DESIGN AND INSTALLATION MANUAL,
P/N 16546, Revision A, December, 2005

Pneumatic Release Module,

P/N 16547

AMEREX CORPORATION INC. - 7595 GADSDEN HIGHWAY - TRUSSVILLE, AL 35173

Amerex Pneumatic Release Module
Installation, Operation and Maintenance Manual
For Use with Amerex Fire Suppression Systems

Features & Benefits

- Mechanical Releasing Unit Using Pressurized Detection Tubing
- No Detection Cable, Crimps, Conduit or Corner Pulleys Required
- Visible Trouble Indicator Visible Showing System Status
- Observation Windows for Nitrogen Actuation Cylinder and Detection Accumulator Pressures
- Tubing is Safe for Hazardous (Classified) Locations, Eliminating Electrical Isolation Requirement
- For Kitchen Systems, No Need to Change Detection Layout if Appliances are Moved
- 300 Foot Maximum Continuous Tubing Length, Secured by Snap-In Mounting Anchors
- Pressurized with Compressed Air or Nitrogen Through Standard Schrader Valve
- Automatic Linear Detection; 435 F°(224 C°) Temperature Response
- 375o F (190.5o C) Maximum Intermittent Safe Exposure Temperature, with a Maximum Sustained Ambient Temperature of 176o F (80o C).
- Capable of Supporting One or Two Manual Pull Stations
- Electrical or Mechanical Gas Valve Shut-Off Capable
- Delayed Discharge Actuation Capability with Optional Mechanical Time Delay
- Simple, Quick Six Month Test by De-Pressurizing Through End of Line Fitting
- Two Dry Contact SPDT Microswitches Provided for Optional Auxiliary Use; Provisions for Two Additional SPDT Microswitches
- Auxiliary Pressure Switch Dry Contacts (SPST) Available for External Monitoring.

Approval

The Pnuematic Release Module (PRM) is UL /ULC Listed as a Heat Actuated Device for Special Applications (S7253) and is intended for use with the Amerex IS (Industrial Dry Chemical) and KP (Restaurant Wet Agent) Fire Suppression Systems, only.

The use of the PRM should be reviewed and authorized by the local authority having jurisdiction (AHJ) before installation.

I) General:

This single hazard module supervises and controls one Fire Suppression System. Proven, rugged mechanical components are reliably set into motion with a simple pneumatic detection interface. The PRM is listed with Amerex IS Industrial and KP Restaurant Pre-Engineered Fire Suppression Systems. The PRM meets the detection requirements of NFPA codes 96, 17, and 17A.

II) Installation:

Detection

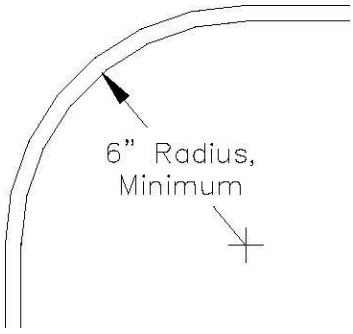
The PRM has provisions for a single, continuous section of detection tubing. No splicing or "tee's" allowed. There shall be only two tubing terminations: one at the accumulator assembly inside the PRM, and the other at the opposite end of the tubing, with the use of an End of Line Fitting (p/n 16506). **Install the tubing in areas where the maximum sustained ambient temperature does not exceed 176o F (80o C).** Exposing the tubing to random and infrequent temperature spikes up to (but not exceeding) 375o F (190.5o C) is acceptable.

A properly designed commercial kitchen hood meeting the requirements of NFPA 96 should maintain temperatures above the filter bank well below 176° F (80° C). However, areas above certain high-heat appliances such as (but not limited to) upright broilers, solid fuel appliances, or charbroilers can reach and maintain temperatures above 176° F (80° C). Other factors, such as a low hood height over the appliances, can lead to elevated ambient temperatures. The use of baffles to redirect exhaust flue gasses from direct impingement on the tubing might be necessary, but may not always be effective. Installation of the tubing into areas beyond the temperature maximum may shorten the useful life of the tubing and require a more frequent replacement interval. Therefore, a thorough operating temperature survey **MUST BE** conducted in all applications prior to installation of a PRM to determine its suitability.

The Amerex part numbers for tubing lengths are:

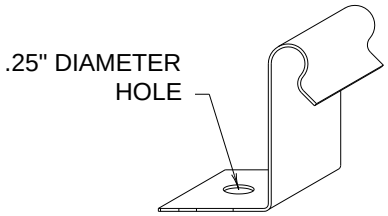
P/N	Length
16551	50'
16552	150'
16554	300'

Tubing may be cut down to the required length, or be coiled up and secured with wire ties outside the hazard area. Cuts must be square and clean. The minimum bend radius is 6 inches, as illustrated below:

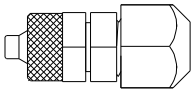


Do not crimp or crush the tubing in the course of handling or installation. A Tubing Clip (p/n 16501) is required at least every 18" of tubing. A Tubing Clip is also required within one inch of the End of Line Fitting. The tubing can exit the panel either through the 5/8" hole at the upper right hand corner of the enclosure (where strain relief fitting is installed at factory), or it can exit through the 5/8" hole at the top right of the enclosure. If it is desired to route it through the top, switch the strain relief fitting with the snap-in plug.

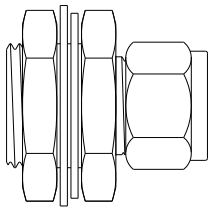
P/N 16501 TUBE CLIP



P/N 16506 END OF LINE FITTING



P/N 16502 QUICKSEAL FITTING 1/4"



The p/n 16502 Quickseal Compression Fitting is required for kitchen hood and other penetrations requiring a UL-listed sealing device.

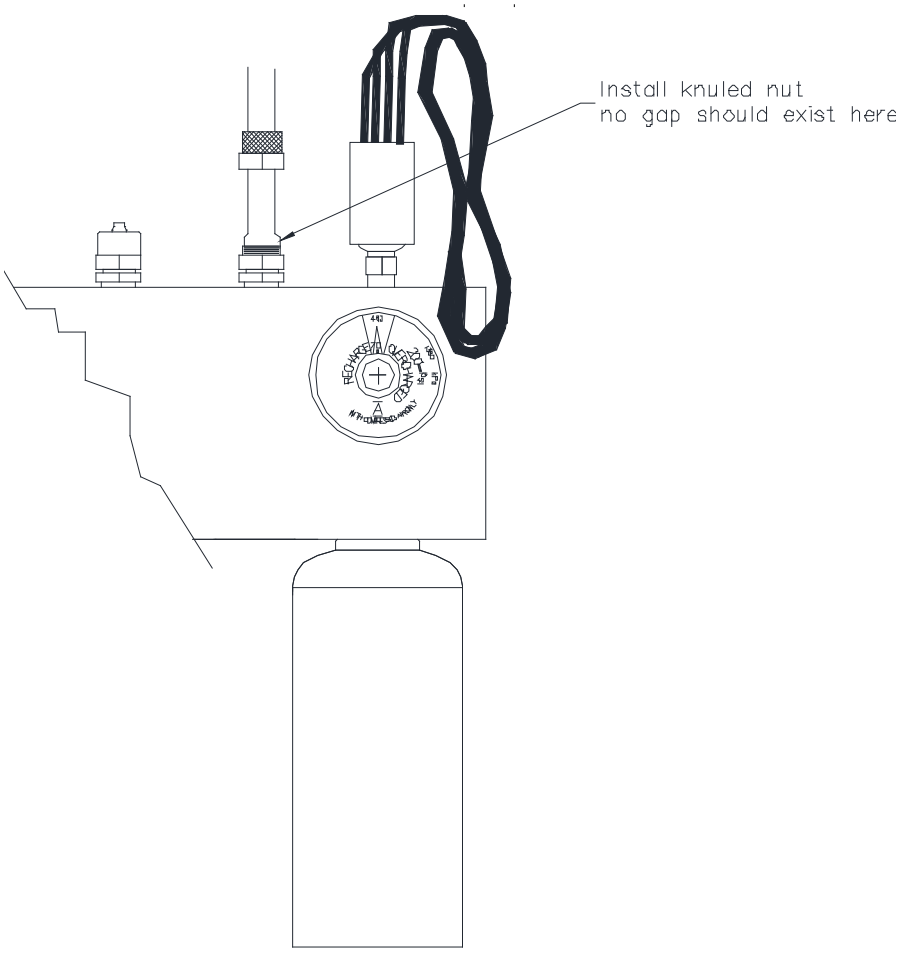
Warning: When tightening the nut on the p/n 16502 Compression Fitting, use a MAXIMUM of ½ turn past hand tight. Wrenching the nut past ½ turn can begin to collapse the detection tubing.

Care must be taken when terminating the start and end of the tubing to ensure leak proof connections. The following are instructions for termination:

Tubing Termination at the PRM:

1) Remove knurled nut from plated tube fitting and slide over end of tubing. The end of the tubing must be cut square and clean. **DO NOT** use pliers or wire cutters for cutting the tube. These tools will collapse the end of the tubing and could create a leak point. The use of the Amerex p/n 16860 Tubing Cutter is required. Do not use any sealants on the connection.

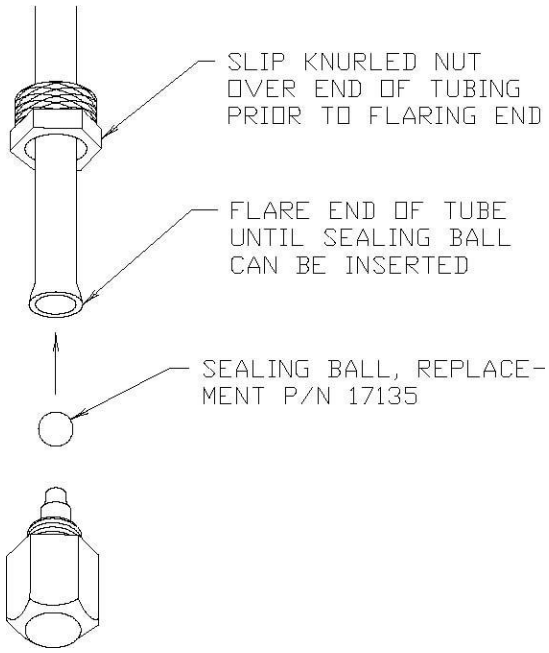
2) Firmly push the end of the tube down over the end of the fitting. If necessary, the use of a heat gun (placed on its lowest setting) may be used to warm the end of the tubing prior to pushing it on the fitting. Do not exceed 176° F (80o C) at the tubing, and only warm approximately one inch of the tubing end. It is important that the end of the tubing be inserted **ALL** the way over the tip of the fitting and firmly bottoms at the base of the fitting. (See the following figure). Hold the tubing in place **firmly** in one hand while tightening the nut with the other. Use a 12mm wrench (or adjustable) to tighten the nut. Resistance will be felt when the nut bottoms out. **Do not over tighten.**



Tubing Termination at the End of Line (EOL):

1) Remove knurled nut from End of Line fitting and slide over the end of the tubing. The end of the tubing must be cut square and clean. **DO NOT** use pliers or wire cutters for cutting the tube. These tools will collapse the end of the tubing and could create a leak point. The use of the Amerex p/n 16860 Tubing Cutter is required. Do not use any sealants on the connection.

2) Flare the end of the tubing slightly with the tip of the fitting. Insert the p/n 17135 black Sealing Ball into the flared end of the tubing. Firmly push the end of the tube down over the end of the fitting, pushing the ball into the tubing. If necessary, a heat gun (placed on its lowest setting) may be used to warm the end of the tubing prior to pushing it onto the fitting. Do not exceed 176° F (80° C) at the tubing, and only warm approximately one inch of the tubing end. It is important that the end of the tubing be inserted **ALL** the way over the tip of the fitting. It may be helpful to place the End of Line Fitting in a small vise while pressing the tubing into position. Hold the tubing in place **firmly** with one hand while tightening the nut with the other. Use a 12mm wrench (or adjustable) to tighten the nut (See the following figure). Resistance will be felt when the nut bottoms out. **Do not over tighten**.



CAUTION: The small sealing ball, p/n 17135, is **ONLY** used at the End of Line Fitting, and must **NEVER** be used at the fitting inside the PRM.

Once the system is pressurized and put into service, both connections should be thoroughly leak checked with a commercial leak check fluid, such as that used in the natural gas industry. Record the date of tubing installation on the tubing replacement label on the accumulator cylinder, and affix the label to the detection accumulator cylinder as shown at the end of this section.

Warning: It is imperative that the field terminations be properly made. YOU, the installer, are responsible for system functionality following installation and placing into service. Failure to properly handle and terminate the tubing can result in air leakage, which will result in an unwanted system discharge. Allow at least 20 minutes for the leak check fluid to indicate any presence of leakage. Even the smallest visible stream of bubbles can cause the system to lose pressure and discharge in just a few days.

Securing the Tubing: The tubing must be secured at a distance not to exceed 18" with p/n 16501 Tubing Clips. A Tubing Clip is also required within one inch of the End of Line Fitting. Since the tubing snaps into the clip, it is recommended that the clips be installed first, then the tubing. Ensure that the tubing is routed in such a way as not to interfere with any moving parts or access openings. Tubing must not be obscured by structural or support structures, and should be fully exposed to any rising hot gasses, to ensure rapid detection response. Never take up slack by pulling the tubing through a series of clips, this action could damage the tubing and shorten its useful life.

Tubing Spacing Requirements:

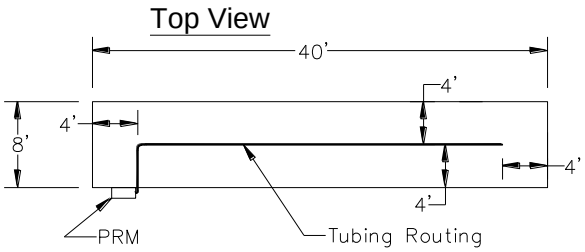
IS Applications:

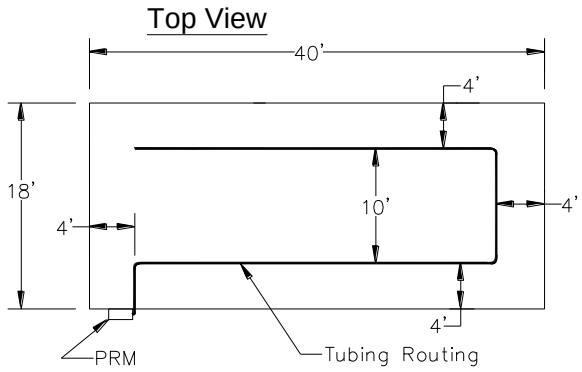
1) In large applications, in order to provide adequate fire detection, it may be necessary to form a "U" or "S" along the ceiling of the hazard. The maximum spacing between parallel runs of tubing must not exceed ten (10) feet. The tubing must be within four (4) feet and no less than two (2) feet from the adjacent wall.

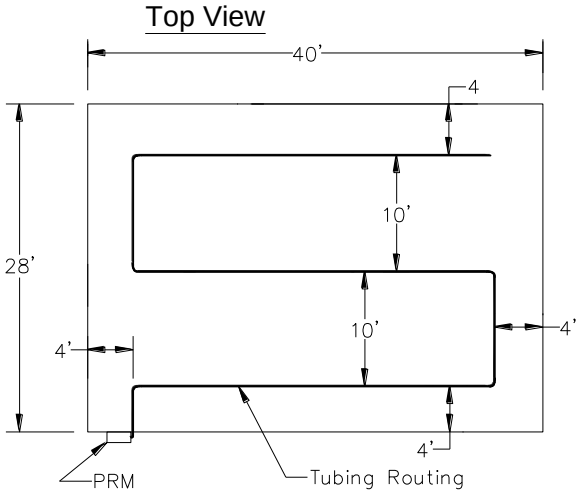
2) Maximum Height Limitations:

Type of IS Coverage	**Maximum Installed Ceiling Height***
Total Flood	16 feet
Vehicle Paint Spray Booth	16 feet
Open Front Paint Spray Booth	12 feet
*It is **not** required to reduce the spacing for high ceilings	

See the following examples of tubing routing on smooth, flat ceilings:





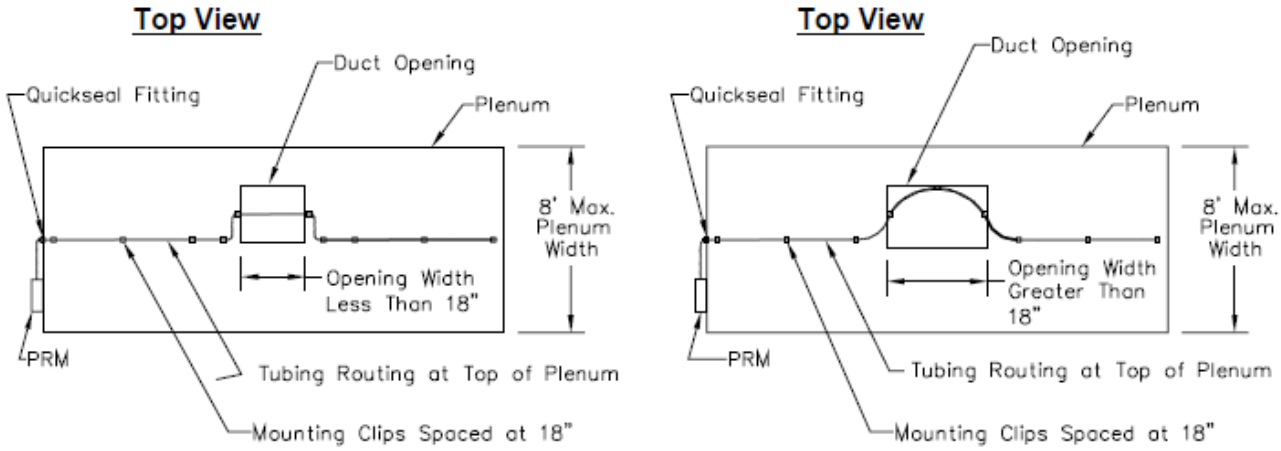


Tubing Spacing Requirements (continued):

Restaurant Kitchen Applications:

1) The detection tubing is to be run at the top of the plenum, behind the filters, centered, from one end to the opposite end to ensure total detection coverage. The tubing must be secured at distances not to exceed 18" with p/n 16501 Tubing Clips. A Tubing Clip is also required within one inch of the End of Line Fitting. The tubing termination must be within six inches of the end of the hood. Ideally, the End of Line Fitting should be located as far forward in the hood as possible, out of any direct stream of hot appliance flue gasses, without penetrating the grease filters.

2) Additionally, the detection tubing is to cross over the plenum / duct opening at its center. When the opening width exceeds the 18" maximum mounting clip spacing, the tubing is to be installed in an 'S' pattern, so that the tubing makes at least one pass through the center of the plenum / duct opening. See figure below:

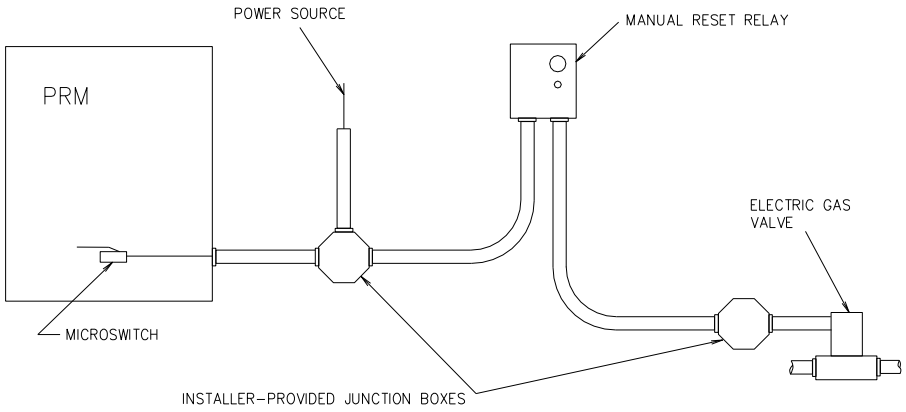


Manual Release

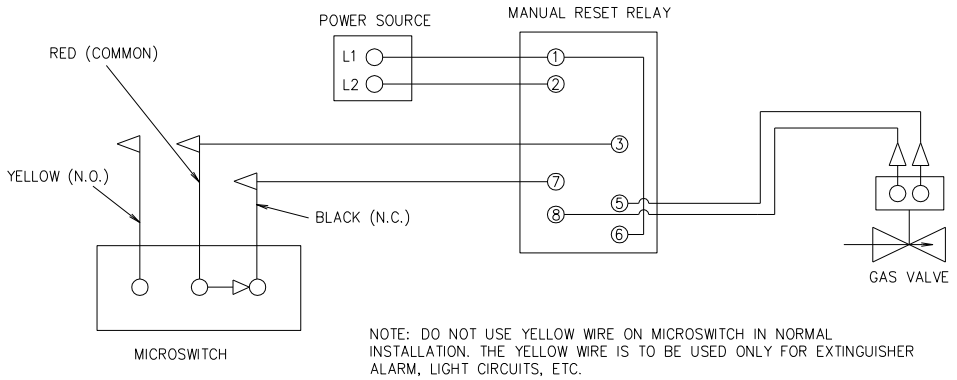
The PRM is capable of supporting one or two Manual Pull Stations (either the p/n 11993 or the p/n 14320 version). Refer to the appropriate Amerex KP, ZD, or IS Installation Manual for design limitations, installation, and servicing instructions of the manual pull station(s).

Auxiliary Microswitch

The PRM is supplied with one SPDT microswitch, pre-installed, and has the capability to support two additional microswitches. The microswitch is rated as shown below:
21 Amp 125, 250, or 277 VAC; 1 HP 125, 250, or 277 VAC; 2 HP 250, 277 VAC.
Uses of the microswitch include the shutdown of electrical appliances, such as an electric gas valve, or the exhaust fan of a paint booth. The following two illustrations show the wiring diagrams for the microswitch in electric gas valve and cooking appliance applications. Electrical terminations must be made in UL-listed junction boxes outside the PRM.

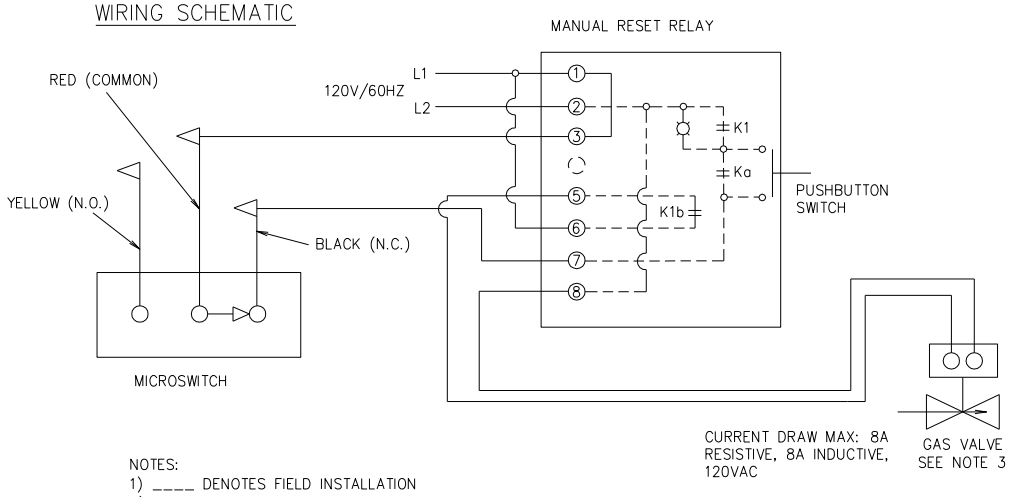


BASIC WIRING DIAGRAM

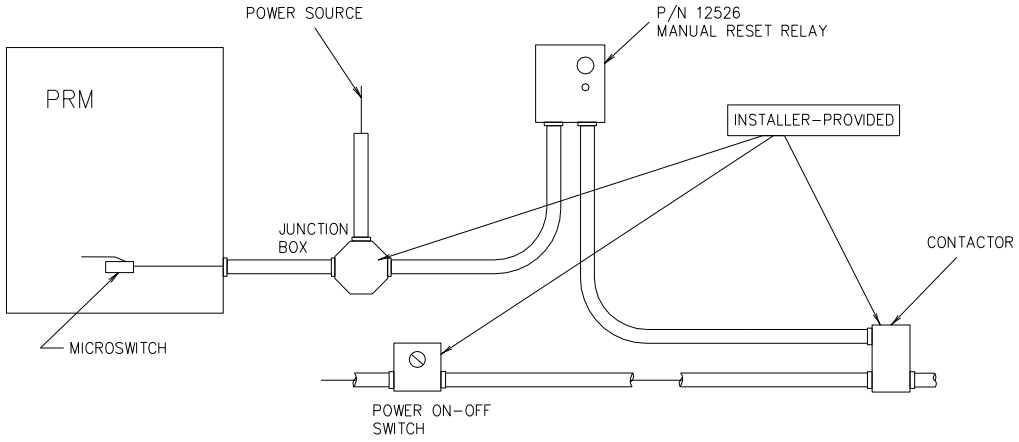


NOTE: DO NOT USE YELLOW WIRE ON MICROSWITCH IN NORMAL INSTALLATION. THE YELLOW WIRE IS TO BE USED ONLY FOR EXTINGUISHER ALARM, LIGHT CIRCUITS, ETC.

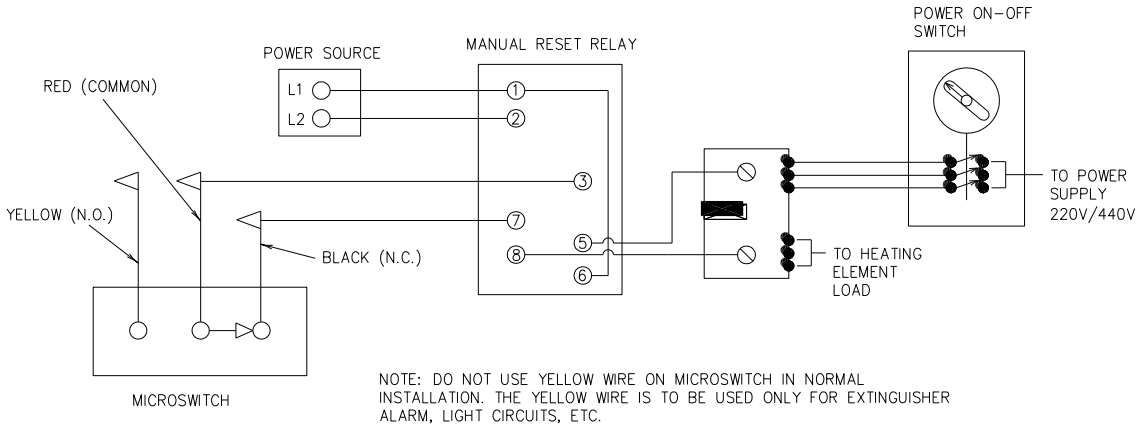
WIRING SCHEMATIC



NOTES:
1) ____ DENOTES FIELD INSTALLATION
2) ---- DENOTES FACTORY INSTALLATION
3) GAS VALVE: UL LISTED ELECTRICALLY-OPERATED SAFETY VALVE FOR NATURAL OR LP GAS AS NEEDED OF APPROPRIATE PRESSURE AND TEMPERATURE RATING, 110V/60HZ OR AMEREX GAS VALVES, P/N 12870, 12871, 12872, 12873, 12874, 12875 AND 12876.
4) K1a AND K1b ARE N.O. WHEN K1 IS DE-ENERGIZED.



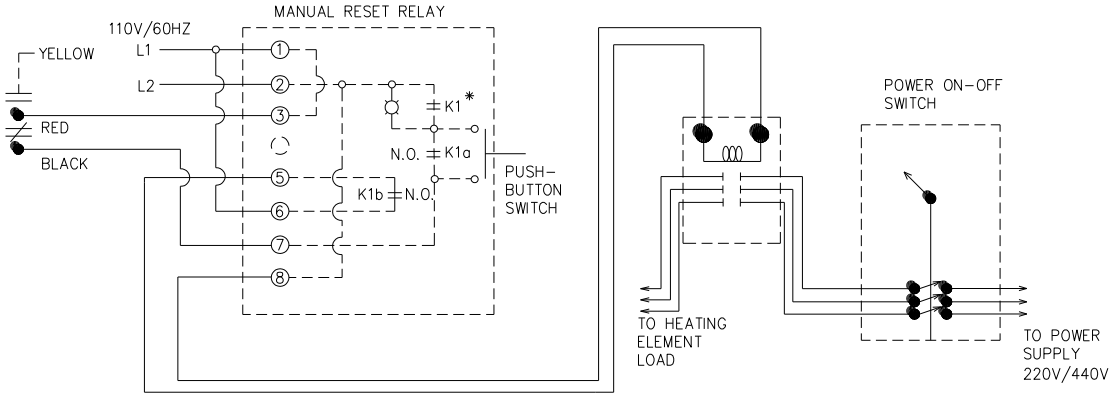
BASIC WIRING DIAGRAM



NOTE: DO NOT USE YELLOW WIRE ON MICROSWITCH IN NORMAL INSTALLATION. THE YELLOW WIRE IS TO BE USED ONLY FOR EXTINGUISHER ALARM, LIGHT CIRCUITS, ETC.

WIRING SCHEMATIC

K1* AND K1b ARE N.O. WHEN K1 IS DE-ENERGIZED



NOTES:
1) ——— DENOTES FIELD INSTALLATION
2) ---- DENOTES FACTORY INSTALLATION
3) CONTACTOR: UL ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING EQUIPMENT COIL, 110V / 60 HZ.

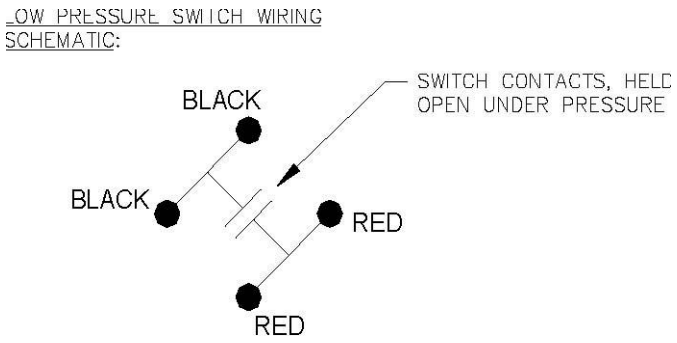
Low Pressure Switch (UL file: E225513)

While the pressure gauge of the accumulator cylinder displays the detection system pressure, this gauge may not always be readily visible. The purpose of the low pressure switch is to provide a remote means to alert personnel that the pressure in the pneumatic detection system has dropped to a level approaching system activation (discharge). Any indication of pressure loss in the PRM requires that the system be serviced, without delay, to avoid an unwanted system discharge. Personnel at the installed system location should be trained to recognize the need to contact a trained and certified Amerex distributor in this event.

The PRM is supplied with a SPST pressure switch with contacts that are held open under pressure. The low pressure switch is factory installed and sealed in the top of the 16652 accumulator assembly. The low pressure switch is provided with two wires on each side of the contacts to allow for proper connection to a supervisory circuit on a fire alarm panel. Electrical terminations must be made in UL-listed junction boxes outside the PRM. The switch has gold-plated contacts rated as shown below:

50/60 Hz, 36 VDC, 1A
120/240 VAC 6.0 FLA, 36 LRA
24 VAC 125 VA pilot duty
120/240 VAC 375 VA pilot duty

The contacts will close at 50 psig (corresponding to the low side of the "green pie" range on the pressure gauge). **If a noticeable drop in pressure occurs, the pressure switch closing point will allow a short period of time for personnel to act, before the system discharges**. The contacts will re-open at 60 psi, during re-pressurization. When re-pressurizing the PRM, ensure that the contacts re-open, and that any connected device is returned to normal.



Fire Suppression – Agent Release

Upon either a manual or automatic response to a fire, an internal Nitrogen Cylinder (either the 10 in^3 p/n 12856, or the 15 in^3 p/n 09956) will expel dry nitrogen which is pressurized to 1,800 psig (12,411 kPa) at 70°F (21°C). The nitrogen gas is used to open the Agent Cylinder Valves, which in turn, releases the agent. For Actuation Network limitations, see below:

Type of System	Nitrogen Cylinder Selected	Actuation Network Limitations to Follow
Industrial System (IS)	10 in^3	p/n 15040 IS Installation Manual – MRM Limitations
	15 in^3	p/n 15040 IS Installation Manual – ERM Limitations
Restaurant System(KP)	10 in^3	p/n 12385 KP or 16640 ZD Installation Manual – MRM Limitations
	15 in^3	p/n 12385 KP or 16640 ZD Installation Manual – MRM Limitations

Mechanical and Electrical Gas Valve

The PRM is capable of closing up to two (2) mechanical gas valves upon system actuation. Electrical gas valves are operated through the use of the microswitches. Refer to the appropriate Amerex KP, ZD, or IS Installation Manual for design limitations, installation, and servicing instructions of the gas valve(s).

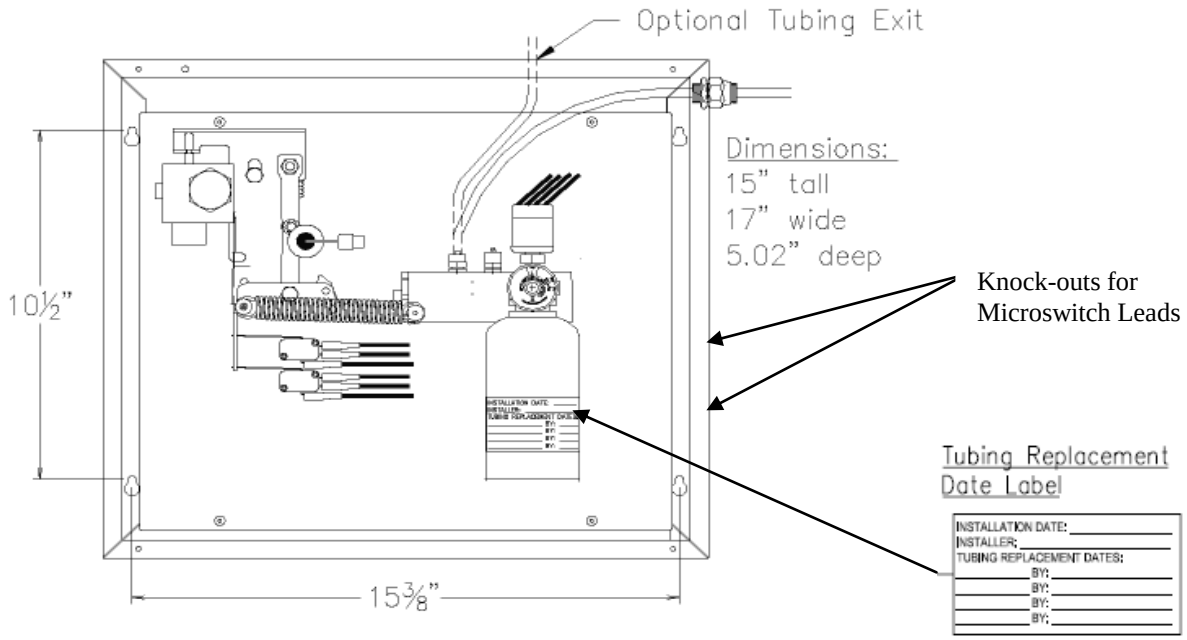
Mechanical Time Delay

If a 10-20 second discharge delay is required (as in the case of Vehicle Paint Spray Booths, for example), the p/n 15765 Mechanical Time Delay is installed at the actuation pressure outlet of the PRM. Refer to the Amerex IS Installation Manual (p/n 15040) for design limitations, installation, and servicing instructions of the Mechanical Time Delay.

PRM Mounting Instructions (Must be Surface-Mounted, Only)

Instructions for mounting (see figure on following page). All installation wiring shall adhere to NFPA 70 (NEC) and all State and Local codes. Terminations of the Microswitches are to be made outside the PRM Enclosure in an appropriate electrical junction box.

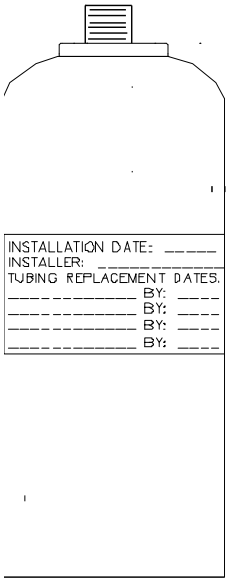
1) Remove necessary knockouts on metal enclosure.
2) Insert mounting hardware (not provided) into wall, spaced to match keyholes on back of box.
3) Mount box on to the screws.
4) Tighten all screws.



III) Maintenance / Recharge:

Inspection and Servicing the Detection Tubing: The tubing must be replaced at intervals not to exceed three (3) years. Record the installation date and the date of replacement on the tubing replacement label on the Detection Accumulator Cylinder (see figure above). The label is shipped in the bag assembly with the Control Panel. The entire length of tubing must be replaced, either at the three year interval or following a fire incident. If grease or coating build-up is excessive, a more frequent replacement interval will be required. At a minimum, excessive build-up is defined as when material completely encircles the tube at ***any*** point along its length. Cleaning of the tube is acceptable, provided that no abrasives are used, and that the text on the outside of the tubing is still legible when completed. Use only a soft cloth with mild detergents and warm water. **If the tubing appears brittle or charred, REPLACE it. "When In DOUBT, Take It OUT." Brittle or charred tubing is evidence of excessive temperatures on the tubing. Corrective action should be taken to re-evaluate the environment where the tubing is installed, or a more frequent tubing inspection and/or replacement interval must be used**. The End of Line Fitting assembly (p/n 16506) must be replaced when the tubing is replaced. Do not attempt to re-use either the Fitting or the Sealing Ball. Thoroughly leak check tubing terminations following re-installation and re-pressurization.

Accumulator Assembly Replacement Interval: The Accumulator Assembly, P/N 22678, must be replaced at a (12) year interval from the date of installation, or more frequently, if damage or corrosion is suspected. Use the installation date as noted on the tubing replacement label located on the accumulator cylinder.



P/N 22678 Accumulator Assembly

Testing the Detection Network: When first placing the system into service, following system actuation, or at the six month servicing interval, the Detection Network shall be tested:

1) Remove the Nitrogen Actuation Cylinder.
2) Slowly release the detection pressure until the panel actuates by performing either of the following:
   A) Depress the Schrader valve on the Detection Accumulator Cylinder. Replace Schrader cap following actuation and re-pressurization.
   B) Slowly loosen the knurled nut on the End of Line Fitting. Re-tighten the nut following actuation and thoroughly leak check following re-pressurization.

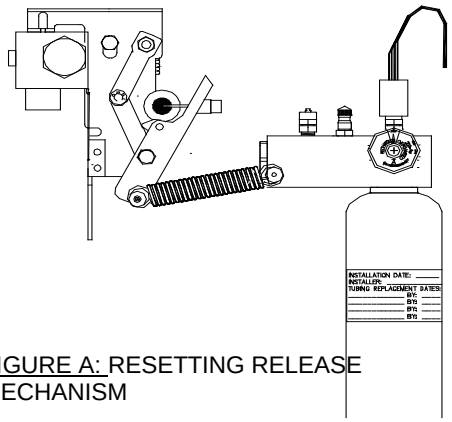


FIGURE A: RESETTING RELEASE MECHANISM

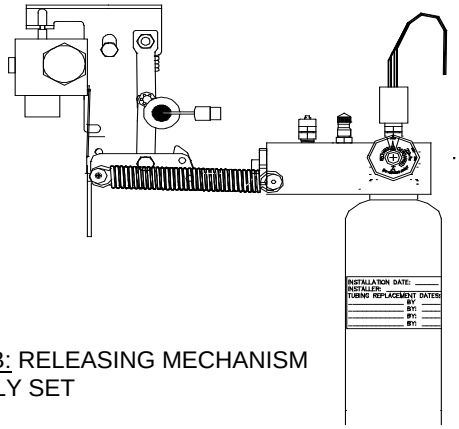


FIGURE B: RELEASING MECHANISM PROPERLY SET

Resetting Steps, Following Panel Activation / System Release: (if a manual actuation has occurred, first reset the Manual Pull Station)

1) Pressurize the Accumulator Cylinder to approximately 35 PSI with compressed air through the Schrader Valve. The Trip Plunger should extend.

2) Rotate the Spring Loaded Lever clockwise ("1" in Figure A), until its tip is latched under the Trip Plunger. Resume pressurization of the Accumulator Cylinder to 70 PSI at 70^{o}F. Leak check the fittings at both ends of the tubing. Re-make tubing terminations, if necessary.

3) Using the Amerex Cocking Tool, p/n 13341 in conjunction with a 3/8" drive socket wrench and extension, re-cock the Collapsible Column ("2" in Figure A). This is accomplished by simultaneously pushing in on the Lock Spring while turning the Cocking Tool counterclockwise. The mechanism should now appear as depicted in Figure B.

4) Follow Maintenance and Recharge Instructions in the applicable Amerex Installation, Operation, and Maintenance Manual with regard to the Manual Pull Station(s), Actuation Network, Distribution Piping, and Mechanical and Electrical Gas Valves.

5) Replace the Nitrogen Actuation Cylinder (p/n 12856 or 09956).

IV) Replacement Parts:

P/N	Description
12524	Microswitch, for auxiliary field wiring
16501	Tubing Clip (Bag of 25)
16506	End of Line Fitting
16551	50’ Tubing Roll
16552	150’ Tubing Roll
16554	300’ Tubing Roll
12856	10 in^3 Nitrogen Actuation Cylinder
09956	15 in^3 Nitrogen Actuation Cylinder
16502	Quickseal Compression Fitting, ¼”
22678	Accumulator Assembly Module

Warranty Statement:

Amerex warrants its Pneumatic Releasing Module to be free from defects in material and workmanship for a period of three (3) years from the date of purchase. During the warranty period, any defective part will be repaired or replaced (at Amerex option). This warranty is valid only if each system is installed, serviced, and maintained by an Amerex factory trained Authorized Distributor in strict accordance with this Amerex Manual No. 16546, and the appropriate KP and/or IS Amerex Installation, Operation and Maintenance Manual; all work must be performed using genuine Amerex replacement parts. This Warranty does not cover defects resulting from modification, alteration, misuse, exposure to corrosive conditions or improper installation or improper maintenance. Warranties on component items not manufactured by Amerex are provided by others whose warranty, evaluation, and judgement will be final. **ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF FITNESS FOR PURPOSE AND MERCHANTABILITY, ARE LIMITED TO THE TIME PERIOD AS STATED ABOVE. IN NO EVENT SHALL AMEREX CORP. BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.** Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so that the above limitations or exclusions may not apply to you. Amerex Corp. neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than as expressly set forth herein. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. To obtain performance of the obligation of this Warranty, write to Amerex Corp., P.O. Box 81, Trussville, AL 35173-0081, U.S.A. for instructions.