Continued)

14. Clean seating surface and return each adaptor/tube assembly to tank. Firmly tighten.

NOTICE

Do not reinstall any tank at this time.

15. Remove blow-off caps from nozzles. Inspect each blow-off cap and replace if deteriorated. On metal blow-off caps, make certain spring clip rotates freely on cap.

NOTICE

Rubber blow-off caps that have been installed in the system for one year or more must be replaced.

16. Check all nozzles to ensure that they are free of cooking grease build-up and have a covering of clean silicone grease on the orifice. Reinstall blow-off caps.
17. Remove lock bar and manually test the regulated release assembly by operating the remote manual pull station.
18. Cock the regulated release mechanism using cocking lever (Part No. 14995). See Figure 16.

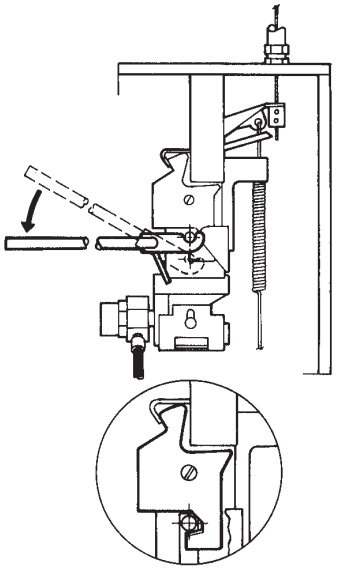


FIGURE 16
000320

19. Raise the tension lever to “UP” position. See Figure 17.

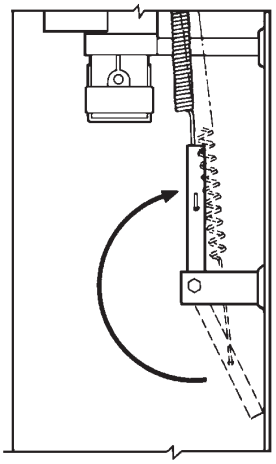


FIGURE 17
000362

20. Install test link (Part No.15751) in terminal detector.
21. Lower tension lever to “DOWN” position. See Figure 18.

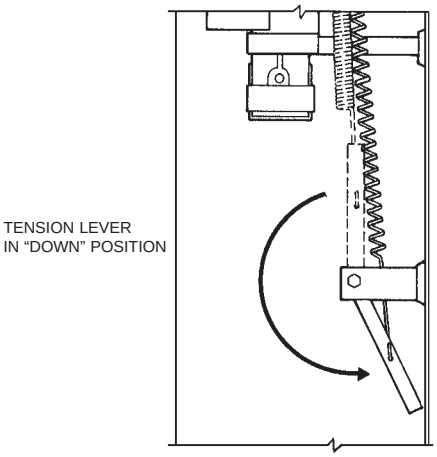


FIGURE 18
001096

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 VI.

23. After successful actuation, raise the tension lever to “UP” position.
24. Clean and return properly-rated, Ansul approved, fusible link to terminal detector.

NOTICE

Fusible links installed in system for one year or more must be replaced.

25. Remove, clean, and return additional fusible links to series detector linkage(s). (Fusible links loaded with grease and other extraneous material can result in excessive delays in actuation.)
26. Lower tension lever to “DOWN” position.
27. Recock the regulated release mechanism and insert lock bar.

12-YEAR MAINTENANCE EXAMINATION (Continued)

28. Inspect the base of the wire rope 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 19.

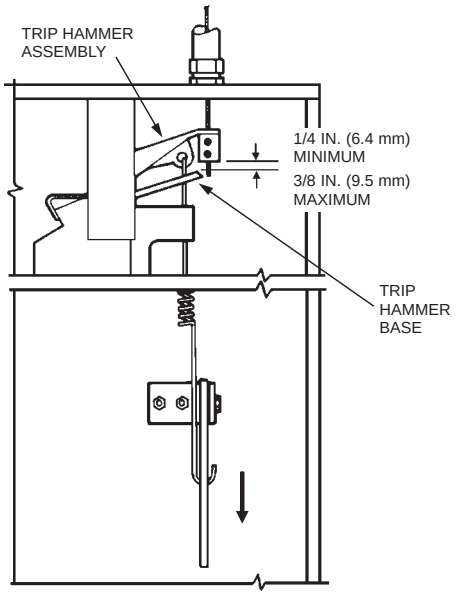


FIGURE 19
000329

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 3/8-1/2 in. (9.5-12.7 mm), tighten set screws, and repeat Steps 26 and 28.

29. Locate detector linkage and properly position in each bracket.
30. Make certain additional devices have operated as intended.
31. Before reinstalling cartridge, reset all additional equipment by referring to appropriate section of "Recharge and Resetting Procedures," Section VII.
32. Place each fully charged tank in enclosure and/or bracket and secure.
33. Reconnect all distribution piping, actuation hose and water hose as required. Wrench tighten.
34. Check each gas cartridge by removing shipping cap and weighing cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
35. Make certain regulated release mechanism is cocked and lock bar is installed, then screw replacement cartridge into regulated release mechanism and each regulated actuator receiver(s) and hand tighten.
36. Remove lock bar.
37. Place regulated release assembly and each regulated actuator assembly enclosure cover in-place.
38. 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.
39. Record date of 12 year maintenance examination on tag attached to enclosure and/or in a permanent file.

The PIRANHA Self-Contained option is equipped with its own water supply tank. It requires no domestic water supply. This option is ideal for hazards where the building water supply is not sufficient, because of either water volume or pressure, to properly supply the PIRANHA system.

This section contains the additional information required to properly design, installation, test, recharge, and maintain a self-contain system. Various instructions in other sections will also be used for the PIRANHA self-contained option. Refer back to these sections when utilizing the self-contained option.

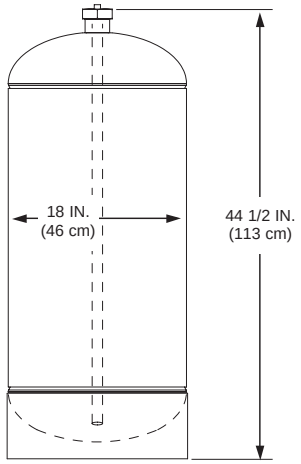
COMPONENTS

These components are in addition to the standard system components listed in Section III-System Components, Pages 3-1 to 3-10. Some components listed in Section III are not appropriate for use with the Self-Contained option. In that section, those components are noted as "not to be used with the self-contained design option."

Water Supply Tank

A 40-gallon (151 L) water supply tank is available for the PIRANHA 7, 10, and 13. The water tank is constructed of mild steel with a rust-inhibitive coating (epoxy paint) both internal and external. The Self-Contained Water Supply Tank is equipped with an outlet adaptor and pick-up tube.

40 gallon (151 L) – Part No. 432597



18 IN. (46 cm) 40 GAL. (151 L) WT. FULL 400 LB. (181 kg)

FIGURE 1
006822

Self-Contained Regulated Release Assembly (Mechanical)

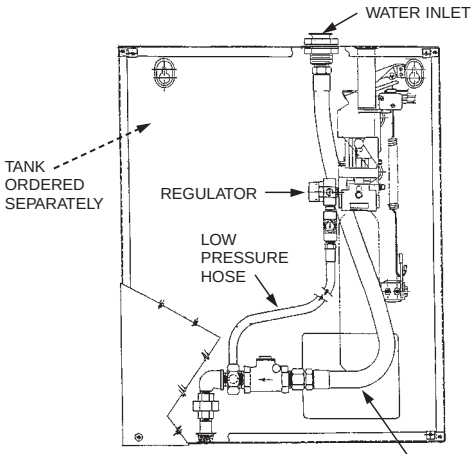
The ANSUL AUTOMAN Self-Contained Regulated Release Assembly (Mechanical), Part No. 432283, is to be used with the self-contained option **ONLY**. This assembly contains the regulated release mechanism, expellant gas hose for agent hookup, and enclosure knockouts to facilitate installing actuation piping; expellant piping; detection system; and additional equipment. This regulated release assembly must be mounted on a rigid surface. The regulator is designed to regulate the nitrogen cartridge pressure to 150 psi (10.3 bar) and allow a constant flow of gas into the agent tank when the system is actuated.

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

Agent tanks must be ordered separately and must be mounted within the enclosure. See Section III, "Components", for detailed tank information.

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.

Cartridges must be ordered separately. See Section III, "Components," for detailed cartridge information.



20 1/2 IN. (52 cm) WIDE X 23 1/2 IN. (60 cm) HIGH
X 7 1/2 IN. (19 cm) DEEP
WT. APPROX. 35 LB. (16 kg) WITHOUT AGENT TANK

FIGURE 2
006823

Self-Contained Mechanical Regulated Release Assembly With OEM Bracket

The Self-Contained Mechanical Regulated Release Assembly with OEM Bracket, Part No. 432595, 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.

Cartridges must be ordered separately. See Section III, "Components," for detailed cartridge information.

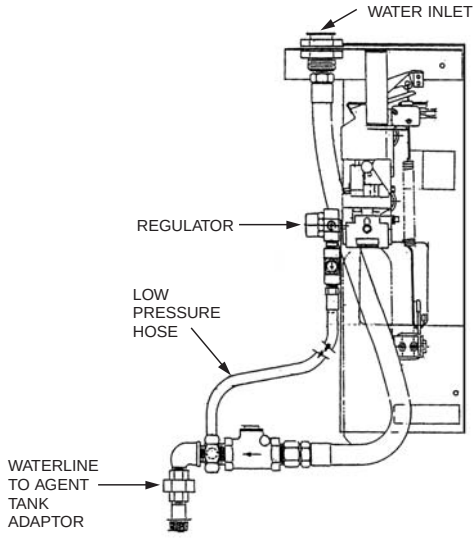


FIGURE 3
006824

COMPONENTS (Continued)

Water Tank Expellant Gas Assembly

The Water Tank Expellant Gas Assembly, Part No. 432528, consists of two (2) pneumatic actuators, one (1) 75 psi (5.2 bar) regulator, and a stainless steel hose and fittings for actuator connection. These components are housed in a stainless steel enclosure. This assembly is utilized to expel the water from the water supply tank.

The Water Tank Expellant Gas Assembly requires two (2) LT-A-101-30 nitrogen cartridges, Part No. 423491. Cartridges and cartridge brackets must be ordered separately.

Note: This shipping assembly includes the first initial bottle of anti-algae concentrate, Part No. 432656.

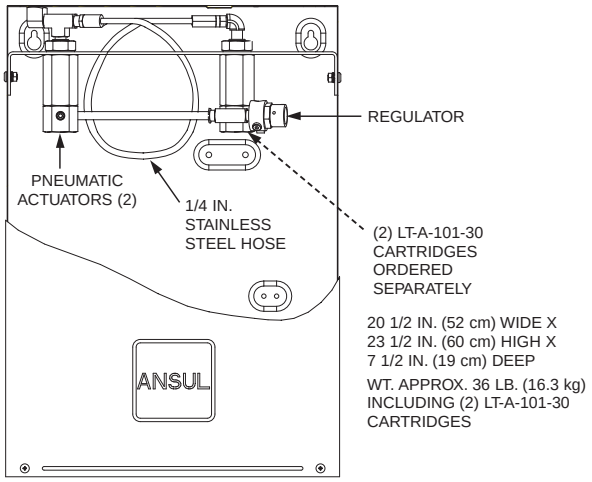


FIGURE 4
006825

LT-A-101-30 Expellant Gas Cartridge

The LT-A-101-30 Expellant Gas Cartridge, Part No. 423491, is a sealed pressure vessel containing nitrogen gas under pressure. When the cartridge seal is punctured by the pneumatic actuator pin, the gas flows into the water supply tank and carries it through the distribution piping network and out the nozzles.

The expellant gas cartridge meets the requirements of DOT 3A-2100. The cartridge has been approved for both Dept. of Transportation (DOT) and Transport Canada (TC).

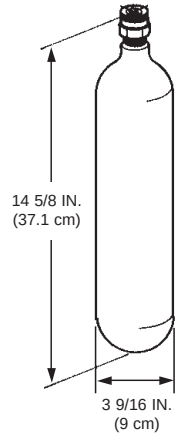


FIGURE 5
000148

24 in. (61 cm) 1/4 in. Stainless Steel Hose

The 24 in. (61 cm) 1/4 in. Stainless Steel Hose, Part No. 32336, can be used to connect the actuation piping from the regulated release to the water tank expellant gas assembly.

The following compression fittings are also available.

Part No. 32338 – 1/4 in. Male Actuation Connector

Part No. 31811 – 1/4 in. Male Actuation Tee

Part No. 31810 – 1/4 in. Male Actuation Elbow

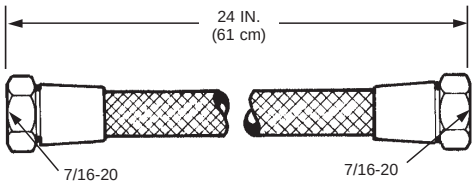


FIGURE 6
000433

10 Ft. Expellant Gas Hose

The 1/4 in. 10 ft. (3.1 m) long rubber Expellant Gas Hose, Part No. 433097, can be utilized between the water tank expellant gas assembly and the water supply tank. This eliminates the need to use rigid 1/4 in. piping between these two components.

Anti-Algae Concentrate

The Anti-Algae Concentrate, Part No. 432656, is used to retard any algae growth within the water storage tank. After tank is filled, add one bottle of anti-algae concentrate to the tank. Add a new bottle at each water tank recharge.

DESIGN

Design Parameters

The Design Parameters chart below indicates the requirements for piping the water line, actuation gas line, expellant gas line, and the elevation mounting requirements between the ANSUL AUTOMAN Self-Contained Regulated Release Assembly, Water Tank Expellant Gas Assembly and the Water Supply Tank. All agent distribution piping is the same as noted for each size PIRANHA domestic water supply system. Refer to Section IV, "Design," for all agent piping requirements. See Figure 7.

PIRANHA-7, 10, and 13 – 40 Gallon (151 L) Tank

Max. 3/4 in. Water Supply Line Length	Max. No. of 3/4 in. Water Supply Line Elbows	Max. 1/4 in. Actuation Gas Line Length	Max. 1/4 in. Expellant Gas Line Length	Max. Elevation Difference Between Bottom of Water Tank and Top of Self-Contained Regulated Release Assembly See Note 1.
50 ft. (15.2 m)	11	50 ft. (15.2 m)	10 ft. (3.1 m)	12 ft. (3.7 m)

Note No.1 – Vertical water supply piping rise can exceed 12 ft. (3.7 m) but the physical vertical distance between the bottom of the water tank and the top of the self-contained regulated release assembly cannot exceed 12 ft. (3.7 m).

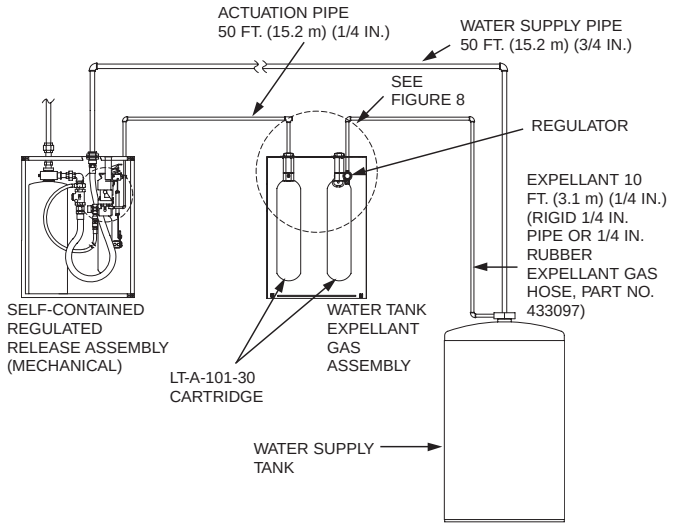


FIGURE 7
006826

INSTALLATION

General Piping Requirements

1. All actuation, and distribution piping requirements are the same as those listed in Section V, “Installation,” "General Piping Requirements." Also, install 1/4 in. expellant gas line between water tank expellant gas assembly and the water tank adaptor. See Figure 8 for piping/stainless steel hose options.

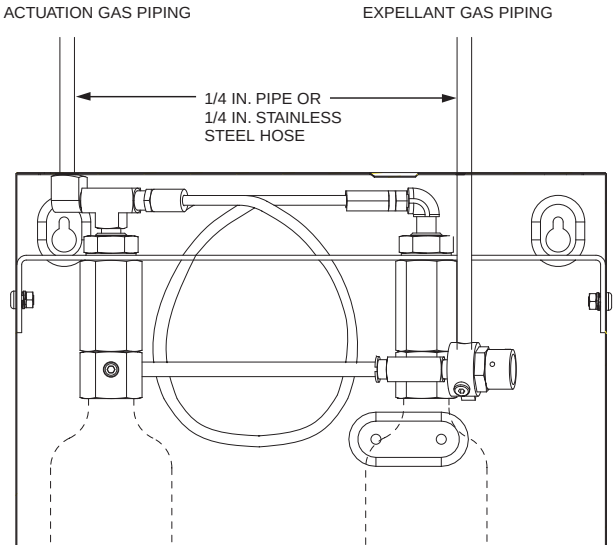


FIGURE 8
006827

2. Water supply piping between the water supply tank and the ANSUL AUTOMAN Self-Contained Regulated Release Assembly must be 3/4 in. Schedule 40 stainless steel pipe and fittings or 3/4 in. galvanized pipe and fittings.
3. Vertical water supply piping rise can exceed 12 ft. (3.7 m) but the physical vertical distance between the bottom of the water tank and the top of the self-contained regulated release assembly cannot exceed 12 ft. (3.7 m).
4. Use of a 3/4 in. pipe union is required at the water supply tank so piping can be removed for tank filling and recharge.

Filling Water Supply Tank

1. After all installation procedures have been completed, remove 3/4 in. supply piping and 1/4 in. expellant gas piping from water supply tank outlet. Remove tank adaptor and pickup tube.
2. Fill tank with clean water. Tank should be filled to 1 in. (2.5 cm) from bottom of tank collar.
3. After filling, add one bottle of anti-algae solution, Part No. 423656, to water in tank. Mix into water with clean long metal rod or wooden stick.
4. Re-install tank adaptor and pickup tube assembly. Tighten securely.
5. Re-install 3/4 in. water supply piping and 1/4 in. expellant gas piping. Tighten securely.

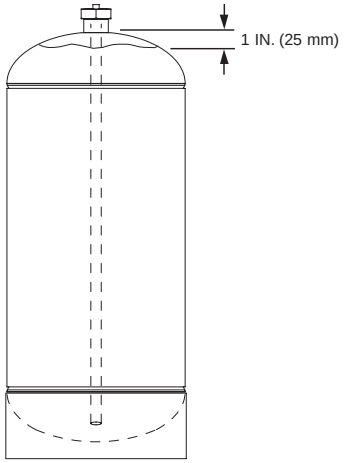


FIGURE 9
006822

Note: Do not install expellant gas cartridges at this time. Install cartridges only after all Testing and Placing in Service Procedures have been completed.

TESTING AND PLACING IN SERVICE

After the system has been completely installed, and **BEFORE INSTALLING THE ACTUATION AND EXPELLANT GAS CARTRIDGES,** the system must be tested at the self-contained regulated release assembly.

Refer to Section VI, “Testing and Placing in Service,” and complete all procedures. Exception: It is not necessary to complete the "Pressure Testing The Water System" procedure. This is not appropriate for the self-contained design option.

Installing Actuation Gas Cartridge

After all testing has been completed, install actuation cartridge in self-contained regulated release assembly.

1. Remove shipping cap and weigh cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
2. Make certain self-contained regulated release mechanism is cocked and lock bar is installed. Then, install cartridge into release assembly and hand tight.
3. Remove lock bar.
4. Install cover on self-contained regulated release assembly and secure with appropriate fasteners or visual inspection seals, Part No. 197.

Installing Expellant Gas Cartridges

After all testing has been completed, install actuation cartridge in water tank expellant gas assembly.

1. Remove shipping cap and weigh cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
2. Install a cartridge into each of the two pneumatic actuators located in the water tank enclosure. Hand tighten.
3. Install cover on water tank expellant gas assembly and secure with appropriate fasteners or visual inspection seals, Part No. 197.

RECHARGE AND RESETTING PROCEDURES

Refer to Section VII, Recharge and Resetting Procedures, and complete Cleanup, Flushing, and Resetting instructions.

Once completed, recharge the self-contained system by completing the following:

1. Fill the PIRANHA tank with 1.5 gallons (5.8 L) PIRANHA-7, 2.25 gallons (8.5 L) PIRANHA-10, or 3.0 gallons (11.6 L), PIRANHA-13 with only PRX Liquid fire Suppressant.

⚠ CAUTION

Make certain tank is filled to 1 – 1 1/8 in. (25.4-28.6 mm) from bottom of fill opening. 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.**

2. Replace bursting disc, Part No. 423666, in adaptor assembly. Make certain silver side of disc is away from tank.
3. Replace adaptor/tube assembly and tighten into place. Return and secure tank in regulated release assembly. Reconnect expellant gas hose, water hose, and distribution piping as required.
4. Remove piping and adaptor assembly from water supply tank.
5. Fill tank with clean water to 1 in. (2.5 cm) below collar. Add one bottle of anti-algae solution, Part No. 432656. Mix into water with clean long metal rod or wooden stick.
6. Re-install adaptor and all piping. Tighten securely.
7. Install actuation cartridge in self-contained regulated release assembly by completely the following:
   a. Remove shipping cap and weigh cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
   b. Make certain self-contained regulated release mechanism is cocked and lock bar is installed. Then, install cartridge into release assembly and hand tight.
   c. Remove lock bar.
   d. Install cover on self-contained regulated release assembly and secure with appropriate fasteners or visual inspection seals, Part No. 197.
8. Install actuation cartridge in water tank expellant gas assembly by completing the following:
   a. Remove shipping cap and weigh cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge.
   b. Install a cartridge into each of the two pneumatic actuators located in the water tank enclosure. Hand tighten.
   c. Install cover on water tank expellant gas assembly and secure with appropriate fasteners or visual inspection seals, Part No. 197.
9. Record recharge date on tag attached to unit and/or in a permanent file.

MAINTENANCE EXAMINATION

Refer to SECTION VIII – MAINTENANCE EXAMINATION, and complete all appropriate procedures.

Note: At 12 year hydro, tank can be emptied using small water pump. Remove tank adaptor and insert hose into tank to pump out water.

ANSUL INCORPORATED
ONE STANTON STREET
MARINETTE, WI 54143-2542
715-735-7411

Part No. 423385-5

Litho in U.S.A.