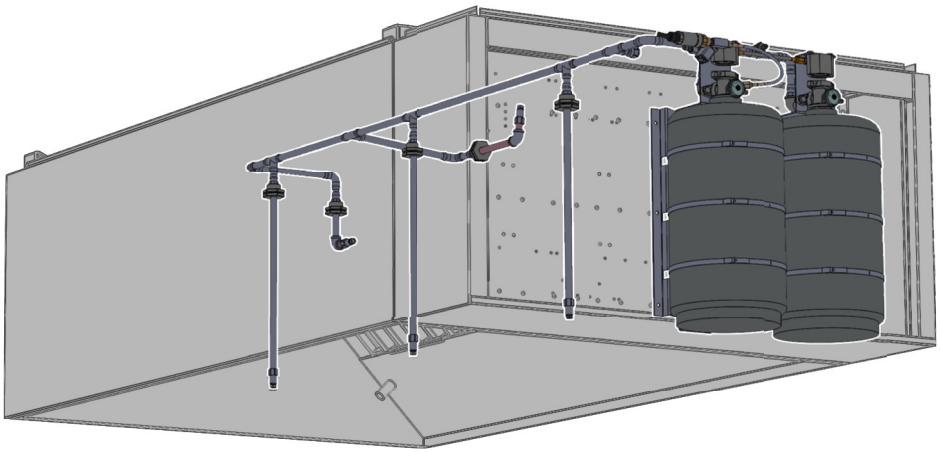
Model TANK Fire Suppression Extinguishing System

Installation, Operation, and Maintenance Manual



TANK Fire Suppression Extinguishing System Typical Hood End Cabinet Installation

RECEIVING AND INSPECTION

Check for any signs of damage upon receipt, and if found, report it immediately to the carrier. Check that all items are accounted for and free of damage.

WARNING!!

The TANK Fire Suppression extinguishing system unit is to be installed, inspected, recharged and maintained in accordance with NFPA 17A, NFPA 96, and the National Fire Code of Canada as applicable.

Installation and maintenance of the TANK Fire Suppression extinguishing system must be performed in accordance with this manual by a factory trained and authorized distributor. Improper installation poses serious risk of injury due to electric shock and other potential hazards. Read this manual thoroughly before installing or servicing this equipment. ALWAYS disconnect power prior to working on equipment.

Save these instructions. This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.

Part No. A0029342
July 2021 Rev 13

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WARRANTY

Model TANK Fire Suppression extinguishing system is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 60-months from date of shipment. Warranty does not cover consumable products such as batteries and nitrogen. This warranty is null and void if:

1. The system is not installed by a factory trained installer per the MANUFACTURER'S installation instructions shipped with the product.
2. The equipment is not installed in accordance with Federal, State, Local codes, and regulations.
3. The system is misused or neglected, or not maintained per the MANUFACTURER'S maintenance instructions.
4. The system is not installed and operated within the limitations set forth in this manual.
5. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 60-month warranty period, upon examination by the MANUFACTURER, such part will be repaired or replaced by MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization, and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

NOTE: To receive warranty coverage for this product, copy and print out the "Start-Up and Maintenance Documentation" on page 68. Fill in all required information. Fax the page to 1-919-516-8710 or call 1-866-784-6900 for emailing information.

Certifications and Approvals

The Tank Fire Suppression system is ETL Listed in accordance with ANSI/CAN/UL/ULC 300, ULCORD-C1254.6.

The microprocessor-based control board is ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

The Tank Fire Suppression system is acceptable for use in New York City, and is approved per FDNY COA #5870.

System Overview

The Tank Fire Suppression extinguishing system provides fire protection for commercial cooking appliances and ventilation. The Tank Fire Suppression extinguishing system is electrically released via a 24V DC solenoid valve. Extinguishing system units with electrical detection, activation, and control require the use of a Listed Control Panel, which has been found acceptable for releasing device service and which is compatible with the electrical actuators used on the extinguishing system. In addition, all electrical detectors, notification devices, and pull stations are required to be Listed and compatible with the Control Panel.

COMPONENTS

The following section lists the major components used in the TANK Fire Suppression extinguishing system.

Figure 1 - Shipping/Test View

1. Unit is shown in Shipping/Test Position
2. Tank Straps
3. Tank Mounting Bracket (Secured to cabinet with rivets)
4. Cylinder Tanks (Up to four tanks may be installed depending on cabinet size.)

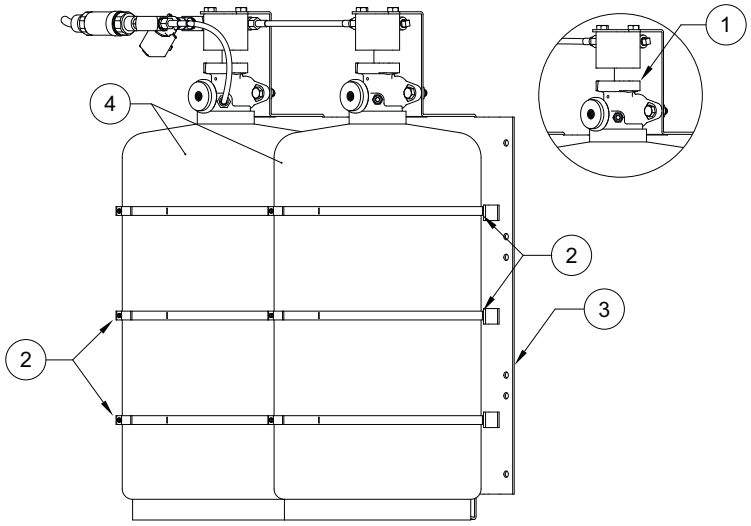
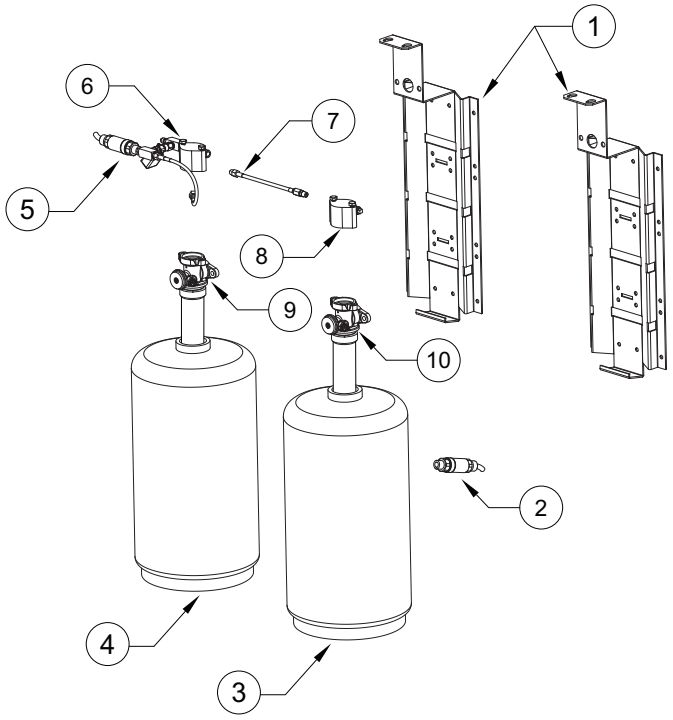


Figure 2 - Exploded View

1. Tank Mounting Brackets
2. Secondary Supervisory Pressure Switch (Optional)
3. Secondary Cylinder (Optional)
4. Primary Cylinder
5. Supervisory Pressure Switch
6. Primary Actuator Kit
7. Secondary Actuator Hose (Optional)
8. Secondary Valve Actuator (Optional)
9. Primary Valve with Siphon Tube
10. Secondary Valve with Siphon Tube (Optional)

Tank straps not shown.



NOTE: Tanks should never be filled in the field.

Cylinder Assembly

The TANK Fire Suppression cylinder assembly (p/n 87-300001-001) uses a mild steel cylinder, conforming to 4BW250 DOT & 4BWM-17 TC specifications, and a nickel-plated brass valve with pressure indicator gauge. Each valve includes a Schrader port for connection to the primary actuator hose (for primary cylinders) or the supervisory pressure switch (optional for secondary cylinders).

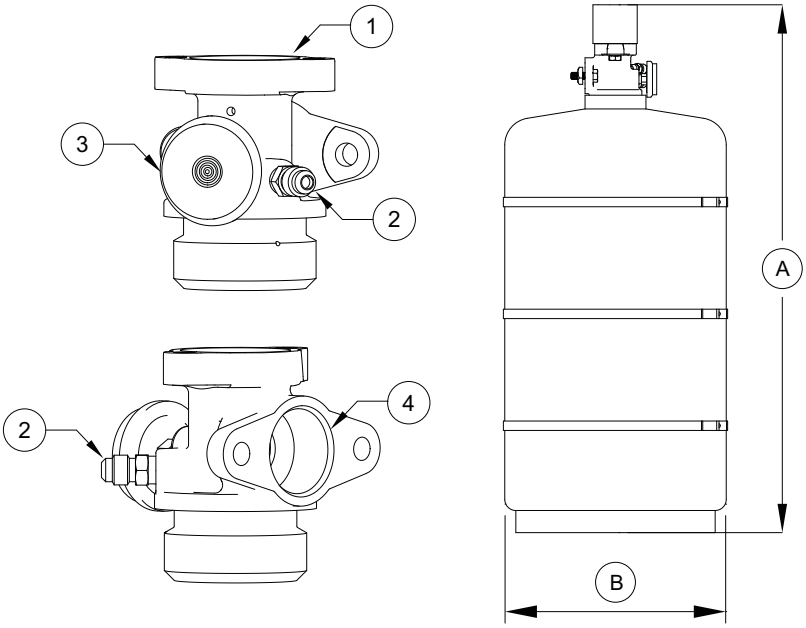
Each cylinder assembly is factory-filled with TANK liquid fire suppressant and pressurized to 200 PSIG (1379 kPA) at 70°F (21°C). Each cylinder supports up to 5 nozzles for a total of 20 flow points.

Figure 3 - Cylinder Tank Details

1. Valve Actuation Interface
2. Schrader Valve
3. Pressure Gauge
4. Discharge Outlet

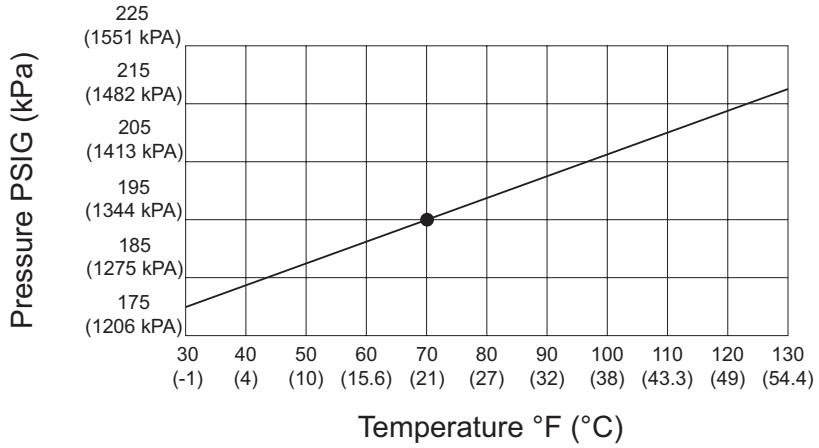
A. Tank to Actuator Distance = 23-1/4”

B. Tank Diameter = 10”



The pressure of a cylinder will vary with the ambient temperature, as detailed in **Table 1**. The gauge indicator (shown in **Figure 3**) should be in the acceptable ‘green’ range for a cylinder that is properly pressurized and within the listed operating temperature range. For a cylinder at the lowest listed operating temperature of 32°F (0°C), the pressure gauge should read approximately 175 psig (the lower end of the green range). For a cylinder at the highest listed operating temperature of 130°F (54.4°C), the pressure gauge should read approximately 225 psig (the upper end of the green range).

Table 1 - Cylinder Temperature Vs Pressure

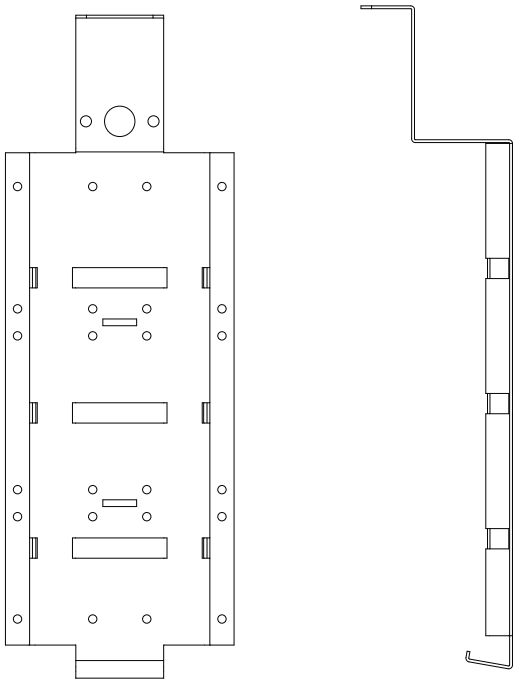


Cylinder and Actuator Bracket

Each cylinder assembly is secured to a factory-installed cylinder bracket in the cabinet (p/n TFS-UCTANKBRACKET). The cylinder is secured to the cylinder bracket via three (3) stainless steel straps.

The cylinder bracket also includes a platform for securing a primary actuator kit or secondary valve actuator during shipping and maintenance procedures.

Figure 4 - Cylinder and Actuator Bracket

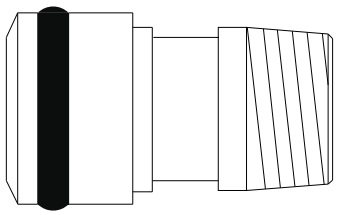


Discharge Adapter

The discharge adapter (p/n WK-283952-000) is used to connect the TANK Fire Suppression cylinder valve outlet to the agent distribution pipe network. The 1/2-inch NPT internal thread of the discharge adapter outlet is connected to the supply line via an elbow and adapter.

The discharge adapter uses an O-ring (p/n WK-108019-000) at the valve port to eliminate leaks during discharge.

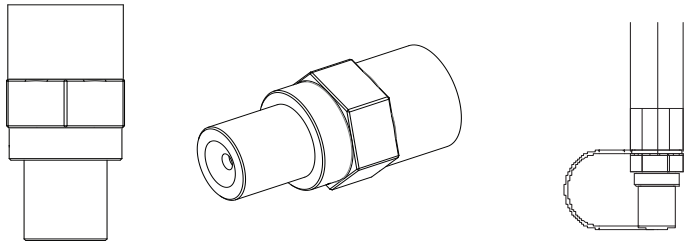
Figure 5 - Discharge Adapter



Nozzles

The nozzle (p/n 3070-3/8H-SS10) is a 4 flow nozzle and is used for plenum, duct, and dedicated appliance coverage (e.g., salamanders, upright broilers, chain broilers, and appliance with upright obstructions). The nozzles include a cap (p/n 3074-1-1). The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing the agent to flow to the protected hazard area. Refer to **"Duct and Plenum Protection" on page 14**.

Figure 6 - Fire System Nozzle



Primary Actuator Kit (PAK)

The Primary Actuator Kit (PAK) (p/n 87-300030-001) is installed on each primary cylinder assembly to pneumatically open the cylinder valve and provide actuation pressure for up to three secondary valve actuators.

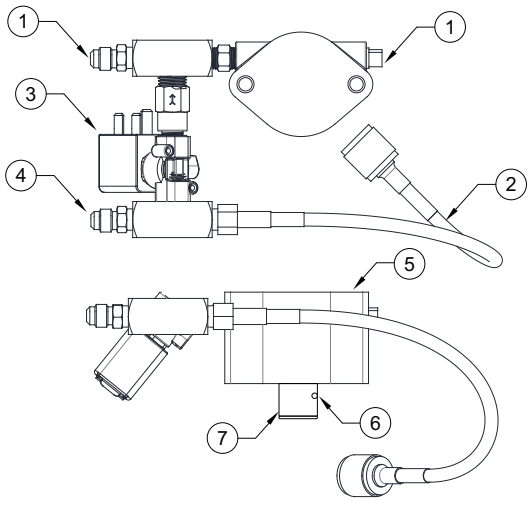
The PAK consists of a pneumatic actuator, 24V DC solenoid valve, check valve, primary actuator hose, and associated fittings.

Upon automatic or manual system actuation, the control panel sends a momentary 24V DC release signal, opening the PAK solenoid. Pressure from the primary cylinder is passed through the solenoid and check valve, into the primary actuator (actuating the primary cylinder), and into the interconnected secondary valve actuators (actuating the secondary cylinders).

The primary actuator has a 1/8" NPT inlet port for connection to the primary system cylinder, and a 1/8" NPT outlet port for connection to the secondary cylinder actuation line or actuation plug for single cylinder system. The primary actuator includes a piston with a spring-loaded locking pin which locks the piston in the discharge position, ensuring complete discharge of the cylinder contents.

Figure 7 - Primary Actuator Kit

1. Schrader Service Port
2. Primary Actuator Hose (Stainless Steel)
3. Solenoid Valve
4. Supervisory Pressure Switch Connection
5. Primary Actuator
6. Locking Pin
7. Piston

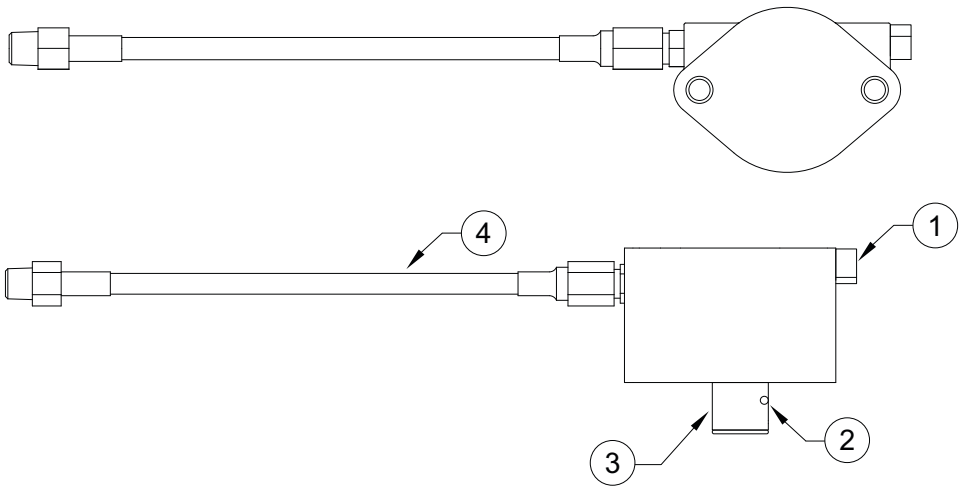


NOTE: The primary supervisory pressure switch is standard on primary tanks. Secondary supervisory pressure switches are optional on secondary tanks.

Secondary Valve Actuator (SVA) and Hose

A Secondary Valve Actuator (SVA) (p/n 87-120042-001) is installed on each secondary cylinder assembly to pneumatically open the cylinder valve(s). The SVA has 1/8” NPT inlet and outlet ports for connection to the system actuation line via the SVA hose. All secondary hoses require a 1” minimum bend radius. The SVA includes a spring-loaded locking pin that locks the actuator piston in the discharge position, ensuring complete discharge of the cylinder contents.

Figure 8 - Secondary Valve Actuator

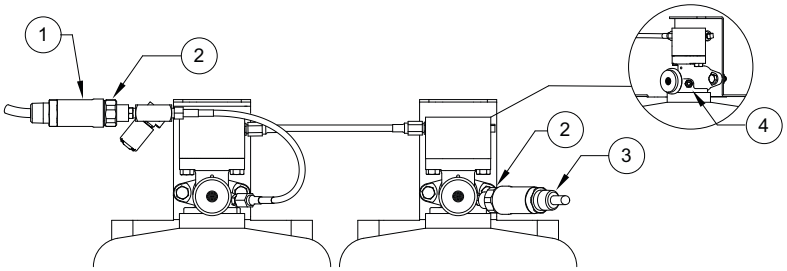


1. Actuation Line Plug
2. Locking Pin
3. Piston
4. Secondary Valve Actuator Hose
   - 7.5” hose option (p/n 87-120045-001)
   - 24” hose option (p/n 87-120045-002)
   - 60” hose option (p/n 87-120045-003)

Supervisory Pressure Switch

The primary and (optional) secondary supervisory pressure switch (p/n 87-300040-001) are preset to alarm at a cylinder pressure of ~10% below the lowest operating system pressure of 175 psig (pressure at the lowest listed operation temperature of 32°F). The supervisory pressure switch uses a diaphragm sensor to detect pressure changes. At the predetermined set point, the unit actuates a SPDT snap-acting switch, converting a pressure signal into an electrical signal. The supervisory pressure switch can be used on primary and/or secondary cylinders. For primary cylinders, the pressure switch is mounted on the primary actuator kit. For secondary cylinders, the pressure switch is mounted on the Schrader fitting installed on the cylinder valve.

Figure 9 - Supervisory Pressure Switch



1. Supervisory Pressure Switch (Primary)
2. Wrench Flats
3. Secondary Supervisory Pressure Switch (Optional)
4. Schrader Valve Port

Gas Shut-Off Valves

Electric gas shut-off valves are used to shut down the flow of fuel gas to the kitchen appliances upon actuation of the TANK Fire Suppression system. An energized solenoid is used to hold the gas valve in the open position. The solenoid closes the valve when de-energized via the output relay of the control panel. The gas valves are available in 120V AC and 24V DC, ranging from 3/4” to 3” pipe sizes (**Table 2**).

Table 2 - Electric Gas Valves

Size	P/N (ASCO) 120V AC	P/N (ASCO) 24V AC
3/4”	8214235	8214G236-24VDC
1”	8214250	8214G251-24VDC
1-1/4”	8214265	8214G266-24VDC
1-1/2”	8214275	8214G276-24VDC
2”	8214280	8214G281-24VDC
2-1/2”	8214290	-
3”	8214240	-

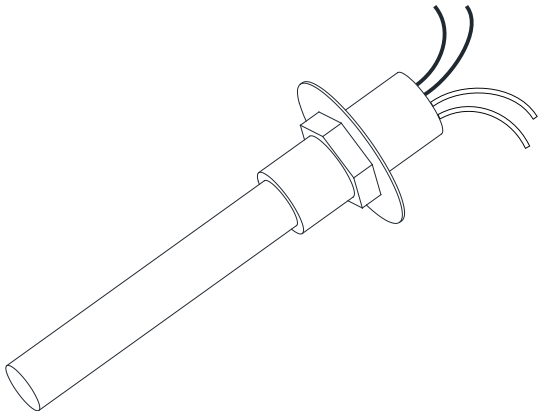
Electric Remote Manual Release

An electrically operated manual release that is listed must be used with the TANK Fire Suppression extinguishing system. The electric remote manual release is used to actuate the TANK Fire Suppression extinguishing system manually and must be properly located and supervised in accordance with NFPA 17A and NFPA 96.

Firestat (Heat) Detector

The Firestat (Fenwal Detect-a-Fire) is a listed electric thermal detector available in a variety of temperature settings and used to actuate the TANK Fire Suppression extinguishing system automatically. When a Firestat senses a temperature higher than its setpoint, the Firestat contacts will close and energize the TANK Fire Suppression system via the control panel.

Figure 10 - Firestat



INSTALLATION

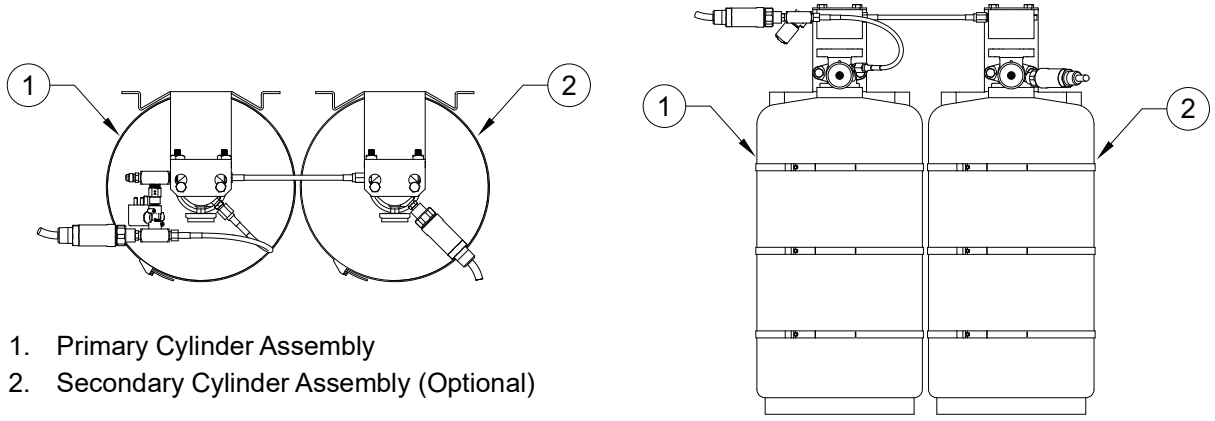
The extinguishing system consists of pressurized agent storage cylinders, agent distribution piping, valve actuators, supervisory pressure switches, and agent discharge nozzles. All primary components and piping are factory-installed. Systems may be comprised of single or multiple cylinders depending on the size and configuration of the protected hazards.

Cylinders can be piped independently, or manifolded. On two-cylinder systems, the cylinders will be in a manifold configuration. Refer to **Figure 30 on page 30** for a two-cylinder system example. On three-cylinder systems, two cylinders will be in a manifold configuration and one independent. On four-cylinder systems, there will be two separate manifolds.

In a fire condition or upon manual actuation, the solenoid valve is opened, allowing pressure from the primary cylinder to flow to the primary and secondary cylinder valve actuators, opening the cylinder valves and discharging liquid fire suppressant to the protected hazard areas.

WARNING!
System must be installed in conditioned space between 32°F and 130°F.

Figure 11 - Cylinder Assemblies

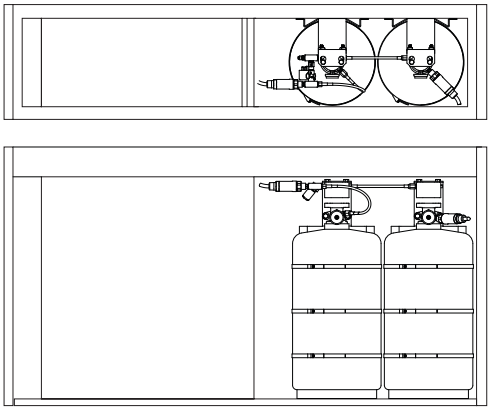


1. Primary Cylinder Assembly
2. Secondary Cylinder Assembly (Optional)

Cylinders

Cylinders are typically factory-installed, pressurized, and may be located anywhere within the hood end cabinet. Additional cylinders may be field installed, as needed, in the additional hood end or wall mount cabinet. The following examples show a dual cylinder system mounted to the right of the hood control unit. Each cylinder assembly is secured to a factory-installed cylinder bracket in the hood end cabinet. The cylinder is secured to the cylinder bracket via three (3) stainless steel straps.

Figure 12 - Dual Cylinder Mounted in Cabinet



Right side cabinet mount shown.

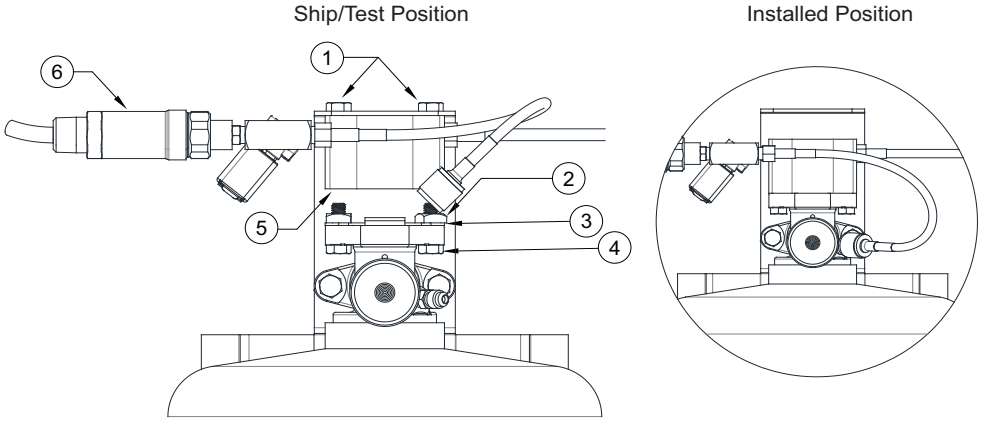
Primary and Secondary Actuator Installation

WARNING!

Do not complete PAK or secondary valve actuator installation until system test and commissioning are complete. The cylinder bracket includes a platform for securing a primary actuator kit or secondary valve actuator during shipping and maintenance procedures. The system actuators must be in the ship/test position for all commissioning and test procedures. Testing with actuators in place will result in discharge of the agent cylinders.

Refer to "Start-up/Test Procedure" on page 54 for the testing and commissioning procedure.

Figure 13 - PAK in Ship/Test and Installed Positions



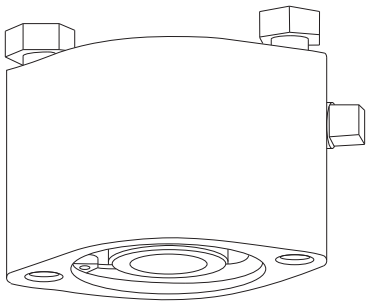
1. Shipping Bolts
2. Nut
3. Valve Protection Plate
4. Mounting Bolts
5. Primary Actuator Kit (In Transport Position)
6. Supervisory Pressure Switch

Primary Actuator Kit (PAK)

The primary actuator kit is mounted to the primary cylinder bracket during shipment and when testing the system. With the cylinders securely mounted and connected to the system piping, the primary actuator kit can be installed onto the primary cylinder for the final setup.

1. Remove the valve protection plate and nuts. Retain the mounting bolts for installation of the PAK.
2. Ensure the primary actuator piston is in the set position.
3. Loosen the PAK shipping bolts from the top of the bracket, slide the unit back and lower it into position on the valve actuation flange.
4. Insert the mounting bolts through the bottom of the valve flange into the PAK mounting holes and tighten securely.
5. Connect the primary actuator hose to the Schrader valve port on the primary cylinder valve. The primary hose requires a 1.5" minimum bend radius.

Figure 14 - Actuator Valve Set Position



WARNING!

Installation of the primary actuator hose is the FINAL step performed.

Connecting this hose earlier may result in accidental system discharge. Refer to "Start-up/Test Procedure" on page 54 for the testing and commissioning procedure.

When inspecting the primary actuator hose, replace O-ring (p/n 19020).

The primary and secondary actuation hoses cannot be interchanged. The primary actuation hose must be used with the PAK.

Secondary Valve Actuator

With the cylinders securely mounted and connected to the system piping, the secondary valve actuators (SVA) can be installed onto each of the secondary cylinder(s).

1. Remove the valve protection plate and nuts. Retain the mounting bolts for installation of the SVA.
2. Loosen the SVA shipping bolts from the top of the bracket, slide the unit back and lower it into position on the valve actuation flange.
3. Insert the mounting bolts through the bottom of the valve flange into the SVA mounting holes and tighten securely.
4. Ensure the secondary actuator hose is securely connected to the primary actuator output port and SVA input port.

Key Limitations

- Refer to **"Secondary Valve Actuator (SVA) and Hose" on page 8** for secondary hose information.
- Secondary actuator hose(s) require 1" minimum bend radius.
- Maximum number of secondary valve actuators operating from the primary actuator unit is three (3).

WARNING!

The Valve Protection Plate must remain on the valve actuation port until the valve actuator is installed.

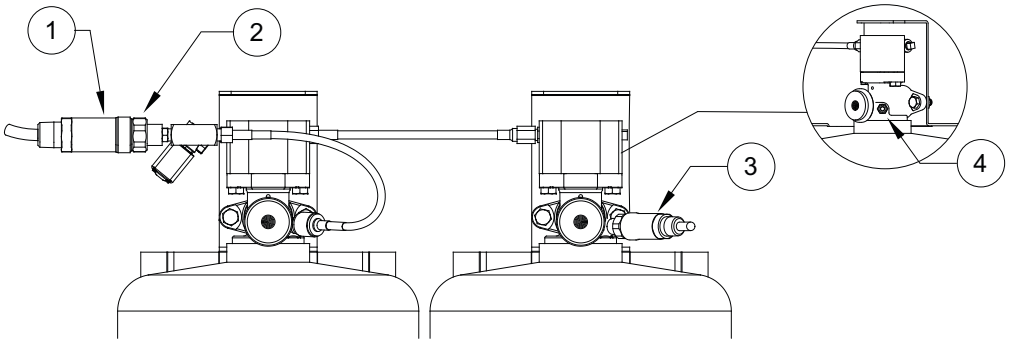
The primary and secondary actuation hoses cannot be interchanged. The secondary actuation hose (7", 24" or 60" length) must be used with secondary valve actuators.

Supervisory Pressure Switch

A supervisory pressure switch will always be located on the primary cylinder by the Primary Actuator Kit (PAK). For secondary cylinders, this is an optional component that may be added on. For primary cylinders, the pressure switch is mounted on the primary actuator kit. For all secondary cylinders, the pressure switch is mounted on the Schrader fitting on the cylinder valve.

1. Remove cap from applicable Schrader fitting.
2. Thread the switch onto the Schrader using the brass wrench flats only.

Figure 15 - Supervisory Pressure Switch Installation



1. Supervisory Pressure Switch (Primary)
2. Wrench Flats
3. Optional Secondary Supervisory Pressure Switch
4. Schrader Valve Port

WARNING!

Proof pressure (*) limits stated on the nameplate must never be exceeded, even by surges in the system. Occasional operation of unit up to proof pressure is acceptable (e.g., start-up, testing). Continuous operation should not exceed the designated over range pressure (**).

***Proof pressure - the maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage (e.g., start-up, testing).**

****Over Range Pressure - the maximum pressure to which a pressure sensor may be continuously subjected without causing damage and maintaining set point repeatability.**

NOTE: Pressure switches do not contain any field replaceable parts. Refer to applicable control panel manual for wiring of the supervisory pressure switch. Wire in accordance with local and national electrical codes.

WARNING!

Disconnect all supply circuits before wiring pressure switch. Electrical ratings stated in literature and on nameplate must not be exceeded - overload on a switch can cause failure on the first cycle.

The electrical rating is rated to 5A resistive and 3A inductive at 30V DC; gold flashing over silver contact for loads down to 1mA at 24V DC.

Wiring Color Code	Terminals
Red	NO (NC under Pressure)
Black	NC (NO under Pressure)
White	Com

Supervisory pressure switches are connected in series to the control panel supervisory input.

Duct and Plenum Protection

The TANK Fire Suppression extinguishing system for duct and plenum coverage can be provided by independent fire suppression tanks and piping or integrated with the fire suppression tanks and piping used for protection of the appliances. Max of 5 nozzles per TANK for duct and plenum coverage only.

Plenum Protection

The nozzle (p/n 3070-3/8H-SS10) is used to protect plenum areas in both single bank and V-bank plenum configurations. The nozzle will protect up to a 4' wide x 10' long plenum section. For larger plenum areas, additional nozzles are added as required, with each nozzle protecting no more than a 4' wide by 10' long plenum section. Nozzles may be installed pointing in the same direction, and/or at opposite ends of the plenum, pointing toward each other. The nozzles must not be installed back-to-back when protecting plenum areas. When positioned at the end of the plenum, nozzles must be installed from 0 to 6" into plenum.

If the riser is not centered on the plenum, the plenum nozzle is placed on the side of the plenum closest to the riser.

The nozzle locations for plenum protection are shown in **Figure 16** and **Figure 17**.

Figure 16 - Single Bank Filter Plenum

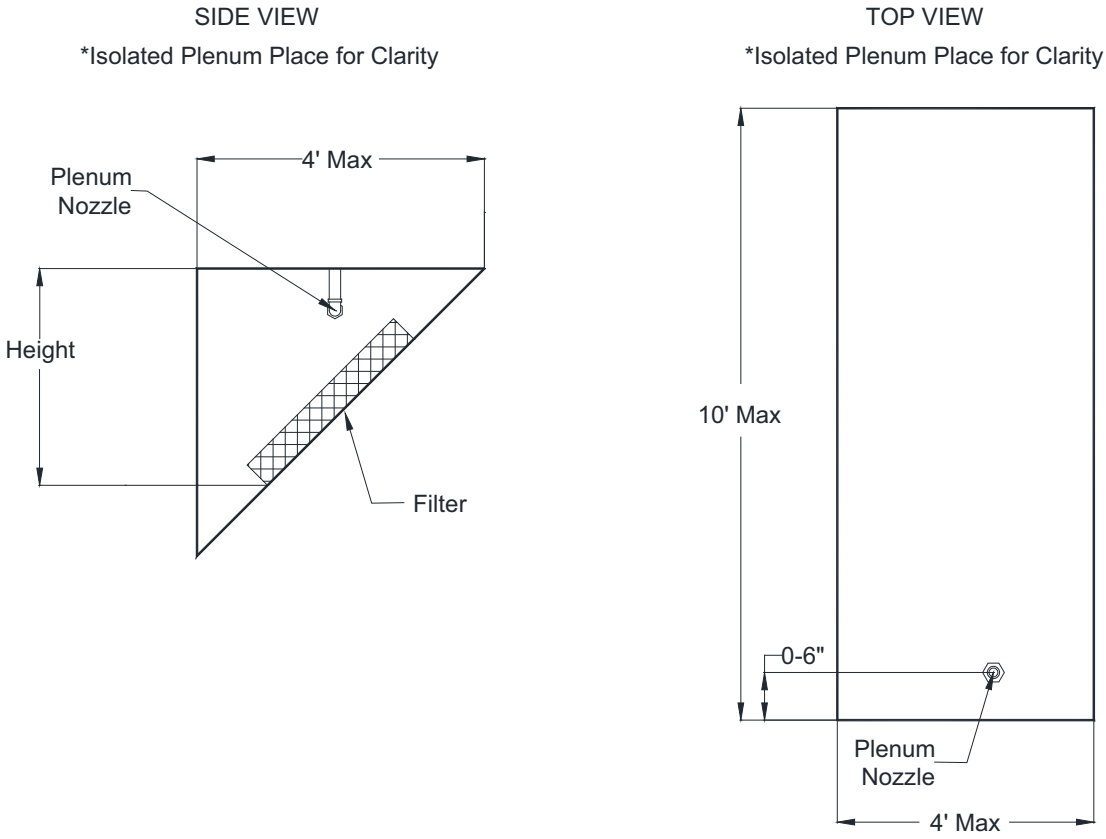
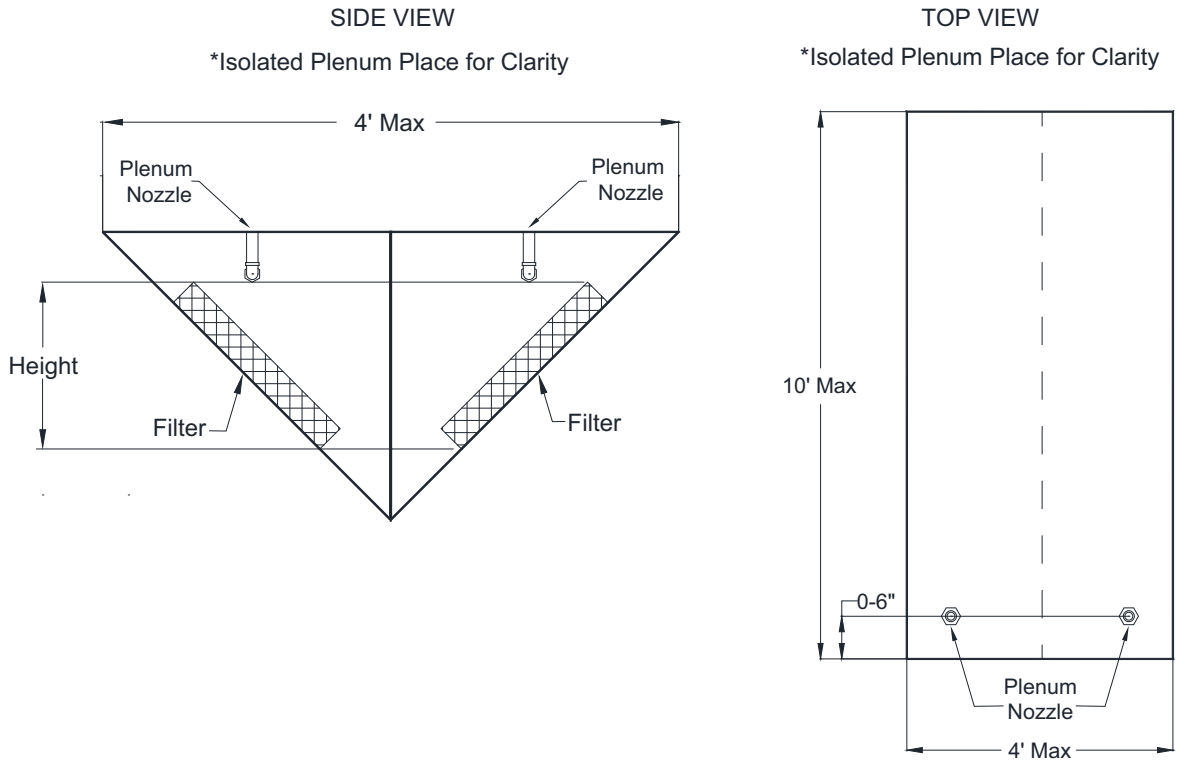


Figure 17 - Dual V-Bank Filter Plenum



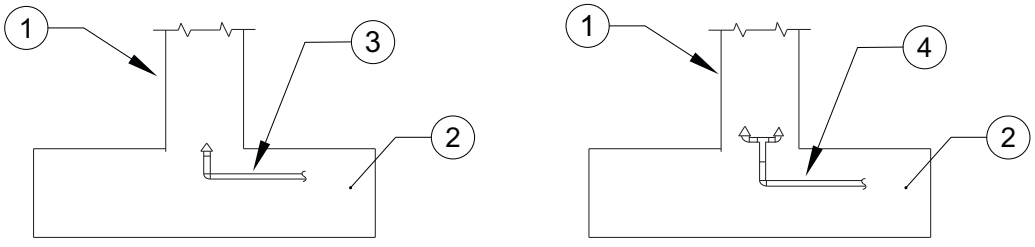
Duct Protection

The nozzle (p/n 3070-3/8H-SS10) is used for the protection of exhaust ductwork and can protect any duct cross-section type (e.g. round, square, or rectangular). A sufficient quantity of nozzles must be provided to ensure that no single nozzle coverage exceeds 75" in perimeter.

A single nozzle will protect a duct up to 75” perimeter (18” nominal diameter) and unlimited length. Two nozzles are required for protection of 75-150” perimeter and unlimited length. A minimum of 3 nozzles is required for protection of ducts exceeding 150" perimeter (36” nominal diameter) and unlimited length.

When using multiple nozzles (modular protection), the coverage area for each nozzle must not exceed 75" perimeter.

Figure 18 - Nozzle Duct Protection



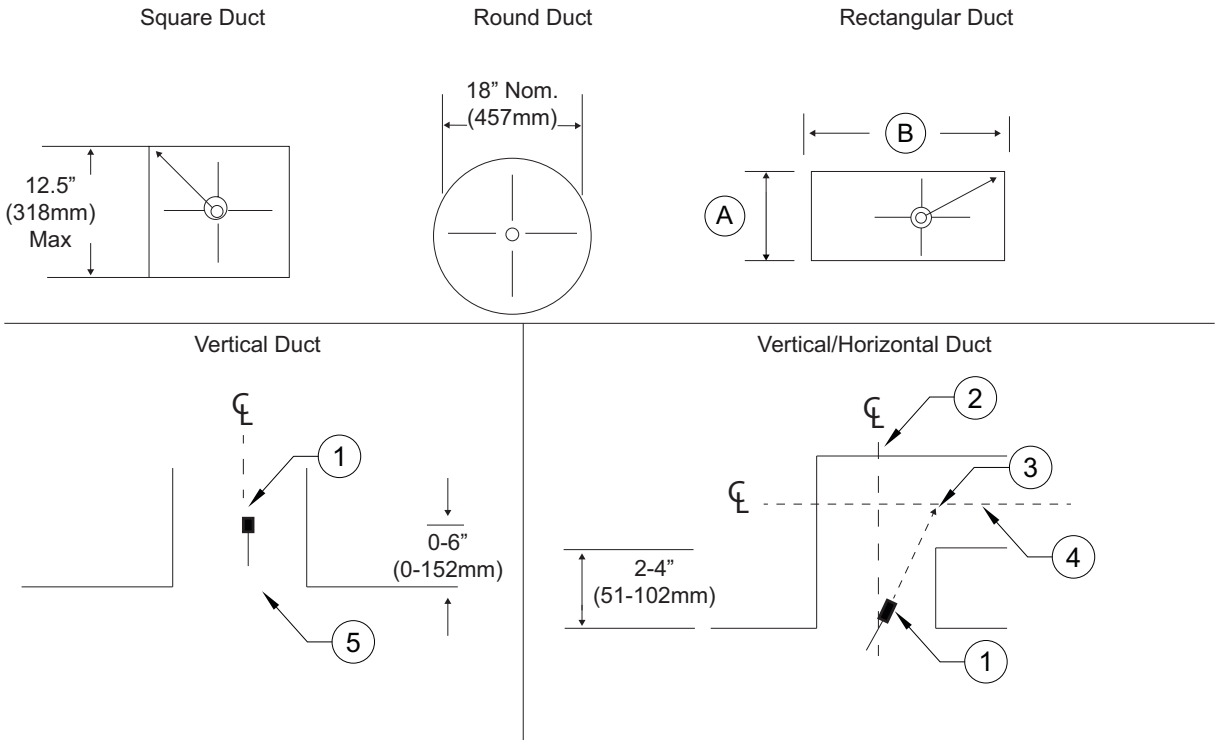
1. Duct
2. Hood
3. Single Nozzle
4. Dual Nozzle

Nozzles must be installed from 0" to 6" into the protected area of the duct. When more than one nozzle is required (modular protection), each nozzle must be located at the center of its protected module area. Additional nozzles are not required for changes in direction*. Duct obstructions and common ductwork must be protected in accordance with this manual, NFPA 17A and NFPA 96.

The nozzle location and aim for duct protection are shown in **Figure 19** and **Figure 20**.

*When a change in direction occurs less than 6" from the duct entrance, the nozzle must be aimed as shown in **Figure 19** and **Figure 20**.

Figure 19 - Single Nozzle Placement (0-75” Perimeter Duct)

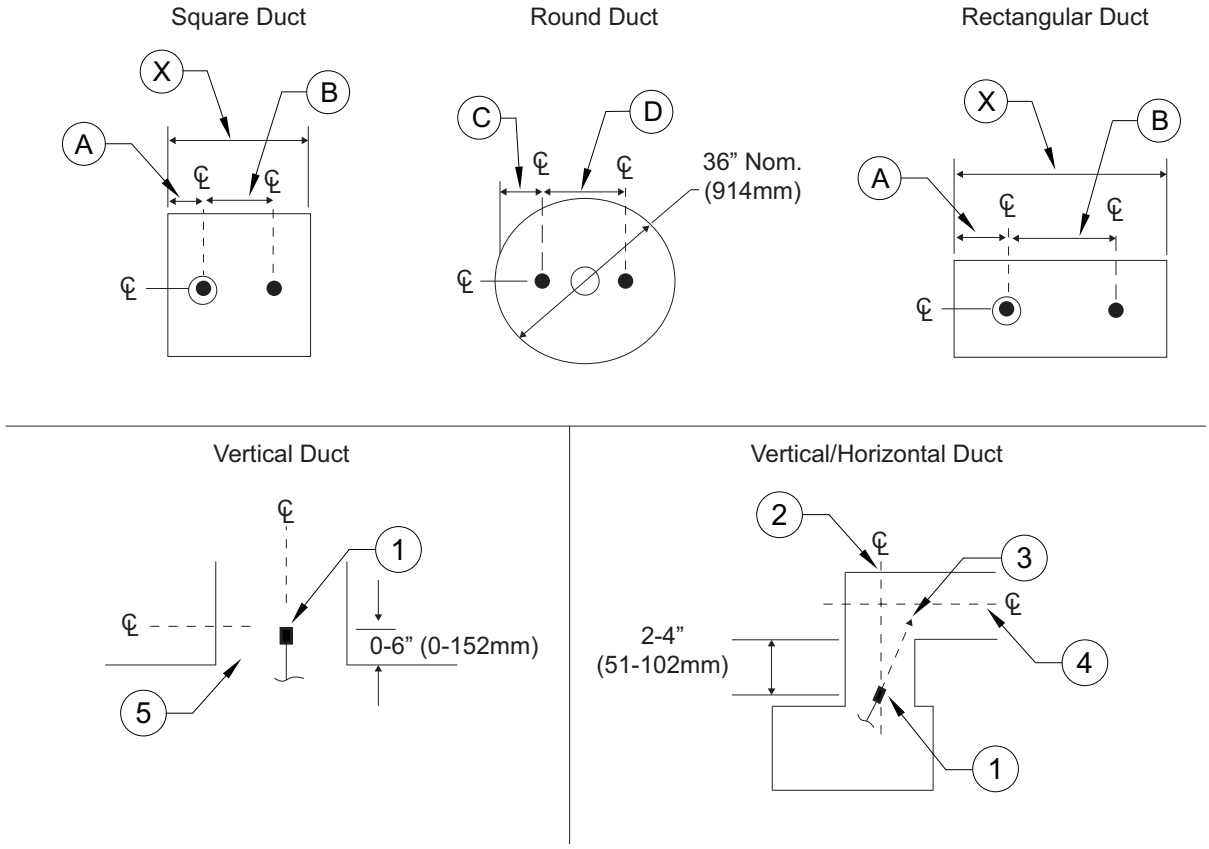


1. Nozzle
2. Horizontal Duct Centerline (CL)
3. Aim Point
4. Vertical Duct Centerline (CL)
5. Duct Entrance

A. Rectangular Duct Width
B. Rectangular Duct Length

- Duct perimeter up to and including 75” (1270mm).
- To determine the perimeter: 2(A) + 2(B) = 75” (1905 mm).

Figure 20 - Dual Nozzle Placement (75-150” Perimeter Duct)



1. Nozzle
2. Vertical Duct Centerline (CL)
3. Aim Point
4. Horizontal Duct Centerline (CL)
5. Duct Entrance

A. 1/4 of dimension X
B. 1/2 of dimension X
C. 1/4 of Duct Diameter
D. 1/2 of Duct Diameter

Ventilation Exhaust and Dampers

The TANK Fire Suppression extinguishing system can be used with the exhaust fan either on or off when the system is discharged. It is recommended that the exhaust fan remain on at the time of discharge to aid in the removal of smoke, gases, and other airborne materials from the hazard area in the event of a fire. If the Authority Having Jurisdiction (AHJ) requires that the damper closes in the event of a fire system discharge, the system designer shall provide for protection downstream of the damper in compliance with NFPA 96, local codes, and/or as approved by the AHJ.

Electrostatic Precipitators (ESP)

An Electrostatic Precipitator (ESP) is designed to remove smoke and other airborne contaminants from the air flowing through the exhaust ductwork as a means of pollution control. Exhaust ductwork using ESPs requires nozzle(s) (p/n 3070-3/8H-SS10) upstream, before the ESP. Distribution piping to the nozzles must not interfere with the function of the ESP unit.

A Pollution Control Unit (PCU) and/or Electrostatic Precipitator (ESP) covered with this fire system can utilize up to 12 nozzles per tank.

Appliance Protection

The TANK Fire Suppression system utilizes both overlapping and dedicated nozzle appliance coverage, depending on the type of cooking appliance(s) requiring protection. Dedicated and overlapping nozzles use p/n 3070-3/8H-SS10.

Overlapping appliance coverage allows a given area under the hood, defined as the hazard zone, to be protected by overlapping nozzles. Nozzles are evenly spaced at the same height and alignment (front-to-back) relative to the hazard zone.

Dedicated appliance protection utilizes a nozzle, or nozzles, for protection of an individual appliance.

Overlapping, dedicated appliance, plenum, and duct protection may be incorporated in a single pipe network on the TANK Fire Suppression extinguishing system, as long as the number of nozzles per tank does not exceed five.

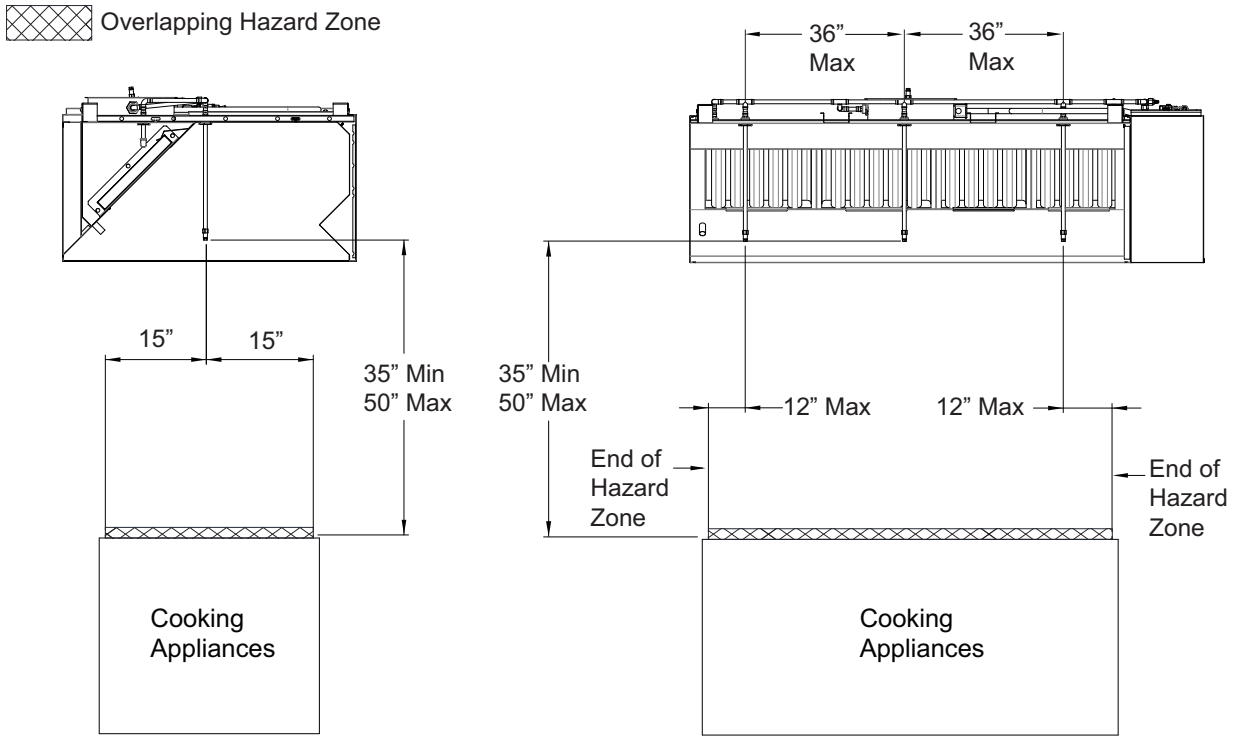
The following sections detail the different nozzle coverage and placement parameters for overlapping and dedicated nozzle appliance protection methodologies. Double row coverage is allowed fro TANK with solid-fuel appliances.

Overlapping Appliance Protection

A single hazard zone utilizing overlapping coverage is 30” deep, by the total length of the cooking surface of the protected appliances. The cooking surfaces of all appliances protected by overlapping nozzles must be located within the defined hazard zones. Cooking appliances eligible for overlapping protection are outlined in **Table 3 on page 19**. The lowest and highest cooking surfaces will determine the height of the fire suppression nozzles. All overlapping nozzles must be mounted at the same height in a single hazard zone.

For applications where overlapping protection cannot be used, such as an upright boiler, dedicated appliance protection must be used.

Figure 21 - Overlapping Protection Option



Appliance Coverage

Table 3 illustrates the maximum permitted cooking surface dimensions of each appliance that can be protected within a single overlapping zone. It is important to note that the cooking surface (area requiring protection) is different than the total appliance size.

Table 3 - Standard Overlapping Protection 5 nozzles per tank (20 flow points), 36” nozzle spacing

Hazard	Fuel Source	Maximum Depth of Cooking Surfaces	Maximum Length of Cooking Surfaces	Maximum Height of Fuel
Multi Vat Fryer (3) (with or w/o Drip-board)	Gas or Electric	30” deep	Unlimited	N/A
Split Vat Fryer, (3) (with or w/o Drip-board)	Gas or Electric	30” deep	Unlimited	N/A
Tilt Skillet	Gas or Electric	30” deep	Unlimited	N/A
Griddle	Gas or Electric	30” deep	Unlimited	N/A
Gas/Electric Radiant Charbroiler	Gas or Electric	30” deep	Unlimited	N/A
Upright Charbroiler/ Salamander, Chain*	Gas or Electric	30” deep	Unlimited	N/A
Appliance w/o Shelf/Obstruction*	Gas or Electric	30” deep	Unlimited	N/A
Wok	Gas or Electric	11-24” diameter	11-24” diameter	6-3/4” deep

Notes:

1. All dimensions shown are based on overlapping protection.
2. All dimensions and areas shown reference the cooking surface of the appliance, which is typically smaller than the outside dimensions of the appliance itself.
3. For multi-vat fryers, no single fryer module (vat & drip board) can exceed the above limitations.
4. Protection for tilt skillets and braising pans are to be based on the coverage parameters provided for fryer protection. Tilt skillets should be placed at the back of the hazard zone. Tilt skillet coverage must not interfere with the edge of the nozzle discharge pattern.
5. All appliance hazard surfaces must be located within the hazard zone.
6. Smaller appliances can be positioned anywhere in the zone (e.g., moved left, right, forward, or backward, provided the cooking hazard does not extend beyond the perimeter of the zone).
7. When the depth of the appliance exceeds maximum cooking hazard dimensions, a second row of nozzle coverage should be added.

Figure 21 illustrates the placement of nozzles for TANK Fire Suppression overlapping protection.

Appliances denoted with an (*) require dedicated coverage. Refer to **“Upright Broiler/Salamander Protection” on page 25** and **“Appliance with Shelf” on page 26** for details.

Coverage Exceptions

Table 4 - Overlapping Protection 4 nozzles per tank (20 flow points), 30” nozzle spacing

Hazard	Fuel Source	Maximum Depth of Cooking Surfaces	Maximum Length of Cooking Surfaces	Maximum Height of Fuel
Deep Fat/Industrial Fryer (with or w/o Drip-board)	Gas or Electric	34” deep	Unlimited	N/A
Tilt Skillet	Gas or Electric	34” deep	Unlimited	N/A
Wok	Gas or Electric	Greater than 24”, up to 30” diameter	30 inch diameter	9-1/2” deep

Deep Fat/Industrial Fryer/Tilt Skillets over 14” wide and up to 34” max depth will be overlapping with 4 nozzles per tank, 30” spacing. Max oil capacity: 24.75 gallons.

Table 5 - Appliances using 3 nozzles per tank, 24” nozzle spacing

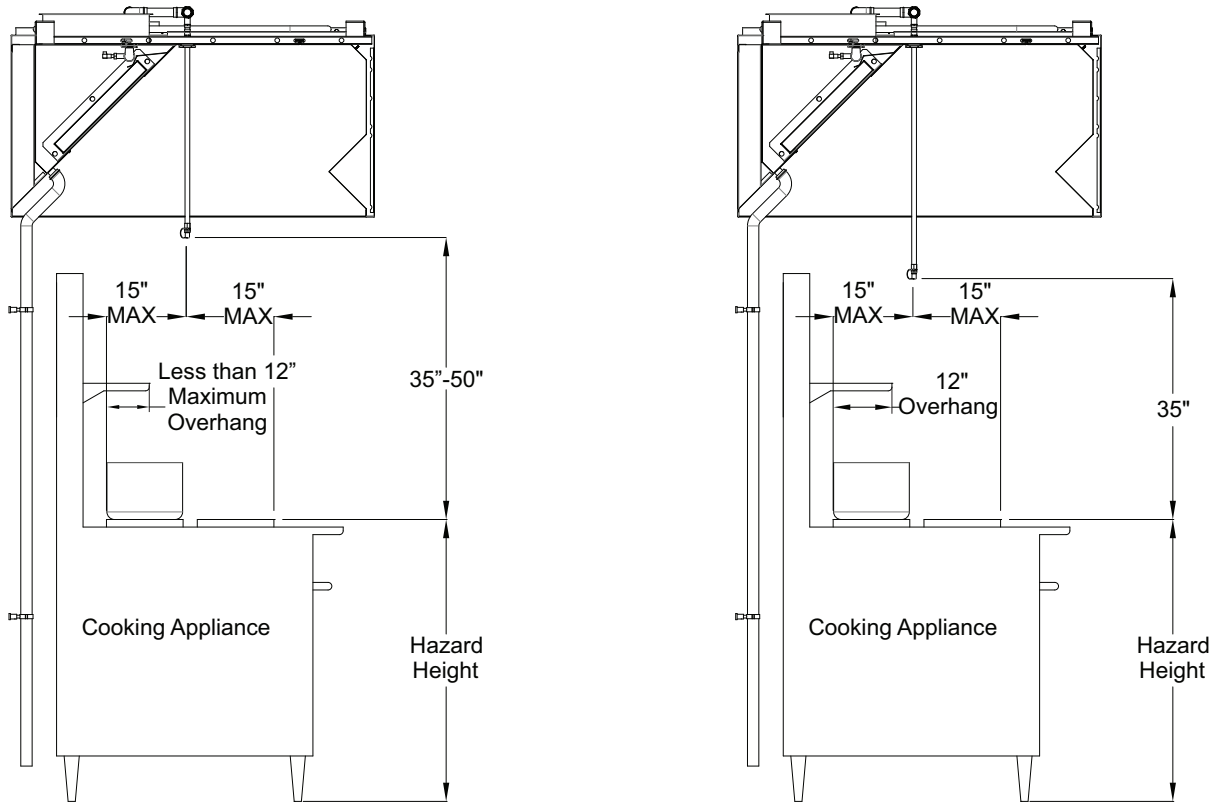
Hazard	Fuel Source	Maximum Depth of Cooking Surfaces	Maximum Length of Cooking Surfaces	Maximum Height of Fuel
Natural Charcoal Broiler	Charcoal	30” deep	Unlimited	4”
Solid Fuel Charbroiler	Mesquite or Hardwood	30” deep	Unlimited	6”
Lava Rock Charbroiler	Gas or Electric	30” deep	Unlimited	3” Depth

Table 6 - Appliance with Back Shelf 4 nozzles per tank (20 flow points), 36” nozzle spacing

Hazard	Fuel Source	Maximum Depth of Cooking Surfaces	Maximum Length of Cooking Surfaces	Maximum Height of Fuel
Less than 12” Back Shelf	Gas or Electric	30” deep	Unlimited	N/A
12” Back Shelf	Gas or Electric	30” deep	Unlimited	N/A

- Shelves or protrusions from appliances measuring 6” or less are not considered shelves, standard overlapping coverage applies. Refer to **Table 3 on page 19**.
- Shelves or obstructions greater than 6” and up to 12” require 4 nozzles per tank, 36” nozzle spacing.
- Shelves exactly at 12” depth require 35” distance from nozzle tip to cooking surface. Shelves less than 12” may use nozzle distance from cooking surface of 35” to 50”, every effort should be taken to minimize nozzle spray pattern obstruction with the shelf.

Figure 22 - Appliance with Back Shelf Options



Overlapping Protection

Standard overlapping protection is 5 nozzles (20 flow points) at 36” spacing. Exceptions are noted below. All overlapping nozzles must be spaced no more than 12” from each end of the appliance, and located at the centerline of the 30” hazard zone (front to back), at the same height, and aimed straight down. The nozzle height must be 35” to 50” above the appliance cooking surface, except for woks, where the height is measured 3 inches below the top rim of the wok. The nozzles must be positioned along the total hazard zone length to allow protection of each appliance in the hazard zone.

Exceptions to standard overlapping protection:

- Large/Industrial fryers over 14” wide, 4 nozzles at 30” nozzle spacing per tank.
- Woks larger than 24 inch diameter, 4 nozzles at 30” spacing per tank.
- Appliance with shelves, 4 nozzles at 36” spacing per tank.
- Solid Fuel Appliances, 3 nozzles at 24” spacing per tank.

Refer to **“Coverage Exceptions” on page 20** for more information.

Overlapping Coverage - Group Protection

Overlapping protection provides coverage for a continuous hazard zone, with all nozzles at consistent position (i.e., zone centerline), spacing, and height.

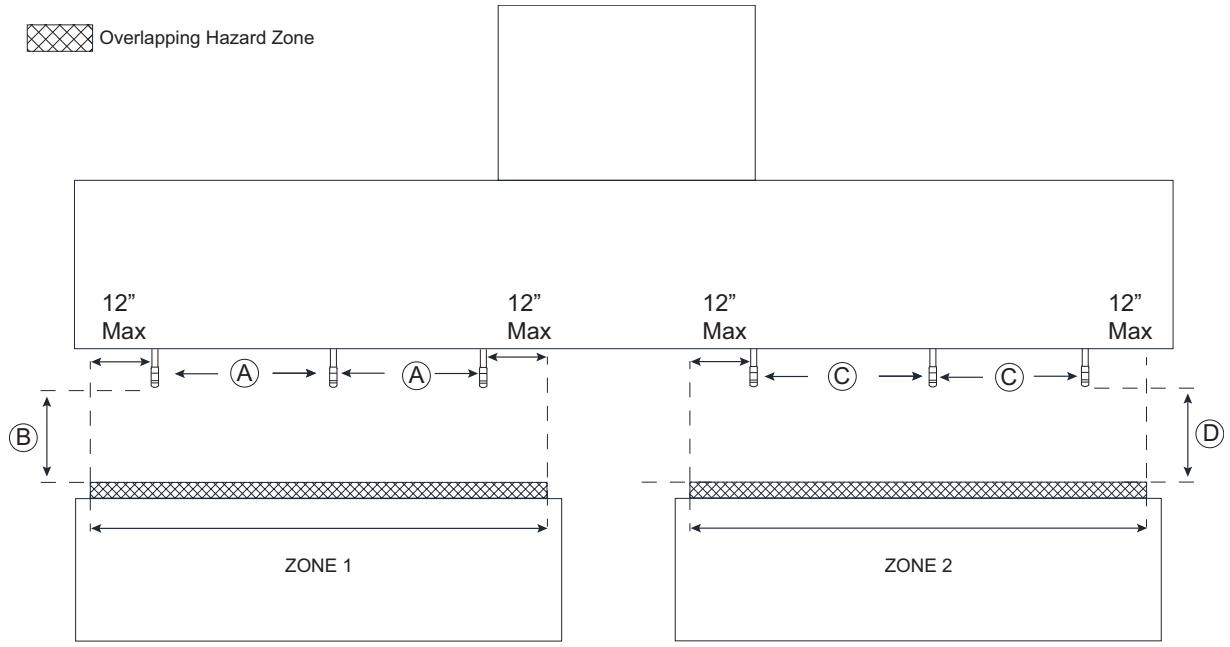
When there is an area within a hazard zone for which continuous overlapping coverage is not applicable, the overlapping protection zone must be ended, and a new zone started for the new group of appliances. Examples where continuous protection is interrupted, include a counter, storage or prep area, appliance not requiring protection (e.g., enclosed oven) or an appliance requiring dedicated appliance coverage.

The examples on **page 23** through **page 24** provide details of group overlapping protection for interrupted zones. This section illustrates the methodology for defining when a new hazard zone is required, as described above. For specific overlapping coverage parameters (e.g., nozzle spacing and height requirements).

Group Protection Example 1 – Appliance line separated by unprotected space.

End nozzles must be located 12” or less (horizontally) from the end of the hazard zone. Standard overlapping nozzles must be spaced no further than the maximum allowed interval 36” on center. Refer to **“Coverage Exceptions” on page 20** for more details on coverage exceptions.

Figure 23 - Example 1

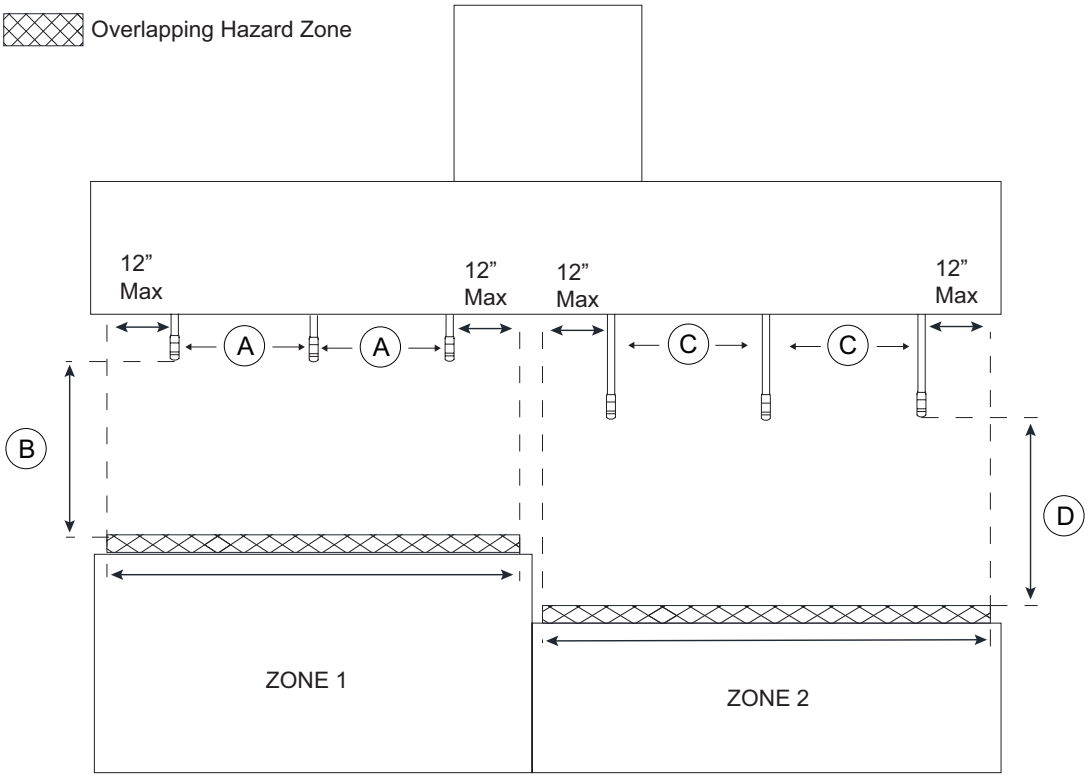


A. Zone 1 Overlapping Nozzle Spacing
B. Zone 1 Overlapping Nozzle Height
C. Zone 2 Overlapping Nozzle Spacing
D. Zone 2 Overlapping Nozzle Height

NOTE: Overlapping nozzle spacing and height requirements are based on the appliances protected for each individual zone. Nozzles must always be located at the start and end of each zone, no more than 12” from the end of the hazard zone (edge of 1st/last cooking appliance surface). Refer to “Overlapping Appliance Protection” on page 18. Zones cannot overlap.

Example 2 – Appliance lines with overlapping nozzles at different heights

Figure 24 - Example 2



A. Zone 1 Overlapping Nozzle Spacing
B. Zone 1 Overlapping Nozzle Height
C. Zone 2 Overlapping Nozzle Spacing
D. Zone 2 Overlapping Nozzle Height

NOTE: All hazard surfaces in a zone must be within 35"-50" of the nozzles in that zone.

NOTE: Overlapping nozzle spacing and height requirements are based on the appliances protected for each individual zone. Nozzles must always be located at the start and end of each zone, no more than 12" from the end of the hazard zone (edge of 1st/last cooking appliance surface). Refer to "Overlapping Appliance Protection" on page 18.

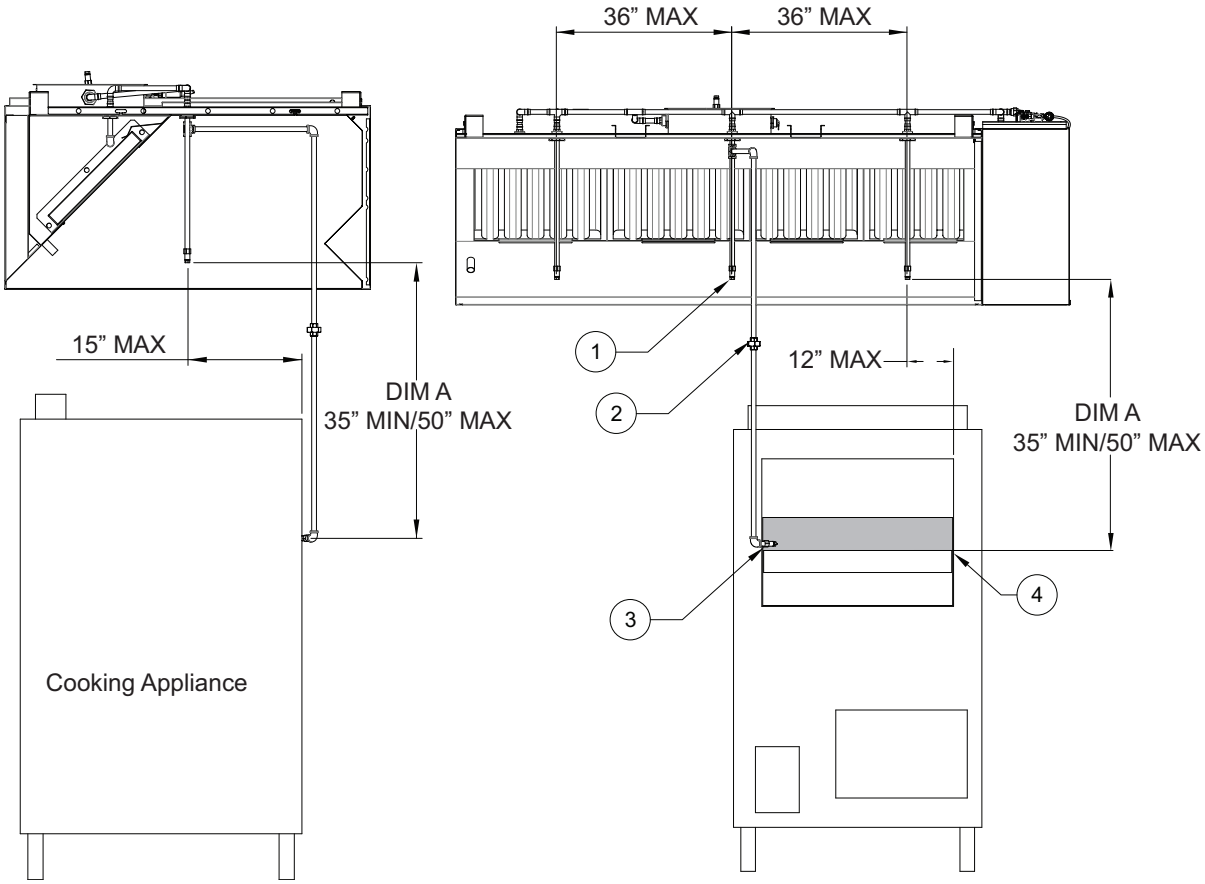
Upright Broiler/Salamander Protection

Upright broilers, chain broilers, and cheesemelters have specific coverage requirements. Unlike appliances with an exposed flat cooking surface, these appliances have an internal cooking surface and only have a small opening in the face or end of the appliance.

To cover the internal hazard posed by these appliances, a nozzle must be placed at the opening and aimed at the opposite rear corner of the appliance. This nozzle must be branched off one of the nozzle drops and piped to the appliance opening. **No more than 2 nozzles per drop.** The drawing below illustrates how this should be accomplished. Should the cooking surface of the appliance exceed 1,050 in^2, an additional nozzle will be required on the opposite of the appliance for added fire protection. Refer to **Figure 25** for details.

1. Pipe and fittings above the hood will be 1/2” copper pipe/Pro-Press, Grade L copper tubing and copper Pro-Press fittings.
2. Pipe and fittings inside the hood capture volume will be 3/8” NPT stainless steel or chrome-plated black iron. No sleeving permitted.
3. Nozzle Part Number: 3070-3/8H-SS10. Nozzle heights above hazard zone (DIM A).
4. In addition to Standard Overlapping Protection, additional nozzles may be utilized for supplemental appliance specific protection. No more than two (2) nozzles may be used on a single drop.
5. Appliance drop fittings may be sealed with pipe dope or Teflon tape.

Figure 25 - Broiler/Salamander Protection



1. Nozzle
2. Install union in pipe leading to nozzle to allow for appliance removal and cleaning.
3. Nozzle aimed at opposite interior corner of appliance.
4. Hazard Zone

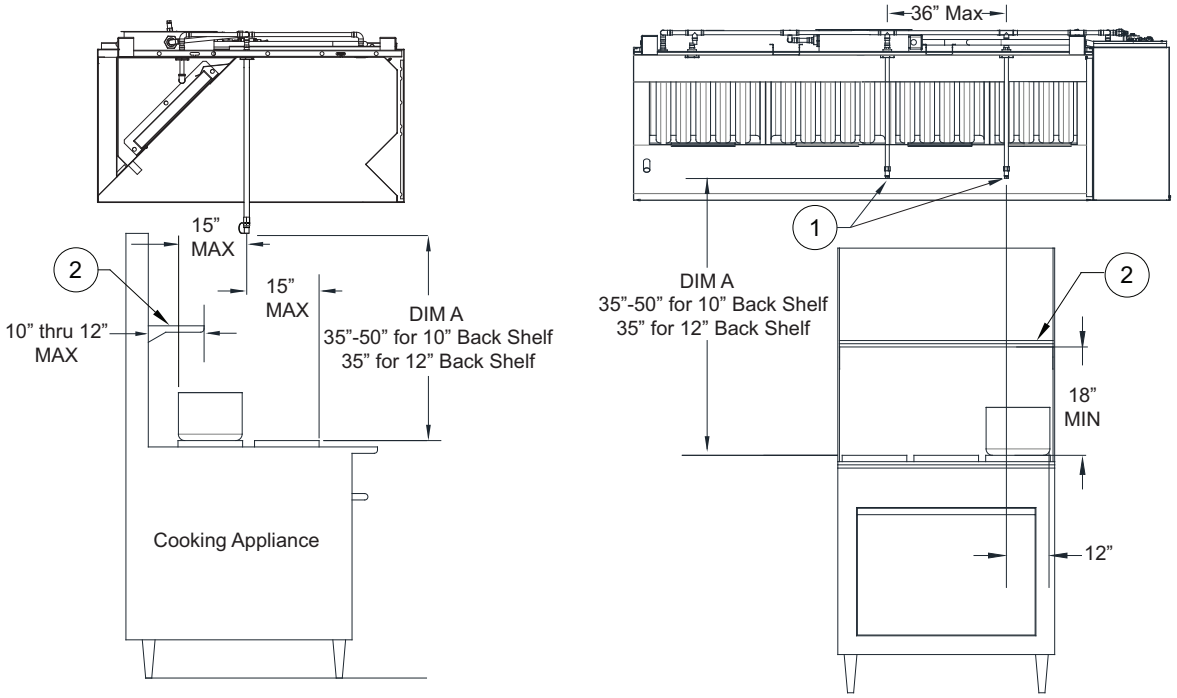
Appliance with Shelf

Appliance top cooking equipment are available with multiple burner assemblies. Some appliances are equipped with shelving behind the appliance for additional storage. **Figure 26** illustrates the shelf cannot overhang the appliance more than 10-12” from the back of the hazard zone.

All dimensions fixed unless otherwise noted (e.g., min/max).

1. Pipe and fittings above the hood will be 1/2” copper pipe/Pro-Press, Grade L copper tubing/fittings.
2. Pipe and fittings inside the hood capture volume will be 3/8” NPT stainless steel or chrome-plated black iron. No sleeving permitted.
3. Nozzle Part Number: 3070-3/8H-SS10. Nozzle heights above hazard zone (DIM A).
4. Appliance drop fittings may be sealed with pipe dope or Teflon tape.

Figure 26 - Appliance Top with Shelf



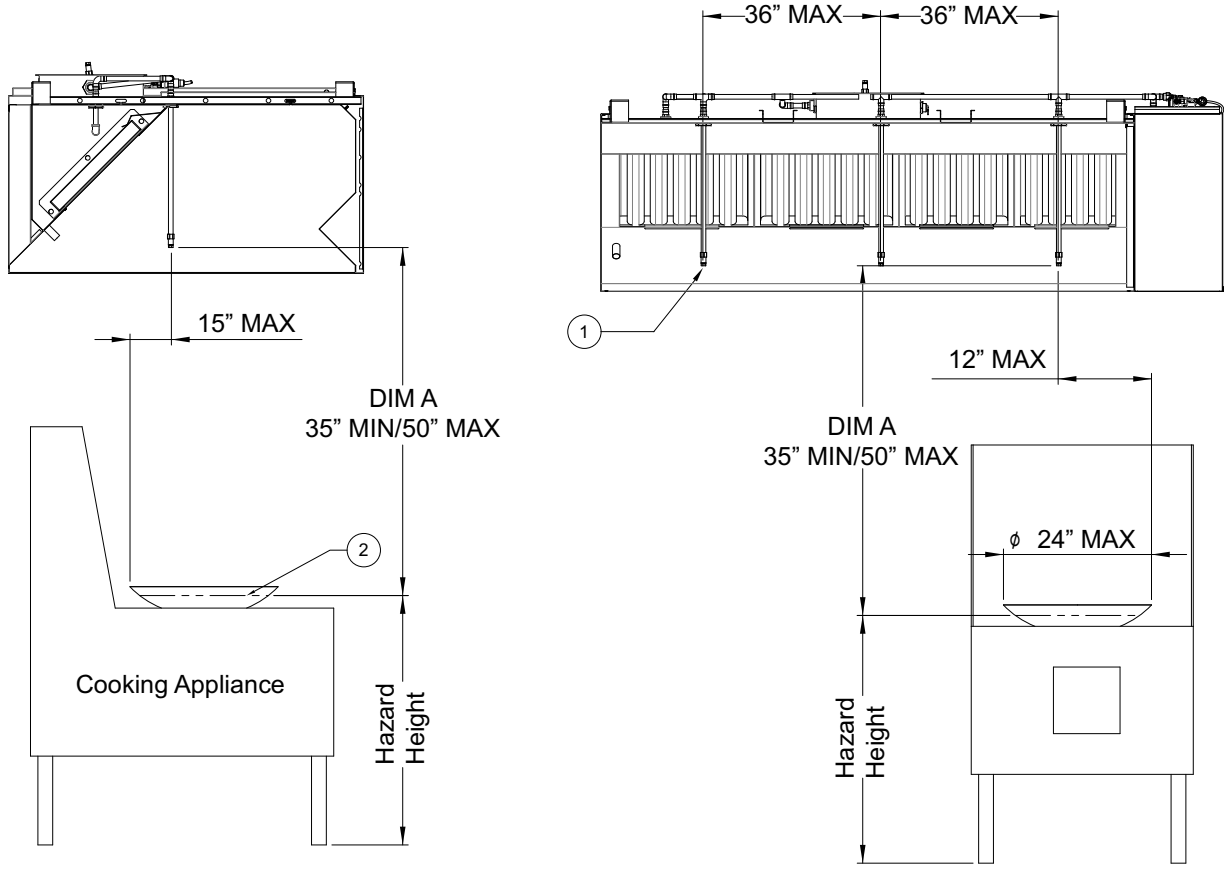
1. Nozzle (p/n 3070-3/8H-SS10)
2. Shelf - 10” through 12” maximum distance from the rear edge of the cooking hazard to the front edge of the shelf.

Wok Protection

Nozzle for Wok protection must be located within 12” from the left or right of the Wok and 15” from the front or back of the Wok. The Wok diameter range for protection is 11” to 24” diameter.

1. Pipe and fittings above the hood will be 1/2” copper pipe/Pro-Press, Grade L copper tubing/fittings.
2. Pipe and fittings inside the hood capture volume will be 3/8” NPT stainless steel or chrome-plated black iron. No sleeving permitted.
3. Nozzle Part Number: 3070-3/8H-SS10. Nozzle heights above hazard zone (DIM A).
4. Install drops at 36” maximum spacing. Drops must be installed with an internal pipe wrench or other no-marring pipe tool.
5. Appliance drop fittings may be sealed with pipe dope or Teflon tape.

Figure 27 - Wok Diameter Protection (up to 24”)



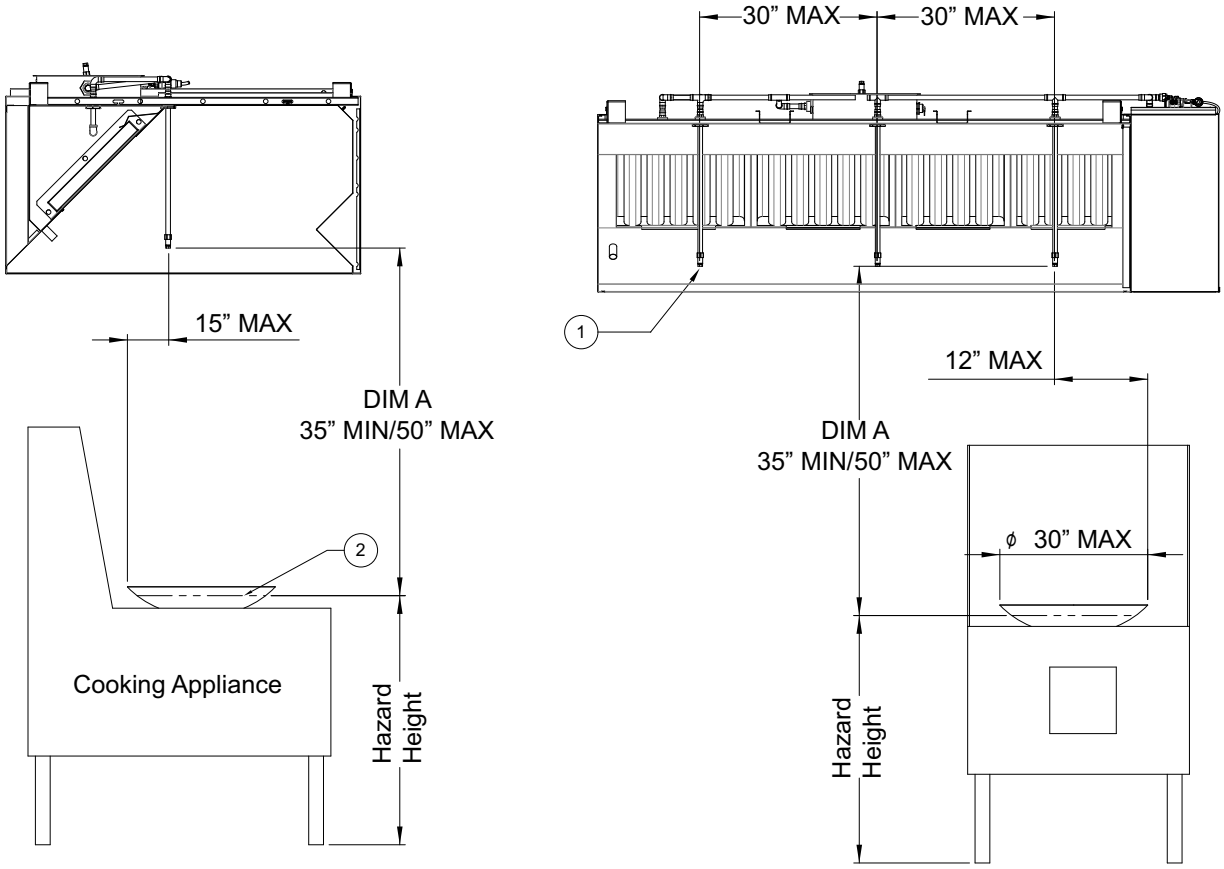
1. Nozzle (p/n 3070-3/8H-SS10)
2. UL300 defines the wok cooking surface as 3” below the rim of the wok.

Large Wok Protection

Nozzle for Wok protection must be located within 12” from the left or right of the Wok and 15” from the front or back of the Wok. The Wok diameter range for protection is 30” diameter. 4 nozzles per tank, 30” nozzle spacing

1. Pipe and fittings above the hood will be 1/2” copper pipe/Pro-Press, Grade L copper tubing/fittings.
2. Pipe and fittings inside the hood capture volume will be 3/8” NPT stainless steel or chrome-plated black iron. No sleeving permitted.
3. Nozzle Part Number: 3070-3/8H-SS10. Nozzle heights above hazard zone (DIM A).
4. Install drops at 30” maximum spacing. Drops must be installed with an internal pipe wrench or other no-marring pipe tool.
5. Appliance drop fittings may be sealed with pipe dope or Teflon tape.

Figure 28 - Wok Diameter Protection (up to 30”)



1. Nozzle (p/n 3070-3/8H-SS10)
2. UL300 defines the wok cooking surface as 3” below the rim of the wok.

Appliance with Upright Obstruction

Salamanders/Cheesemelters have specific coverage requirements, unlike appliances with an exposed flat cooking surface, these appliances have an internal cooking surface and only have a small opening in the face or end of the appliance.

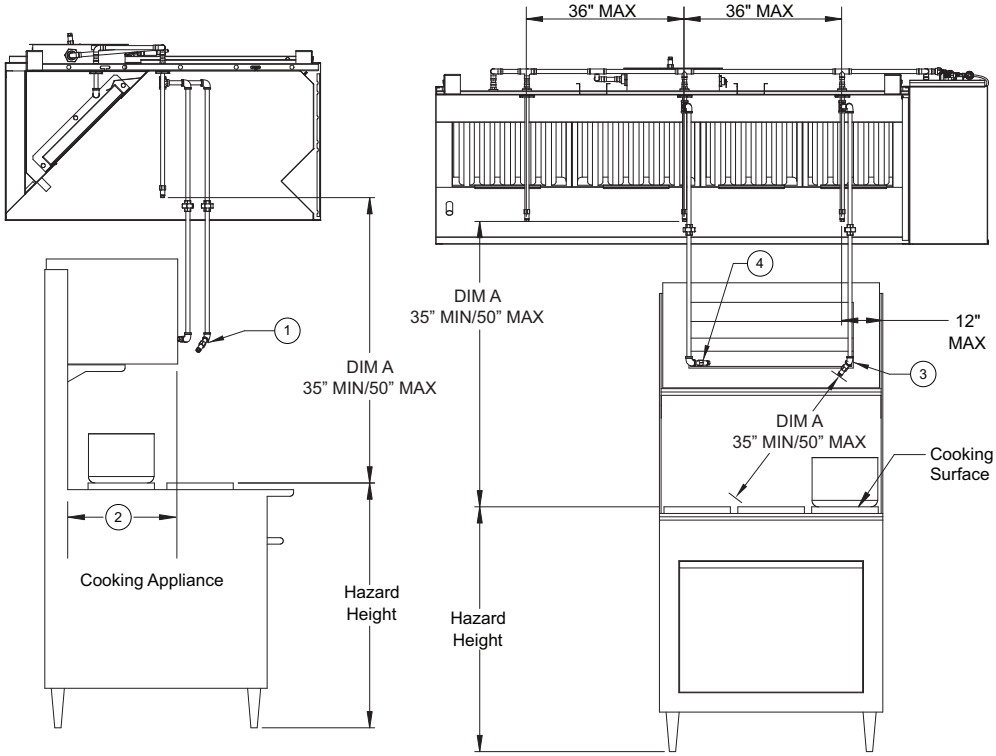
To cover the internal hazard posed by these appliances, a nozzle must be placed at the opening and aimed to the opposite rear corner of the appliance. This nozzle must be branched off one of the nozzle drops with a tee and piped to the appliance opening. No more than two nozzles can be utilized for a single drop. Should the cooking surface of the appliance exceed 1050 in^2, an additional nozzle will be required on the opposite side of the appliance for added fire protection, refer to **Figure 29**. Salamander/Cheesemelters should follow appliance coverage for **"Upright Broiler/Salamander Protection" on page 25**.

An additional nozzle must be piped from a nozzle drop nearest the appliance, to cover the hazard underneath the salamander. This nozzle is to be aimed at the centerline of the hazard zone, a minimum of 35"-50" away. **Overlapping coverage is required for appliance specific coverage**.

All dimensions fixed unless otherwise noted (e.g., min/max).

1. Pipe and fittings above the hood will be 1/2" copper pipe/Pro-Press, Grade L copper tubing/fittings.
2. Pipe and fittings inside the hood capture volume will be 3/8" NPT stainless steel or chrome-plated black iron. No sleeving permitted.
3. Nozzle Part Number: 3070-3/8H-SS10. Nozzle heights above hazard zone (DIM A).
4. In addition to Standard Overlapping Protection, additional nozzles may be utilized for supplemental appliance specific protection. No more than two (2) nozzles may be used on a single drop.
5. Appliance drop fittings may be sealed with pipe dope or Teflon tape.

Figure 29 - Appliance with Upright Obstruction



1. Nozzle (p/n 3070-3/8H-SS10)
2. Shelf/obstruction that extends more than 10-12" from the rear edge of the cooking hazard to the front edge of shelf/obstruction.
3. 45° Elbow
4. Nozzle, per Upright Broiler/Salamander protection

Agent Distribution Piping

The agent distribution piping shall be 3/8” NPT Schedule 40 black iron fittings or 1/2” Pro-Press copper fittings. Fittings shall be minimum class 150. The pipe for the nozzle drops cannot be sleeved in steel but can be made from polished stainless steel, or polished chrome-plated black iron.

Galvanize pipe or fittings must not be used. Pipe thread or compound should be used to help seal.

Distribution piping can be run in single cylinder or dual cylinder, manifold configurations. Refer to **page 31** for single cylinder configuration details. Refer to **page 36** for dual cylinder configuration details.

The distribution network consists of a supply line and all applicable branches depending on the protected hazards. Branch lines include the plenum branch, duct branch, overlapping nozzle appliance branch, and dedicated nozzle appliance branch.

The supply line is defined as the run of all pipe and fittings from the tank outlet to the last branch line, including fittings at the start of all branch lines. All branch lines start at the outlet of the applicable supply line fitting and do not include the supply tee.

A plenum branch is defined as the run of all pipe and fittings from the supply line tee outlet to the plenum nozzle(s).

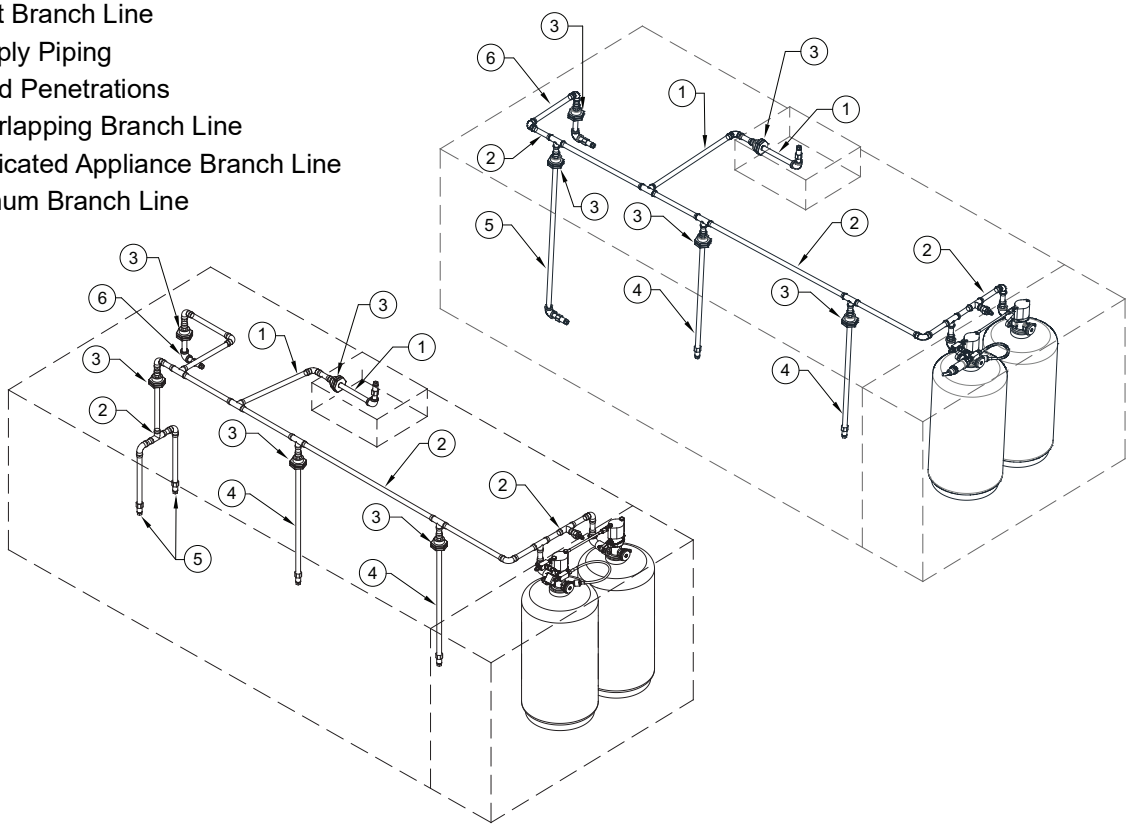
A duct branch is defined as the run of all pipe and fittings from the supply line tee outlet to the duct nozzle(s). Duct branch lines on risers greater than 75 inch perimeter can have a “tee” installed. Two separate duct branch lines are not required.

An overlapping nozzle appliance branch is defined as the run of all pipe and fittings from the supply line tee outlet to the nozzle.

A dedicated nozzle appliance branch is defined as the run of all pipe and fittings from the supply line tee outlet to the nozzle.

Figure 30 - Distribution Piping

1. Duct Branch Line
2. Supply Piping
3. Hood Penetrations
4. Overlapping Branch Line
5. Dedicated Appliance Branch Line
6. Plenum Branch Line



Single Cylinder Nozzle and Piping Parameters

A single cylinder supports up to 5 nozzles, 20 flow points‘. Max supply line up to 42 feet to the first overlapping nozzle.

Table 7 - Agent Distribution Piping Limitations for Single Cylinder System

Pipe Section	Max Pipe Length (ft)
Max Supply Line to First Overlapping Nozzle	42
Overlapping Nozzle Appliance Branch	10
Dedicated Nozzle Appliance Branch	10

Notes:

1. One (1) tee allowed per appliance drop.
2. No more than two nozzles can be utilized for a single appliance drop.
3. Additional elbows are permitted on branch lines, provided linear pipe length is reduced by corresponding equivalent length (1.3 ft per 90° elbow, 0.6 ft per 45° elbow).

For example: a 3/8” steel elbow has an equivalent length of 1.3 ft. An appliance branch may use 4 elbows, provided the total linear pipe is reduced by 1.3 ft (e.g., from 5 ft to 3.7 ft). Additional pipe cannot be added in lieu of fittings, as pipe volume limits could be exceeded.

4. Maximum 6 ft vertical rise of supply line above cylinder outlet.
5. Minimum 7 ft. of supply line to first overlapping nozzle.
6. If hoods are piped to the same TANK, the sum of piping between hoods plus distance to first overlapping nozzle should NOT exceed 42 feet.

Dual Cylinder Nozzle and Piping Parameters

A dual cylinder system supports up to 40 flow points and 10 nozzles. Dual cylinder can be piped in series or parallel. Max supply line up to 42 feet to the first overlapping nozzle.

Table 8 - Agent Distribution Piping Limitations for Dual Cylinder System

Pipe Section	Max Pipe Length (ft)
Max Supply Line to First Overlapping Nozzle	42
Overlapping Nozzle Appliance Branch	10
Dedicated Nozzle Appliance Branch	10

Notes:

1. One (1) tee allowed per appliance drop.
2. No more than two nozzles can be utilized for a single appliance drop.
3. Additional elbows are permitted on branch lines, provided linear pipe length is reduced by corresponding equivalent length (1.3 ft per 90° elbow, 0.6 ft per 45° elbow).

For example: a 3/8” steel elbow has an equivalent length of 1.3 ft. An appliance branch may use 4 elbows, provided the total linear pipe is reduced by 1.3 ft (e.g., from 5 ft to 3.7 ft). Additional pipe cannot be added in lieu of fittings, as pipe volume limits could be exceeded.

4. Maximum 6 ft vertical rise of supply line above cylinder outlet.
5. Minimum 7 ft. of supply line to first overlapping nozzle.
6. If hoods are piped to the same TANK, the sum of piping between hoods plus distance to first overlapping nozzle should NOT exceed 42 feet.

Nozzle Installation

Distribution piping and nozzles are factory-installed. Verify that the nozzles and distribution network are installed in accordance with the design and installation parameters for all protected hazards, as set forth in this manual.

NOTE: The TANK Fire Suppression extinguishing system design must be reviewed if any hazard changes have been made, including (but not limited to): appliance type, appliance sizes, appliance location, factory pre-piping or nozzles, plenum size or configuration, and duct size or configuration.

1. Ensure nozzles are securely installed. DO NOT OVERTIGHTEN.

NOTE: Do not over-tighten or nozzles may be damaged.

2. Ensure all nozzle types, placement, and aim are in accordance with the limitations in this manual. Nozzles can be used to achieve proper aim on dedicated appliance protection nozzles only.
3. Refer to **Figure 6 on page 7** for details on nozzle(s).

Gas Shut-Off Valves

The electric gas valve is held open in the energized state, and closes when de-energized via the output relay of the control panel. A listed manual reset relay is required to ensure manual reset prior to fuel being restored in accordance to NFPA17A.

Gas valves (**Figure 31**) are designed to shut off the flow of gas to the kitchen appliances in the event of fire system activation. Electric gas shutoff valves must be installed with an upstream strainer to prevent debris from prohibiting gas valve function. New pipe, properly reamed and cleaned of metal burrs, should be used. Proper care is needed to ensure that the gas flow is in the same direction as indicated on the gas valve and strainer. Do not over-tighten pipe connections. Apply pipe dope to the male threads only. If necessary, install a drip leg in the gas line in accordance with the Authority Having Jurisdiction (AHJ).

120V AC gas valves 3/4” - 2” can be mounted with the solenoid in any position above horizontal.

120V AC gas valves 2-1/2” - 3” must be mounted with the solenoid vertical and upright. The pipe must be horizontal.

All **24V DC** gas valves must be mounted with the solenoid vertical and upright. The pipe must be horizontal.

Proper clearance must be provided in order to service the strainers. A minimum of 4” clearance distance must be provided at the base of the strainer.

Figure 31 - Electric Gas Valve

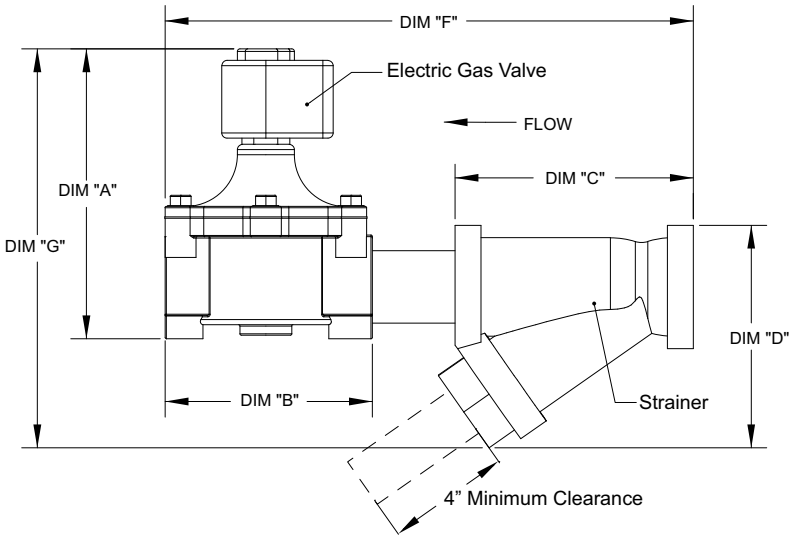


Table 9 - Gas Valve Details

Gas Valve (ASCO)	Strainer	Size	DIM “A”	DIM “B”	DIM “C”	DIM “D”	DIM “F”	DIM “G”
8214235	4417K64	3/4”	6-15/16”	5-15/16”	4”	4-1/2”	11-15/16”	9-7/8”
8214250	4417K65	1”	6-15/16”	5-15/16”	4-7/8”	5-3/16”	12-13/16”	10-11/16”
8214265	4417K66	1-1/4”	7-5/8”	6-3/8”	5-1/8”	5-15/16”	13-1/2”	12-1/16”
8214275	4417K67	1-1/2”	7-5/8”	6-3/8”	5-3/4”	6-3/16”	14-1/8”	12-5/16”
8214280	4417K68	2”	7-5/8”	6-3/8”	7-1/4”	7-13/16”	15-5/8”	13-15/16”
8214290	4417K69	2-1/2”	10-5/16”	8-1/16”	8-7/8”	9-7/8”	18-15/16”	18-5/8”
8214240	4417K71	3”	10-5/16”	8-1/16”	10”	10-15/16”	20-1/16”	19-11/16”

Fire Protection System Firestat

The Firestat is a device installed in the riser of the hood, at the duct connection, that measures temperature. The standard temperature setting is 360°F. Depending on heat produced by appliance, a higher rated temperature Firestat will be required. If a temperature higher than the setpoint is sensed, the Firestat contacts will close and energize the electrical control board. The fire system will activate.

The Firestat has 2 black wires and 2 white wires. These wires must be connected to the supervised loop. Use high-temperature wiring when installing Firestat components. Wago connectors (part number: 221-412) must be used.

Multiple sensors are wired in parallel in the supervised loop. The Firestat may be installed on the opposite side of the quick seal for access in the duct.

Non-Solid Fuel Appliances (Rated 450°F)

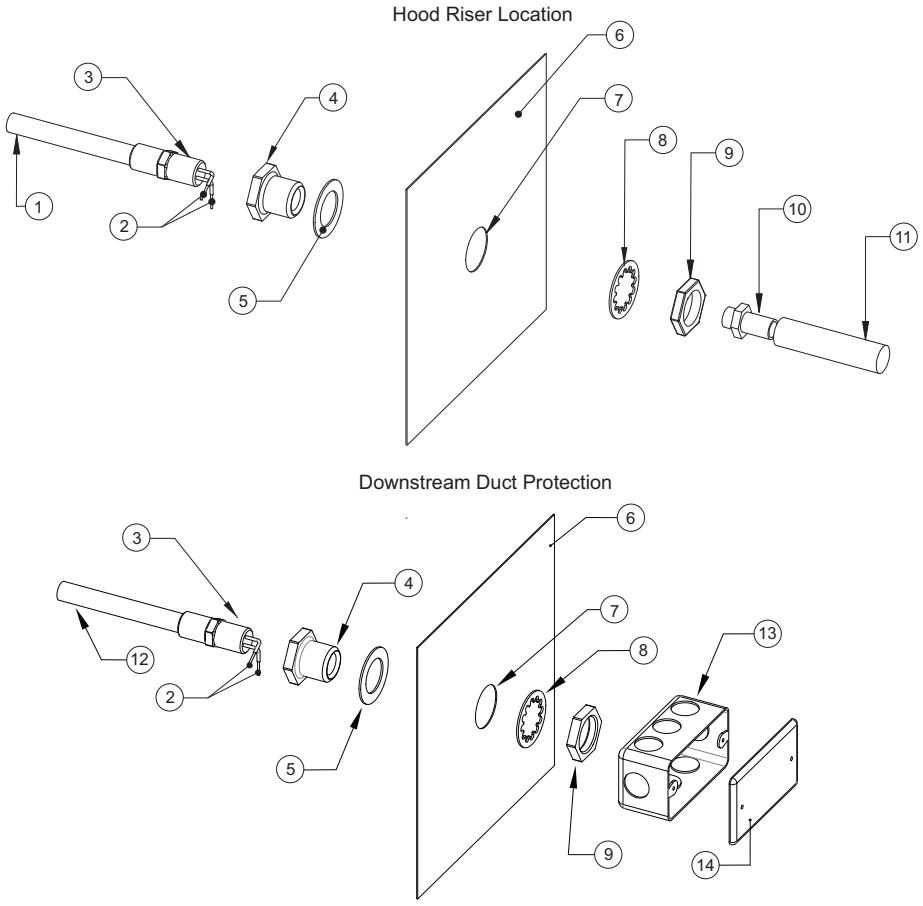
Non-solid fuel appliances rated for 450°F will not require additional firestats, regardless of the configuration and length of ductwork.

Non-Solid Fuel Appliances (Rated 600°F)

Non-solid fuel appliances rated for 600°F will require downstream detection if the duct run contains any horizontal section over 25 feet in length. Downstream detection should be installed at the end of a horizontal section. Duct layouts that include less than 25 feet of horizontal ductwork will not require additional detection.

NOTE: When additional Firestats are required, install in an accessible location near an access door, hood riser, or fan. The door will provide access to install, clean, and replace the Firestat when needed. If a PCU is equipped with electronic detection, PCU Firestats can serve as downstream detectors, if present. The temperature rating of the Firestat in the duct must always match the temperature rating of the Firestat in the riser.

Figure 32 - Firestat Details



Firestat Components

1. Hood Riser Firestat
   - Fenwal Part Number - 12-F28021-32144-OT-360 - Normally Open, Close on Rise @ 360°F
   - Fenwal Part Number - 12-H28021-12144-OT-600 - Normally Open, Close on Rise @ 600°F
2. Wiring - 2 black wires/2 white wires.
3. Seal threads with Teflon Tape before installation
4. 1/2” NPT Quick Seal (Adapter Body) - Part Number Kit 32-00002
5. 1/2” NPT Quik Seal (Gasket) - Part Number Kit 32-00002
6. External Surface of hood/duct.
7. 1 1/8” - 1 1/4” diameter hole.
8. 1/2” NPT Quik Seal (Lock Washer) - Part Number Kit 32-00002
9. 1/2” NPT Quik Seal (Nut) - Part Number Kit 32-00002
10. 1/2” flex conduit connector - Part Number A009088
11. Flex metallic conduit to ECP junction box (closest to the hood) - Part Number A0005719
12. Duct Protection Firestat
    - Fenwal Part Number 12-F28021-005360 - Normally Open, Close on Rise @ 360°F
    - Fenwal Part Number 12-H28021-005-0T-600 - Normally Open, Close on Rise @ 600°F
13. Extension Ring - Part Number 59361-1/2
14. Extension Ring Cover - Part Number 100-BW

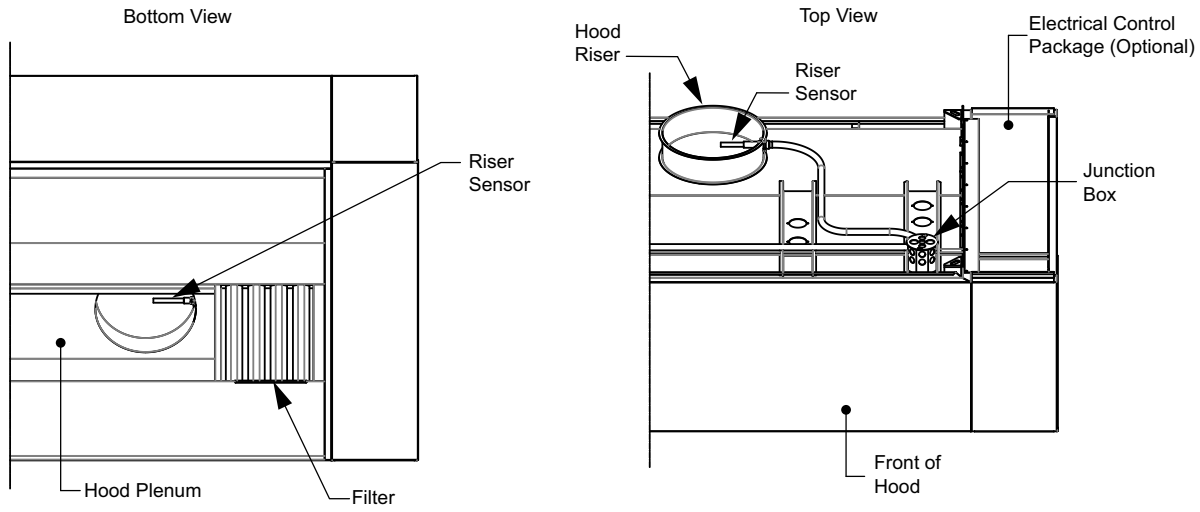
Hood Riser Sensor Replacement

The following instructions are for replacing a hood duct stat or fire stat located in the riser.

NOTE: Make sure the fire system is deactivated and all controls are powered down before servicing the unit. Service should only be performed by trained personnel.

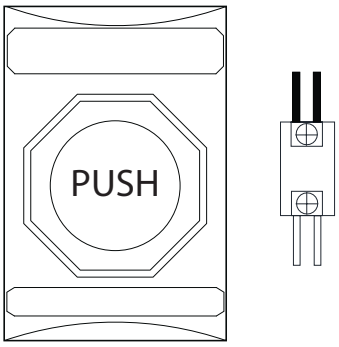
1. Locate faulty sensor in hood riser. Remove the hood filters to access from the hood plenum.
2. Determine the location of the sensor's lead ends. This will either be on the top of the hood, in the junction box which has conduit routed to the riser, or in the electrical control package that is mounted on the hood (if it is a stand-alone hood).
3. Access the sensor's lead ends and remove Wago connectors. Attach a fish tape (or pulling rope) to the lead ends.
4. Unscrew the sensor from the quick seal in hood plenum. Pull leads completely out, pulling the fish tape until exposed.
5. Attach replacement sensor to fish tape and pull back through conduit until lead ends are back in the original location.
6. Replace Wago connectors on the new sensor's lead ends.
7. Twist new sensor counterclockwise, 2-1/2 turns to pre-tension wires. Thread sensor in riser quick seal (using Teflon tape on threads).
8. Replace hood filters.
9. Power up the system to test functionality.

Figure 33 - Sensor Replacement



Fire Protection Manual Actuation Device

Figure 34 - Activation Device



The push/pull station (**Figure 34**) is a remote manual actuation device to activate the fire system. This remote manual actuation device (push/pull station) contains one set of normally open contacts and mounts to any standard single gang junction box. When the front button is pressed, the electrical connection to the fire system is completed, thus activating the fire system.

The remote manual actuation device (push/pull station) should be mounted at a point of egress and positioned at a height determined by the Authority Having Jurisdiction (AHJ). This position is usually 10 to 20 feet from hood and 42 to 48 inches above the floor. Multiple remote manual actuation devices (push/pull stations) are acceptable to use in the fire system and are wired in parallel per the electrical schematic. The remote manual actuation device (push/pull station) is reset by twisting the push-button clockwise until the internal latch is released.

The clear protective cover must be installed to protect the device from accidental activations. This cover is provided as part of the manual actuation device. Below are the part numbers for the devices and replacement parts (**Table 10**).

Note: When connecting the wires to the push/pull station, do not twist the wire ends together. Insert each wire on the opposite side of the screw.

Table 10 - Activation Device Part Numbers

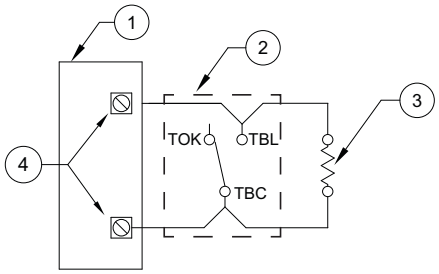
Part Description	Part Number
Push-Button with Clear Cover	SS2031ZA-EN
Push-Button with Clear Cover and Horn	SS2041ZA-EN
Red Extension for Surface Mounted Push/Pull Stations	KIT-102722-R
Red Junction Box with Deep Back	STI-KIT71101AR
Normally Open Contact	STI-10196
Normally Closed Contact	STI-10198
Contact Housing Assembly	SF-10197H

Trouble Input Wiring

Trouble contacts and supervision switches from each device should be connected to the trouble input of the building fire alarm panel to indicate a trouble condition.

Figure 35 - Wiring Connection for Trouble Contact

1. Building Fire Alarm
2. CORE Control Panel Trouble Contact
3. End of Line Device
4. Building Fire Alarm - Trouble Input Wiring

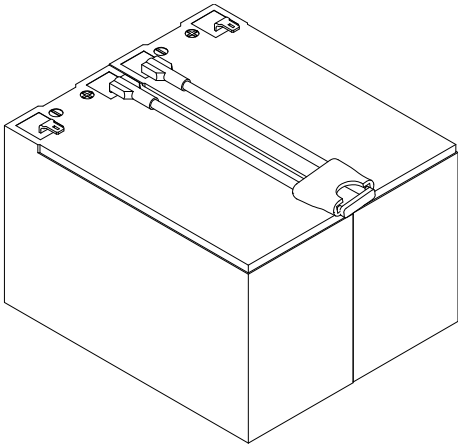


Battery Backup

Important!!

The battery backup system requires that the batteries be changed every 2 years, from the date of fire system commissioning, maximum. Failure to do this will result in a void in product reliability and may cause severe damage to facility due to loss of fire protection.

Figure 36 - Battery Backup



The fire protection system contains a battery backup. During a power loss, the “Fire System Activated” light will flash 11 times between pauses indicating the power loss.

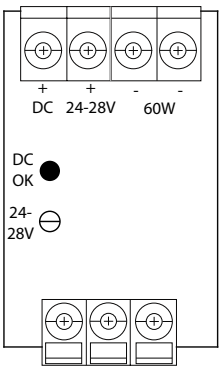
The batteries must be replaced every 2 years, from the date of fire system commissioning. Part number PS-1270-F2, two are required. Although the batteries are hot-swappable, which means they can be replaced while there is input power to the control, for your safety, all sources of power must be removed from the control before replacing the batteries. To replace the batteries, unplug the battery cable from the J1 connector on the electrical board (PCBCORE). Then remove the retaining strap holding the batteries in place. Remove the batteries from the cabinet. Transfer the fuse and cable set from the old batteries to the new batteries being extremely careful to observe the RED and BLACK lead and terminal colors. Reinstall the batteries in the cabinet and reconnect the battery plug to J1. The batteries are lead-acid type and are recyclable; **please dispose of the old batteries properly**.

During extended periods of inactivity where the fire protection system will be without AC power for more than 2 days, such as a shutdown or natural disaster, it is best to decommission the fire system by disconnecting the batteries. This will prevent any damage to the batteries through complete discharge. When the system becomes active again, commission the system by reconnecting the batteries and allow the batteries to charge for 48 hours.

Power Supply Adjustment

To properly charge the batteries, the power supply must be adjusted to output 27.5V DC. This can be checked with an accurate digital voltmeter placed across Terminals H1D and N1D. To adjust the output voltage, place a small flat-bladed screwdriver into the yellow dial. Turn the dial clockwise, this will increase the voltage.

Figure 37 - Power Supply

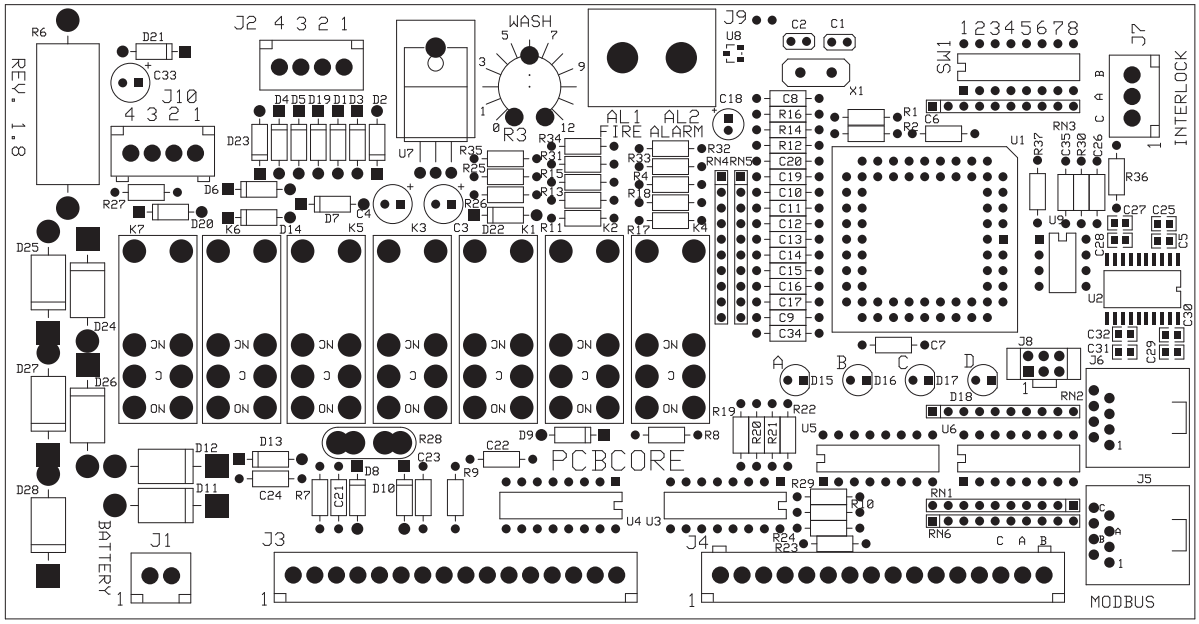


Fire Protection System Printed Circuit Board

The fire protection system printed circuit board (PCBCORE) is a microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliable operation of the fire system. Under normal conditions, the “Fire System Activated” light is flashing one brief flash every 3 seconds, indicating the system is armed and ready. If a fault is detected anywhere in the system, an audible alarm will periodically sound, and the “Fire System Activated” light will flash a fault code to indicate the fault that was detected. This fault code consists of a series of flashes followed by a pause. Simply count the number of flashes between the pauses and refer to the chart below to find the cause of the fault. Any fault is extremely important and must be corrected and rectified immediately to ensure proper operation of the fire system.

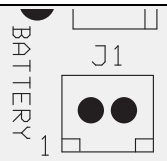
The connections for building fire panels are located at AL1 and AL2 as dry contacts.

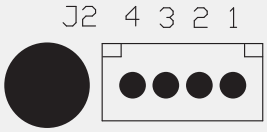
Figure 38 - Printed Circuit Board

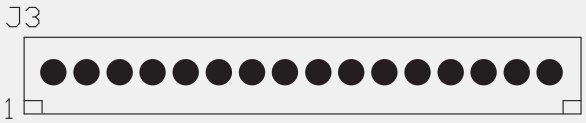


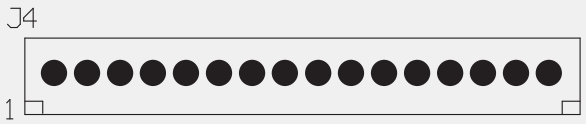
Connector Descriptions

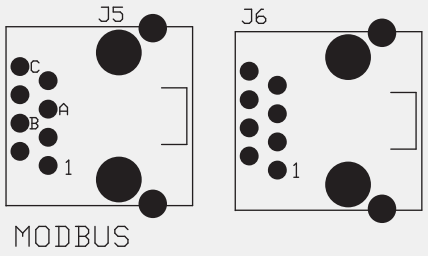
Note: Some connections may not be used dependent on system configurations.

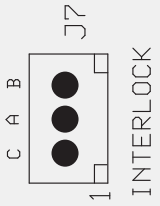
Connector J1 contains battery pack connections for battery charging and monitoring.	
Pin 1 – Battery Positive	Pin 2 – Battery Negative

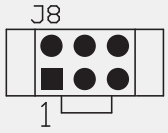
Connector J2 contains Supervised Sensor Loop connections	
Pin 1 – Start Positive Loop Pin 2 – Start Negative Loop	Pin 3 – Finish Negative Loop Pin 4 – Finish Positive Loop

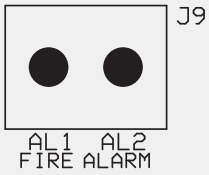
Connector J3 contains Power Supply and Device connections	
Pin 1 and Pin 2 – Positive Input, Power Supply Pin 3 and Pin 4 – Negative Input, Power Supply Pin 5 – Positive Output, Gas Valve Solenoid Pin 6 – Positive Output, Surfactant Pump Pin 7 – Positive Output, Release Valve Solenoid Pin 8 and Pin 9 – 24V DC Input, Shutoff Valve Supervision	Pin 10 – N/A Pin 11 – Drive Output, Fire Relay Pin 12 – Drive Output, 100% Relay Pin 13 – Drive Output, Trouble Relay Pin 14 – Drive Output, Wash Relay Pin 15 – Drive Output, Spare Relay Pin 16 – Drive Output, Auto-Man Relay

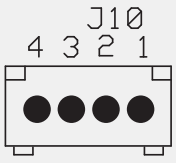
Connector J4 contains Power Supply and Device connections	
Pin 1 – Positive Input, Power Supply Pin 2 – Output, Panel Mounted Audible Alarm Pin 3 – Output, Panel Mounted LED Fire/Fault Indicator Pin 4 – N/A Pin 5 – Drive Output, Cooking Equipment Disable Relay Pin 6 – Negative Input, Power Supply Pin 7 – N/A	Pin 8 – Input, Pump Prime/Reset Push Button Pin 9 – Input, Gas Cartridge/Pressure Switch Pin 10 – Input, Fan Switch Pin 11 – Input, Gas Valve Reset Push Button Pin 12 – Input, Door/Tamper Switch Pin 13 – Input, Test Mode Pin 14 – Modbus Network, Common Signal (C) Pin 15 – Modbus Network, Negative Signal (A) Pin 16 – Modbus Network, Positive Signal (B)

Connector J5 and J6 is for RJ-45 connections	
These two connections are for the Modbus Network. This network may be used by non-fire system related equipment to monitor operating conditions of the electrical (PCBCORE) board.	

Connector J7 Interlock Network connections	
Pin 1 – Interlock Network, Common Signal (C) Pin 2 – Interlock Network, Negative Signal (A)	Pin 3 – Interlock Network, Positive Signal (B)

Connector J8 Interlock Network connections	
Factory Use Only	

Connector J9 Building Fire Alarm connections for a set of normally open dry contacts. These are provided for signaling a building fire alarm panel if a fire condition is present.	
Pin 1 – Dry Contact Closure	Pin 2 – Dry Contact Closure

Connector J10 contains Supervised Sensor Loop connections	
Pin 1 – Start Positive Loop Pin 2 – Start Negative Loop	Pin 3 – Finish Negative Loop Pin 4 – Finish Positive Loop