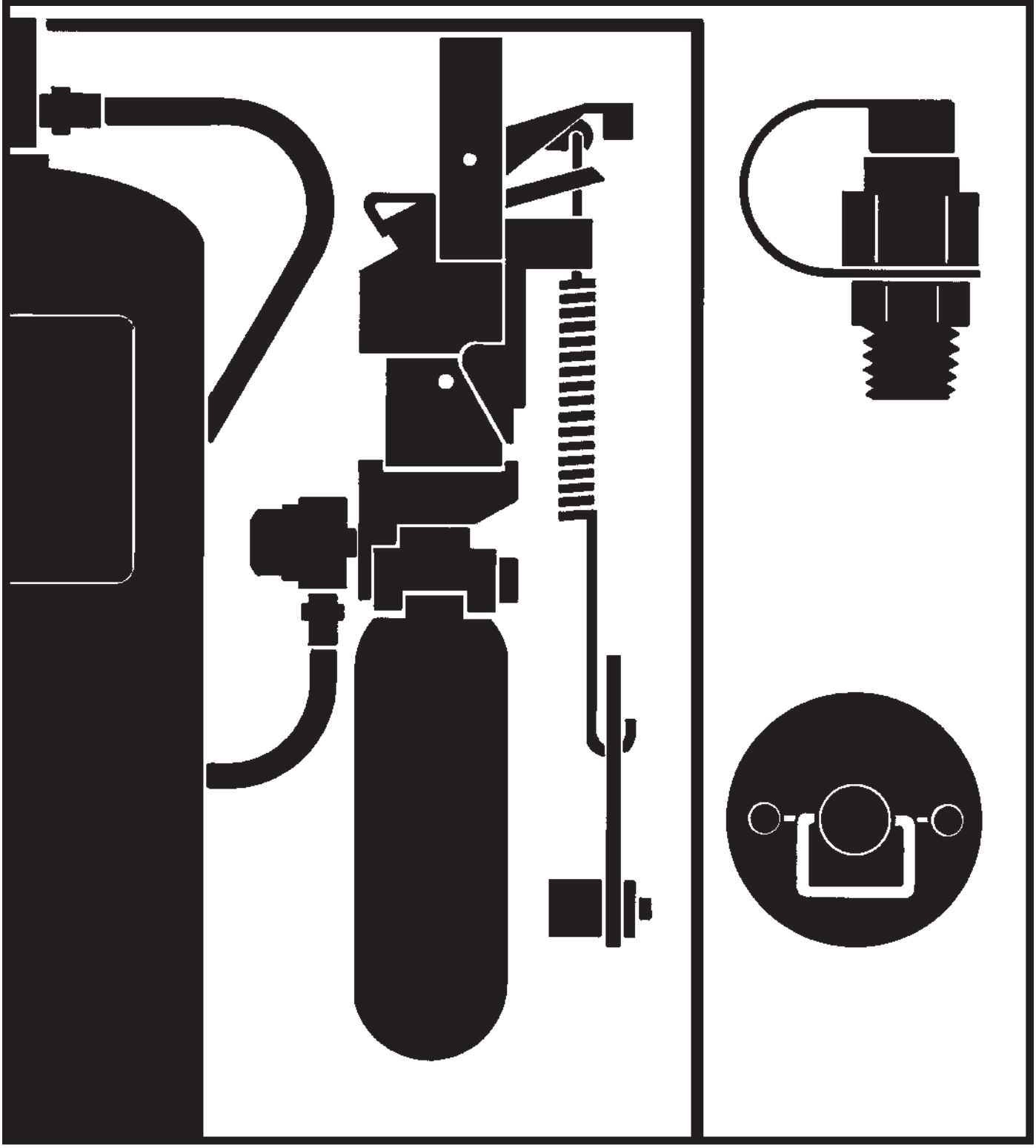
R-102 RESTAURANT FIRE SUPPRESSION SYSTEM

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DESIGN, INSTALLATION, RECHARGE, AND MAINTENANCE MANUAL



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Bulletin

Bulletin No. 2022060
UL EX3470

DATE: October 24, 2022

TO: Authorized ANSUL® Restaurant System Distributors and OEMs

FROM: Product Management—Restaurant Systems

SUBJECT: ANSUL® R-102 Protection for **Prince Castle Flame King Broiler (Natural Gas/LP Gas)**

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

We are pleased to announce the R-102 fire suppression system coverage for the following Marmon Model: **Prince Castle Flame King Broiler (Natural Gas/LP Gas)**

This Bulletin is a supplement to ANSUL® R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and is not intended to replace the requirements and limitations outlined therein. The information contained within this Bulletin will be added to the manual at the next revision.

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UL EX3470

Prince Castle Flame King Broiler (Natural Gas/LP Gas) With Catalyst or Impedance Plate

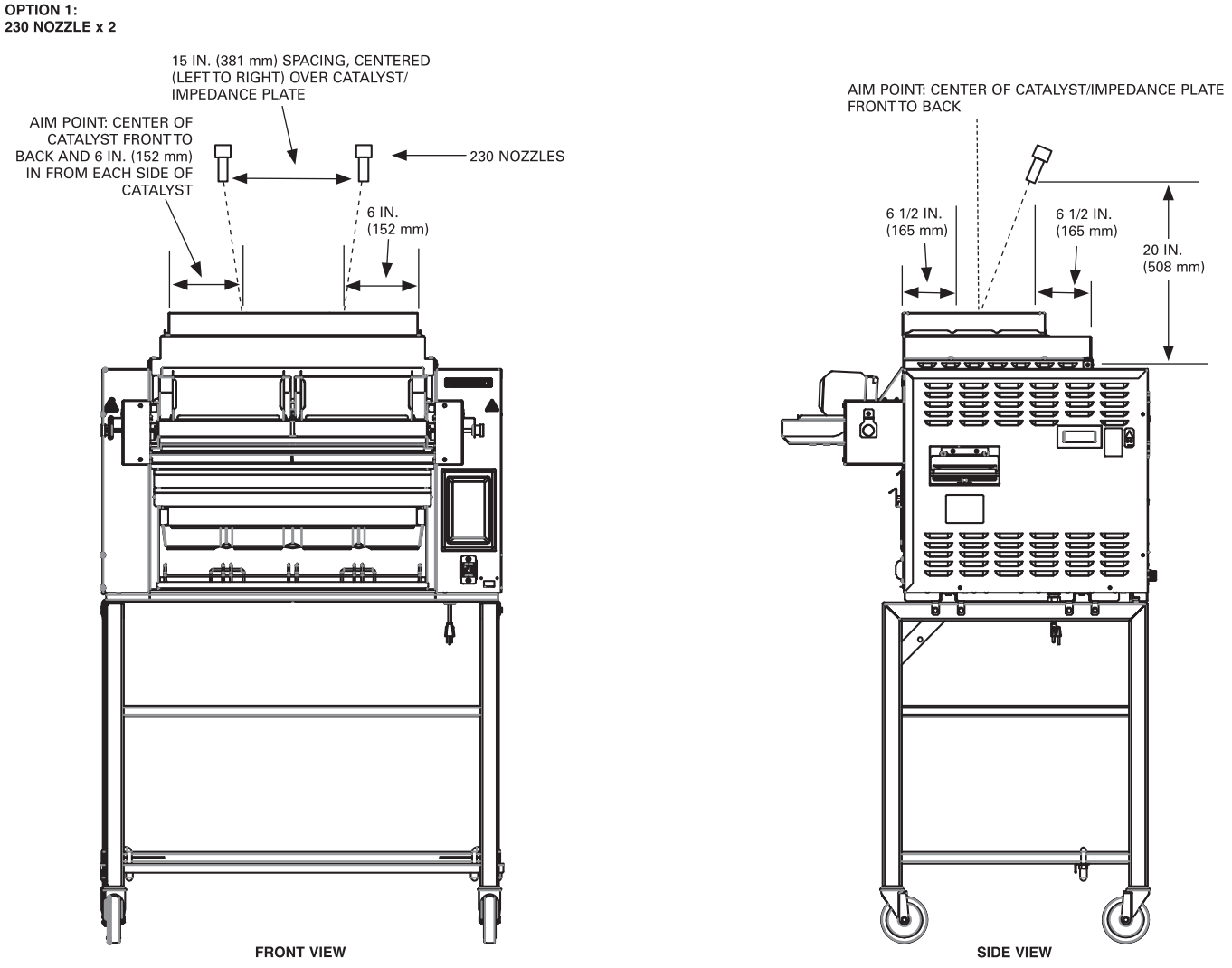
Option 1: High proximity

Nozzle Quantity/Type: Two 230 nozzles

Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front edge of appliance or back edge of catalyst/impedance mount. Nozzles positioned 15 in. (381 mm) apart. See Figure 1.

Nozzle Aiming Point: Center of catalyst/impedance plate front to back and 6 in. (152 mm) in from each side of catalyst/impedance plate.



NOTE: IMAGE IS SHOWN WITH CATALYST. LOCATIONS ARE SAME FOR IMPEDANCE PLATE

FIGURE 1
011748

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UL EX3470

Prince Castle Flame King Broiler (Natural Gas/LP Gas) With Catalyst or Impedance Plate

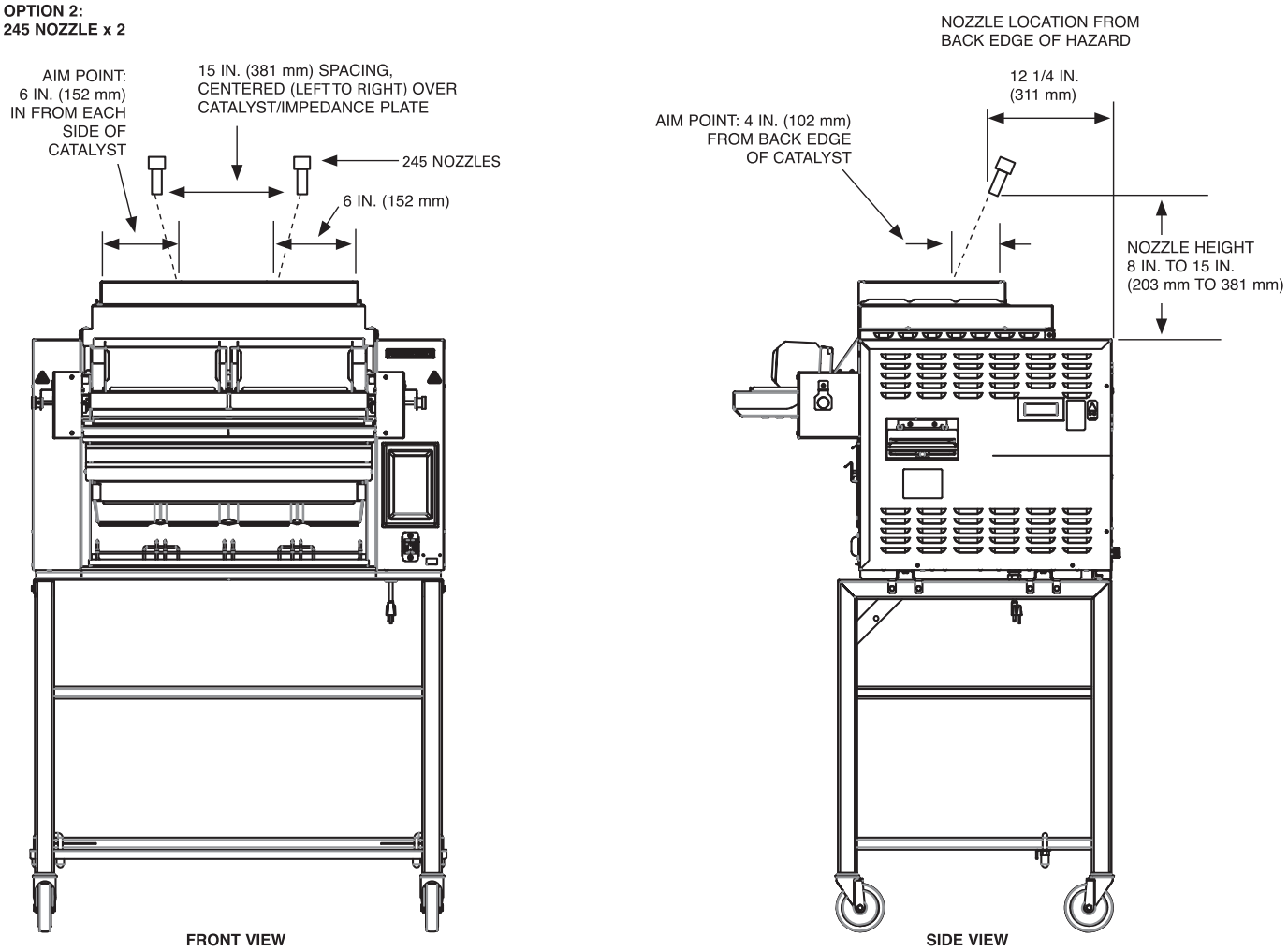
Option 2: Low proximity, nozzles rear-mounted facing forward

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm)

Nozzle Location: 12 1/4 in. (311 mm) from back edge of appliance. Nozzles positioned 15 in. (381 mm) apart. See Figure 2.

Nozzle Aiming Point: 4 in. (102 mm) from back edge of catalyst/impedance plate
6 in. (152 mm) in from each side of catalyst/impedance plate



NOTE: IMAGE IS SHOWN WITH CATALYST. LOCATIONS ARE SAME FOR IMPEDANCE PLATE.

FIGURE 2
011749

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UL EX3470

Prince Castle Flame King Broiler (Natural Gas/LP Gas)
With Catalyst or Impedance Plate

Option 3: Low proximity, nozzles front-mounted facing rearward

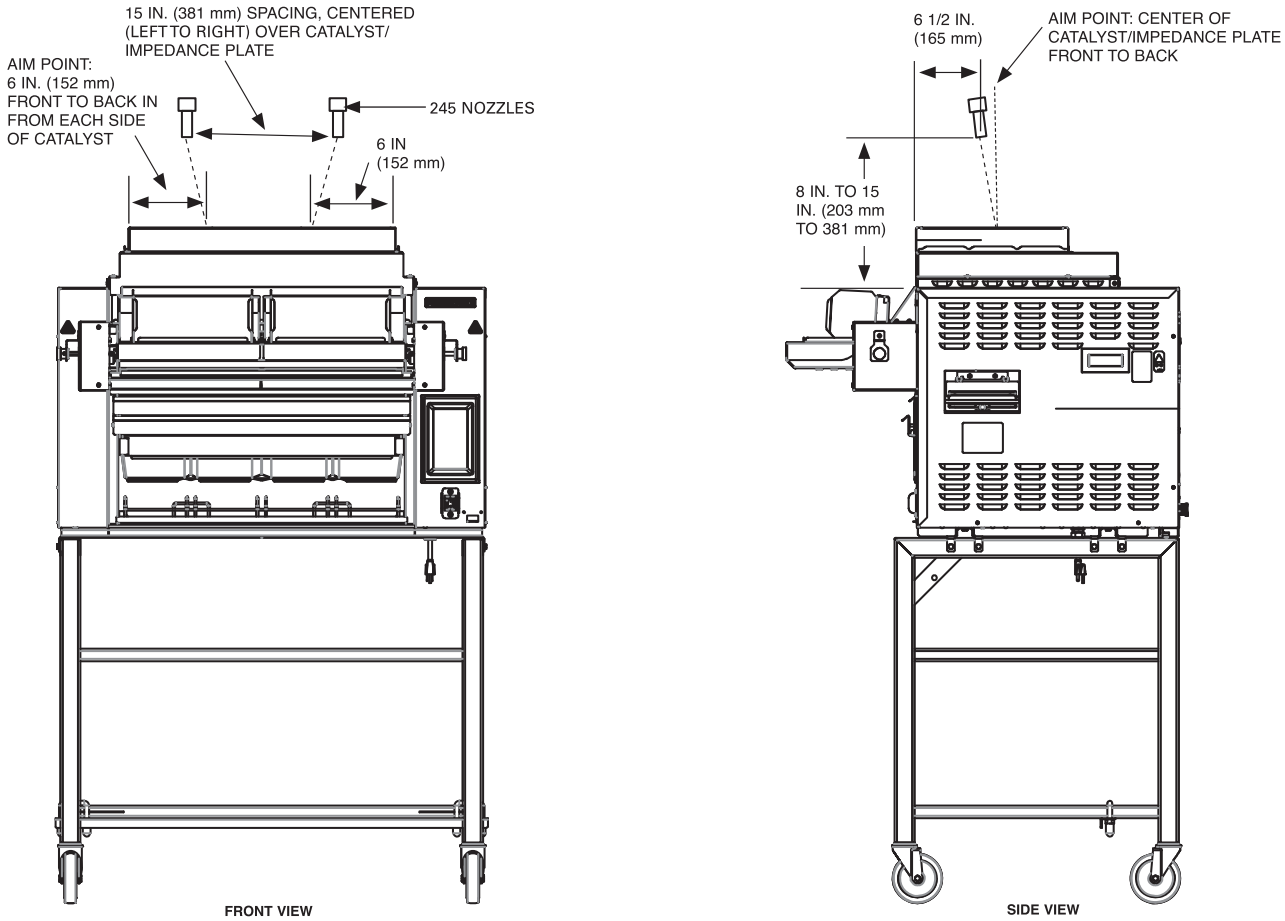
Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front edge of appliance. Nozzles positioned 15 in. (381 mm) apart. See Figure 3.

Nozzle Aiming Point: Center of catalyst/impedance plate front to back and 6 in. (152 mm) in from each side of catalyst/impedance plate.

OPTION 3
245 NOZZLE x 2



NOTE: IMAGE IS SHOWN WITH CATALYST. LOCATIONS ARE SAME FOR IMPEDANCE PLATE

FIGURE 3
011750

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Appliance Specifications

Upper Platens cook surface

- Manufacture – Marmon
- Model - See Figure 4
  - Natural Gas: FK4-NGA-BKNA
  - Propane: FK4-LPA-BKNA
- Equipment Type – Broiler Upright
- Rated Input – 112,000 BTU/HR Natural Gas/LP Gas
- External Dimensions – 42 1/2 in. x 28 5/8 in. x 64 1/2 in. (1079 mm x 727 mm x 1638 mm)

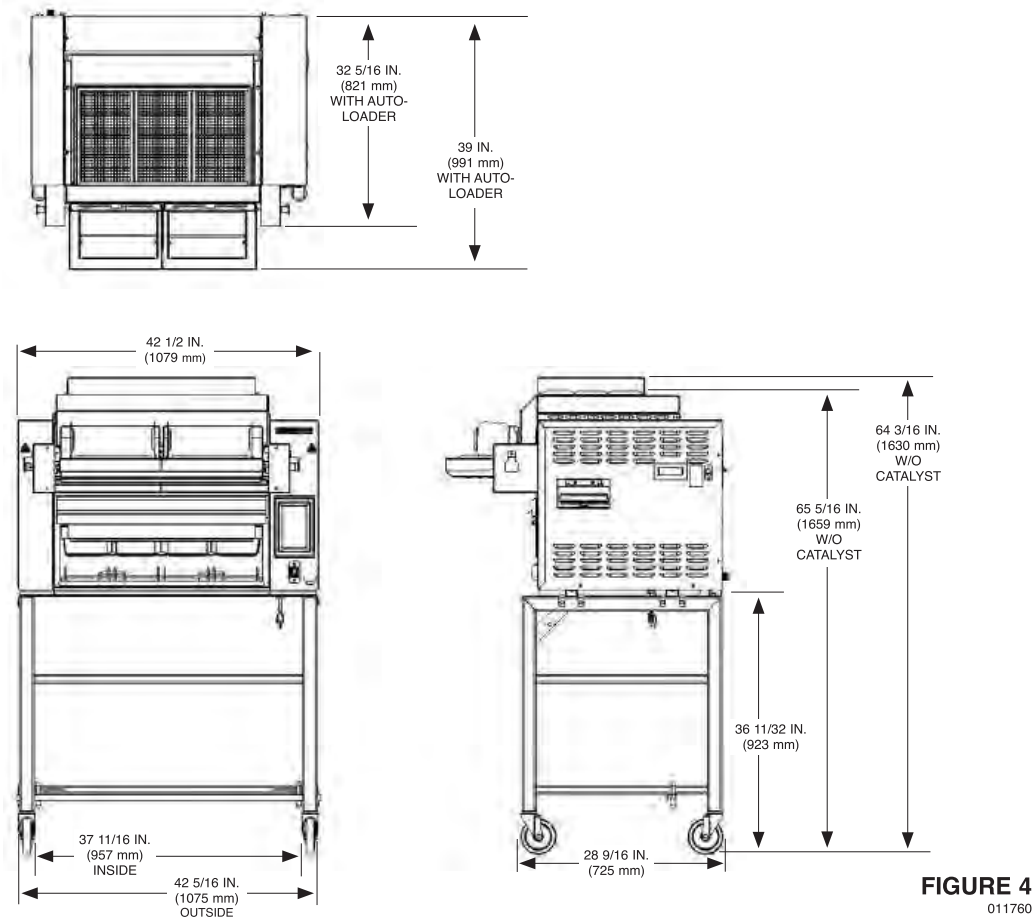


FIGURE 4
011760

Thank you for your continued support. Should you have any questions pertaining to this bulletin, please contact your U.S. District Manager or International Area Manager, or call Technical Services at the number listed below.

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Bulletin

Bulletin No. 2022022
UL EX3470

DATE: April 18, 2022

TO: Authorized ANSUL® Restaurant System Distributors and OEMs

FROM: Product Management - Restaurant Systems

SUBJECT: ANSUL® R-102 Protection for **Vulcan Model VMCS-101 (24 in.) with MSA24-C0100P/MSA24-C0200P 24 in. Gas (NG/LP) Griddle**

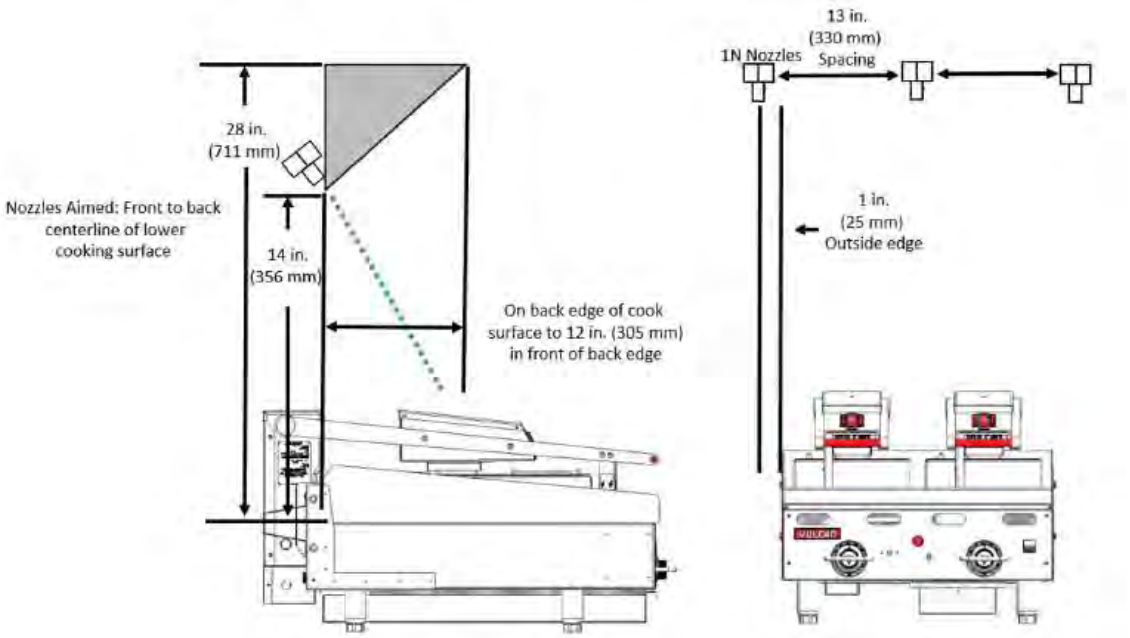
NOTICE: It is the responsibility of your company to verify that this information has been received by the employees who currently hold certification credentials for design and/or service of the system(s) referenced within this bulletin

We are pleased to announce R-102 fire suppression system coverage for the following Vulcan Model: **VMCS-101 (24 in.) with MSA24-C0100P/MSA24-C0200P 24 in. Gas (NG/LP) Griddle.**

This Bulletin is a supplement to the ANSUL® R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and is not intended to replace the requirements and limitations outlined therein. The information contained within this Bulletin will be added to the manual at the next revision.

VMCS-101 (24 in.) with MSA24-C0100P/MSA24-C0200P 24 Gas (NG/LP) Griddle

Protection using 1N Nozzles with 13 in. (330mm) nozzle spacing, aiming to centerline of each lower platen



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Specifications

Nozzle Quanity/Type: Three 1N nozzles
Nozzle Spacing: 1 in. (25 mm) from outside edge with 13 in. (330 mm) nozzle spacing
Nozzle Height: 14 in. (356 mm) to 28 in. (711 mm) from cooking surface
Nozzle Location: Back edge of cook surface to 12 in. (305 mm) forward
Nozzle Aiming Point: Aimed to cooking surface centerline of each lower griddle surface

Appliance Specifications

Upper Platens cook surface

- Manufacture – Vulcan Electric
- Model – VMCS-101
- Equipment Type – Griddle Top Upper – Electric
- Rated Input – 208 AC, 17.3A, 50/60Hz - single phase, 3.6kW,
- Cooking Surface Dimensions – 22.9 in. length x 10.4 in. width each

Lower Griddle cook surface

- Manufacture – Vulcan Electric
- Model – MSA24
- Equipment Type – Heavy Duty Gas Griddle – Liquid Propane –
- Rated Input – 54,000 BTU/hr.
- External Dimensions – 31.5 in. length x 24 in. width X 15.5 in. high; provided with 4 in. high back splash.
- Cooking Surface Dimensions – 24 in. length x 24 in. width

Thank you for your continued support. Should you have any questions pertaining to this bulletin, please contact your Territory Sales Manager or call Technical Services as listed below.

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Bulletin

Bulletin No. 2022002
UL EX3470

DATE: April 18, 2022

TO: Authorized ANSUL® Restaurant System Distributors and OEMs

FROM: Product Management—Restaurant Systems

SUBJECT: Extended ANSUL® R-102 Protection for General Wok Coverage

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

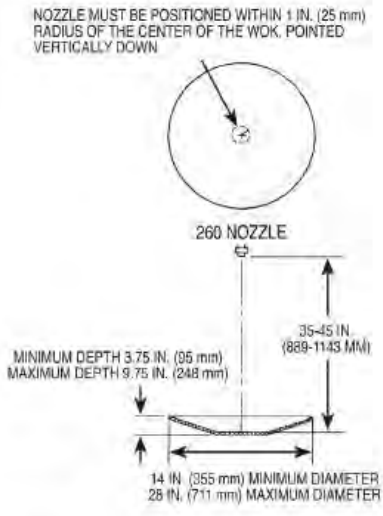
We are pleased to announce Extended General Wok Protection for the ANSUL® R-102 fire suppression system.

This Bulletin is a supplement to the ANSUL® R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and is not intended to replace the requirements and limitations outlined therein. The information contained within this Bulletin will be added to the manual at the next revision.

The following nozzle positioning and coverage limitations must be followed:

Extended General Wok Protection

Nozzle Quantity/Type: One 260 nozzle
Nozzle Height: 35 in. (889 mm) to 45 in. (1,143 mm) from interior bottom of wok
Nozzle Location: Within 1 in. (25 mm) radius of the center of the wok
Nozzle Aiming Point: Aimed to center, pointed vertically down
Changes: 8 in. (203 mm) max depth upgraded to 9.75 in. (247 mm)
Note: This max depth is only acceptable on woks with a max diameter of 28 in. (711 mm)



Thank you for your continued support. Should you have any questions pertaining to this bulletin, please contact your Territory Sales Manager or call Technical Services as listed below.

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Bulletin

Bulletin No. 2021106
UL EX3470

DATE: April 18, 2022

TO: Authorized ANSUL® Restaurant System Distributors and OEMs

FROM: Product Management—Restaurant Systems

SUBJECT: New ANSUL® R-102 Protection for Panda Express Auto Wok RCG-P

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

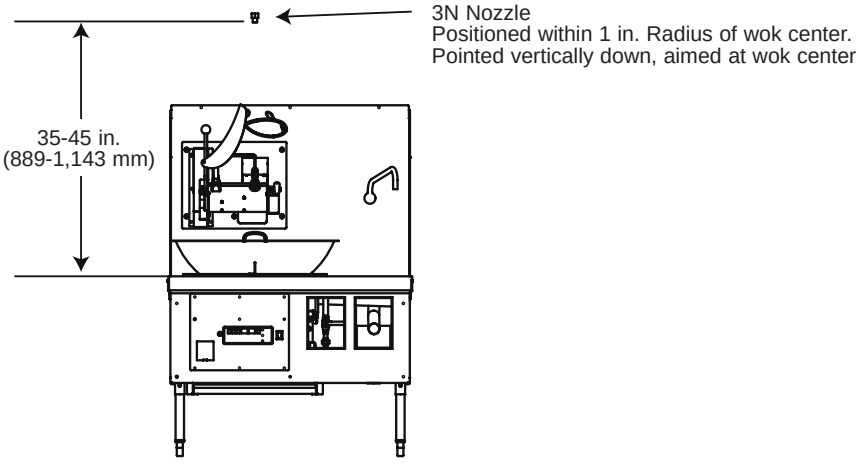
We are pleased to announce ANSUL® R-102 fire suppression system coverage for the Panda Express Auto Wok, Model RCG-P.

This Bulletin is a supplement to the ANSUL® R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and is not intended to replace the requirements and limitations outlined therein. The information contained within this Bulletin will be added to the manual at the next revision.

The following nozzle positioning and coverage limitations must be followed:

Panda Express Autio Wok Model RCG-P

Nozzle Quantity/Type: One 3N nozzle
Nozzle Height: 35 in. (889 mm) to 45 in. (1,143 mm) from interior bottom of wok
Nozzle Location: Within 1 in. (25 mm) radius of the center of the wok
Nozzle Aiming Point: Aimed to center, pointed vertically down



Thank you for your continued support. Should you have any questions pertaining to this bulletin, please contact your Territory Sales Manager or call Technical Services as listed below.

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Bulletin

Bulletin No. 2021118

UL EX3470 - December 10, 2021

DATE: January 13, 2022

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

FROM: Product Management—Restaurant Systems

SUBJECT: R-102 Protection Options – Nieco Model FH94E **Electric** Broiler

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

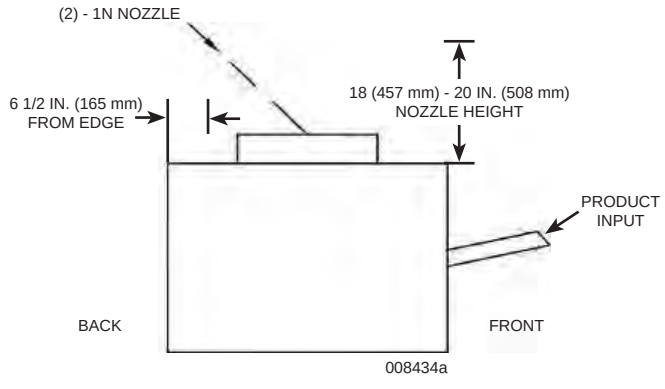
We are pleased to announce additional ANSUL® R-102 fire protection for Nieco Model FH94E **Electric** Broiler with catalyst. The additional protection offers high and low proximity nozzle positioning options.

This bulletin is a supplement to the ANSUL® R-102 Design, Installation, Recharge and Maintenance Manual (Part No. 418087-12) dated September 1, 2014 and is not intended to replace the requirements and limitations outlined therein. The information contained in this bulletin will be added to the manual at the next update.

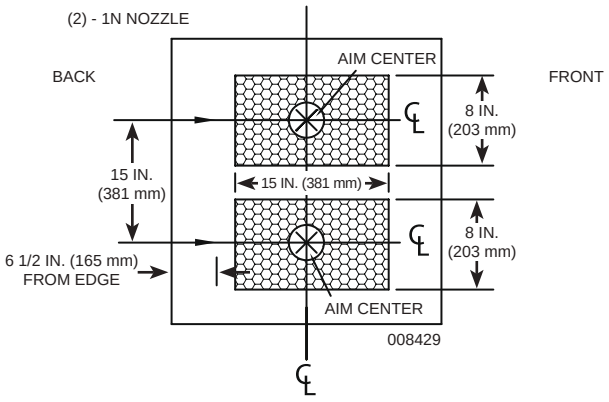
The following nozzle positioning and coverage limitations must be followed:

High Proximity Protection

Nozzle Type: 1N
Nozzle Quantity: Two
Nozzle Height: 18 in. (457 mm) to 20 in. (508 mm)
Nozzle Location: 6 ½ in. (165 mm) from front or back edge of hazard
Nozzles positioned 15 in. (381 mm) apart
Nozzle Aiming Point: Center of catalyst



SIDE VIEW



TOP VIEW

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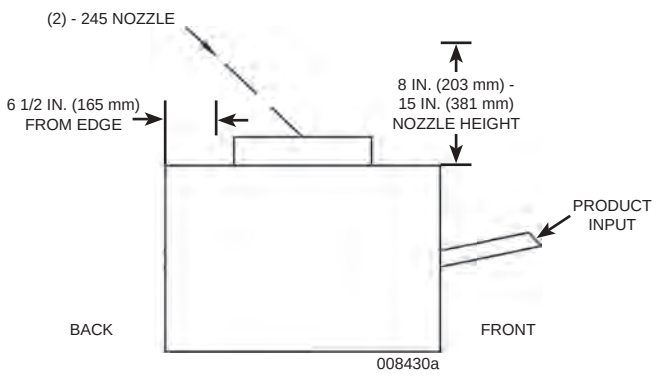
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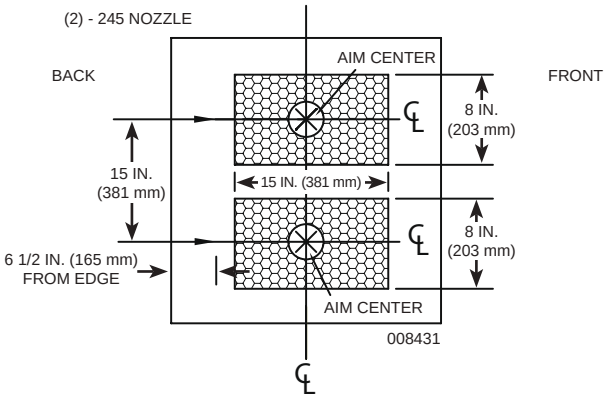
UL EX3470 - December 10, 2021

Low Proximity Protection

Nozzle Type: 245
Nozzle Quantity: Two
Nozzle Height: 8 in. (203 mm) to 15 in. (381 mm)
Nozzle Location: 6 ½ in. (165 mm) from front or back edge of hazard
Nozzles positioned 15 in. (381 mm) apart
Nozzle Aim Point: Center of catalyst



SIDE VIEW



TOP VIEW

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

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

Design, installation, recharge, and maintenance shall be performed by an individual holding current certification from an ANSUL® R-102 Training Program with training in all areas of the R-102 system.

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

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

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All instructions contained herein relate to a typical installation.

Date: 2022-NOV-14
Part Number: 418087-13

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⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

CAUTION

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

NOTICE

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

Date	Page	Description
2022-NOV-14	All	Previous REV. 11 changed to REV. 13 to match revision level of manual. Formatting updates applied across the document to improve style consistency. Cross references and figure numbers updated, where applicable. “Extinguish” changed to “suppress.” Measurements in “mm^2” changed to “m^2” if value exceeds 999 mm^2.
	1-1	Reworded sentence. Added CCCF to System Approvals. Revised text.
	1-2	Added new terms to the list of definitions.
	1-3	Revised text. Added new terms to the list of definitions.
	2-1	Revised text.
	3-1	Revised subheading. Added new image.
	3-2	”120 VAC” added to the title. Moved information and revised where marked. Added note. Added note to state 24VDC is ULC APPROVED ONLY.
	3-3	Added cartridges. Information added to OEM Remote Release/ Bracket Assembly. Added “or remote release assembly.” Existing component moved to this page. Revised where marked.
	3-4	Moved information and revised where marked.
	3-5	Measurement changed. Moved information and revised where marked. New note.
	3-6	Added text. Corrected dimension. New note.
	3-8	Added text.
	3-7	Moved information and revised where marked. Removed part #s and 3/4 in.
	3-9	Moved information and revised where marked.
	3-10	Added “For interior use only.” Moved information and revised where marked.

Date	Page	Description
2022-NOV-14	3-11	Added “For interior use only.” Moved information and revised where marked.
	3-12	Moved information and revised where marked.
	3-13	Part No. revised. New note.
	3-14	Added text. Moved information and revised where marked.
	4-1	Paragraph changed to bullet points. Moved information and revised where marked.
	4-2	Moved information and revised where marked.
	4-4	Moved information and revised where marked.
	4-6	Measurement changed.
	4-7	New note. Revised text. Removed “Cooking.”
	4-8	Moved information and revised where marked.
	4-9	Moved information and revised where marked.
	4-10	New page.
	4-11	Replaced “Cooking Area” with “Module.” Added text.
	4-12	Table title changed.
	4-13	Replaced figure.
	4-14	Reworded text. “Burner grate” changed to “hazard area.”
	4-15	Added titles on figures.
	4-16	Added titles on figures.
	4-17	“Burner grate” changed to “hazard area.” New note.
	4-18	New text. “Burner grate” changed to “hazard area.” Measurement changed.
	4-19	Information removed.
	4-20	Information removed.
	4-21	
	4-24	Moved information and revised where marked.
	4-25	New image.
	4-30	Added information.
	4-32	Revised text.

Legend for Pages with Revision Indicators:	► Indicates revised technical information. ■ Indicates change in page sequence (located at top of page, left of header).

Date	Page	Description
2022-NOV-14	4-35	New note. Added callouts. Moved information and revised where marked.
	4-36	New note. Added callouts. Moved information and revised where marked.
	4-37	New note. Added callouts. Moved information and revised where marked.
	4-38	New page.
	4-39	Text added.
	4-40	Alternative model names added.
	4-42	Text added. Added “Garland Electric Dual-Side Clamshell Broiler – Model CXBE12.”
	4-43	Removed “View” from both headings.
	4-44	Removed “View” from both headings.
	4-45	Removed “View” from first heading. Changed “Catalytic Converter” to “Catalyst.”
	4-46	Changed “Catalytic Converter” to “Catalyst.”
	4-47	Changed “Catalytic Converter” to “Catalyst” in both headings.
	4-48	Changed “Catalytic Converter” to “Catalyst” in both headings.
	4-49	Changed “Catalytic Converter” to “Catalyst” in both headings.
	4-51	Text added.
	4-53	Callouts added.
	4-54	Callouts added.
	4-55	Callouts added.
	4-56	New information.
	4-57	New information.
	4-58	New information.
	4-59	New information.
	4-60	New information.
	4-61	New information.
	4-62	New information.
	4-63	New information. Added maximum pipe length information below table.
	4-64	Callouts added.

Date	Page	Description
2022-NOV-14	4-65	New information.
	4-66	Title changed. Revised information.
	4-67	Title changed. Moved information and revised where marked.
	4-68	Title changed. Note added.
	4-69	Title changed.
	4-70	Title changed. Note added.
	4-71	Title changed. Moved information and revised where marked.
	4-72	Title changed.
	4-73	Title changed. New note.
	4-74	Title changed. Moved information and revised where marked.
	4-75	New information.
	4-76	New information.
	4-77	Added “2nd tank not allowed” and “Maximum 7 tanks....”
	4-78	New text. Removed use of “101 remote mechanical release.” Added check valves to Figure 4-123. Added “Check Values”. Changed “9 to 15 Tanks Maximum to “10 to 15” where marked.
	4-79	Text added.
	4-80	Text added. Moved information and revised where marked.
	4-83	Text added.
	4-84	Text added.
	4-86	Added part numbers for Automan enclosures.
	4-85	Text added.
	4-87	Text added. New notes.
	4-88	Text added.
	4-89	Moved information and revised where marked.
	4-90	Text added. Notice added. New note.
	4-91	Moved information and revised where marked. Notice added.
	4-92	Address revised. Text added.
	5-1	Added text. Changed “6 gallon” to “9 Gallon.” Added metric conversions.

Legend for Pages with Revision Indicators:	▸ Indicates revised technical information. ■ Indicates change in page sequence (located at top of page, left of header).

Date	Page	Description
2022-NOV-14	5-2	Added title.
	5-3	Added title. Caution changed to warning. Wording of warning changed.
	5-4	Text in Notice changed. Removed “Recommended” from title and table. Changed “Piping Installation” to “Installing The Pipework.”
	5-5	Changed “Dow Coming No. 111 silicone grease” to “HP-300 Grease.” Added text. Removed “For Castered/Moveable Equipment” from title.
	5-6	Text added or revised where marked.
	5-7	Title changed from “Restraining Cable Installation” to “Installing the Restraining Cable.”
	5-8	Changed text. Notice reworded. Changed “1/8 in.” to “1/4 in..” Added text. Text added or revised where marked.
	5-9	Added “1/4 in.” Added “of 1/4 in. pipe or 17 1/2 ft (5.3 m) of 1/4 in. Stainless Steel (SS) actuation hose.” Added “of 1/4 in. pipe.” New image.
	5-10	Added “of 1/4 in. pipe or 17 1/2 ft (5.3 m) of 1/4 in. SS actuation hose.” Removed callout.
	5-11	Paragraph changed to Notice.
	5-12	Added “HARD PIPE OPTION” as heading. Removed “(max. 5)” from first paragraph. Added callout. Added Step 2, 4 and 5. Replaced “Remote Release” with “a maximum of 5 Remote Mechanical Releases.” Changed “Mechanisms” to “Mechanical.” Revised notes.
	5-13	Text added or revised where marked.
	5-20	Added “X” on Figure 5-46.
	5-23	Text added.
	5-31	Step removed.
	5-38	Added “X” on Figure 5-112.

Date	Page	Description
2022-NOV-14	5-40	Removed text. Note changed to Caution.
	5-41	Text revised.
	5-43	Removed “Wiring Schematic” title.
	5-44	Removed “Wiring Schematic” title.
	5-45	Removed “snap-action.”
	5-46	Added note.
	6-1	Added note. Changed paragraph to a Caution. Changed “Visual Inspection Seals” to “Lead Wire Seals.”
	6-2	Changed “Visual Inspection Seals” to “Lead Wire Seals.”
	6-4	Added text.
	7-1	Paragraph changed to Notice.
	7-3	Text added. Step removed. Red Painted Steel Tanks image removed.
	7-4	Removed steps.
	7-5	Removed steps.
	7-6	Text added. Changed “visual” to “lead wire.”
	8-1	Added “and hoses.”
	8-2	Replaced “a good grade of extreme temperature silicone grease” with “HP-300 Grease.” Text added or modified where marked.
	8-3	Image added. Note added. Text added or modified where marked.
	8-4	Text added or revised where marked.
	8-5	Note added. Text added or revised where marked.
	8-6	Text added.
	8-7	Text added or modified where marked.
	8-8	Text added or modified where marked.
	8-11	Text added or modified where marked.
	8-12	Text added or revised where marked.

Legend for Pages with Revision Indicators:	► Indicates revised technical information. ■ Indicates change in page sequence (located at top of page, left of header).

Date	Page	Description
	9-1	Note added.
	9-5	Part Numbers and Descriptions removed. Part Numbers and Descriptions added.
	9-7	Text added.
	9-8	Text added.
	9-9	Title added. New image. Parts removed from table.
	9-10	New image. Parts removed from table.
	9-14	New image.
	9-17	Callouts added to Figure 9-4. Added “Releasing Device.”

Legend for Pages with Revision Indicators:	▸ Indicates revised technical information. ■ Indicates change in page sequence (located at top of page, left of header).

SECTION		PAGE
1	**GENERAL INFORMATION**	**1-1 – 1-4**
	Design and Application	1-1
	UL Listing	1-1
	System Approvals	1-1
	Definition of Terms	1-1
2	**SYSTEM DESCRIPTION**	**2-1 – 2-2**
	Total System	2-1
	Single-Tank System	2-1
	Double-Tank System	2-1
	Three-Tank System	2-2
	Multiple-Tank System	2-2
3	**SYSTEM COMPONENTS**	**3-1 – 3-14**
	Fire Suppressant Agent	3-1
	Agent Tank Assembly	3-1
	Regulated Release Assembly (Mechanical)	3-1
	120 VAC Regulated Release Assembly (Electrical)	3-2
	OEM Release/Bracket Assembly (for OEM In-Cabinet Use Only)	3-2
	24 VDC Regulated Release Assembly	3-2
	Remote Mechanical Release	3-3
	Regulated Actuator Assembly	3-3
	OEM Remote Release/Bracket Assembly	3-3
	OEM Regulated Actuator Assembly	3-3
	Double Tank Enclosure Assembly	3-4
	Single Tank Enclosure Assembly	3-4
	Red Painted Bracket Assembly	3-4
	Gas Cartridges	3-5
	Nozzles	3-5
	Lubricant/Grease	3-6
	Swivel Adaptor	3-6
	Metal Blow-Off Cap	3-6
	Reducing Coupling	3-6
	Conduit Offset Assembly	3-6
	“Quik-Seal” Adaptor	3-7
	“Compression-Seal” Adaptor	3-7
	“Hood Seal” Adaptor Assembly	3-7
	Cocking Lever/Lock Pin	3-8
	Detectors	3-8
	Pulley Elbows	3-9
	Pulley Tee	3-9
	Stainless Steel Wire Rope	3-9
	Remote Manual Pull Station	3-9
	Flexible Conduit	3-10
	Mechanical Gas Valves	3-10
	Electrical Gas Valves	3-11
	Manual Reset Relay	3-12
	Regulator Test Kit	3-12
	Electrical Switches	3-12
	Alarm Initiating Switch	3-12
	Vent Plug Assembly	3-13
	Cartridge Receiver Gasket	3-13
	Fusible Link	3-13
	Maximum Registering Thermometer	3-13
	Hose/Grommet Package	3-13
	In-Line Burst Disc Assembly (Manifolded Systems Only)	3-13
	1/4 in. Check Valve	3-14
	Nozzle Aiming Device	3-14
	Stainless Steel Braided Actuation Hose	3-14
	Agent Distribution Hose and Restraining Cable Kit	3-14
4	**SYSTEM DESIGN**	**4-1 – 4-92**
	System Design	4-1
	Nozzle Placement Requirements	4-1 – 4-7
	Duct Protection	4-1
	Transition Protection	4-4
	Electrostatic Precipitator Protection	4-4
	Plenum Protection	4-5
	Appliance Protection	4-7 – 4-31
	Fryer – Single Nozzle Protection	4-7
	Fryer – Multiple Nozzle Protection	4-11
	Multiple Nozzle Fryer Protection – Tilt Skillet/Braising Pan	4-13
	Range Protection	4-14
	Griddle Protection	4-19
	Chain Broiler Protection	4-22
	Horizontal Chain Broiler Protection	4-22
	Overhead Chain Broiler Protection	4-23
	Salamander Broiler Protection	4-24
	Upright Broiler/Salamander Protection	4-24
	Gas-Radiant/Electric Char-Broiler Protection	4-25
	Electric Char-Broiler Protection	4-25
	Lava-Rock (Ceramic) Char-Broiler Protection	4-26
	Natural Charcoal Broiler Protection	4-26
	Alternate Ceramic/Natural Charcoal Char-Broiler Protection	4-27
	Wood Fueled Char-Broiler Protection	4-27
	Wok Protection	4-28
	Nozzle Application Chart	4-29

SECTION		PAGE
4	**SYSTEM DESIGN (Continued)**	**4-1 – 4-92**
	Specific Application by Model	4-32
	Overlapping Coverage - Option 1	4-67
	Overlapping Coverage - Option 2	4-71
	Overlapping Coverage - Option 3	4-75
	Tank and Cartridge Requirements	4-77
	Actuation and Expellant Gas Line Requirements	4-77
	Distribution Piping or Hose Requirements	4-79
	Detection System Requirements	4-88
	Manual Pull Station Requirements	4-90
	Mechanical Gas Valve Requirements	4-91
	Electrical Gas Valve Requirements	4-91
	Alarm Initiating Switch Requirements	4-92
	Electrical Switch Requirements	4-92
5	**INSTALLATION INSTRUCTIONS**	**5-1 – 5-46**
	Installation Instructions	5-1
	Installing Release Assembly Components	5-1
	Installing the Distribution Piping	5-4
	Installing the Agent Distribution Hose	5-5
	Agent Distribution Hose Installation Instructions	5-6 – 5-8
	General Requirements	5-6
	Installation Requirements	5-6
	Installing the Restraining Cable	5-7
	Final Installation Guidelines and Checkout Procedures	5-8
	Installing the Actuation and Expellant Gas Line	5-8
	Installing the Detection System	5-13
	Installing Remote Manual Pull Station	5-17
	Installing Mechanical Gas Valve	5-18
	Installing the Remote Manual Pull Station or Mechanical Gas Valve Using Flexible Conduit	5-22 – 5-34
	Design Requirements	5-22
	Installation Instructions	5-23
	Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Junction Box, or Mechanical Gas Valve	5-23
	Connecting Flexible Conduit to Pulley Elbows, Pulley Tees, or Union Fittings	5-25
	Assembling the Block	5-27
	Connecting the Block and the Faceplate	5-29
	Installing Flexible Conduit Through a Conduit Offset	5-32
	Flexible Conduit Splicing (Allowed on Pull Station Installations Only)	5-34
	Component Removal Instructions	5-36
	Pull Station Installation without Pulley Block Assembly	5-37
	Installing Electrical Gas Valves	5-38
	Installing Electrical Switches	5-39
	Installing Alarm Initiating Switch	5-42
	Electrical Switch Requirements	5-43 – 5-45
	Electric (110 VAC/60 Hz) Gas Shut-off Valve	5-43
	Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load	5-44
	Electric (110 VAC/60 Hz) Application with Customer Supplied Contactor and Heating Element Load, and Power Supply Switch	5-45
	Wiring 24 VDC Regulated Release Assembly	5-46
6	**TESTING AND PLACING IN SERVICE**	**6-1 – 6-4**
	Testing Manual Pull Station	6-1
	Testing Mechanical Gas Valves	6-1
	Testing Electrical Gas Valves	6-2
	Testing Electrical Switch	6-2
	Testing Detection System	6-3
7	**RECHARGE AND RESETTING PROCEDURES**	**7-1 – 7-6**
	Cleanup Procedures	7-1
	Recharge	7-1
	Resetting	7-4 – 7-6
	Resetting Remote Manual Pull Station	7-4
	Resetting Mechanical Gas Shut-Off Valve	7-5
	Resetting Electrical Switch	7-5
	Resetting Electrical Gas Shut-Off Valve	7-5
	Resetting Pressure Switch	7-5
	Replacement Cartridge	7-6
8	**MAINTENANCE EXAMINATION**	**8-1 – 8-12**
	Semi-Annual Maintenance Examination	8-1
	12-Year Maintenance Examination	8-7
9	**APPENDIX**	**9-1 – 9-18**
	System Selection Guide	9-1
	System Component Index	9-5
	Viega Propress Component Index	9-8
	Parts Lists	9-9 – 9-14
	AUTOMAN Regulated Release Assembly	9-9
	Regulated Actuator Assembly	9-10
	Enclosure Assembly	9-11
	Bracket Assembly	9-12
	Tank Assembly	9-13
	Remote Release	9-14
	Multiple Nozzle Fryer Protection Calculation Examples	9-15
	Wiring Diagram	9-16

DESIGN AND APPLICATION

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

When recharging, resetting, servicing, and maintaining previous UL300 listed ANSUL® R-102 system installations, it may be necessary to reference the ANSUL® R-102 technical manual which was current at the time of the system's design and installation.

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

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

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

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

Make up or supply air fans, internal to the exhaust hoods being protected, shall be shut down upon system actuation.

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

UL LISTING

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

SYSTEM APPROVALS

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

DEFINITION OF TERMS

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

Agent Tank: A pressure vessel containing the liquid agent.

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

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

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

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

DEFINITION OF TERMS (Continued)

Branch Line: The agent distribution piping which extends from the supply line to the nozzles.

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

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

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

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

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

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

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

Dedicated Nozzle Appliance Protection: Protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

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

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

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

Discharge Hose Assembly: A hose to be installed in the agent distribution line to allow the movement of castered appliances. This hose can also be installed to fixed solid surfaces above or below the hood.

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

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

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

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

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

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

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

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

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

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

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

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

DEFINITION OF TERMS (Continued)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Regulator: A device used to regulate the pressure from the nitrogen cartridge into the agent tanks when the system is actuated.

Releasing Panel: A device listed to automatically operate the AUTOMAN 24 VDC Regulated Release Assembly.

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

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

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

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

Silicone Lubricant: A heat-resistant organic compound used to lubricate O-rings, rubber and mechanical components. (recommend HP-300 Grease (Part No. 445051)).

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

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

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

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

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

NOTES:

TOTAL SYSTEM

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

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

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

Single-Tank System

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

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

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

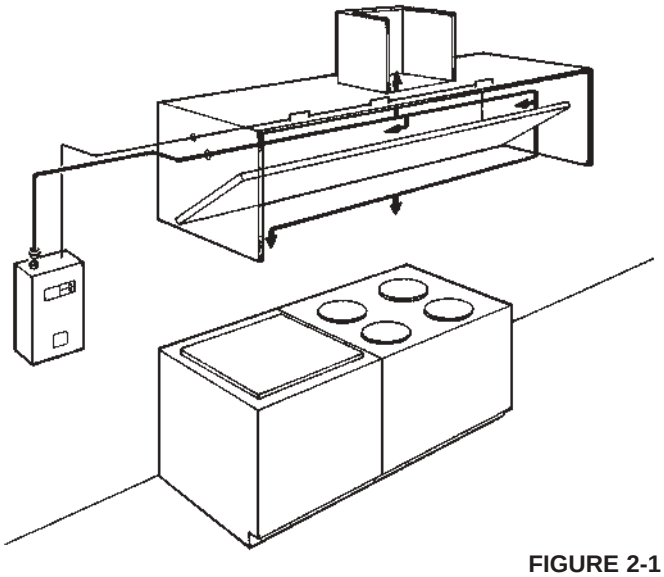


FIGURE 2-1
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Double-Tank System

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

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

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

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

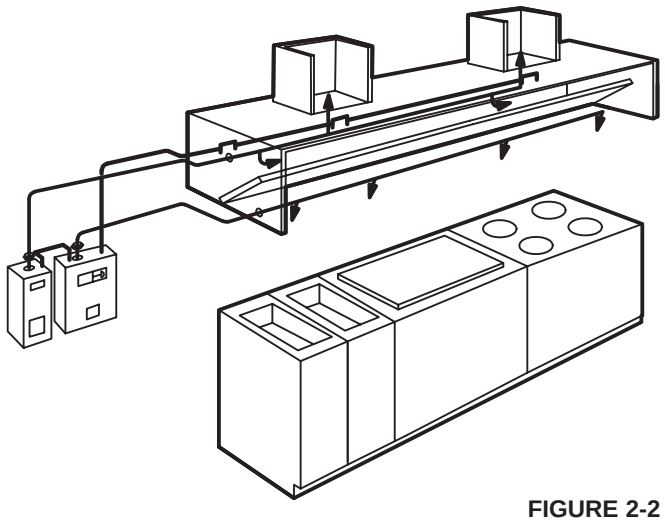


FIGURE 2-2
008321

TOTAL SYSTEM (Continued)

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

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

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

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

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

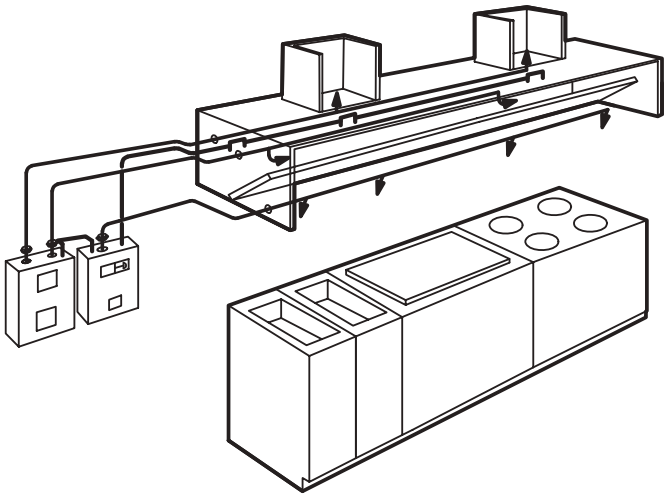


FIGURE 2-3
008322

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

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

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

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

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

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

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

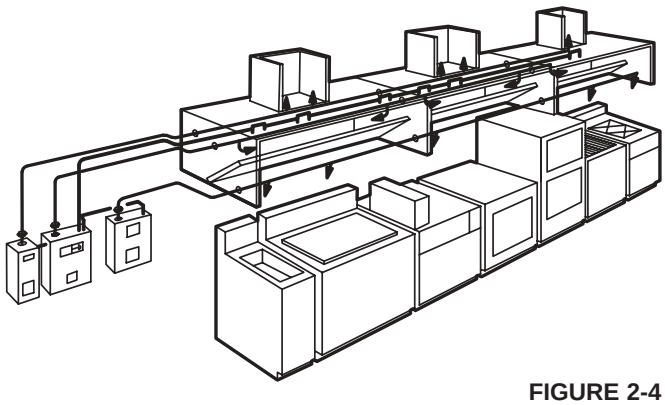


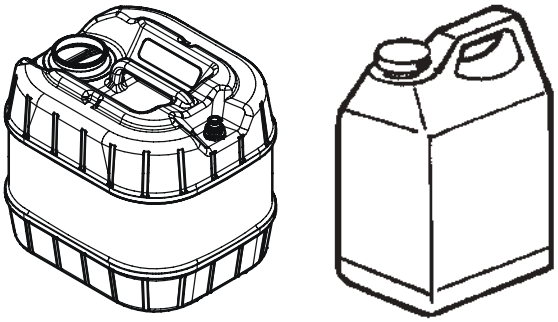
FIGURE 2-4
008323

FIRE SUPPRESSANT AGENT

ANSULEX low pH liquid fire suppressant (1.5 gal – Part No. 79694 or 3.0 gal – Part No. 79372) is a potassium-based solution designed for fast knock-down and suppression of grease-related fires. The agent is shipped in plastic containers which provide one complete tank charge. Agent storage life expectancy is twelve years and can be stored at a temperature of -40 °F to 130 °F (-40 °C to 54 °C). **When installing agent in R-102 system, temperature range is 32 °F to 130 °F (0 °C to 54 °C).**

The distributor must record the batch numbers and date of shipment receipt to be filed with each installation record.

ANSULEX LOW PH LIQUID FIRE SUPPRESSANT



3.0 GAL
SHIPPING WT. 35 LB (15.9 kg)

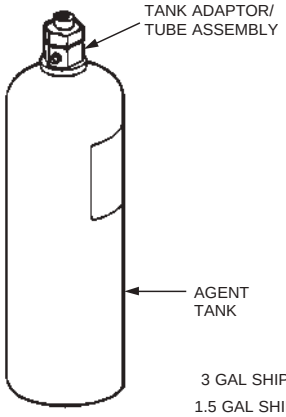
1.5 GAL
SHIPPING WT. 19 LB (8.6 kg)

FIGURE 3-1
010892, 000137

AGENT TANK ASSEMBLY

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

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



3 GAL SHIPPING WT. 7 LB (3.2 kg)
1.5 GAL SHIPPING WT. 5 LB (2.3 kg)

FIGURE 3-2
000140

REGULATED RELEASE ASSEMBLY (MECHANICAL)

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

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

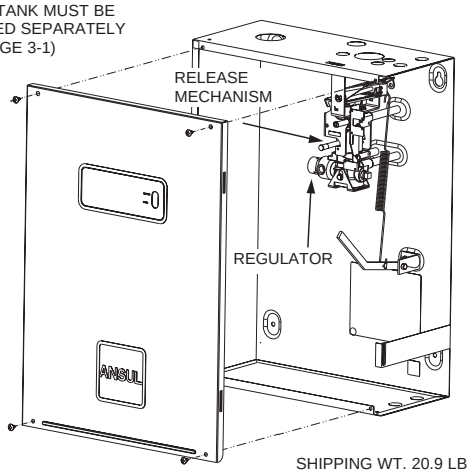
The tank is mounted within the enclosure. The tank contains an adaptor/tube assembly with a burst disc union. The burst disc helps prevent siphoning of the agent up the pipe due to significant temperature fluctuations in the area where the tank is located. The tank is stainless steel and, under normal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

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

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

AUTOMAN REGULATED MECHANICAL RELEASE ASSEMBLY

NOTE: AGENT TANK MUST BE ORDERED SEPARATELY (SEE PAGE 3-1)



SHIPPING WT. 20.9 LB (9.5 kg)

FIGURE 3-3
009454

▸ 120 VAC REGULATED RELEASE ASSEMBLY (ELECTRICAL)

The AUTOMAN Regulated Electrical Release Assembly (Part No. 429856) is identical to the mechanical version except it also contains a factory installed 120 VAC solenoid and electrical switch. This assembly is not intended to be used with electric detection (for use with fusible links only).

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

▸ AUTOMAN 120 VAC REGULATED ELECTRICAL RELEASE ASSEMBLY

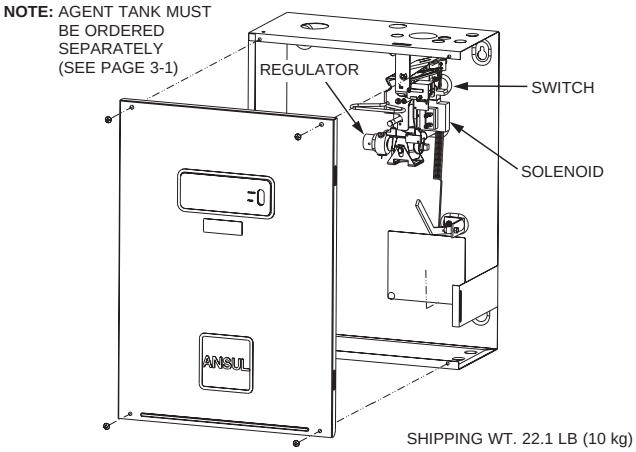


FIGURE 3-4
009455

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

The OEM Regulated Mechanical Release/Bracket Assembly (Part No. 79493) contains the same regulated release mechanism as the standard AUTOMAN regulated release assembly. The OEM regulated electrical release/bracket assemblies are identical to the mechanical version except there is a factory installed solenoid and electrical switch. These release/bracket assemblies must be installed in a suitable equipment enclosure either horizontally or vertically. They contain all the necessary mounting and conduit holes needed to fully install the assembly. The agent tank is installed separately and need not be bracketed once it is piped and filled.

Note: OEM release/bracket assembly must be installed high enough in cabinet so that there is sufficient room to install and remove cartridge.

▸ **Note:** OEM regulated electrical release/bracket assembly (Part No. 418054) is not intended to be used with electric detection (for use with fusible links only).

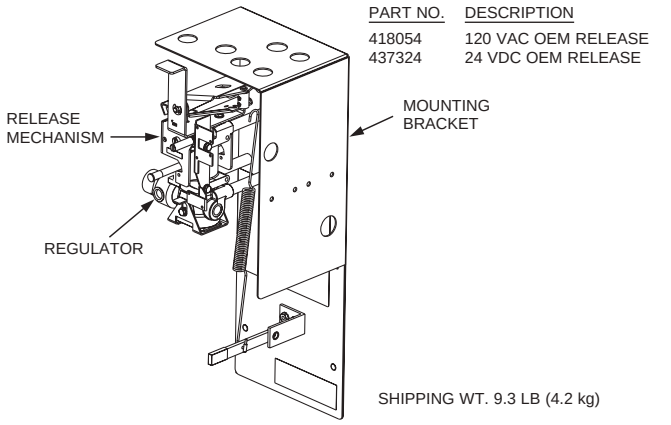


FIGURE 3-5
009457

24 VDC REGULATED RELEASE ASSEMBLY

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

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

▸ 24 VDC (ULC APPROVED ONLY)

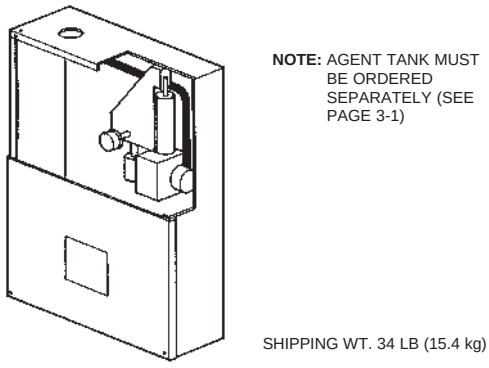


FIGURE 3-6
002279

▸ **Note:** For installation instructions for 24 VDC AUTOMAN (AUTOMAN II-C) regulated release, the AUTOPULSE control panels, and/or electric thermal detection, refer to the appropriate manuals:

- AUTOPULSE 542R control panel - Fire Alarm Control Panel Installation Manual (Part No. 434946)
- AUTOPULSE Z-10 Control Panel - Installation, Programming, and Operating Instructions (Part No. 430545)
- AUTOMAN II-C Releasing Device Manual (Part No. 17788)
- ▸ • AUTOPULSE Detection and Control Systems Manual (Part No. 430261)

REMOTE MECHANICAL RELEASE

The Remote Mechanical Release (Part No. 433485) is used to actuate up to five R-102 regulated actuators. The Remote Mechanical Release needs to be installed in a Stainless Steel Enclosure or an OEM suitable equipment enclosure. The remote mechanical release uses the 101-10 carbon dioxide cartridge or the LT-20-R nitrogen cartridge.

The following cartridge options are approved for use in the remote mechanical release/bracket assembly:

	LT-20-R Nitrogen	101-10 CO_2
• TC/DOT	423429	423439
• European Part No.	428440	N/A
• Australian Part No.	428948	N/A

REMOTE MECHANICAL RELEASE

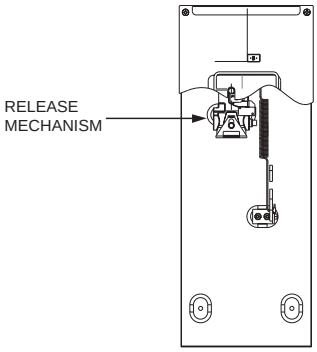


FIGURE 3-7
009456

REGULATED ACTUATOR ASSEMBLY

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

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

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

REGULATED ACTUATOR ASSEMBLY

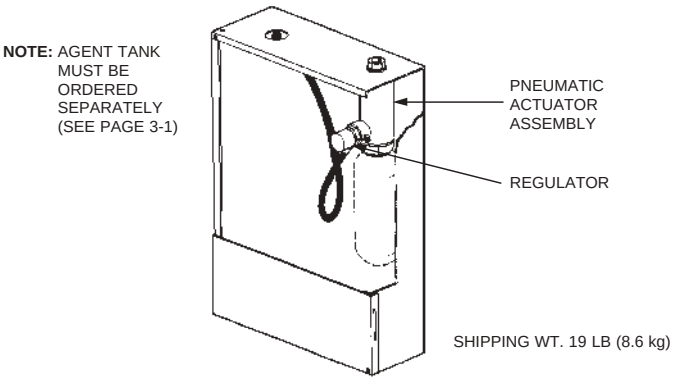


FIGURE 3-8
000143

OEM REMOTE RELEASE/BRACKET ASSEMBLY

Also available is an OEM Remote Release/Bracket Assembly (Part No. 439946). The OEM remote release/bracket contains the same release mechanism as the standard remote release, and must be installed in a suitable equipment enclosure either horizontally or vertically. The remote release contains all the necessary mounting and conduit holes needed to fully install the assembly.

The following cartridge options are approved for use in the OEM remote release/bracket assembly:

	LT-20-R Nitrogen	101-10 CO_2
• TC/DOT	423429	423439
• European Part No.	428440	N/A
• Australian Part No.	428948	N/A

Note: OEM release/bracket assembly must be installed high enough in the cabinet so that there is sufficient room to install and remove the cartridge.

OEM REGULATED ACTUATOR ASSEMBLY

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

Note: OEM regulated actuator assembly must be installed high enough in the cabinet so that there is sufficient room to install and remove the cartridge.

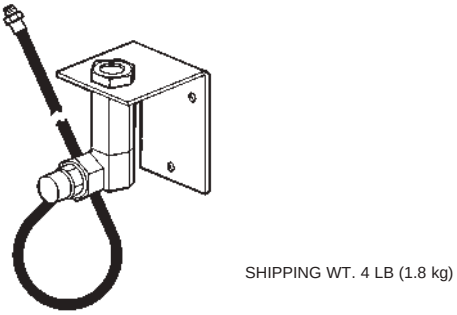


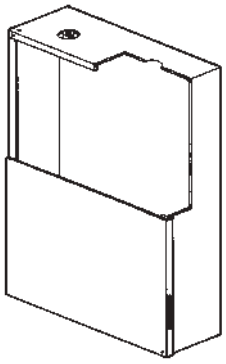
FIGURE 3-9
002225

DOUBLE TANK ENCLOSURE ASSEMBLY

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

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

DOUBLE TANK ENCLOSURE ASSEMBLY



SHIPPING WT. 26 LB (11.8 kg)

FIGURE 3-10
002277

SINGLE TANK ENCLOSURE ASSEMBLY

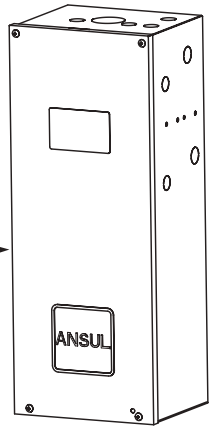
The Single Tank Enclosure Assembly (Part No. 429870) is used in double and multiple-tank systems and must be mounted to a rigid surface near the regulated release or regulated actuator assembly where the expellant gas line is connected.

The enclosure is designed for mounting either a 1.5 gal (Part No. 429864) or a 3 gal tank (Part No. 429862) in a minimum amount of space.

ENCLOSURE ASSEMBLY

NOTE: AGENT TANK MUST BE ORDERED SEPARATELY (SEE PAGE 3-1)

MOUNTING ENCLOSURE



SHIPPING WT. 13 LB (5.9 kg)

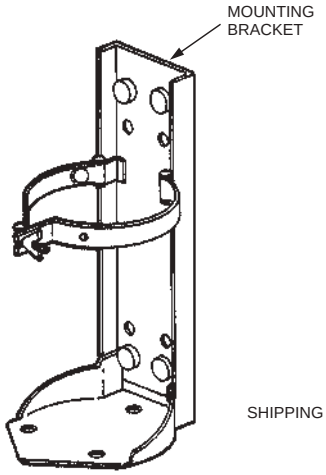
FIGURE 3-11
000142

RED PAINTED BRACKET ASSEMBLY

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

The tank bracket is constructed of mild steel and painted red. It is designed for mounting the tank in a minimum amount of space. The bracket assembly can only be utilized with 3 gal tanks (Part No. 429862).

BRACKET ASSEMBLY



SHIPPING WT. 7 LB (3.2 kg)

FIGURE 3-12
000141

GAS CARTRIDGES

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

Four nitrogen gas cartridges and three carbon dioxide gas cartridges are available as shown in Figure 3-13.

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

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

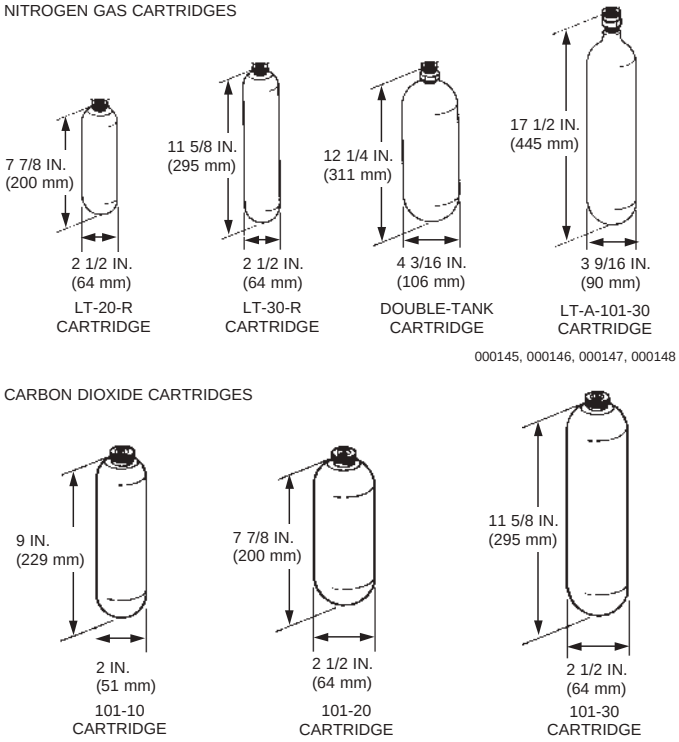


FIGURE 3-13
000149, 000150, 000151

Additional cartridge shipping assemblies are available for European and Australian requirements (see Table 3-1).

TABLE 3-1: AVAILABLE CARTRIDGES

Cartridge Description	European Part No.	Australian Part No.	TC/DOT Part No.
LT-20-R	428440	428948	423429
LT-30-R	428441	426553	423435
Double Tank	428446	426563	423493
LT-A-101-30	428442	426555	423491
101-10 - CO_2	N/A	N/A	423439
101-20 - CO_2	N/A	N/A	423441
101-30 - CO_2	N/A	N/A	423443

Note: 101-20 Co_2 (Part No. 423441) is only rated certified as a DOT type cartridge.

NOZZLES

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

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

Although these nozzles are similar in appearance and have certain common parts, the tip of each nozzle is designed for a specific application and must only be used in those areas. See Nozzle Application Chart on page 4-29, for individual nozzle usage. Nozzles are shipped with metal blow-off caps included (see Table 3-2).

A 25 pack of nozzle o-rings (Part No. 439848) is also available.

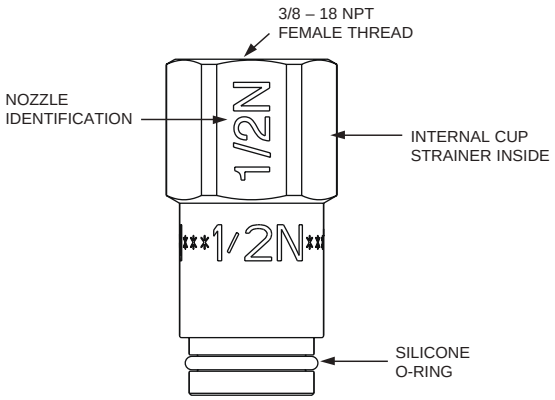


FIGURE 3-14
009474

TABLE 3-2: NOZZLE IDENTIFICATION CHART

Part No.	R-102 Nozzle (10 Packs)	Nozzle Flow No.	Nozzle Material
443319	Nozzle, 1F	1	Chrome-Plated Body
443321	Nozzle, 1/2N	1/2	Chrome-Plated Body
443317	Nozzle, 1N*	1	Chrome-Plated Body
443323	Nozzle, 1W*	1	Chrome-Plated Body
443325	Nozzle, 2W	2	Chrome-Plated Body
443327	Nozzle, 3N	3	Chrome-Plated Body
443329	Nozzle, 230	2	Chrome-Plated Body
443331	Nozzle, 245	2	Chrome-Plated Body
443333	Nozzle, 260	2	Chrome-Plated Body
443335	Nozzle, 290	2	Chrome-Plated Body
443337	Nozzle, 2120	2	Chrome-Plated Body

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

Note: All nozzles come with metal blow-off caps.

LUBRICANT/GREASE

Dow Corning MOLYKOTE HP-300 lubricant/grease (Part No. 445051) is available in a 100 gm tub.

Note: Do not apply silicone grease to any nozzle orifice.

SWIVEL ADAPTOR

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

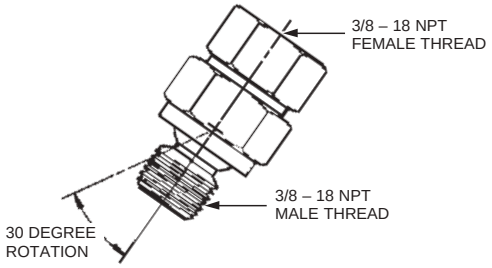


FIGURE 3-15
000003

METAL BLOW-OFF CAP

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

The metal blow-off cap package (Part No. 439861) contains 10 blow-off caps.

Also available is a 10 pack of stainless steel blow-off caps (Part No. 439866).

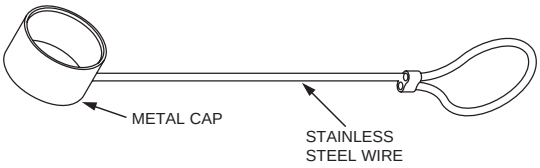


FIGURE 3-16
009475

REDUCING COUPLING

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

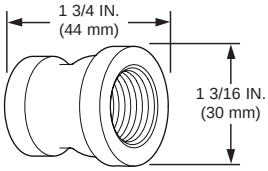


FIGURE 3-17
008324

CONDUIT OFFSET ASSEMBLY

The Conduit Offset Assembly is used to change direction of the wire rope on detection, mechanical gas valve, and remote pull station lines. The conduit offset assembly can only be used in the area where the conduit attaches to the release assemblies. The conduit offset shipping assembly (Part No. 436063) consists of 6 conduit offsets.

Note: A single Conduit Offset Assembly is Part No. 435961.

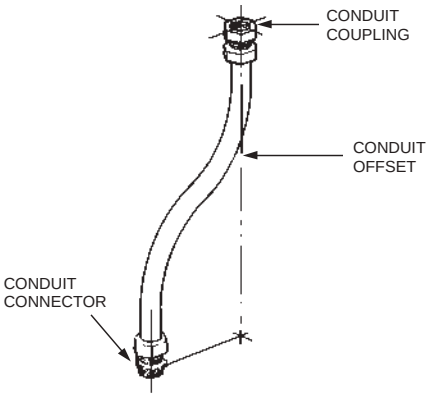


FIGURE 3-18
000153

"QUIK-SEAL" ADAPTOR

The "Quik-Seal" Adaptor is a listed mechanical bulkhead fitting that produces a liquid-tight seal around both distribution piping and detection conduit which runs through restaurant hoods and ducts. The "Quik-Seal" Adaptor accepts threaded pipe or conduit. The adaptor is available for 1/4 in., 3/8 in., or 1/2 in. pipe or conduit sizes. When using with EMT conduit, a conduit connector must be installed in each end of the adaptor. The "Quik-Seal" Adaptor shipping assembly must be ordered as listed in Table 3-3:

TABLE 3-3: "QUIK-SEAL" ADAPTOR SHIPPING PART NUMBERS

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

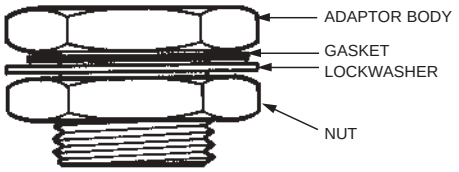


FIGURE 3-19
000154

"COMPRESSION-SEAL" ADAPTOR

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around pipe and conduit when installing distribution piping and detection conduit through restaurant hoods and ducts. The "Compression-Seal" Adaptor is a straight-through design requiring no cutting or threading of conduit or pipe. The adaptor is available for pipe sizes of 1/4 in., 3/8 in., 1/2 in., and EMT conduit size of 1/2 in. Each "Compression-Seal" Adaptor shipping assembly must be ordered as listed in Table 3-4:

TABLE 3-4: "COMPRESSION-SEAL" ADAPTOR SHIPPING PART NUMBERS

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

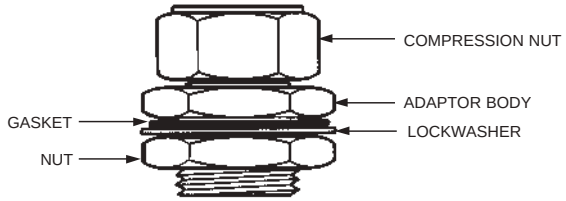


FIGURE 3-20
000155

"HOOD SEAL" ADAPTOR ASSEMBLY

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

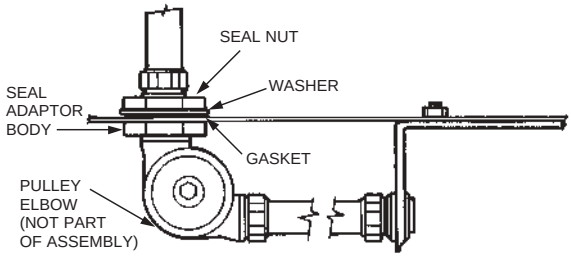


FIGURE 3-21
000156

Note: "Quik-Seal" is a trademark of Evergreen Tool Company, Inc.

COCKING LEVER/LOCK PIN

The Cocking Lever is a component required to arm both the mechanical/electrical AUTOMAN release and the mechanical gas valve. After the AUTOMAN release is cocked (armed), the Lock Pin must be inserted to eliminate the accidental firing of the release mechanism. These components are available as either an individual shipping assembly or a shipping assembly containing both. See Table 3-5 for the various shipping assembly part numbers.

TABLE 3-5: COCKING LEVER/LOCK PIN SHIPPING PART NUMBERS

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

Short Handle Cocking Lever
Part No. 441042

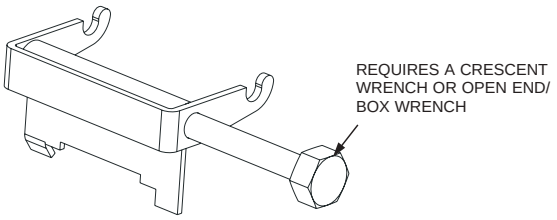


FIGURE 3-22
008325a

Long Handle Cocking Lever
Part No. 441041

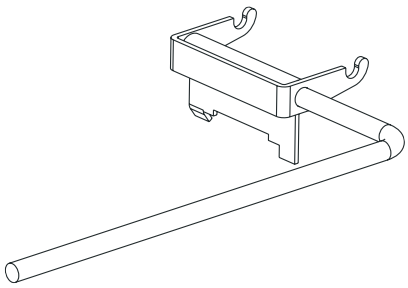


FIGURE 3-23
008325b

Lock Pin
Part No. 438031

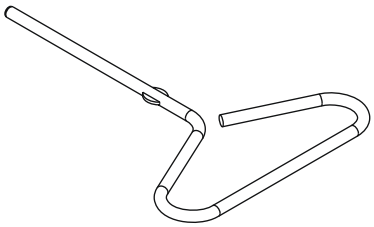


FIGURE 3-24
008325

Cocking Lever only (Mechanical Gas Valve)
Part No. 416018



FIGURE 3-25
011528

DETECTORS

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

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

The detection line consists of two types of assemblies:

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

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

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

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

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

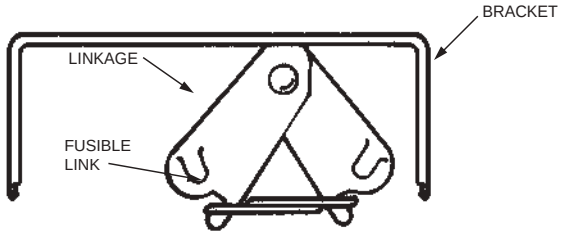


FIGURE 3-26
000159

DETECTORS (Continued)

Electric Thermal Detector

Rate compensating temperature thermal detectors are normally open, mechanical contact closure switches designed to operate at a factory preset temperature. There are four preset temperatures which meet NFPA standards and are UL Listed and FM Approved. After determining the maximum ambient temperature at the thermal detector location, select the correct thermal detector according to the temperature condition chart below:

Thermal Detector Model No.	Part No.	Maximum Ambient Temperature °F	(°C)
TD-225	13976	155	(68)
TD-325	13975	255	(124)
TD-450	13974	380	(193)
TD-600	13971	530	(277)
TD-725	13977	625	(329)

Note: A transient rush of warm air up to 40 °F (4 °C) per minute may expand the shell, but not enough to trigger the AUTOPULSE control panel. Temperature increases over 40 °F (4 °C) per minute, however, may initiate an alarm condition in the control panel.

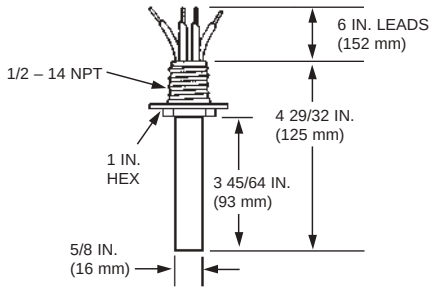


FIGURE 3-27
007354

PULLEY ELBOWS

There are two types of pulley elbows used to change the direction of the wire rope by 90°. Both types are recommended to be used up to temperatures of 700 °F (371 °C). The socket end type has socket ends with set screws for 1/2 in. conduit. The compression end type has compression ring ends also for 1/2 in. conduit. Pulley elbows must be ordered in quantities of 50 as shipping assembly (Part No. 415671) socket end type and (Part No. 423251) compression end type.

SOCKET END TYPE COMPRESSION END TYPE



FIGURE 3-28
000160, 000161

PULLEY TEE

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

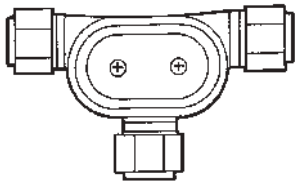


FIGURE 3-29
000447

STAINLESS STEEL WIRE ROPE

The 1/16 in. Stainless Steel Wire Rope is used for actuation of mechanical detection, remote manual pull stations, and mechanical gas valves. The wire rope is available in 50 ft (15.2 m) (Part No. 15821) and 500 ft (152.4 m) (Part No. 79653) lengths. The stainless steel wire rope contains a blue tracer cable.

REMOTE MANUAL PULL STATION

The remote manual pull station (Part No. 434618 or 435960) is made out of a molded red composite material. The red color makes the pull station more readily identifiable as the manual means for fire suppression system operation. The pull station is compatible with the Flexible Conduit.

Part No.	Description
427074	Trim rings (pack of 10)
435726	Pull tabs
024915	Break rods
550122	WC-100 Crimps for 1/16 in. stainless steel wire rope (100 pack)

Part No. 434618 (Without Wire Rope)

Part No. 435960 (With 50 ft (15.2 m) of Wire Rope)

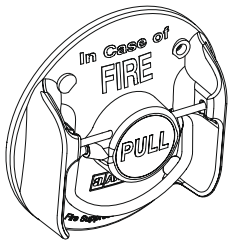


FIGURE 3-30
008326

REMOTE MANUAL PULL STATION (Continued)

The pull station ordering information is listed below for single languages.

Part No.	Description
434618	Remote Pull Station, English
436349	Remote Pull Station, French
436353	Remote Pull Station, German
436361	Remote Pull Station, Spanish
436369	Remote Pull Station, Russian
436373	Remote Pull Station, Turkish
437156	Remote Pull Station, Polish
437375	Remote Pull Station, Hungarian
438233	Remote Pull Station, Portuguese

The pull station ordering information is listed below for bilingual models.

Part No.	Description
436357	Remote Pull Station, English/Italian
436365	Remote Pull Station, English/Dutch
440679	Remote Pull Station, English/Arabic
443692	Remote Pull Station, English/Swedish

FLEXIBLE CONDUIT

Flexible Conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit. Flexible conduit can be used only with the molded manual pull station (Part No. 434618) and mechanical gas valve installations. For ordering information see Table 3-6.

TABLE 3-6: FLEXIBLE CONDUIT PART NUMBERS

Part No.	Description
434525	Flexible conduit, 500 ft (152.4 m)
435959	Flexible conduit with 500 ft (152.4 m) wire rope
439104	50 ft (15.2 m) Flexible Conduit pre-fed wire rope
435979	Flexible conduit strain relief (50-pack)
434347	Flexible conduit inserts (50-pack)
79827	EMT compression fitting union
55813	EMT conduit compression fitting
436150	P-clips (pack of 50)

Note: Flexible conduit is intended for indoor use ONLY.

Note: Flexible conduit cannot be used in the detection line.

MECHANICAL GAS VALVES

The Mechanical Gas Valves are designed to shut off the flow of gas to the appliances upon actuation of the regulated release assembly. The valves are available in sizes of 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., and 2 in. ANSUL® style; and 2 1/2 in. and 3 in. ASCO* style (see Table 3-9 for dimensions). The valves are rated for natural and LP gas. Both styles are UL Listed and include the air cylinder, tubing, and fittings
(Part No. 15733) for connection to the release mechanism. The valves are for interior use only. See Table 3-7 for operating pressure and Table 3-8 for flow capacity and natural gas limits.

TABLE 3-7: GAS VALVE MAXIMUM OPERATING PRESSURE

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

TABLE 3-8: PIPE FLOW CAPACITY

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

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

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

To calculate gas flow for other than 0.64 SP GR:

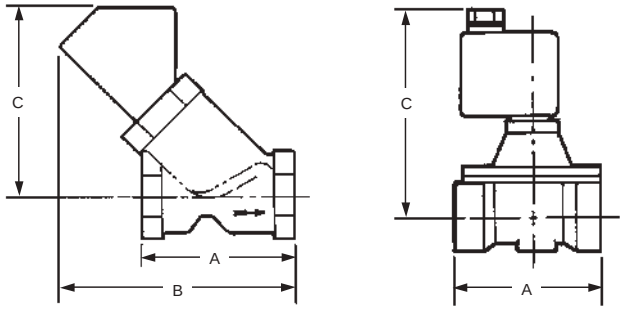
$$\text{New CFH} = (\text{CFH at 0.64}) \times \sqrt{\frac{0.64}{\text{New SP GR}}}$$

* ASCO is a trademark of ASCO Valve, Inc.

MECHANICAL GAS VALVES (Continued)

TABLE 3-9: VALVE DIMENSIONS

Valve Size in.	A		B		C	
	in.	(mm)	in.	(mm)	in.	(mm)
3/4	3 3/4	(95)	6 3/8	(162)	5 1/2	(140)
1	3 3/4	(95)	6 3/8	(162)	5 1/2	(140)
1 1/4	4 7/8	(124)	7 3/8	(187)	6 3/8	(162)
1 1/2	4 7/8	(124)	7 3/8	(187)	6 3/8	(162)
2	5 7/8	(149)	7 7/8	(200)	6 11/16	(170)
2 1/2	7 13/16	(198)	-	-	9 1/16	(230)
3	7 25/32	(198)	-	-	9 1/16	(230)



3/4 IN. THRU 2 IN. 2 1/2 IN. THRU 3 IN.

FIGURE 3-31
004208, 004209

ELECTRICAL GAS VALVES

The Electrical Gas Valves are designed to shut off the flow of either natural or LP gas to the appliances upon actuation of the regulated release assembly. The valves are available in sizes of 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., 2 in., 2 1/2 in., and 3 in. (see Table 3-12 for dimensions). The valve is held open by an energized solenoid and upon system actuation, the switch contacts in the regulated release assembly open, thus de-energizing the circuit to the gas valve solenoid, causing the valve to close. Valves are available in 120 VAC and are UL Listed. The valves are for interior use only. See Table 3-10 for operating pressure and Table 3-11 for flow capacity and natural gas limits.

TABLE 3-10: GAS VALVE MAXIMUM OPERATING PRESSURE

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

TABLE 3-11: PIPE FLOW CAPACITY

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

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

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

To calculate gas flow for other than 0.64 SP GR:

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

TABLE 3-12: VALVE DIMENSIONS

Valve Size	A		B	
	in.	(mm)	in.	(mm)
3/4 in.	3 5/16	(84)	3 5/8	(92)
1 in.	5	(127)	6 27/32	(174)
1 1/4 in.	7 13/16	(198)	7 29/32	(201)
1 1/2 in.	5	(127)	5 19/32	(142)
2 in.	6 3/32	(155)	5 15/16	(151)
2 1/2 in.	7 13/16	(198)	7 29/32	(201)
3 in.	7 13/16	(198)	7 29/32	(201)

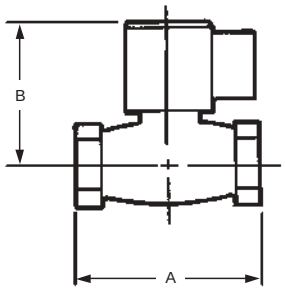


FIGURE 3-32
004210

MANUAL RESET RELAY

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

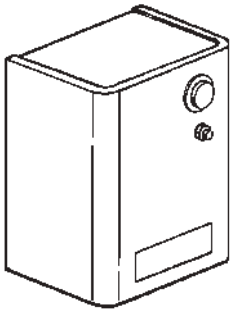


FIGURE 3-33
000087

REGULATOR TEST KIT

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

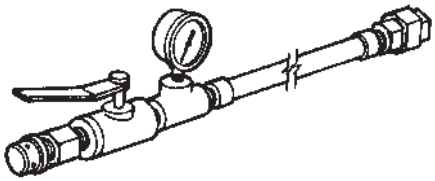


FIGURE 3-34
000169

ELECTRICAL SWITCHES

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

Switches are available in kits:

- One Switch Kit (Part No. 423878)
- Two Switch Kit (Part No. 423879)
- Three Switch Kit (Part No. 423880)
- Four Switch Kit (Part No. 423881)

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

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

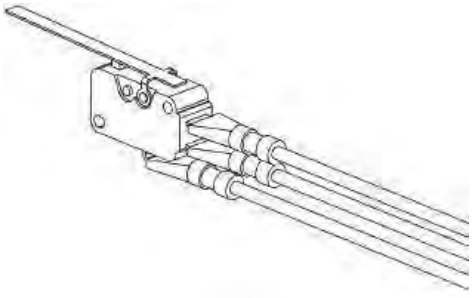


FIGURE 3-35
011535

ALARM INITIATING SWITCH

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

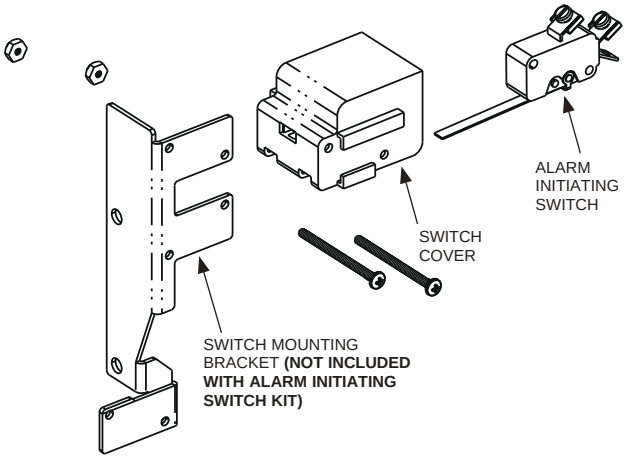


FIGURE 3-36
009137

VENT PLUG ASSEMBLY

The Vent Plug Assembly (Part No. 68800) is installed on the agent tank adaptor to prevent pressure buildup within the agent tank or distribution lines due to temperature fluctuations.

Note: The previous part number of 74247 should be ordered using the new part number (68800).

CARTRIDGE RECEIVER GASKET

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

FUSIBLE LINK

Select correct UL Listed Fusible Link (see Figure 3-37) for installation in each detector according to the temperature conditions indicated in Table 3-13 and Table 3-14:

TABLE 3-13: SL STYLE

Fusible Link Shipping Assembly Part No. (Qty.)	Temperature Rating		To Be Used Where Temperature Does Not Exceed		Color of Link
	°F	(°C)	°F	(°C)	
439085 (25)	165	(74)	100	(38)	Black
439086 (25)	212	(100)	150	(66)	White
439087 (25)	280	(138)	225	(107)	Blue
439088 (25)	360	(183)	290	(143)	Red
439089 (25)	450	(232)	360	(182)	Green

TABLE 3-14: A-PC STYLE

Fusible Link Shipping Assembly Part No. (Qty.)	Temperature Rating		To Be Used Where Temperature Does Not Exceed	
	°F	(°C)	°F	(°C)
439227 (10)	165	(74)	100	(38)
439228 (10)	212	(100)	150	(66)
439229 (10)	280	(138)	225	(107)
439230 (10)	360	(183)	290	(143)
439231 (10)	450	(232)	360	(182)
439232 (25)	500	(260)	400	(204)

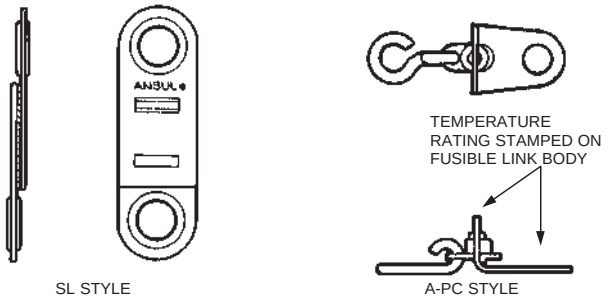


FIGURE 3-37
000170, 000171

MAXIMUM REGISTERING THERMOMETER

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

HOSE/GROMMET PACKAGE

The Hose/Grommet Package (Part No. 418511) consists of a 24 in. (610 mm) rubber hose and two grommets. This package is required when expellant gas hose is routed outside the AUTOMAN Regulated Release, Regulated Actuator, and/or tank enclosure assemblies.

IN-LINE BURST DISC ASSEMBLY (MANIFOLDED SYSTEMS ONLY)

The In-Line Burst Disc Assembly (see Table 3-15 and Figure 3-39) is required to eliminate the siphoning of the agent up the pipe during extreme temperature variations. In addition to eliminating the siphoning effect, the common in-line burst disc assembly eliminates the possibility of one or more individual discs located in the tank adaptor from failing to burst. The assembly consists of a stainless steel body which houses the burst disc. The Burst Disc Assembly is to be used in a manifolded system and it is necessary to modify or remove the burst disc located in all of the R-102 tank adaptors in the system. The in-line burst disc assembly is to be mounted as close to the tank outlet as possible. After system discharge, the assembly must be disassembled and a new burst disc installed.

TABLE 3-15: IN-LINE BURST DISC ASSEMBLY PART NUMBERS

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

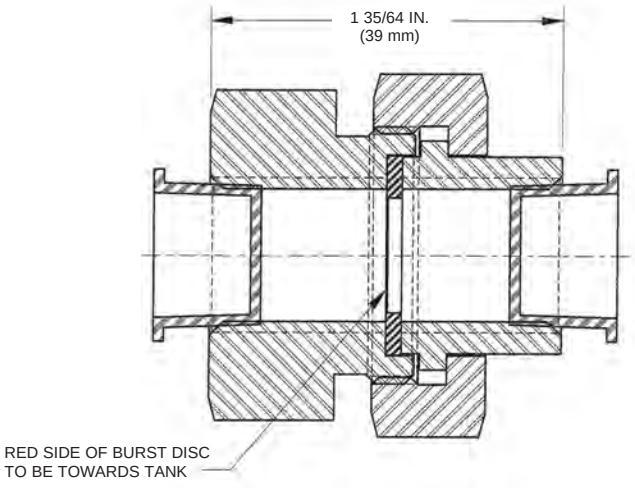


FIGURE 3-38
008383

1/4 IN. CHECK VALVE

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

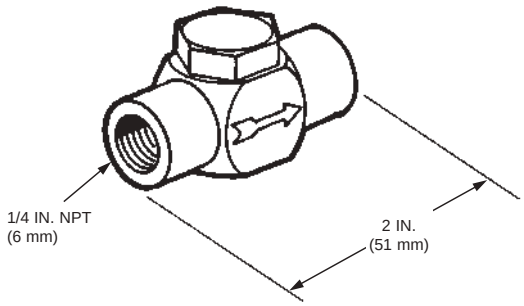


FIGURE 3-39
000899

NOZZLE AIMING DEVICE

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

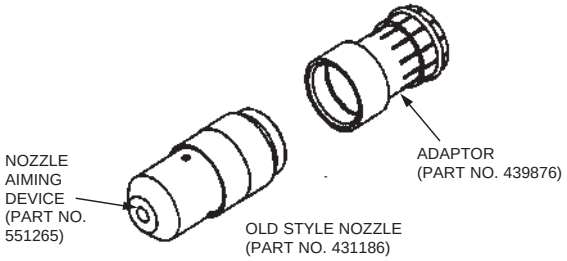


FIGURE 3-40
006520

STAINLESS STEEL BRAIDED ACTUATION HOSE

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

TABLE 3-16: HOSE PART NUMBERS

Hose Part No.	Length		Couplings
	in.	(mm)	
31809	16	(406)	7/16-20 x 7/16-20 Females
32335	20	(508)	7/16-20 x 7/16-20 Females
32336	24	(610)	7/16-20 x 7/16-20 Females
430815	42	(1,067)	7/16-20 Female x 1/4 in. NPT Male

TABLE 3-17: FITTING PART NUMBERS

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



FIGURE 3-41
000433

AGENT DISTRIBUTION HOSE AND RESTRAINING CABLE KIT

The Agent Distribution Hose and Restraining Cable Kit (Part No. 435982) consists of a 5 ft (1.5 m) long agent distribution hose, a 3 ft (0.9 m) long restraining cable, and a restraining cable hardware package. The Agent Distribution Hose can be utilized with castered cooking appliances with castered supports found in commercial kitchens. Newly approved locations for installation are as follows:

- Under the hood in the hazard area
- Without the restraining cable in stationary piping instances such as:
  - Non-castered or stationary appliances
  - Back to back hoods
  - Nozzle drops

The hose allows for movement of the appliance for cleaning without having to disconnect any fire suppression system discharge piping.

Note: The agent distribution hose is authorized for use with only UL Listed ANSUL® Wet Chemical Restaurant Fire Suppression Systems.

SYSTEM DESIGN

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

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

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

One of the key elements for restaurant fire protection is a correct system design. This section is divided into sub-sections:

- Nozzle Placement Requirements
- Tank and Cartridge Requirements
- Actuation and Expellant Gas Line Requirements
- Distribution Piping Requirements
- Detection System Requirements
- Manual Pull Station Requirements
- Mechanical Gas Valve Requirements
- Electrical Gas Valve Requirements
- Alarm Initiating Switch Requirements
- Electrical Switch Requirements

Each of these sections must be completed before attempting any installation. System design sketches should be made of all aspects of design for reference during installation.

NOZZLE PLACEMENT REQUIREMENTS

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

Duct Protection – Single Nozzle

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

Note: Ducts from multiple hoods connected to a common ductwork must be protected in compliance with NFPA 17A and all local codes.

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

GENERAL INFORMATION

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

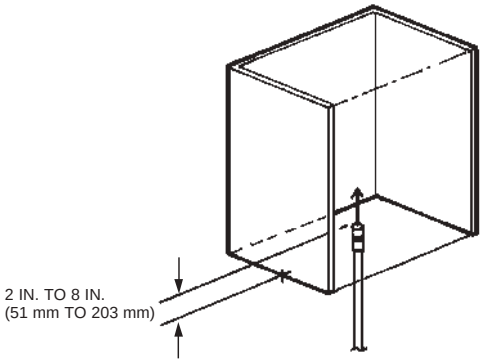


FIGURE 4-1
000173

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

DUCT SIZES UP TO 50 IN. (1,270 mm) PERIMETER
16 IN. (406 mm) DIAMETER

- One 1W nozzle = one flow number
- 50 in. (1,270 mm) perimeter maximum
- 16 in. (406 mm) diameter maximum

DUCT SIZES UP TO 100 IN. (2,540 mm) PERIMETER
32 IN. (812 mm) DIAMETER

- One 2W nozzle = two flow numbers
- 100 in. (2,540 mm) perimeter maximum
- 32 in. (812 mm) diameter maximum

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Duct Protection – Multiple Nozzle

DUCT SIZES UP TO 135 IN. (3,429 mm) PERIMETER – THREE FLOW OPTION

- One 1W nozzle and one 2W nozzle = three flow numbers.
- 135 in. (3,429 mm) perimeter maximum.
- No round duct option available.
- Use Table 4-1 and Figure 4-2 to determine maximum module size for each nozzle.

TABLE 4-1: MAXIMUM MODULE SIZE

Side A Maximum		Side B Maximum		1W Module Side B Maximum		2W Module Side B Maximum	
in.	**(mm)**	**in.**	**(mm)**	**in.**	**(mm)**	**in.**	**(mm)**
4	(101)	60	(1,524)	23	(584)	37	(939)
5	(127)	60	(1,524)	23	(584)	37	(939)
6	(151)	59 1/2	(1,511)	22 1/2	(571)	37	(939)
7	(177)	59	(1,498)	22	(558)	37	(939)
8	(203)	58 1/2	(1,485)	22	(558)	36 1/2	(927)
9	(228)	58	(1,473)	21 1/2	(546)	36 1/2	(927)
10	(254)	57	(1,447)	21	(533)	36	(914)
11	(279)	56	(1,422)	20 1/2	(520)	35 1/2	(901)
12	(304)	55 1/2	(1,409)	20	(508)	35 1/2	(901)
13	(330)	54 1/2	(1,384)	19 1/2	(495)	35	(889)
14	(355)	53 1/2	(1,358)	18 1/2	(469)	35	(889)
15	(381)	52	(1,320)	18	(457)	34	(863)
16	(406)	51	(1,295)	17	(431)	34	(863)
17	(431)	49 1/2	(1,257)	16	(406)	33 1/2	(850)
18	(457)	47 1/2	(1,206)	14 1/2	(368)	33	(838)
19	(482)	46	(1,168)	13 1/2	(342)	32 1/2	(825)
20	(508)	43 1/2	(1,104)	12	(304)	31 11/16	(805)
21	(533)	41	(1,041)	10	(254)	31	(787)
22	(558)	38	(965)	7 1/2	(190)	30 1/2	(774)
23	(584)	33 1/2	(850)	4	(101)	29 1/2	(749)

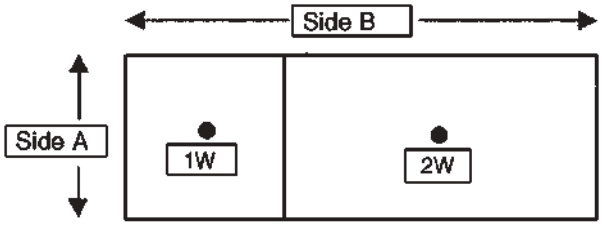


FIGURE 4-2
006521

Example: Protection is required for a duct that has an **A** dimension of 8 in. (203 mm) wide and a **B** dimension of 55 in. (1,397 mm) long.

Referring to Table 4-1 and Figure 4-2, if the **A** dimension is 8 in. (203 mm), the **B** dimension must not exceed 58 1/2 in. (1,485 mm). In this example, the **B** dimension is 55 in. (1,397 mm), therefore, this duct can be protected with a three flow application.

Read over from the 8 in. (203 mm) line on the table to the 1W module column. At that point, the chart shows that the **B** module length for the 1W nozzle can be 22 in. (558 mm). Center the 1W nozzle in that module. The 2W module can now be centered within the remaining module.

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Duct Protection – Multiple Nozzle (Continued)

DUCT SIZES GREATER THAN 100 IN. (2,540 mm) PERIMETER

- Ducts over 100 in. (2,540 mm) perimeter may be modularized using 2W nozzles
- No round duct option available
- Follow the design chart to determine maximum module size for each 2W nozzle
- When determining number of nozzles required, it is sometimes an advantage to check the chart using the shortest side as Side **A** and then recheck it using the longest side as Side **A**. This comparison may reveal a need for a lesser quantity of nozzles one way versus the other way.

When working with Chart 4-2, the quantity of nozzles determined must be equally divided within the duct area.

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

Example: The duct to be protected has a Side **A** of 40 in. (1,016 mm) and a Side **B** of 60 in. (1,524 mm). Referring to the design chart, this duct requires four nozzles.
One half of 4 = 2. Therefore, two nozzles must be equally positioned in each of the two duct areas. See Figure 4-3.

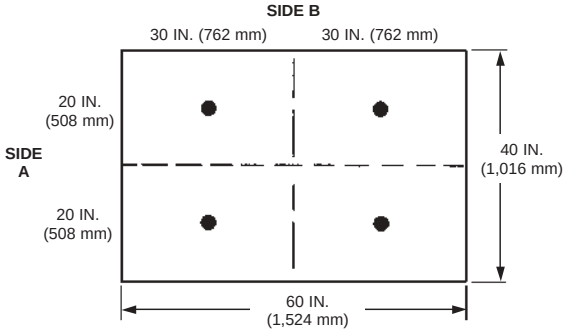


FIGURE 4-3
006523

CHART 4-1

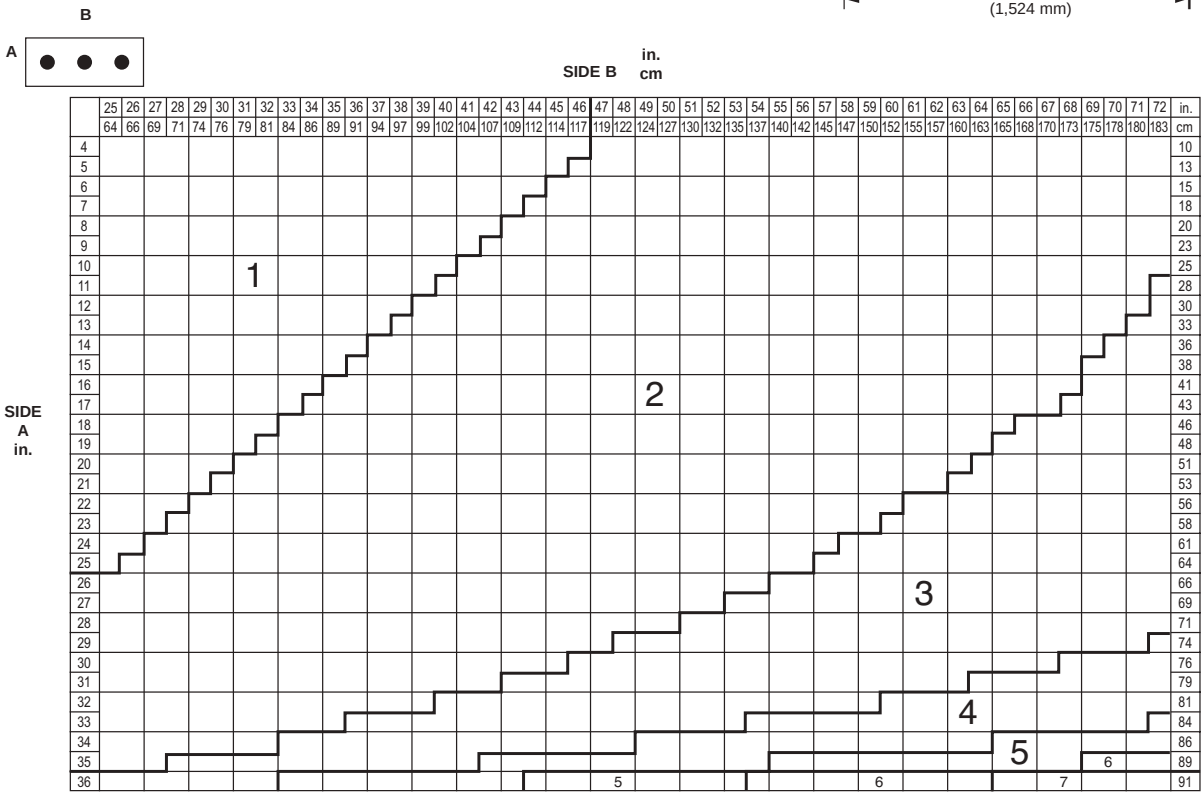
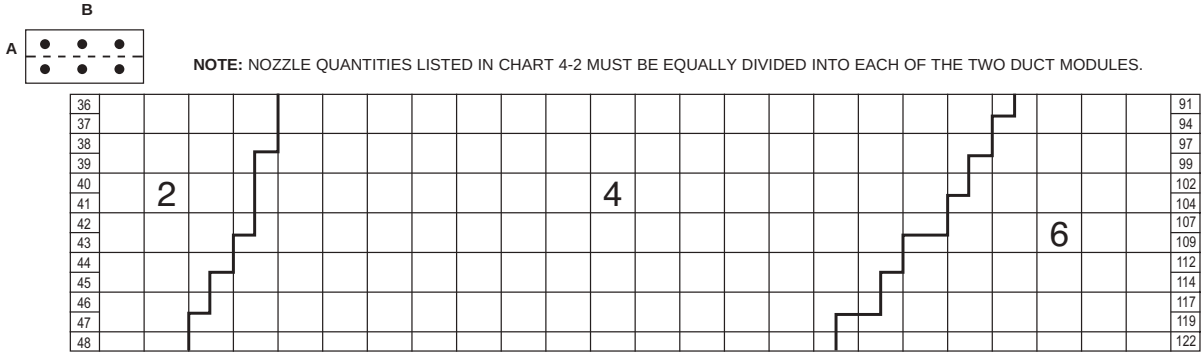


CHART 4-2



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

006522

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Transition Protection

Transitions are protected at a point in the transition where the perimeter or the diameter is equal to or less than the maximum size duct that can be protected. The nozzles must be located in the center of the area at that point, or center of the module protected when more than one duct nozzle is required. See Figure 4-4.

Note: Ducts with a transition that is more than 4 ft (1.2 m) in height require nozzles positioned 2 in. to 8 in. (51 mm to 203 mm) from the hood into the opening of the transition using standard duct nozzle design parameters.

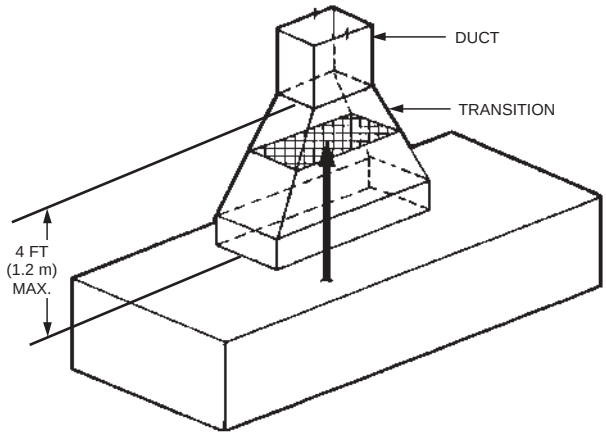


FIGURE 4-4
000174

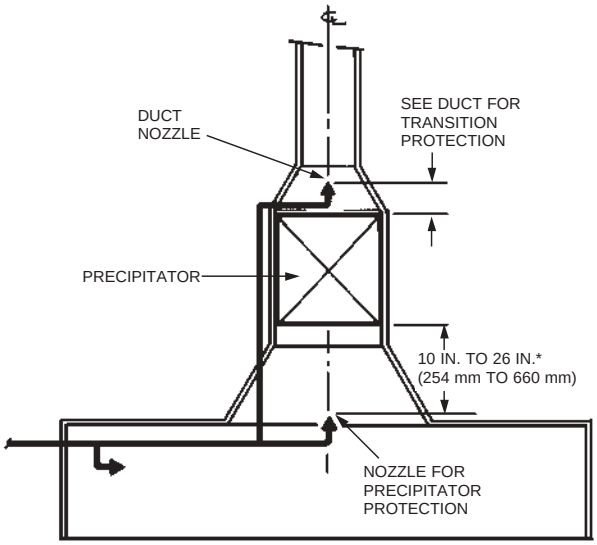
Electrostatic Precipitator Protection

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

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

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

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



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

FIGURE 4-5
000196

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

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Plenum Protection

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

VERTICAL PROTECTION – GENERAL

1W Nozzle – Single and "V" Bank Protection

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

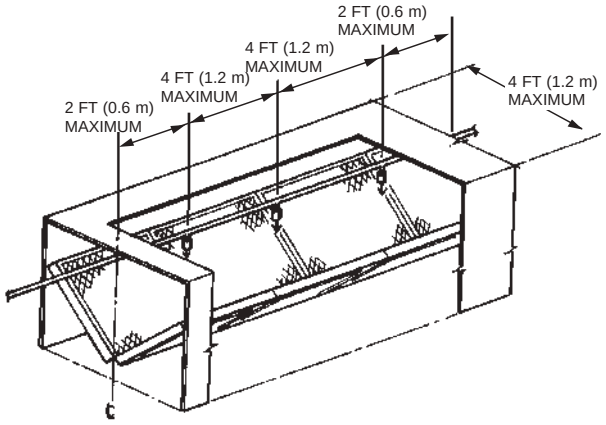


FIGURE 4-6
000197

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

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

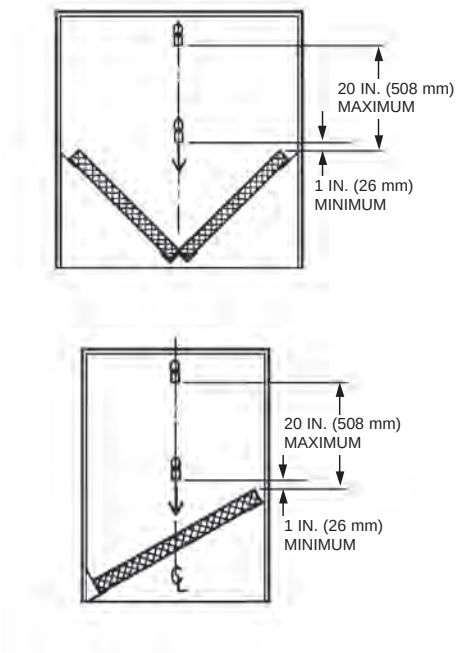


FIGURE 4-7
000199

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

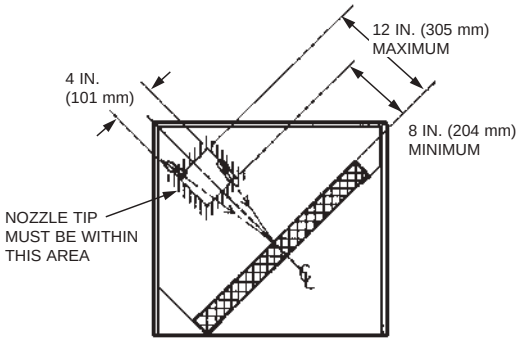


FIGURE 4-8
000200

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Plenum Protection (Continued)

HORIZONTAL PROTECTION – OPTION 1

1N Nozzle Single Bank Protection

One 1N nozzle protects 10 linear feet (3.0 m) by 4 ft (1.2 m) of single filter bank plenum. Mount the nozzles in the plenum, ▸ 2 in. to 4 in. (51 mm to 102 mm) from the face of the filter, centered between the filter height dimension, and aimed down the length. The nozzle must be positioned 0 in. to 6 in. (0 mm to 152 mm) from the end of the plenum to the tip of the nozzle. See Figure 4-9.

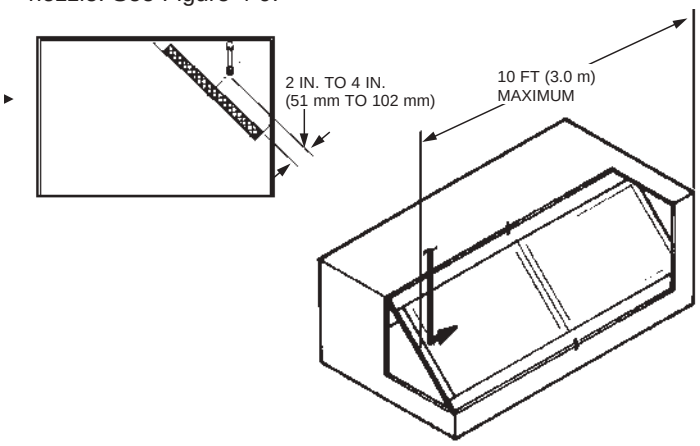


FIGURE 4-9
000201, 000202

HORIZONTAL PROTECTION – OPTION 2

1W Nozzle – “V” Bank Protection

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

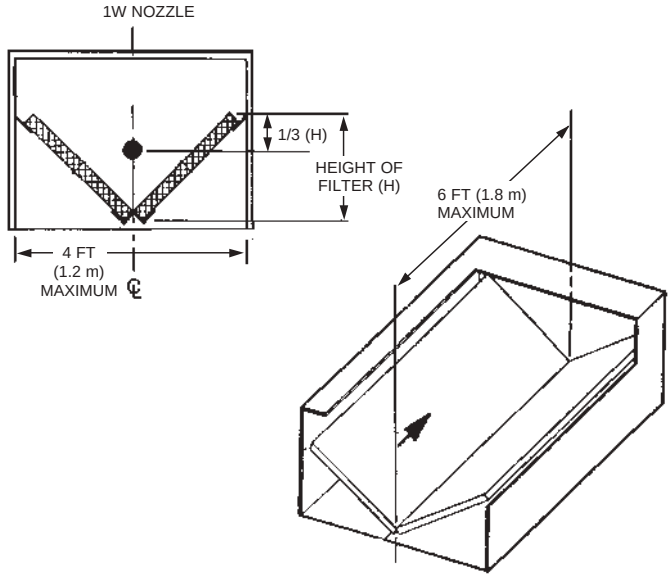


FIGURE 4-10
006524a, 006524b

Two 1N Nozzles – “V” Bank Protection

Two 1N nozzles protect 10 linear feet (3.0 m) by 4 ft (1.2 m) wide of “V” bank plenum. Mount the nozzles in the plenum, ▸ 2 in. to 4 in. (51 mm to 102 mm) from the face of the filter, centered between the filter height dimension, and aimed down ▸ the length. Position the nozzle 0 in. to 6 in. (0 mm to 152 mm) from the end of the plenum to the tip of the nozzle. See Figure 4-11.

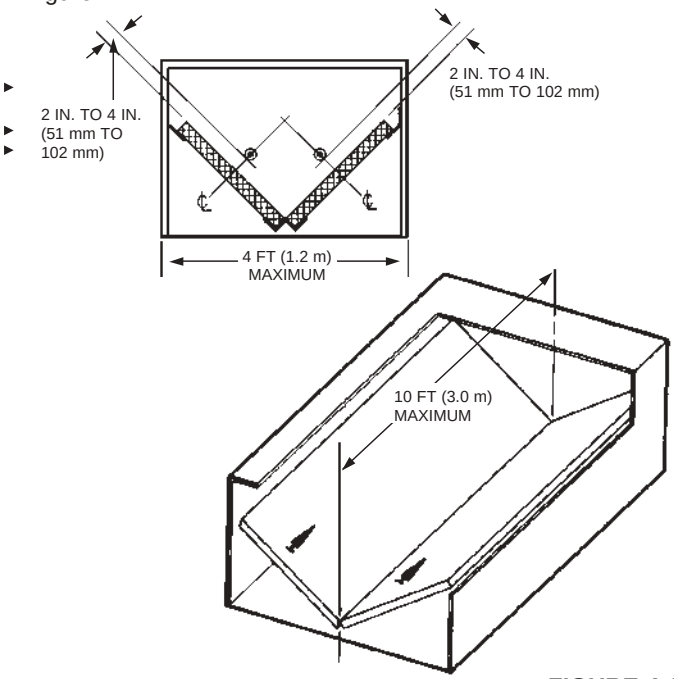


FIGURE 4-11
000203, 000204

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

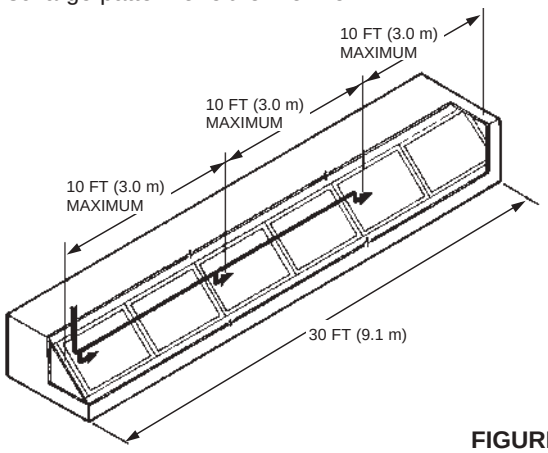


FIGURE 4-12
000206

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Plenum Protection (Continued)

HORIZONTAL PROTECTION – OPTION 2 (Continued)

Two 1N Nozzles – "V" Bank Protection (Continued)

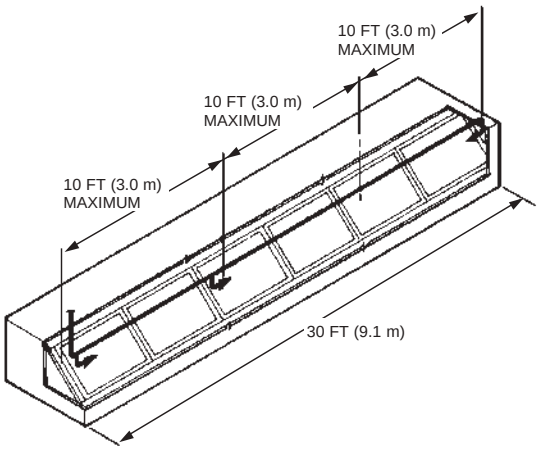


FIGURE 4-13
000207

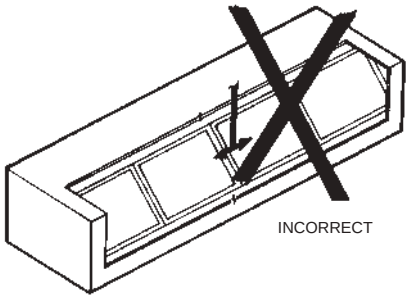


FIGURE 4-14
000208

APPLIANCE PROTECTION

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

▸ **Note**: When protecting appliances which are larger than single nozzle coverage, multiple nozzles can be used.

Larger appliances can be divided into several modules, each equal to or smaller than single nozzle coverage.

Exception: Fryers must not exceed a maximum of 864 $in.^2$ (0.557 m^2).

▸ For modularizing fryers, see *Fryer – Multiple Nozzle Protection* on Page 4-11.

Fryer – Single Nozzle Protection

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

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

   b. FRYERS WITH DRIPBOARDS

      If the fryer includes any dripboard areas, measure both the internal depth (horizontal dimension from front to back) and length of the frypot portion, and then measure the internal depth and length of the overall hazard area including any dripboard areas.

▸ 2. Using Table 4-2: Maximum Area Dimension – Single Nozzle Fryer Protection, determine which nozzle is needed to protect the fryer based on the maximum dimensions listed.
   a. If the fryer does not include a dripboard, use the maximum dimensions listed in the first column of the table to select the correct nozzle.
   b. If the fryer includes any dripboard areas, use both the maximum frypot dimensions in the first column of the table, **and** the maximum overall dimensions in the second column of the table to select the correct nozzle. None of the maximum dimensions in either column may be exceeded.
3. If either the maximum frypot or the overall sizes are exceeded, additional nozzles are required. See the multiple nozzle requirements.

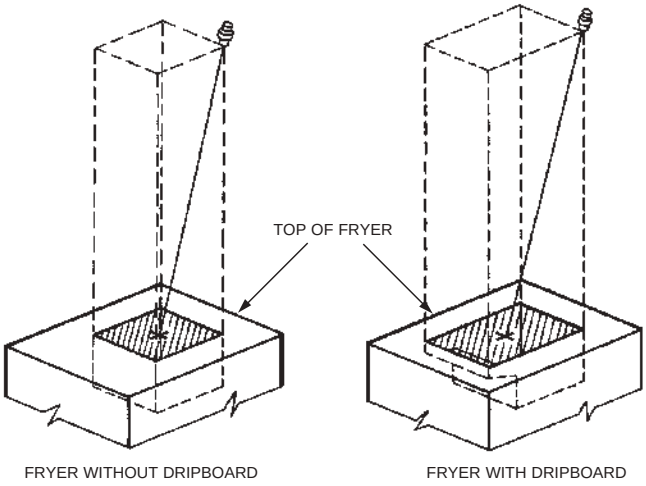
Example: A fryer with a dripboard. The inside of the frypot without the dripboard measures 18 in. in depth x 18 in. in length (457 mm x 457 mm) and the inside of the overall area including the dripboard measures 18 in. in depth x 24 in. in length (457 mm x 610 mm). From the Table 4-2: Maximum
▸ Area Dimension – Single Nozzle Fryer Protection, select either the 3N or the 290 nozzle to protect the fryer, depending on the maximum nozzle height above the fryer and the positioning requirements allowed. See the appropriate Figures.

APPLIANCE PROTECTION (Continued)

Fryer – Single Nozzle Protection (Continued)

TABLE 4-2: MAXIMUM AREA DIMENSIONS – SINGLE NOZZLE FRYER PROTECTION

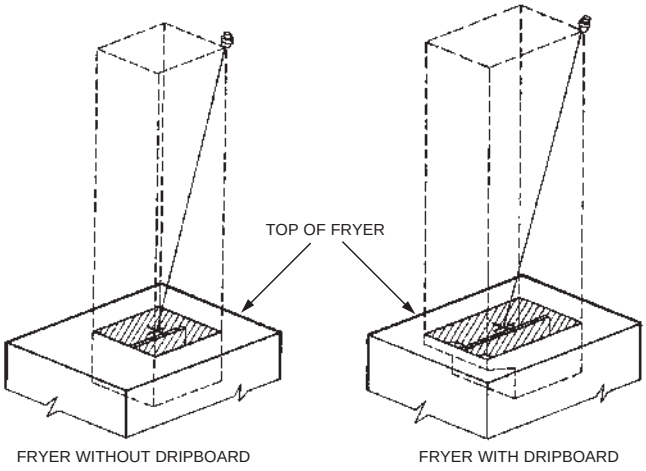
Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
Full or Split Vat 14 in. x 15 in. (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	230	27 in. to 47 in. (686 mm to 1,193 mm)	See Figure 4-15 and Figure 4-16
Full or Split Vat 14 in. x 15 in. (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	245	20 in. to 27 in. (508 mm to 685 mm)	See Figure 4-15 and Figure 4-16
Full or Split Vat 14 in. x 15 in. (355 mm x 381 mm)	Full or Split Vat 14 in. x 21 in. (355 mm x 533 mm)	290	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-17
Full or Split Vat 14 1/2 in. x 14 in. (368 mm x 355 mm)	Full or Split Vat 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm)	290	16 in. to 27 in. (406 mm to 685 mm)	See Figure 4-17



► FULL VAT

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

FIGURE 4-15
002280



► SPLIT VAT

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

FIGURE 4-16
002283

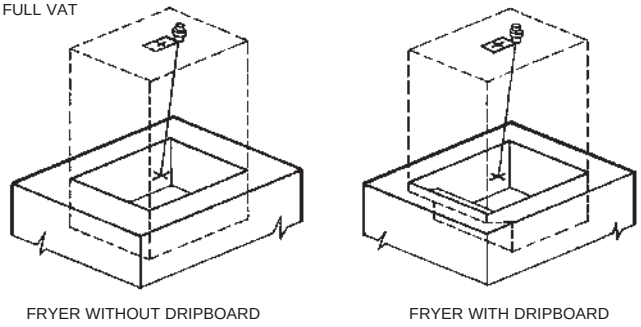
APPLIANCE PROTECTION (Continued)

Fryer – Single Nozzle Protection (Continued)

TABLE 4-2: MAXIMUM AREA DIMENSIONS – SINGLE NOZZLE FRYER PROTECTION (Continued)

Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
Full Vat 14 1/2 in. x 16 1/2 in. (368 mm x 419 mm)	Full Vat 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm)	290	16 in. to 21 in. (406 mm to 533 mm)	See Figure 4-17
Full Vat 19 1/2 in. x 19 in. (495 mm x 482 mm)	Full Vat 19 1/2 in. x 25 3/8 in. (495 mm x 644 mm)	290	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-17
Full Vat 19 1/2 in. x 19 in. (495 mm x 482 mm)	Full Vat 19 1/2 in. x 25 3/8 in. (495 mm x 644 mm)	3N	See Figure 4-18	See Figure 4-18
Full Vat 18 in. x 18 in. (457 mm x 457 mm)	Full Vat 18 in. x 27 3/4 in. (457 mm x 704 mm)	3N	25 in. to 35 in. (635 mm to 889 mm)	See Figure 4-19

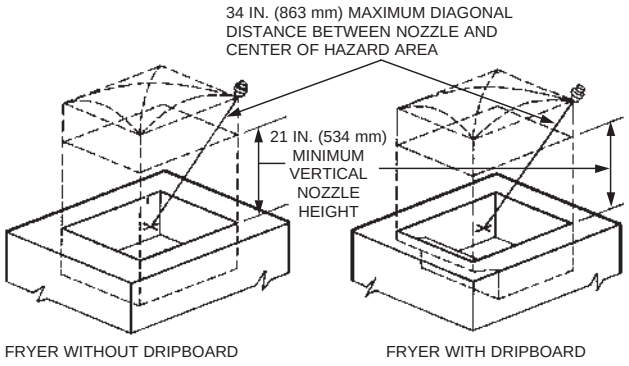
FULL VAT



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

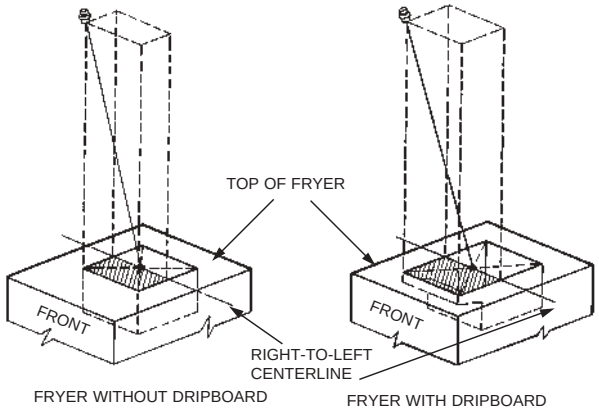
FIGURE 4-17
002286



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-18
002287



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-19
000010, 000008

APPLIANCE PROTECTION (Continued)

Fryer – Single Nozzle Protection (Continued)

TABLE 4-3: MAXIMUM AREA DIMENSIONS – ELECTRIC SPLIT VAT FRYER PROTECTION

Max. Size Frypot Only	Max. Size Overall Vat Area With 4 in. (102 mm) Dripboard*	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
6 1/2 in. x 17 in. (165 mm x 432 mm)	14 in. x 21 in. (356 mm x 533 mm)	245	21 in. to 27 in. (534 mm to 686 mm)	See Figure 4-20
6 1/2 in. x 17 in. (165 mm x 432 mm)	14 in. x 21 in. (356 mm x 533 mm)	290	16 in. to 21 in. (406 mm to 533 mm)	See Figure 4-21

* Individual vat size is 6 1/2 in. x 21 in. (165 mm x 533 mm) including a 4 in. (102 mm) drip board.

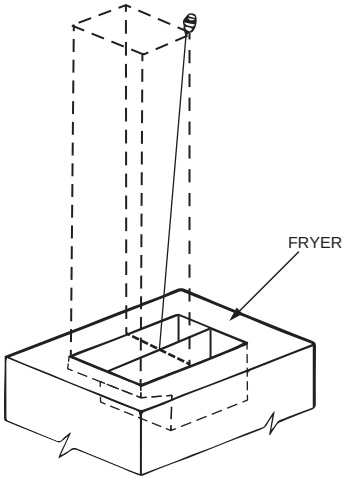


FIGURE 4-20
002283

PLACE ANYWHERE ABOVE AND WITHIN THE FRONT HALF OF THE PERIMETER OF THE SPLIT VAT FRYER, AIMED TO THE CENTER POINT ON THE DIVIDED WALL OF THE SPLIT VAT FRYER.

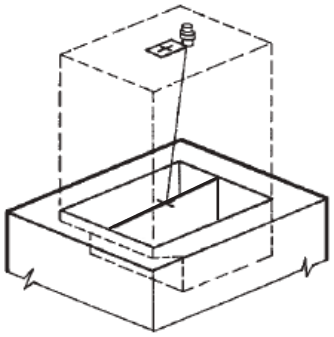


FIGURE 4-21
002286

PLACE ABOVE THE CENTER POINT OF THE SPLIT VAT, ± 3 IN. (76 mm) FROM CENTER ON THE LONGEST SIDE AND ± 1 IN. (25 mm) FROM CENTER ON THE SHORTEST SIDE OF THE SPLIT VAT, AIMED TO THE CENTER POINT ON THE DIVIDING WALL OF THE SPLIT VAT FRYER.

APPLIANCE PROTECTION (Continued)

Fryer – Multiple Nozzle Protection

Design Requirements:

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

The maximum size fryer that can be modularized is 864 in.^{2} (0.557 m^2).

1. Design requirements for multiple nozzle fryers are broken down into two types:
   a. FRYERS WITHOUT DRIPBOARDS
      If the fryer does not include a dripboard, measure the internal depth (horizontal dimension from front to back) and length of the frypot. Then, multiply the depth and length to obtain the area of the frypot in square inches.
   b. FRYERS WITH DRIPBOARDS
      If the fryer includes any dripboard areas, measure both the internal depth and length of the frypot portion, and then measure the internal depth and length of the overall hazard area including any dripboard areas.
      Determine the area of both the frypot and the area of the overall vat by multiplying corresponding depth and length dimensions.
2. Divide the frypot or overall vat into modules, each of which can be protected by a single nozzle, based on the maximum dimension and area coverage of the nozzle as ► specified in Table 4-4: Maximum Module Dimension – Multiple Nozzle Fryer Protection.
   a. If the module considered does not include any portion of the dripboard, use only the maximum frypot area and maximum dimension listed in the first column of the table to select the correct nozzle.
   b. If the module considered includes any dripboard areas, use both the maximum frypot area and dimension listed in the first column of the table, and the maximum overall area and dimensions listed in the second column of the table to select the correct nozzle.
3. None of the maximum dimensions in either column may be exceeded. If either the maximum frypot or the overall sizes are exceeded, the area divided into modules needs to be redefined with the possibility of an additional nozzle.

OPTIONS FOR MODULARIZING FRYERS

Figure 4-22 shows approved methods of dividing (modularizing) fryers so each section can be properly protected. Example: A fryer with a dripboard. The inside vat without the dripboard measures 18 in. in depth x 30 in. in length (457 mm x 762 mm) and the inside of the overall vat including the dripboard measures 24 in. in depth x 30 in. in length (610 mm x 762 mm). Because the fryer is 30 in. (762 mm) in length, it exceeds the coverage of a single nozzle.

Dividing the length in half, each module now has an overall vat dimension of 24 in. in depth x 15 in. in length (610 mm x ► 381 mm). From the Table 4-4: Maximum Module Dimension – Multiple Nozzle Fryer Protection, select either the 3N or the 290 nozzle to protect each fryer module, depending on the maximum nozzle height above the fryer and the positioning requirements allowed. See Figures 4-15 through Figure 4-21.

See additional examples in *Appendix* (pages 9-15 and 9-16).

► EXAMPLE ONLY: 3N NOZZLE

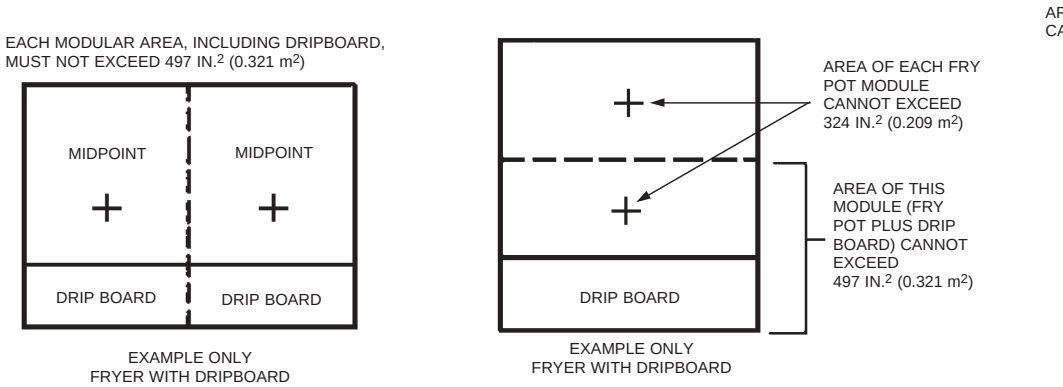


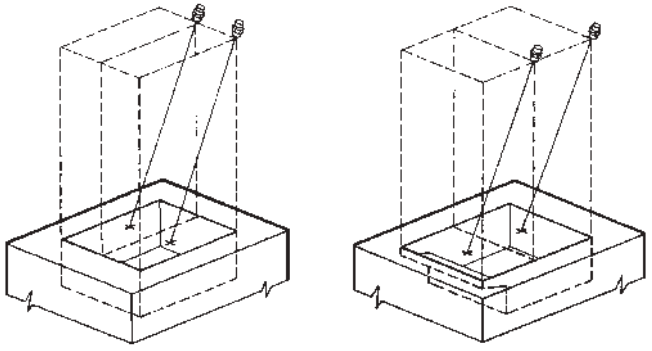
FIGURE 4-22
000214, 000215, 002296

APPLIANCE PROTECTION (Continued)

Fryer – Multiple Nozzle Protection (Continued)

▸ **TABLE 4-4: MAXIMUM MODULE DIMENSION - MULTIPLE NOZZLE FRYER PROTECTION**

Type of Fryer	Module - Frypot Only				Module Overall with Dripboard				Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location See Figure
	Max. Side		Max. Area		Max. Side		Max. Area				
	in.	(mm)	in.^{2}	(m^2)	in.	(mm)	in.^{2}	(m^2)			
Full or Split Vat	21	(533)	210	(0.135)	21	(533)	294	(0.189)	230	27 in. to 47 in. (686 mm to 1,194 mm)	Figure 4-23
Full or Split Vat	21	(533)	210	(0.135)	21	(533)	294	(0.189)	245	20 in. to 27 in. (508 mm to 686 mm)	Figure 4-23
Full or Split Vat	21	(533)	210	(0.135)	21	(533)	294	(0.189)	290	13 in. to 16 in. (330 mm to 406 mm)	Figure 4-25
Full Vat	25 3/8	(644)	370 1/2	(0.239)	25 3/8	(644)	495	(0.319)	290	13 in. to 16 in. (330 mm to 406 mm)	Figure 4-25
Full or Split Vat	26 1/2	(673)	203	(0.131)	26 1/2	(673)	384 1/4	(0.247)	290	16 in. to 27 in. (406 mm to 686 mm)	Figure 4-25
Full Vat	25 3/8	(644)	370 1/2	(0.239)	25 3/8	(644)	495	(0.319)	3N	See Figure 4-25	Figure 4-24
Full Vat	27 3/4	(704)	324	(0.209)	27 3/4	(704)	497	(0.320)	3N	25 in. to 35 in. (635 mm to 889 mm)	Figure 4-26

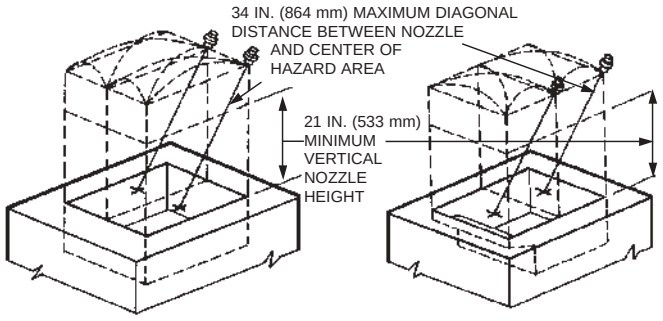


FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-23

000218, 000213

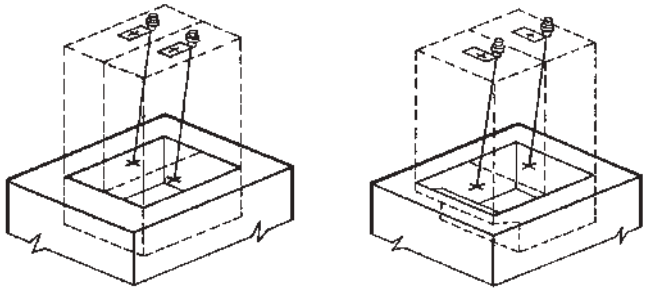


FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-25

002290

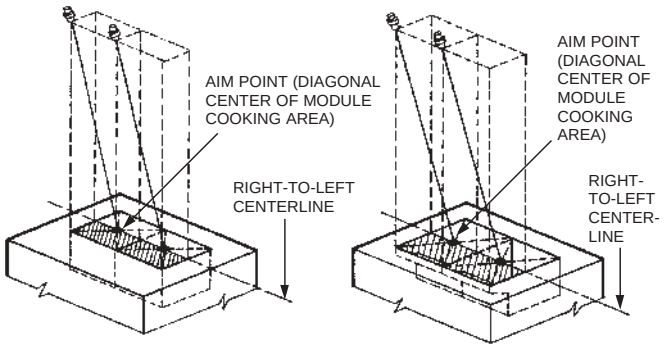


FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-24

002291



FRYER WITHOUT DRIPBOARD FRYER WITH DRIPBOARD

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

FIGURE 4-26

002293

APPLIANCE PROTECTION (Continued)

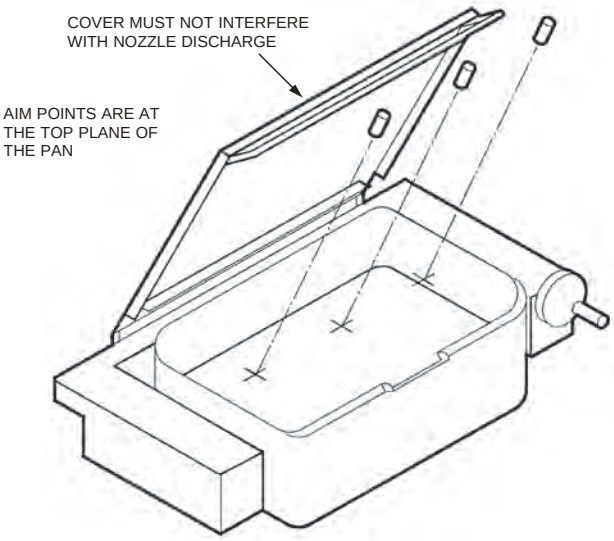
Multiple Nozzle Fryer Protection – Tilt Skillet/Braising Pan

Protection for tilt skillets or braising pans is to be based upon the coverage limitations provided for deep fat fryer protection. See this section, starting on page 4-11, for maximum fryer nozzle coverages and maximum fryer nozzle height limitations.

Although the maximum 864 in.^{2} (0.557 m^2) total surface cooking area requirement applies to fryer protection, it does not apply to tilt skillets or braising pans.

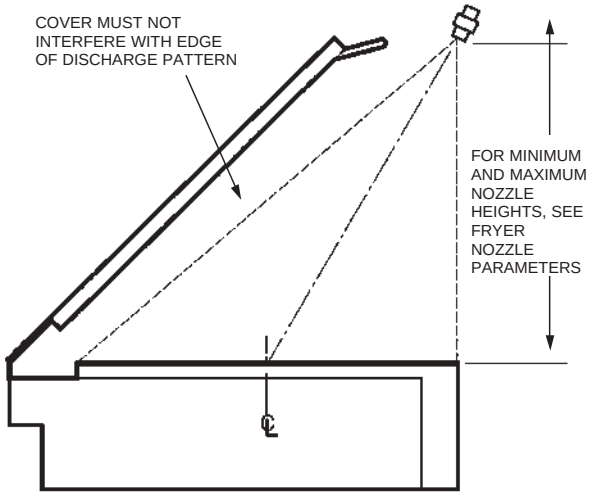
Each tilt skillet/braising pan protected module must not exceed the fryer limitations for Module Overall with Dripboard coverage per nozzle as described in Table 4-4 on page 12.

Tilt skillets and braising pans generally utilize a hinged cover. Fryer protection nozzles are to be placed toward the front of the appliance to minimize the potential for the tilt skillet or braising pan cover to interfere with the nozzle discharge. See Figure 4-27 and Figure 4-28.



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

FIGURE 4-27
000011a



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

FIGURE 4-28
000071

APPLIANCE PROTECTION (Continued)

Range Protection

The R-102 system uses five different nozzles for the protection of ranges. Two of the design options require a one-flow nozzle and three of the design options require two-flow nozzles. The hazard area of a range will include the cooking area of burner grates, electrical coils, induction, and hot tops.

NOTICE

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

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

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

NO OBSTRUCTIONS

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

When using this nozzle for range protection, the maximum length of the hazard area being protected with a single nozzle must not exceed 32 in. (812 mm) and the maximum area of the hazard area must not exceed 384 in.^{2} (0.247 m^2) per nozzle.

When protecting a range, the 1N nozzle must be located a maximum of 10 in. (254 mm) from each hazard area center-line and must be aimed at the center of the cooking surface. See Figure 4-29 and Figure 4-30.

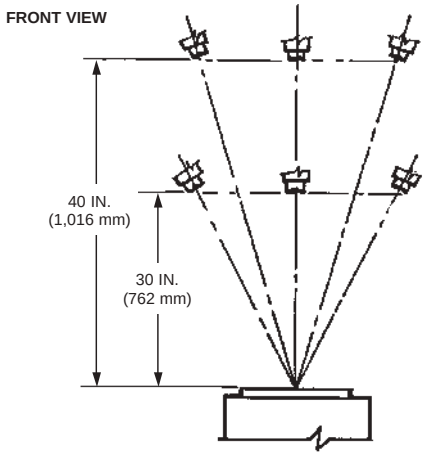


FIGURE 4-29
006539

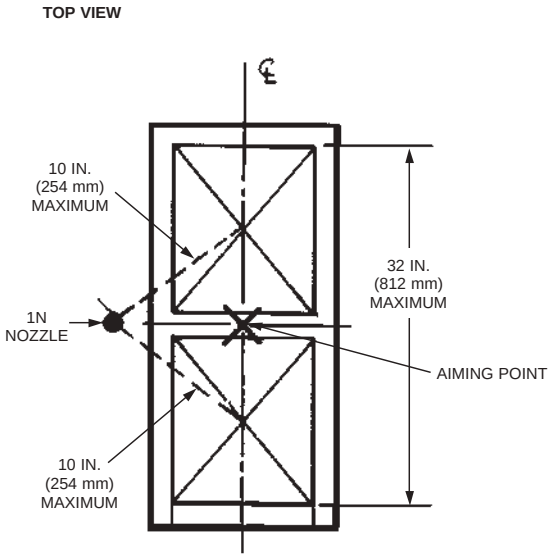


FIGURE 4-30
006540

APPLIANCE PROTECTION (Continued)

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

NO OBSTRUCTIONS

40 in. to 50 in. (1,016 mm to 1,270 mm) above the cooking surface.

This high proximity application uses the 245 nozzle.

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

One 245 nozzle protects a maximum cooking area of 672 in.^{2} (0.433 m^2) with a maximum longest dimension of 28 in. (711 mm).

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

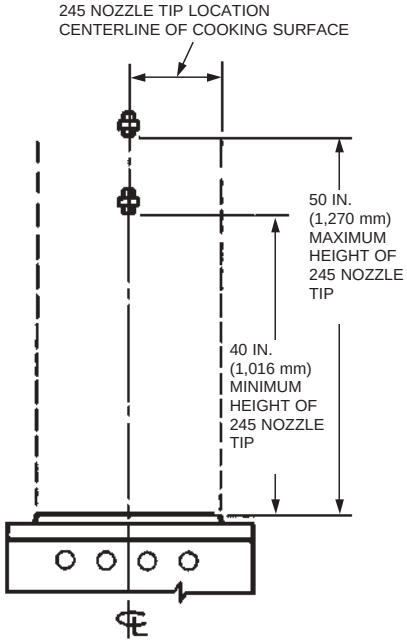


FIGURE 4-31
000236

NOTICE

Four burner grates shown in Figure 4-32. For single or double burner grates, locate nozzle at center of cooking surface or 11 3/8 in. (288 mm) maximum from nozzle centerline to center of any burner grate.

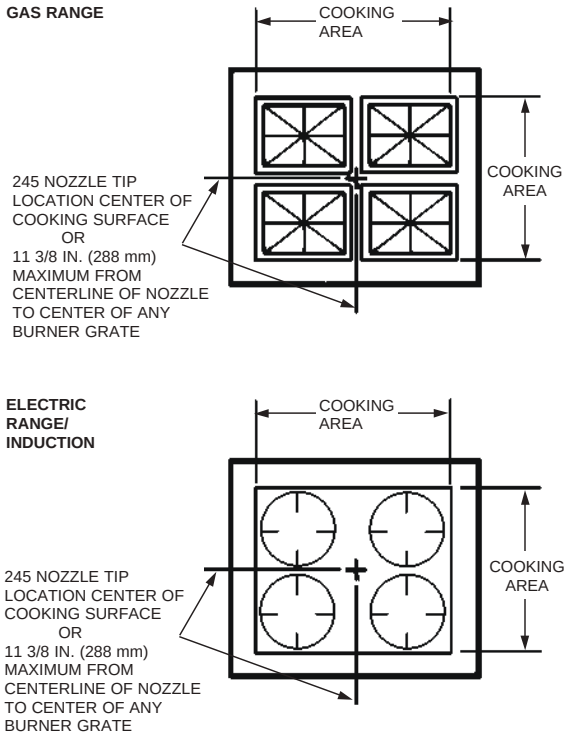


FIGURE 4-32
000766

APPLIANCE PROTECTION (Continued)

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

NO OBSTRUCTIONS

30 in. to 40 in. (762 mm to 1,016 mm) above the cooking surface.

The medium proximity application uses the 260 nozzle.

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

One 260 nozzle protects a cooking area of 768 in.^{2} (0.495 m^2) with a maximum dimension of 32 in. (812 mm).

When using this nozzle for range protection, the nozzle must be pointed vertically down and positioned as shown in Figure 4-33 and Figure 4-34.

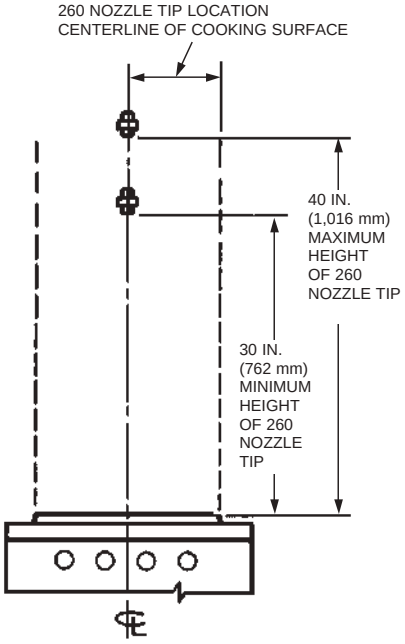


FIGURE 4-33
000236

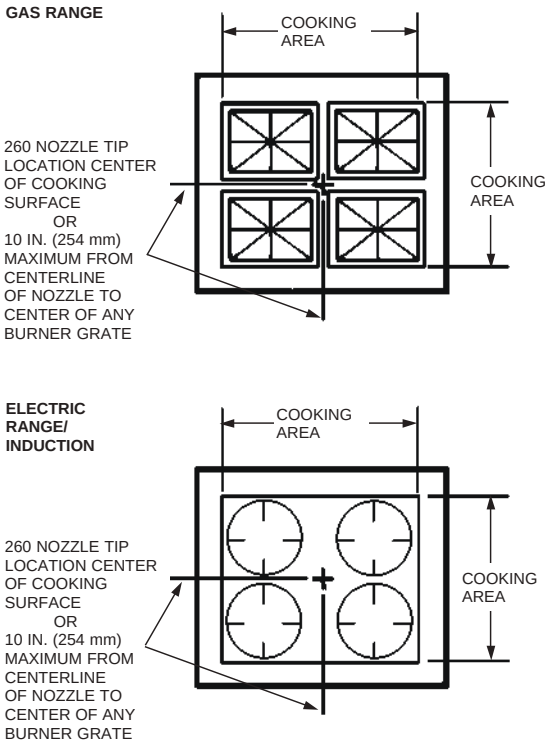


FIGURE 4-34
000766

NOTICE

Four burner grates shown in Figure 4-34. For single or double burner grates, locate nozzle at center of cooking surface.

APPLIANCE PROTECTION (Continued)

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

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

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

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

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

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

The 1N nozzle tip must be positioned at or below the obstruction, if present. The protected area begins at the point straight down from the nozzle tip. The nozzle can be placed at the side of the hazard area aimed either left or right, or can be placed in the front or back of the hazard area. See Figure 4-35 and Figure 4-36 for nozzle location details.

Note: If the hazard area exceeds the single nozzle coverage listed above, additional nozzles are required. Position the additional nozzle in front at high proximity or at the side at low proximity.

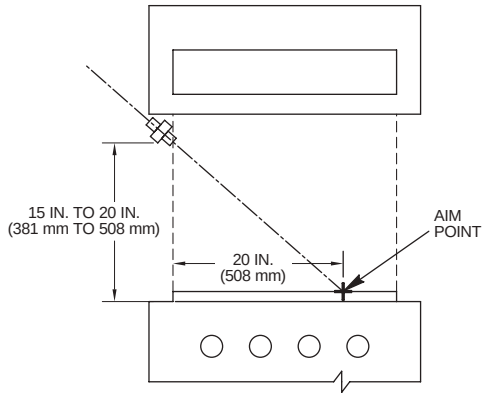


FIGURE 4-35
007924

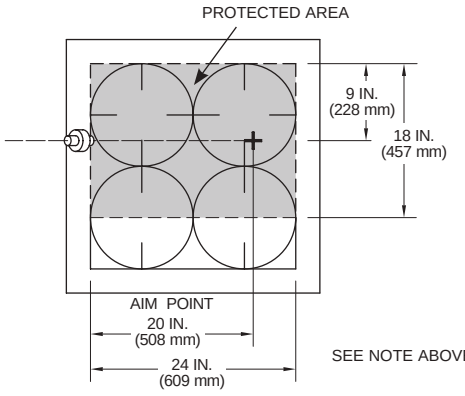


FIGURE 4-36
007925

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

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

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

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

Two 290 nozzles protects a cooking area of 1,008 in.^{2} (0.650 m^2) with a maximum dimension of 36 in. (914 mm).

When using two of these nozzles for low proximity range protection, the nozzles must be positioned along the cooking surface perimeter to 1 1/2 in. (38 mm) inside the perimeter, and aimed at a 45° angle along the longitudinal centerline of the range. See Figure 4-37 and Figure 4-38.

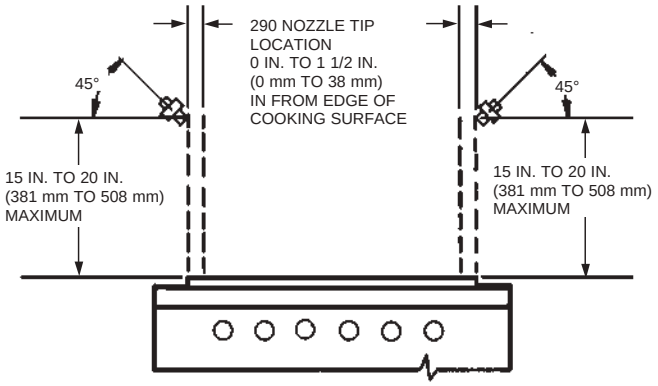
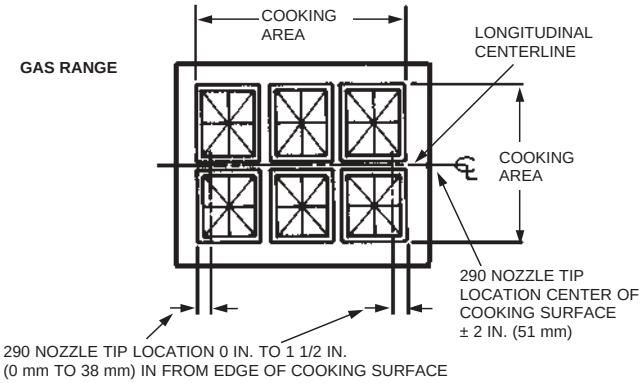


FIGURE 4-37
002276

GAS RANGE



ELECTRIC RANGE/ INDUCTION

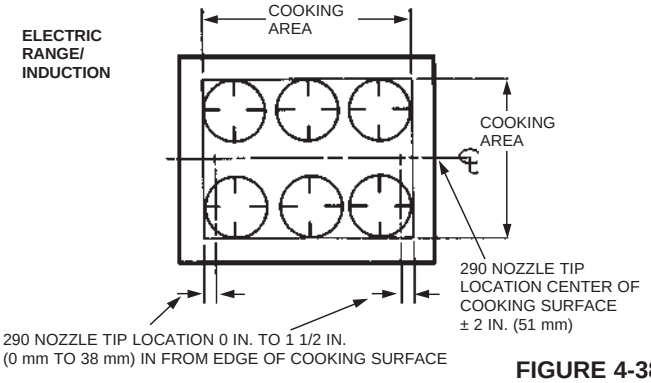


FIGURE 4-38
000239, 000240

APPLIANCE PROTECTION (Continued)

Range Protection (With or Without Back Shelf/ Obstruction)

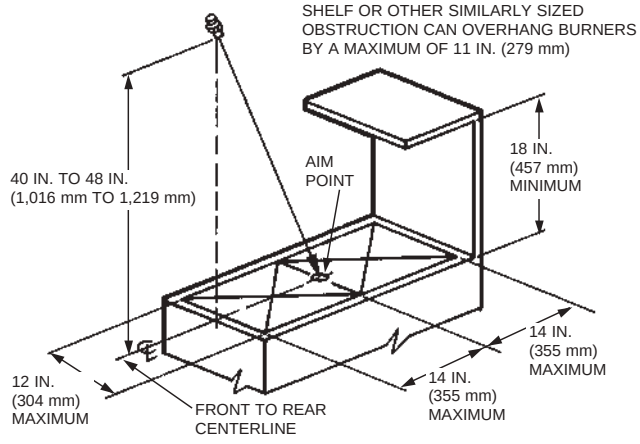
When this type of hazard is equipped with a back shelf or other similarly sized obstruction located above the range top, two protection options are available: One requires a 1F nozzle and the other option requires a 260 nozzle.

RANGE PROTECTION 1F (1-FLOW) NOZZLE (WITH OR WITHOUT BACK SHELF/OBSTRUCTION)

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

The 1F nozzle range protection allows the shelf to be installed at a minimum height of 18 in. (457 mm) above the hazard area.

When using the 1F nozzle for range protection with or without back shelf, the maximum length of the hazard area being protected must not exceed 28 in. (711 mm) and the maximum area of the hazard area must not exceed 336 in.^{2} (0.216 m^2). See Figure 4-39 for nozzle location details.



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

FIGURE 4-39
000238

RANGE PROTECTION 260 (2-FLOW) NOZZLE (WITH OR WITHOUT BACK SHELF/OBSTRUCTION)

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

When using the 260 nozzle for range protection with or without back shelf or other similarly sized obstruction, the maximum length of burner grates being protected must not exceed 32 in. (812 mm) and the maximum area of the burner grates must not exceed 384 in.^{2} (0.247 m^2). Nozzle must be located on the front edge of the burner grates and aimed at a point 10 in. (254 mm) from the back edge of the burner grates. Nozzle must be mounted 30 in. to 40 in. (762 mm to 1,016 mm) above the hazard surface. See Figure 4-40.

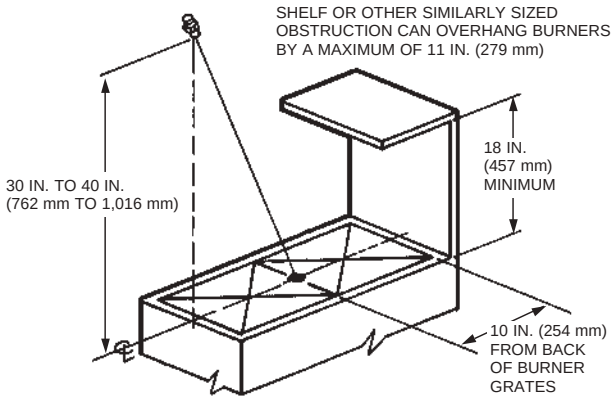


FIGURE 4-40
000238a

APPLIANCE PROTECTION (Continued)

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

35 in. to 40 in. (889 mm to 1,016 mm) above the cooking surface.

This high proximity application uses the 1N nozzle.

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

One 1N nozzle protects a maximum cooking area of 1,080 in.^{2} (0.696 m^2) with the maximum longest side of 36 in. (914 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the cooking surface perimeter to a maximum of 2 in. (51 mm) inside the perimeter, and aimed to the midpoint of the cooking surface. See Figure 4-41 and Figure 4-42.

NOTICE

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

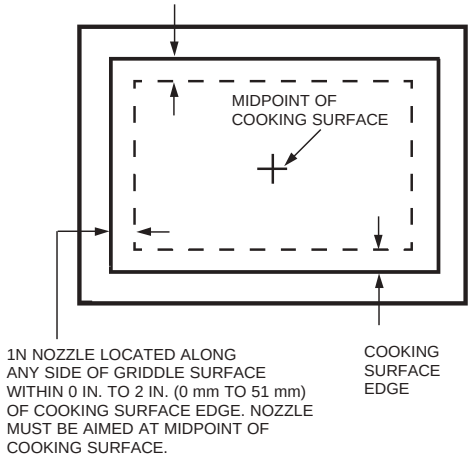


FIGURE 4-41
000241

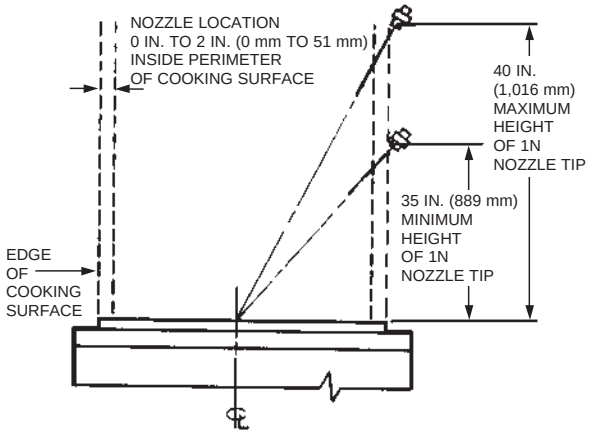


FIGURE 4-42
000243

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

30 in. to 50 in. (762 mm to 1,270 mm) above the cooking surface.

This high proximity application uses the 290 nozzle.

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

One 290 nozzle protects a maximum cooking area of 720 in.^{2} (0.464 m^2) with a maximum dimension of 30 in. (762 mm).

When using this nozzle for high proximity applications, the nozzle must be positioned within 1 in. (25 mm) of the center of the cooking surface and pointed vertically down. See Figure 4-43 and Figure 4-44.

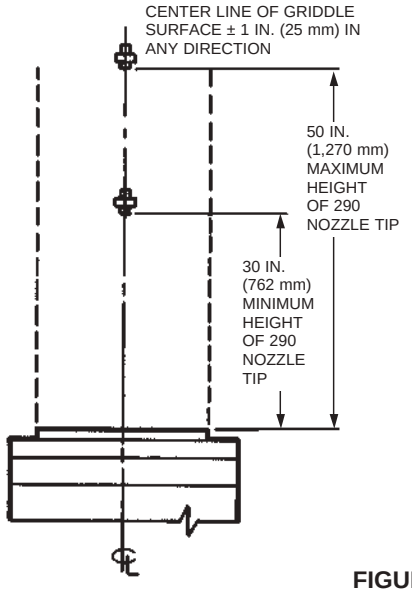


FIGURE 4-43
000244

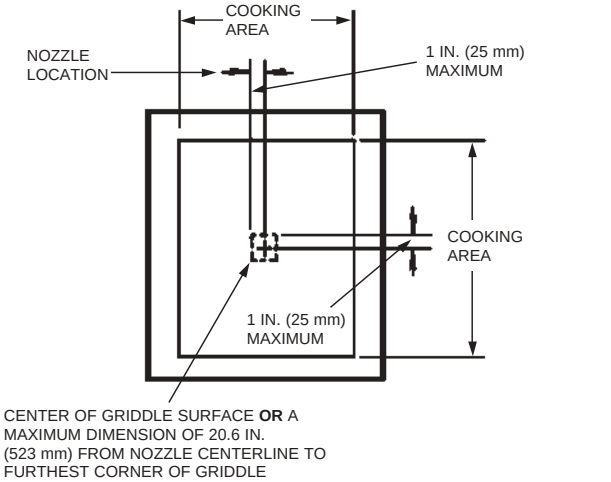


FIGURE 4-44
000773

APPLIANCE PROTECTION (Continued)

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

30 in. to 50 in. (762 mm to 1,270 mm) above the cooking surface.

This high proximity application uses the 260 nozzle.

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

One 260 nozzle protects a maximum cooking area of 1,440 in.^{2} (0.929 m^2) with a maximum dimension of 48 in. (1,219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the cooking surface perimeter to 2 in. (51 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-45 and Figure 4-46.

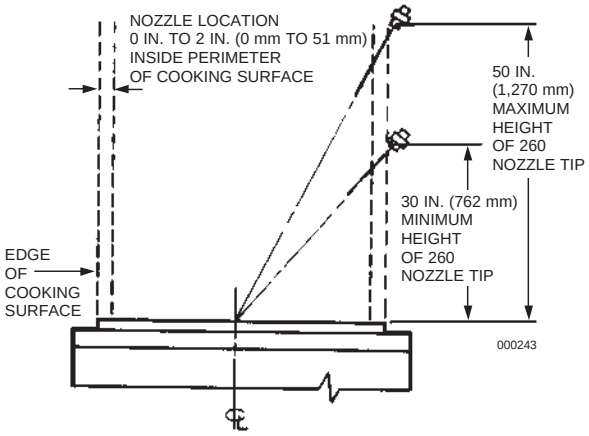


FIGURE 4-45
000243

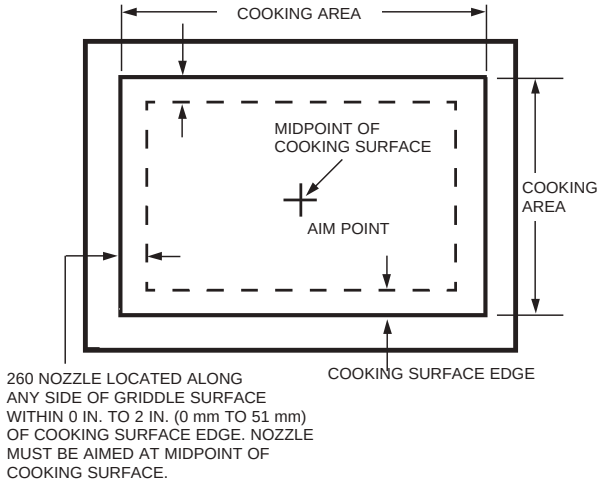


FIGURE 4-46
000241

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

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

The medium proximity application uses the 290 nozzle.

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

One 290 nozzle protects a maximum cooking area of 1,440 in.^{2} (0.929 m^2) with a maximum dimension of 48 in. (1,219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the perimeter to 2 in. (51 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-47 and Figure 4-48.

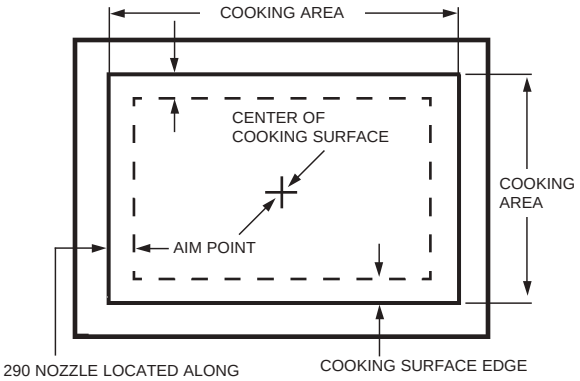


FIGURE 4-47
000241

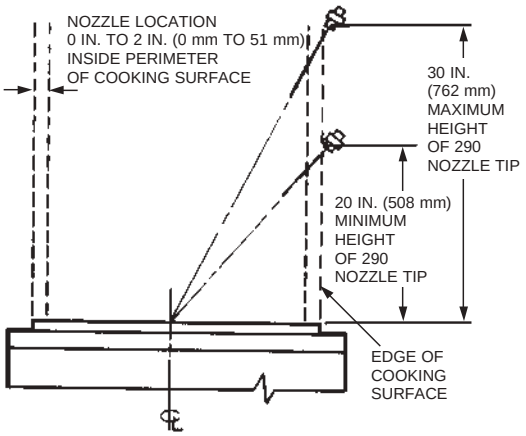


FIGURE 4-48
000243

APPLIANCE PROTECTION (Continued)

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

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

The low proximity application uses the 2120 nozzle.

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

One 2120 nozzle protects a maximum cooking area of 1,440 in.^{2} (0.929 m^2) with a maximum dimension of 48 in. (1,219 mm).

When using this nozzle for griddle protection, the nozzle must be positioned along the perimeter to 2 in. (51 mm) inside perimeter, and aimed at the center of the cooking surface. See Figure 4-49 and Figure 4-50.

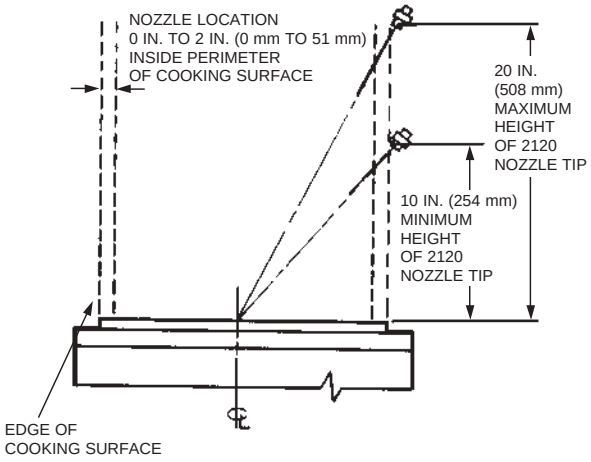


FIGURE 4-49
000243

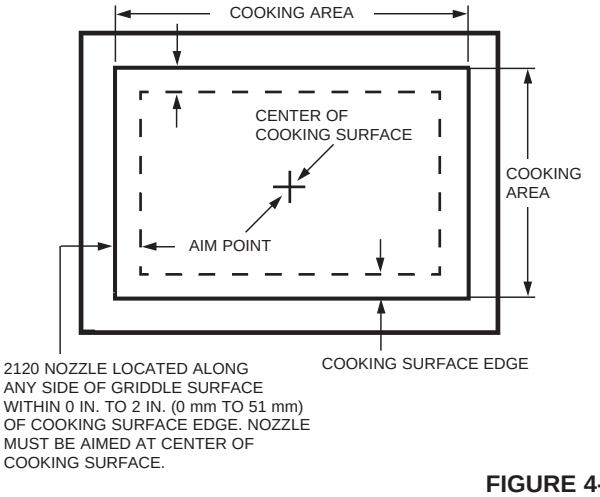


FIGURE 4-50
000241

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

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

The low proximity application uses the 2W nozzle.

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

One 2W nozzle protects a maximum cooking area of 1,080 in.^{2} (0.696 m^2) with a maximum dimension of 36 in. (914 mm).

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

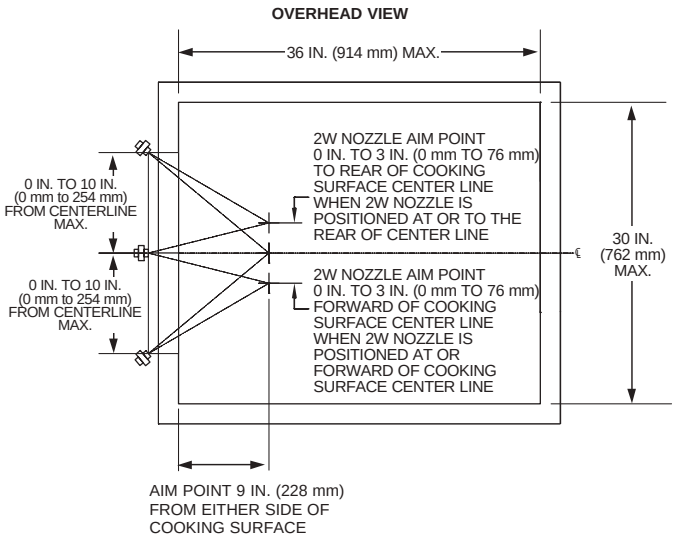


FIGURE 4-51
008149

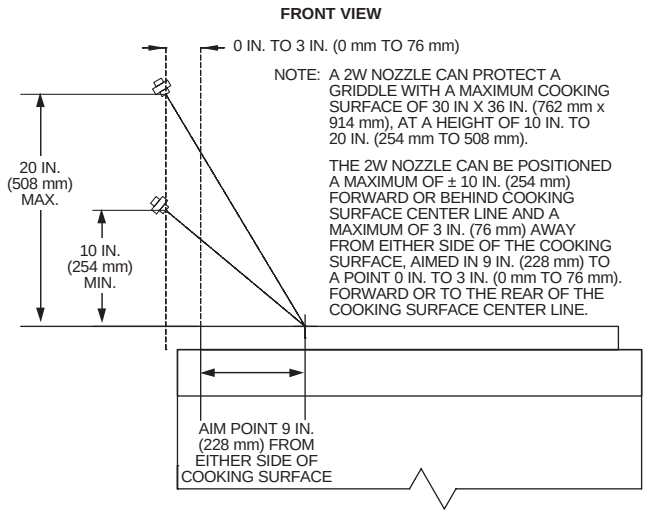


FIGURE 4-52
008150

APPLIANCE PROTECTION (Continued)

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

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

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

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

When using the 1W nozzle for low proximity griddle protection with or without obstruction, the maximum length of the cooking surface to be protected must not exceed 26 in. (660 mm). The nozzle must be centered at one end of the maximum 26 in. (660 mm) length, aimed along a centerline to a point 20 in. (508 mm) from the end of the length, protecting a maximum width of 20 1/2 in. (520 mm).

The 1W nozzle tip must be positioned at or below the obstruction, if present. The protected area begins at the point straight down from the nozzle tip. Position the nozzle above the edge of the hazard area to be protected. See Figure 4-53 and Figure 4-54.

Note: If the hazard area exceeds the single nozzle coverage listed above, additional nozzles are required. Position the additional nozzle in front at high proximity or at the side at low proximity.

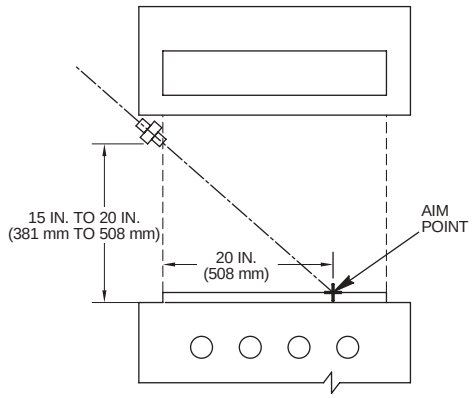


FIGURE 4-53
007924

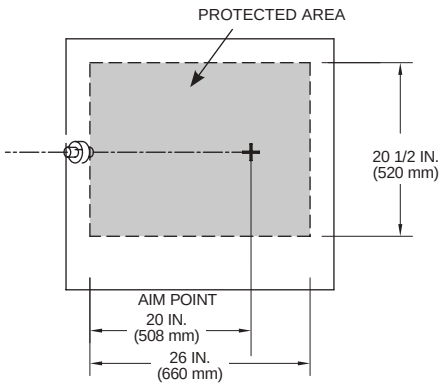


FIGURE 4-54
007926

Chain Broiler Protection

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

Horizontal Chain Broiler Protection

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

Two 1N nozzles are always needed for chain broiler protection when the hazard area to be protected does not meet the *Overhead Broiler Protection* requirements. The maximum internal size of the broiler is 43 in. x 31 in. (1,092 mm x 787 mm). The nozzles must be positioned at each end of the enclosed cooking chamber 1 in. to 3 in. (25 mm to 76 mm) above the surface of the chain and a maximum distance of 4 in. (101 mm) away from the broiler opening. The nozzles may be mounted at either corner as long as they are at opposite ends of the chain broiler and positioned to discharge diagonally across the top of the chain. See Figure 4-55 and Figure 4-56.

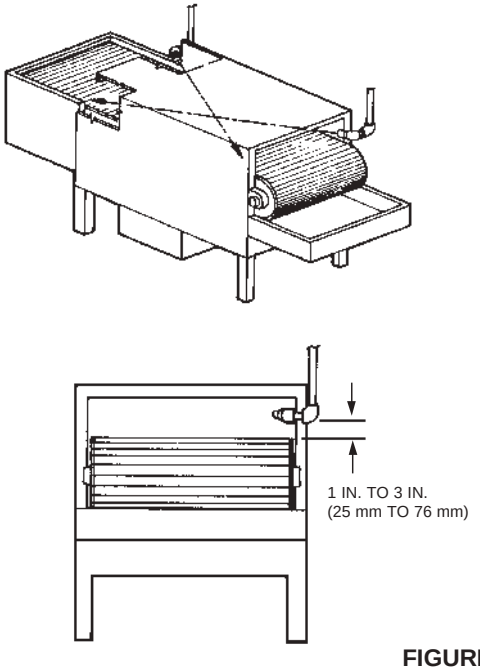


FIGURE 4-55
000245, 000246

APPLIANCE PROTECTION (Continued)

Horizontal Chain Broiler Protection (Continued)

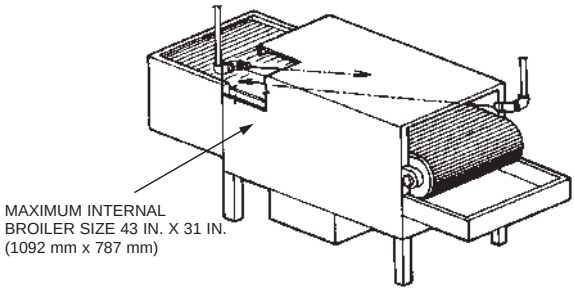


FIGURE 4-56
000247

Overhead Chain Broiler Protection

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

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

When overhead protection is used, the nozzles must be centered above the exhaust opening within 4 in. to 8 in. (101 mm to 203 mm) of each other and they must be located 10 in. to 26 in. (254 mm to 660 mm) above the top of the broiler surface. See Figure 4-57.

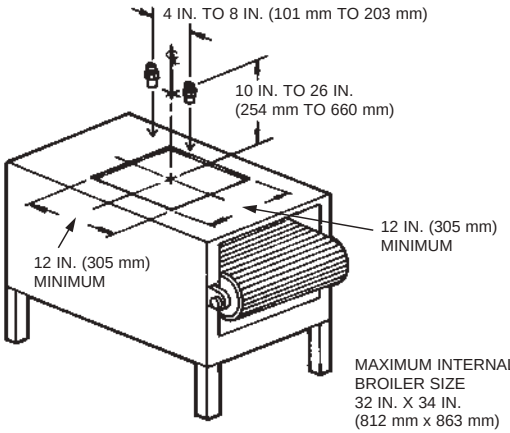


FIGURE 4-57
000248

The nozzles may vary in position as long as they are evenly spaced from the exhaust center and are always 180° opposite of each other. If the opening is not square, the nozzles must be positioned along the centerline, parallel to the longest side of the opening. See Figure 4-58.

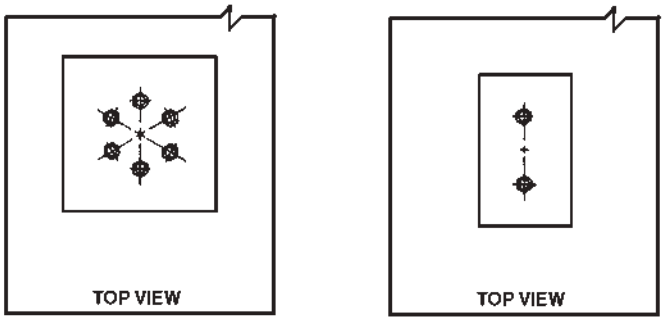


FIGURE 4-58
000249

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

EXAMPLE NO. 1

Internal broiler size is 24 in. long x 20 in. wide (609 mm x 508 mm), with an opening of 16 in. x 16 in. (406 mm x 406 mm).

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

Length of opening – 24 in. x 0.6 = 14 13/32 in.
(609 mm x 0.6 = 366 mm)

Width of opening – 20 in. x 0.6 = 12 in.
(508 mm x 0.6 = 304 mm)

The minimum allowable opening for overhead protection would be 14 13/32 in. x 12 in. (365 mm x 304 mm).

This example would be acceptable for overhead protection.

EXAMPLE NO. 2

Internal broiler size is 30 in. long x 24 in. wide (762 mm x 609 mm) with an opening of 22 in. x 12 in. (558 mm x 304 mm).

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

Length of opening – 30 in. x 0.6 = 18 in.
(762 mm x 0.6 = 457 mm)

Width of opening – 24 in. x 0.6 = 14 13/32 in.
(609 mm x 0.6 = 365 mm)

Minimum allowable opening for overhead protection would be 18 in. x 14 13/32 in. (457 mm x 365 mm).

Because this broiler has an opening of 22 in. x 12 in. (558 mm x 304 mm), the 12 in. (304 mm) width is below the minimum allowable calculated dimension of 14 13/32 in. (365 mm) and therefore would not be acceptable for overhead protection.

APPLIANCE PROTECTION (Continued)

Salamander Broiler Protection

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

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

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

The single 1N nozzle must be located directly in line with either vertical edge of the broiler opening, 6 in. to 12 in. (152 mm to 304 mm) in front of the broiler, and 0 in. to 12 in. (0 mm to 304 mm) above the top of the broiler. The nozzle must be aimed at the center of the broiler opening. See Figure 4-59.

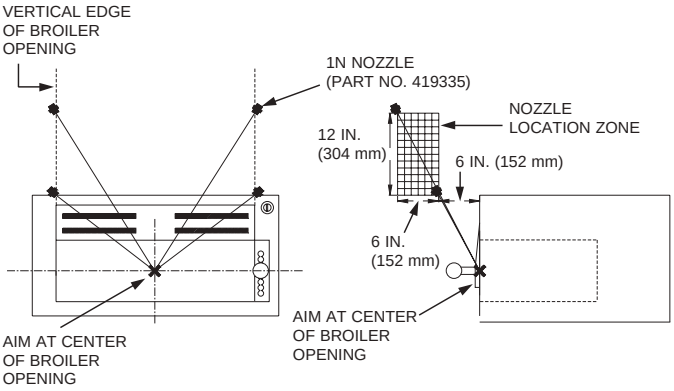


FIGURE 4-59
008426

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

A salamander broiler with a maximum hazard area (internal broiler chamber) of 15 1/2 in. (393 mm) deep x 31 in. (787 mm) wide can be protected using a 1F nozzle. The nozzle is stamped with 1F, indicating that this is a one-flow nozzle.

The single 1F nozzle must be located directly in line with the center of the broiler opening, 8 in. to 12 in. (203 mm to 304 mm) in front of the broiler and 12 in. to 18 in. (304 mm to 457 mm) above the top of the broiler. The nozzle must be aimed at the center of the top broiler opening when the grate is located in the middle position. The nozzle must be orientated so the nozzle tip flats are parallel with the grate left to right centerline. See Figure 4-60.

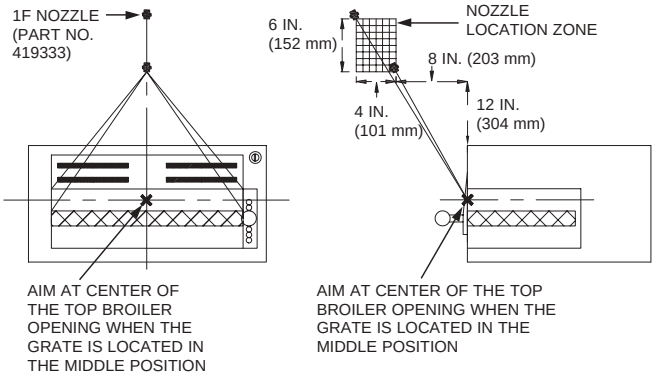


FIGURE 4-60
008426

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

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

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

The single 1N nozzle must be affixed to the side of the cooking chamber, above the grate on either vertical edge of the broiler opening. The nozzle must be aimed at the center of the grates. See Figure 4-61.

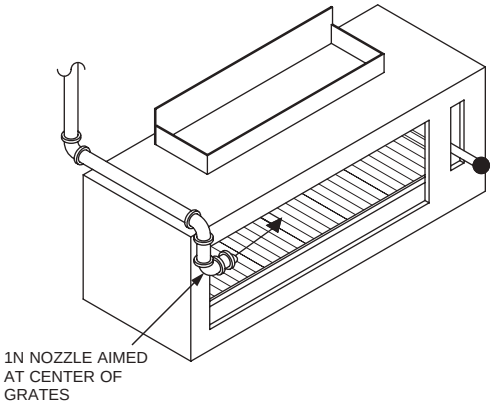


FIGURE 4-61
008428

Upright Broiler/Salamander Protection

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

Two 1/2N nozzles protects a maximum hazard area (internal broiler chamber) of 30 in. x 32 1/2 in. (761 mm x 825 mm). These nozzles must always be used in pairs on an upright broiler. One nozzle must be positioned above the grate and pointed at the back opposite corner of the broiler chamber. The second nozzle must be pointed down into the center of the drip pan through the open slot. See Figure 4-62 and Figure 4-63.

APPLIANCE PROTECTION (Continued)

Upright Broiler/Salamander Protection (Continued)

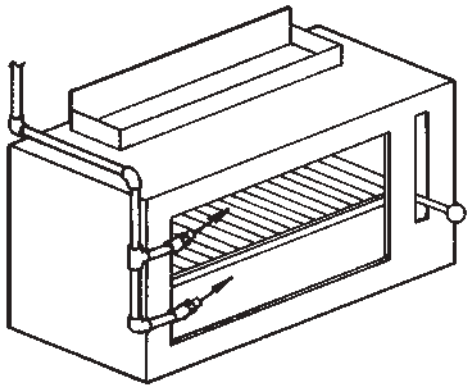


FIGURE 4-62
000251

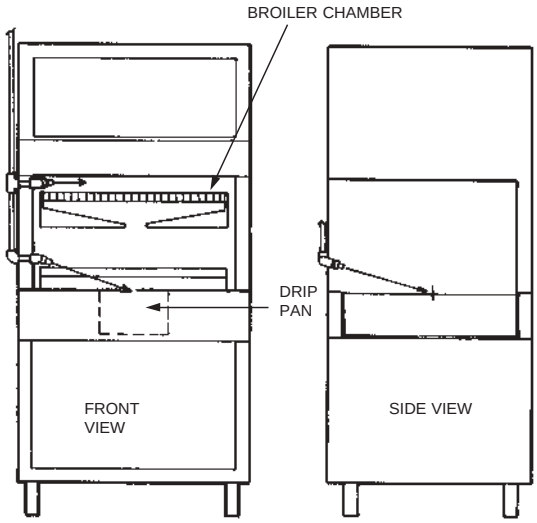


FIGURE 4-63
000252

Gas-Radiant/Electric Char-Broiler Protection

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

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

One 1N nozzle protects a hazard with a maximum length of 36 in. (914 mm) and a total cooking area which does not exceed 864 in.^{2} (0.557 m^2). The nozzle tip must be located 15 in. to 40 in. (381 mm to 1,016 mm) above the hazard surface. When using this nozzle for gas-radiant/electric char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and shall be aimed at the center of the cooking surface. See Figure 4-64.

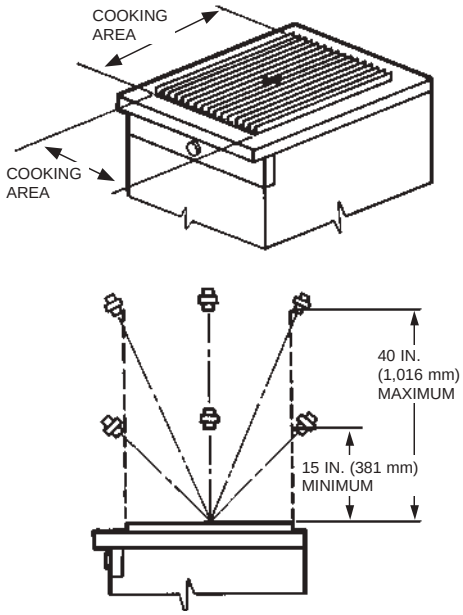


FIGURE 4-64
000256, 000257

Electric Char-Broiler Protection (Optional)

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

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

One 1N nozzle protects a hazard with a maximum length of 34 in. (863 mm) and a total cooking area which does not exceed 680 in.^{2} (0.438 m^2). The nozzle tip must be located 20 in. to 50 in. (508 mm to 1,270 mm) above the hazard surface. When using this nozzle for electric char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and shall be aimed at the center of the cooking surface. See Figure 4-65.

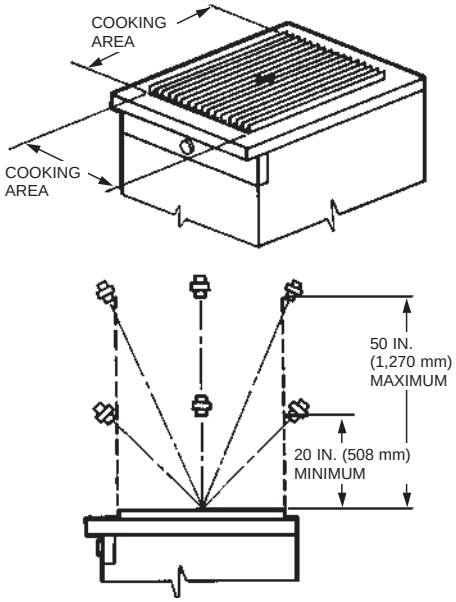


FIGURE 4-65
000256, 000257

APPLIANCE PROTECTION (Continued)

Lava Rock (Ceramic) Char-Broiler Protection

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

One 1N nozzle protects a hazard which has a maximum length of 24 in. (609 mm) and a total cooking area which does not exceed 312 in.^{2} (0.201 m^2). The nozzle tip must be located 18 in. to 35 in. (457 mm to 889 mm) above the hazard surface. When using this nozzle for lava rock (ceramic) char-broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and angled to the center. See Figure 4-66.

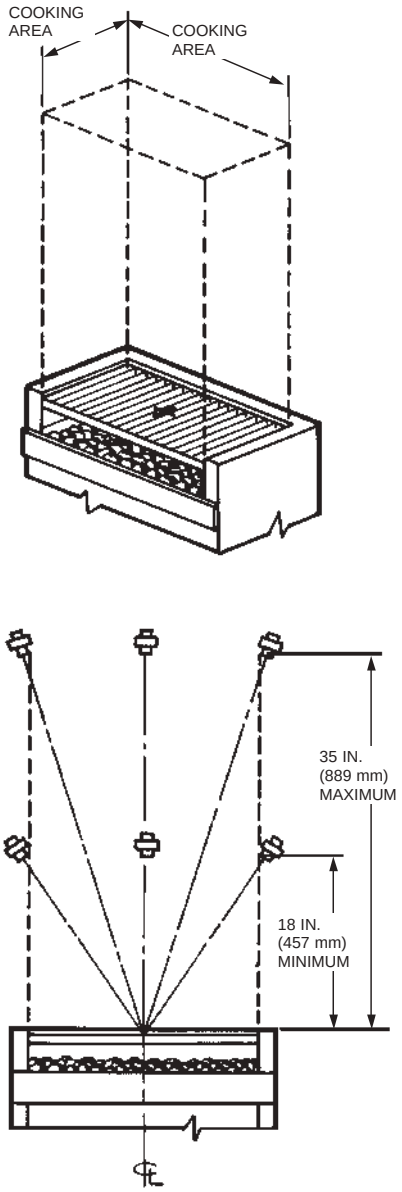


FIGURE 4-66
000258, 000259

Natural Charcoal Broiler Protection

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

One 1N nozzle protects a hazard area which has a maximum length of 24 in. (609 mm) and a total cooking area which does not exceed 288 in.^{2} (0.185 m^2). The nozzle tip must be located 18 in. to 40 in. (457 mm to 1,016 mm) above the hazard surface. When using this nozzle for natural charcoal broiler protection, the nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and aimed at the center of the cooking surface. See Figure 4-67.

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

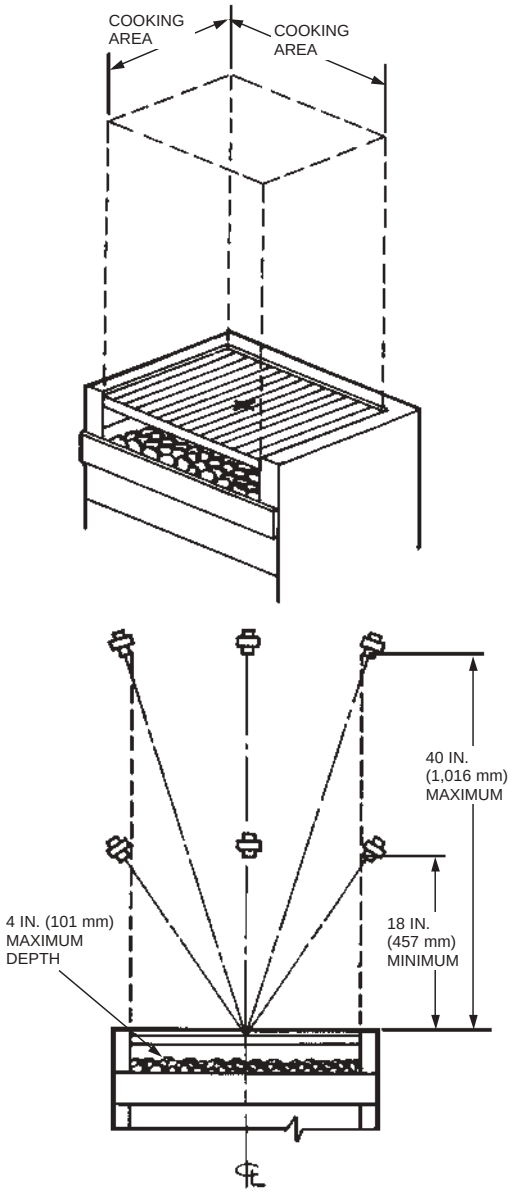


FIGURE 4-67
000260, 000259

APPLIANCE PROTECTION (Continued)

Alternate Ceramic/Natural Charcoal Char-broiler Protection

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

One 3N nozzle protects a hazard which has a maximum length of 30 in. (762 mm) and a total cooking area which does not exceed 720 in.^{2} (0.464 m^2). The nozzle tip must be located 14 in. to 40 in. (355 mm to 1,016 mm) above the hazard surface. The nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and angled to the center. See Figure 4-68.

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

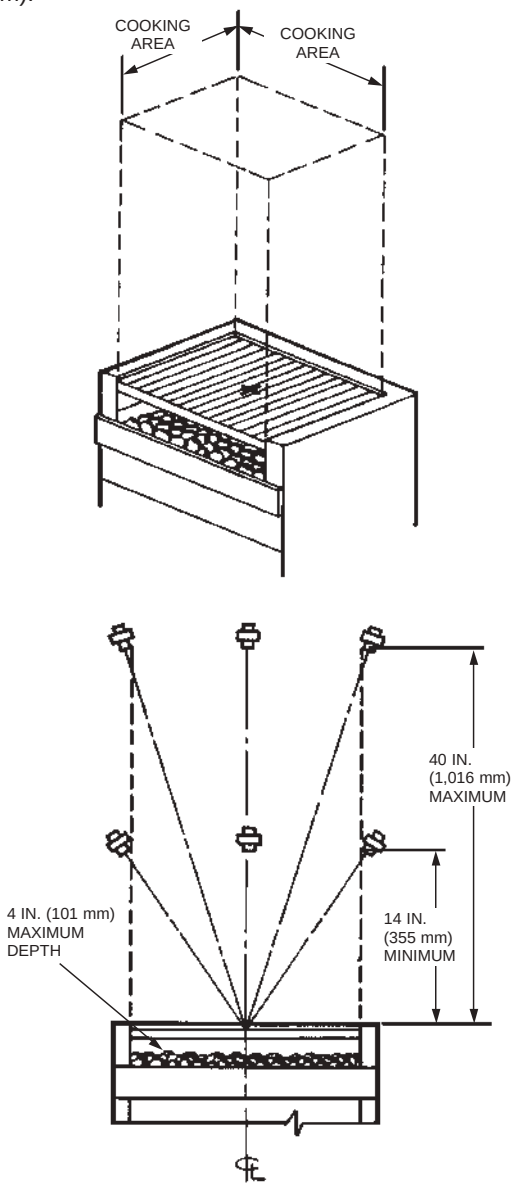


FIGURE 4-68
000260, 000259

Wood Fueled Char-Broiler Protection

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

One 3N nozzle protects a hazard which has a maximum length of 30 in. (762 mm) and a total cooking area which does not exceed 720 in.^{2} (0.464 m^2). The nozzle tip must be located 14 in. to 40 in. (355 mm to 1,016 mm) above the hazard surface. The nozzle must be positioned anywhere along or within the perimeter of the maximum cooking area and aimed at the center of the cooking surface. See Figure 4-69.

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

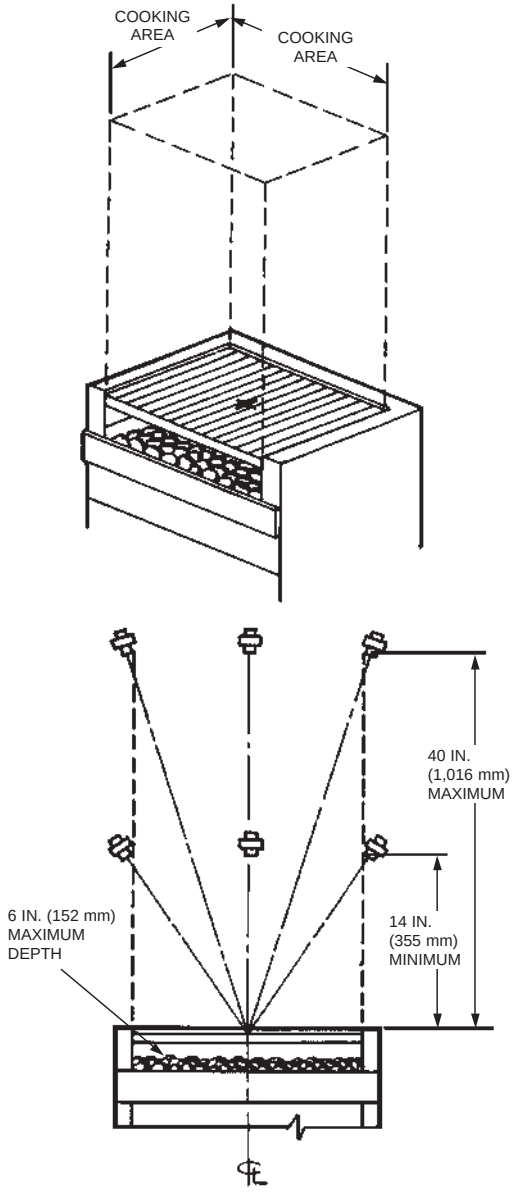


FIGURE 4-69
000260, 000259

APPLIANCE PROTECTION (Continued)

Wok Protection

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

1. A 260 nozzle protects a wok 14 in. (355 mm) minimum diameter up to 30 in. (762 mm) maximum diameter. The wok depth must be no less than 3 3/4 in. (95 mm) and no greater than 8 in. (203 mm).

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

   When using this nozzle, the nozzle must be positioned as shown in Figure 4-70.

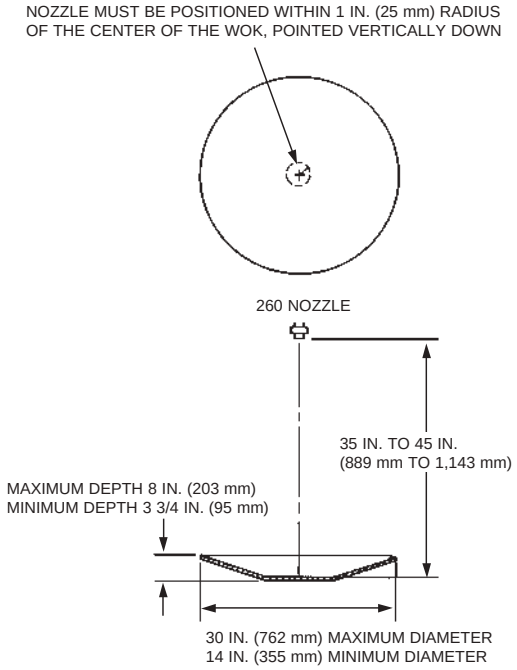


FIGURE 4-70
000261

2. A 1N nozzle protects a wok 11 in. (279 mm) minimum diameter up to 24 in. (609 mm) maximum diameter. The wok depth must be no less than 3 in. (76 mm) and no greater than 6 in. (152 mm). The nozzle is stamped with 1N indicating that this a one-flow nozzle and must be counted as one flow number. When using this nozzle, the nozzle must be positioned anywhere along or within the perimeter of the wok, aimed at the center, 30 in. to 40 in. (762 mm to 1,016 mm) above the hazard surface, as shown in Figure 4-71.

NOTICE

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

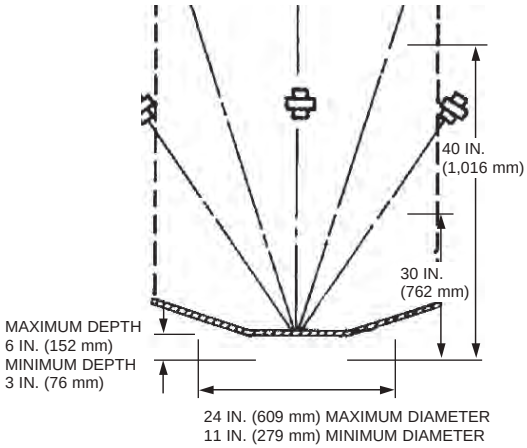


FIGURE 4-71
000261

APPLIANCE PROTECTION (Continued)

Nozzle Application Chart

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

NOTICE

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

Note: When protecting appliances which are larger than single nozzle coverage, multiple nozzles can be used.

Hazard	Maximum Hazard Dimension	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping Flow No.
Duct (Single Nozzle)	Length – Unlimited Perimeter – 50 in. (1,270 mm) Diameter – 16 in. (406 mm)	1	–	443323	1W
Duct (Single Nozzle)	Length – Unlimited Perimeter – 100 in. (2,540 mm) Diameter – 32 in. (812 mm)	1	–	443325	2W
Duct (Dual Nozzle)	Length – Unlimited Perimeter – 135 in. (3,429 mm)	1	–	443325	2W
		1	–	443323	1W
Electrostatic Precipitator (At Base of Duct)	Individual Cell	1	–	443321	1/2N
Plenum (Horizontal Protection)	Length – 10 ft (3.0 m)	1	–	443317	1N
Plenum (Horizontal Protection)	Length – 6 ft (1.8 m) Width – 4 ft (1.2 m)	1	–	443323	1W
Plenum (Vertical Protection)	Length – 4 ft (1.2 m) Width – 4 ft (1.2 m)	1	–	443323	1W
Fryer (Split or Non-Split Vat)	Maximum Size (without drip board) 14 in. x 15 in. (355 mm x 381 mm) Low Proximity	1	13 in. to 16 in. (330 mm to 406 mm)	443335	290
Fryer (Split or Non-Split Vat)	Maximum Size (without drip board) 14 1/2 in. x 14 in. (368 mm x 355 mm) Medium Proximity	1	16 in. to 27 in. (406 mm to 685 mm)	443335	290
Fryer (Split or Non-Split Vat)*	Maximum Size (without drip board) 15 in. x 14 in. (381 mm x 355 mm) High Proximity	1	27 in. to 47 in. (686 mm to 1,194 mm)	443329	230
	Medium Proximity	1	20 in. to 27 in. (508 mm to 686 mm)	443331	245
Fryer (Non-Split Vat Only)	Maximum Size (without drip board) 19 1/2 in. x 19 in. (495 mm x 482 mm) High Proximity	1	21 in. to 34 in. (533 mm to 864 mm)	443327	3N
	Low Proximity	1	13 in. to 16 in. (330 mm to 406 mm)	443335	290
	Maximum Size (without drip board) 18 in. x 18 in. (457 mm x 457 mm) High Proximity	1	25 in. to 35 in. (635 mm to 889 mm)	443327	3N
	Maximum Size (without drip board) 14 1/2 in. x 16 1/2 in. (368 mm x 419 mm) High Proximity	1	16 in. to 21 in. (406 mm to 533 mm)	443335	290
Fryer (Non-Split Vat Only)*	Maximum Size (with drip board) 21 in. x 14 in. (533 mm x 355 mm) (Fry Pot must not exceed 15 in. x 14 in. (381 mm x 355 mm)) High Proximity	1	27 in. to 47 in. (685 mm to 1,193 mm)	443329	230

* For multiple nozzle protection of single fryers, see detailed information on Pages 4-11 and 4-12.

APPLIANCE PROTECTION (Continued)

Nozzle Application Chart (Continued)

Hazard	Maximum Hazard Dimension	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping Flow No.
Fryer (Non-Split Vat Only)* (Continued)	Medium Proximity	1	20 in. to 27 in. (508 mm to 685 mm)	443331	245
	Maximum Size (with drip board) 25 3/8 in. x 19 1/2 in. (644 mm x 495 mm) (Fry pot side must not exceed 19 1/2 in. x 19 in. (495 mm x 483 mm)) High Proximity	1	21 in. to 34 in. (533 mm to 863 mm)	443327	3N
	Low Proximity	1	13 in. to 16 in. (330 mm to 406 mm)	443335	290
	Maximum Size (with drip board) 18 in. x 27 3/4 in. (457 mm x 704 mm) High Proximity	1	25 in. to 35 in. (635 mm to 889 mm)	443327	3N
	Maximum Size (with drip board) 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm) High Proximity	1	16 in. to 21 in. (368 mm x 673 mm)	443335	290
Fryer (Split or Non-Split Vat)	Maximum Size (with drip board) 14 in. x 21 in. (355 mm x 533 mm) Low Proximity	1	13 in. to 16 in. (330 mm x 406 mm)	443335	290
Fryer (Split or Non-Split Vat)	Maximum Size (with drip board) 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm) Medium Proximity	1	16 in. to 27 in. (405 mm to 685 mm)	443335	290
Fryer, Electric Split Vat	Maximum Size (with drip board) 14 in. x 21 in. (356 mm x 533 mm)	1	21 in. to 27 in. (533 mm to 686 mm)	443331	245
	Maximum Size (with drip board) 14 in. x 21 in. (356 mm x 533 mm)	1	16 in. to 21 in. (406 mm to 533 mm)	443335	290
Range	Longest Side (High Proximity) 32 in. (812 mm) Area – 384 in.^{2} (0.247 m^2)	1	30 in. to 40 in. (762 mm to 1,016 mm)	443317	1N
	Longest Side (Low Proximity) 24 in. (609 mm) Area – 432 in.^{2} (0.278 m^2)	1	15 in. to 20 in. (381 mm to 508 mm)	443317	1N
	Longest Side 28 in. (711 mm) Area – 336 in.^{2} (0.216 m^2)	1	40 in. to 48 in. (1,016 mm to 1,219 mm) (With Backshelf)	443319	1F
	Longest Side 32 in. (812 mm) Area – 384 in.^{2} (0.247 m^2)	1	30 in. to 40 in. (762 mm to 1,016 mm) (With Backshelf)	443333	260
	Longest Side (High Proximity) 28 in. (711 mm) Area – 672 in.^{2} (0.433 m^2)	1	40 in. to 50 in. (1,016 mm to 1,270 mm)	443331	245
	Longest Side (Medium Proximity) 32 in. (812 mm) Area – 768 in.^{2} (0.495 m^2)	1	30 in. to 40 in. (762 mm to 1,016 mm)	443333	260
	Longest Side (Low Proximity) 36 in. (914 mm) Area – 1,008 in.^{2} (0.650 m^2)	2	15 in. to 20 in. (381 mm to 508 mm)	443335	290

* For multiple nozzle protection of single fryers, see detailed information on Pages 4-11 and 4-12.

APPLIANCE PROTECTION (Continued)

Nozzle Application Chart (Continued)

Hazard	Maximum Hazard Dimension	Minimum Nozzle Quantity	Nozzle Heights	Nozzle Part No.	Nozzle Stamping Flow No.
Griddle	Longest Side (High Proximity) 48 in. (1,219 mm) Area – 1,440 in.^{2} (0.929 m^2)	1	30 in. to 50 in. (762 mm to 1,270 mm) (Perimeter Located)	443333	260
	Longest Side (High Proximity) 30 in. (762 mm) Area – 720 in.^{2} (0.464 m^2)	1	30 in. to 50 in. (762 mm to 1,270 mm) (Center Located)	443335	290
	Longest Side (High Proximity) 36 in. (914 mm) Area – 1,440 in.^{2} (0.929 m^2)	1	35 in. to 40 in. (889 mm to 1,016 mm) (Perimeter Located)	443317/ 439865	1N/1NSS
	Longest Side (Medium Proximity) 48 in. (1,219 mm) Area – 1,440 in.^{2} (0.929 m^2)	1	20 in. to 30 in. (508 mm to 762 mm) (Perimeter Located)	443335	290
	Longest Side (Low Proximity) 26 in. (660 mm) Area – 533 in.^{2} (0.343 m^2)	1	15 in. to 20 in. (381 mm to 508 mm) (Perimeter Located)	443323	1W
	Longest Side (Low Proximity) 36 in. (914 mm) Area – 1,080 in.^{2} (0.696 m^2)	1	10 in. to 20 in. (254 mm to 508 mm) (Perimeter Located)	443325	2W
	Longest Side (Low Proximity) 48 in. (1,219 mm) Area – 1,440 in.^{2} (0.929 m^2)	1	10 in. to 20 in. (254 mm to 508 mm) (Perimeter Located)	443337	2120
Chain Broiler* (Overhead Protection)	Length – 34 in. (863 mm) Width – 32 in. (812 mm)	2	10 in. to 26 in. (254 mm to 660 mm)	443323/ 439864	1W/1WSS
Chain Broiler (Horizontal Protection)	Length – 43 in. (1,092 mm) Width – 31 in. (787 mm)	2	1 in. to 3 in. (25 mm to 76 mm)	443317/ 439865	1N/1NSS
Gas-Radiant/Electric Char-Broiler	Longest Side – 36 in. (914 mm) Area – 864 in.^{2} (0.557 m^2)	1	15 in. to 40 in. (381 mm to 1,016 mm)	443317/ 439865	1N/1NSS
Electric Char-Broiler	Longest Side – 34 in. (863 mm) Area – 680 in.^{2} (0.438 m^2)	1	20 in. to 50 in. (508 mm to 1,270 mm)	443317/ 439865	1N/1NSS
Lava-Rock Broiler	Longest Side – 24 in. (609 mm) Area – 312 in.^{2} (0.201 m^2)	1	18 in. to 35 in. (457 mm to 889 mm)	443317/ 439865	1N/1NSS
Natural Charcoal Broiler	Longest Side – 24 in. (609 mm) Area – 288 in.^{2} (0.185 m^2)	1	18 in. to 40 in. (457 mm to 1,016 mm)	443317/ 439865	1N/1NSS
Lava-Rock or Natural Charcoal Char-Broiler	Longest Side – 30 in. (762 mm) Area – 720 in.^{2} (0.464 m^2)	1	14 in. to 40 in. (355 mm to 1,016 mm)	443327	3N
Wood Fueled Char-Broiler	Longest Side – 30 in. (762 mm) Area – 720 in.^{2} (0.464 m^2)	1	14 in. to 40 in. (355 mm to 1,016 mm)	443327	3N
Upright Broiler/ Salamander	Length – 32 1/2 in. (825 mm) Width – 30 in. (762 mm)	2	-	443321	1/2N
Salamander Broiler	Length – 29 in. (736 mm) Width – 16 in. (406 mm)	1	-	443317	1N
	Length – 31 in. (787 mm) Width – 15 in. (381 mm)	1	-	443319	1F
	Length – 31 in. (787 mm) Width – 15 in. (381 mm)	1	-	443317	1N
Wok	14 in. to 30 in. (355 mm to 762 mm) Diameter 3 3/4 in. to 8 in. (95 mm to 203 mm) Deep	1	35 in. to 45 in. (889 mm to 1,143 mm)	443333	260
	11 in. to 24 in. (279 mm to 609 mm) Diameter 3 in. to 6 in. (76 mm to 152 mm) Deep	1	30 in. to 40 in. (762 mm to 1,016 mm)	443317/ 439865	1N/1NSS

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

SPECIFIC APPLICATION BY MODEL

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

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

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

This specialized gas fryer can be protected with a combination of a 290 nozzle and a 1W nozzle for low proximity (7 3/4 in. to 8 in. (197 mm to 203 mm) nozzle height only) and two 230 nozzles (Part No. 419339) for high proximity (45 in. (1,143 mm) nozzle height only).

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

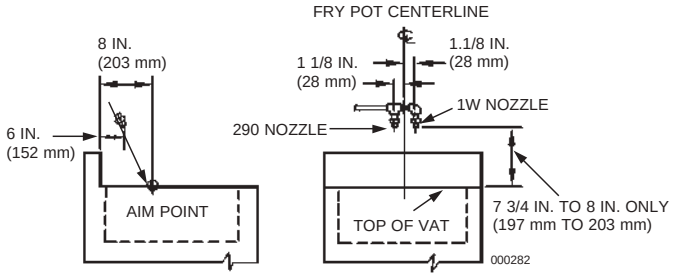
Nozzles must be positioned and aimed as shown in Figure 4-72.

Note: For low proximity protection, see Special Piping Layout in Figure 4-73.

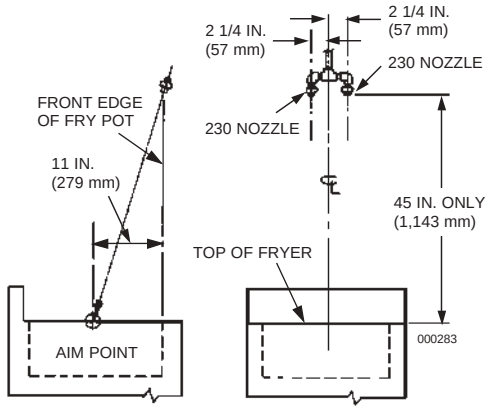
Dean Industries Model GTI Gas Fryer Special Piping Layout

Section A (Tank to Hood Penetration) Piping Limitations

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



LOW PROXIMITY (7 3/4 IN. TO 8 IN. (197 mm TO 203 mm) NOZZLE HEIGHT)

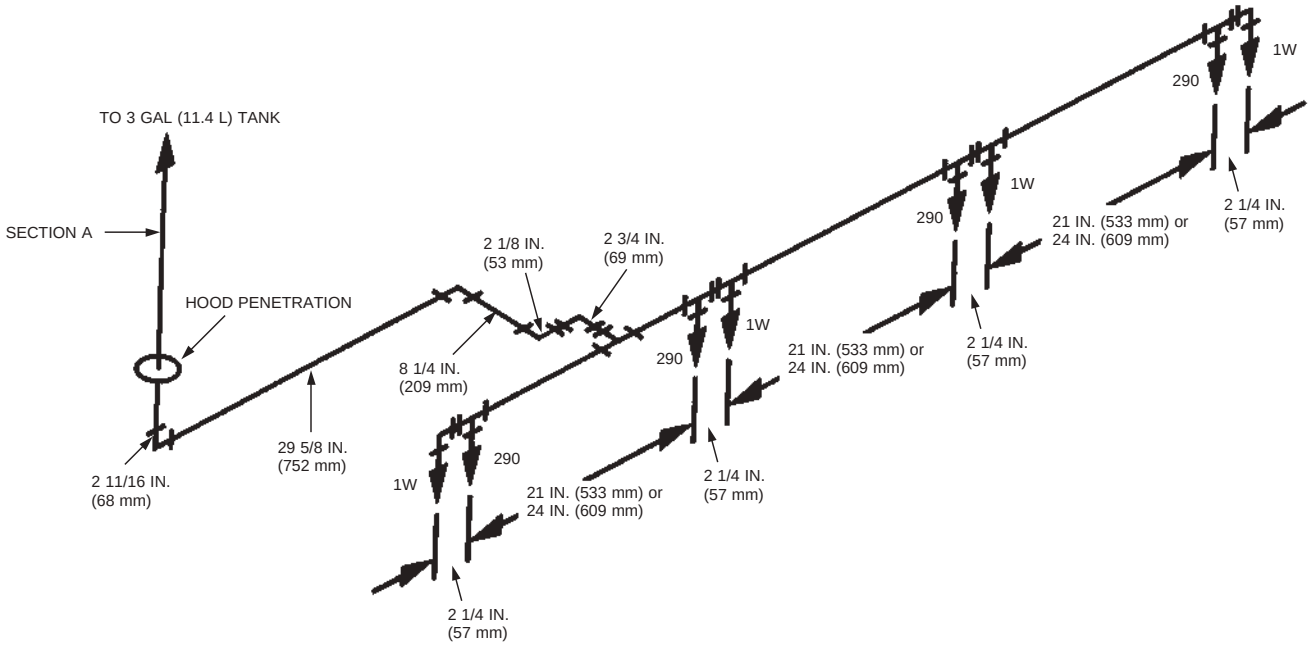


HIGH PROXIMITY (45 IN. (1,143 mm) NOZZLE HEIGHT ONLY)

FIGURE 4-72
000282, 000283

Section B (Hood Penetration to Nozzles) Piping Limitations

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



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

FIGURE 4-73
000284

SPECIFIC APPLICATION BY MODEL (Continued)

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

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

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

The 290 nozzle must be located on the front-to-rear centerline and aimed at the center of the cooking surface. See Figure 4-74.

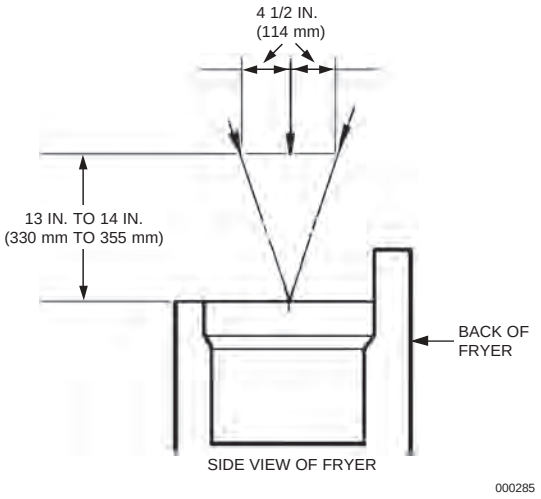


FIGURE 4-74
000285, 000286

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

This specialized single vat electric fryer can be protected either with a single 230 nozzle located 27 in. to 47 in. (685 mm to 1,193 mm) above the top surface of the fryer or with a single 245 nozzle located 20 in. to 27 in. (508 mm to 685 mm) above the top surface of the fryer.

Either nozzle must be located anywhere along or within the perimeter of the cooking surface and aimed at the midpoint. See Figure 4-75. The maximum size of the fry pot (without drip board) is 13 3/4 in. x 16 3/4 in. (349 mm x 425 mm) and the maximum size of the cooking surface (with drip board) is 13 3/4 in. x 20 7/8 in. (349 mm x 530 mm). The vat may be divided in half to make two split vats.

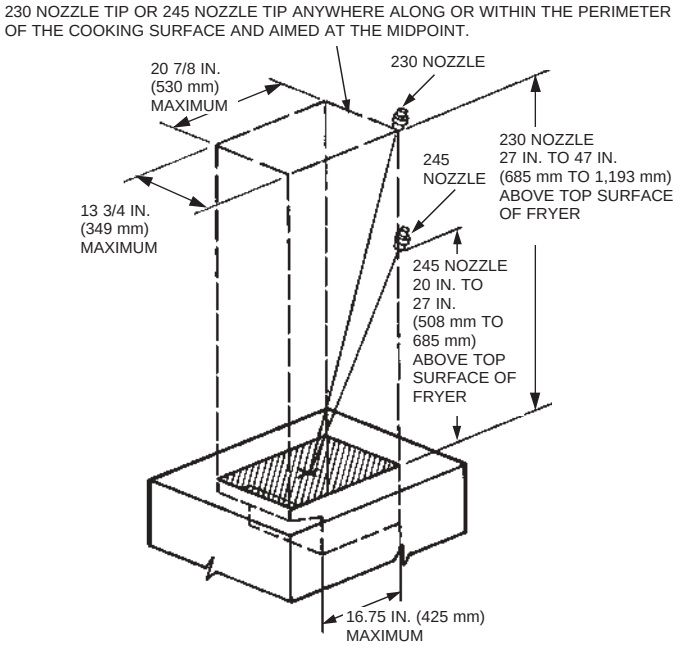


FIGURE 4-75
000209

SPECIFIC APPLICATION BY MODEL (Continued)

Frymaster Energy Efficient RE 14 Fryer

This electric fryer can be protected with either a single 230 nozzle located 27 in. to 47 in. (685 mm to 1,193 mm) above the top surface of the fryer or with a single 245 nozzle located 20 in. to 27 in. (508 mm to 685 mm) above the top surface of the fryer.

Either nozzle must be located anywhere along or within the perimeter of the cooking surface and aimed at the midpoint. See Figure 4-76. The maximum size of the fry pot (without drip board) is 14 in. x 15 1/2 in. (355 mm x 393 mm) and the maximum size of the cooking surface (with drip board) is 14 in. x 20 7/8 in. (355 mm x 530 mm). The vat may be divided in half to make two split vats.

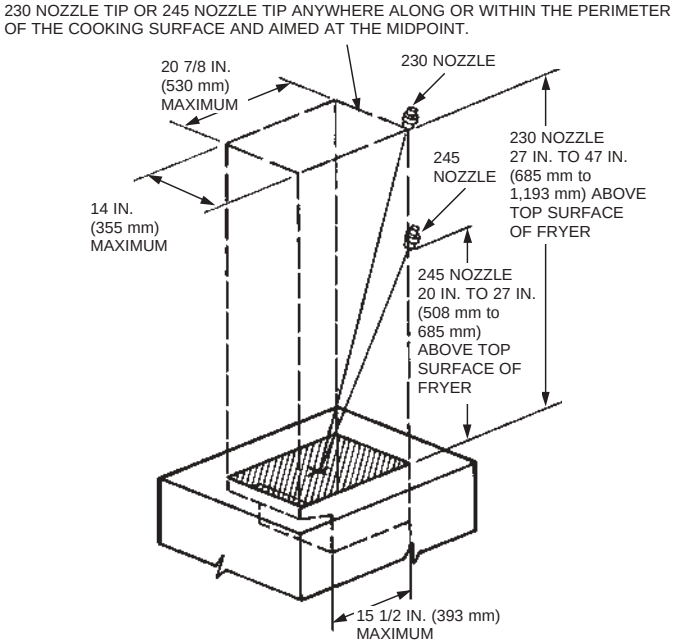


FIGURE 4-76
000209

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

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

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

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

   The 245 nozzle shall be located 18 in. to 20 in. (457 mm to 508 mm) above the top of the fryer vat, 2 in. to 2 1/4 in. (51 mm to 57 mm) to the right or left of the front-to-rear vat centerline, and 0 in. to 3 1/4 in. (0 to 82 mm) forward of the right-to-left vat centerline, and aimed at the vat center point. See Figure 4-77.

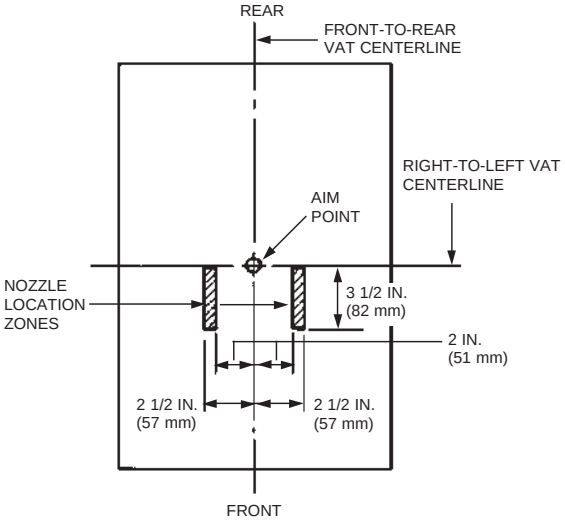


FIGURE 4-77
002297

2. The distance between the start of the first branch line and the start of the last branch line shall not exceed 79 in. (2,006 mm).
3. The total length of all branch lines shall not exceed 162 in. (4,114 mm).
4. The 3 gallon agent tank shall be elevated above the connections between the supply and branch lines.
5. The requirements of the following table shall not be exceeded:

TABLE 4-5: NOZZLE REQUIREMENTS

Requirement	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length - in. (mm)	140 (3,556)	67 (1,701)	6 (152)	42 (1,066)
Minimum Length - in. (mm)	81 (2,057)	4 (101)	4 (101)	17 (431)
Maximum 90° Elbows	5	3	1	6
Maximum Tees	0	1	1	1
Maximum Flow Numbers	11	2	1	2
Minimum Flow Numbers	5	0	0	1/2

SPECIFIC APPLICATION BY MODEL (Continued)

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

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

Nozzle Location: See Figure 4-78.

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

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

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat

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

▸ **System Coverage:** Each fryer requires a dedicated 3 gal (11.4 L) tank of ANSULEX low pH agent discharging through the two one-flow nozzles (1N and 1F).

Note: In this application, up to three 3 gallon tanks can be expelled from one double tank or LT-A-101-30 cartridge. The cartridge used for this hazard specific fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection requires an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

▸ **Note:** When protecting the Henny Penny fryers, a regulated actuator assembly is dedicated to discharge up to three side-by-side separately piped 3 gallon tanks with one double-tank nitrogen cartridge. The UL 300 listed limitations require the ▸ use of the Henny Penny Piping and Nozzle Kit (Part No. 434455).

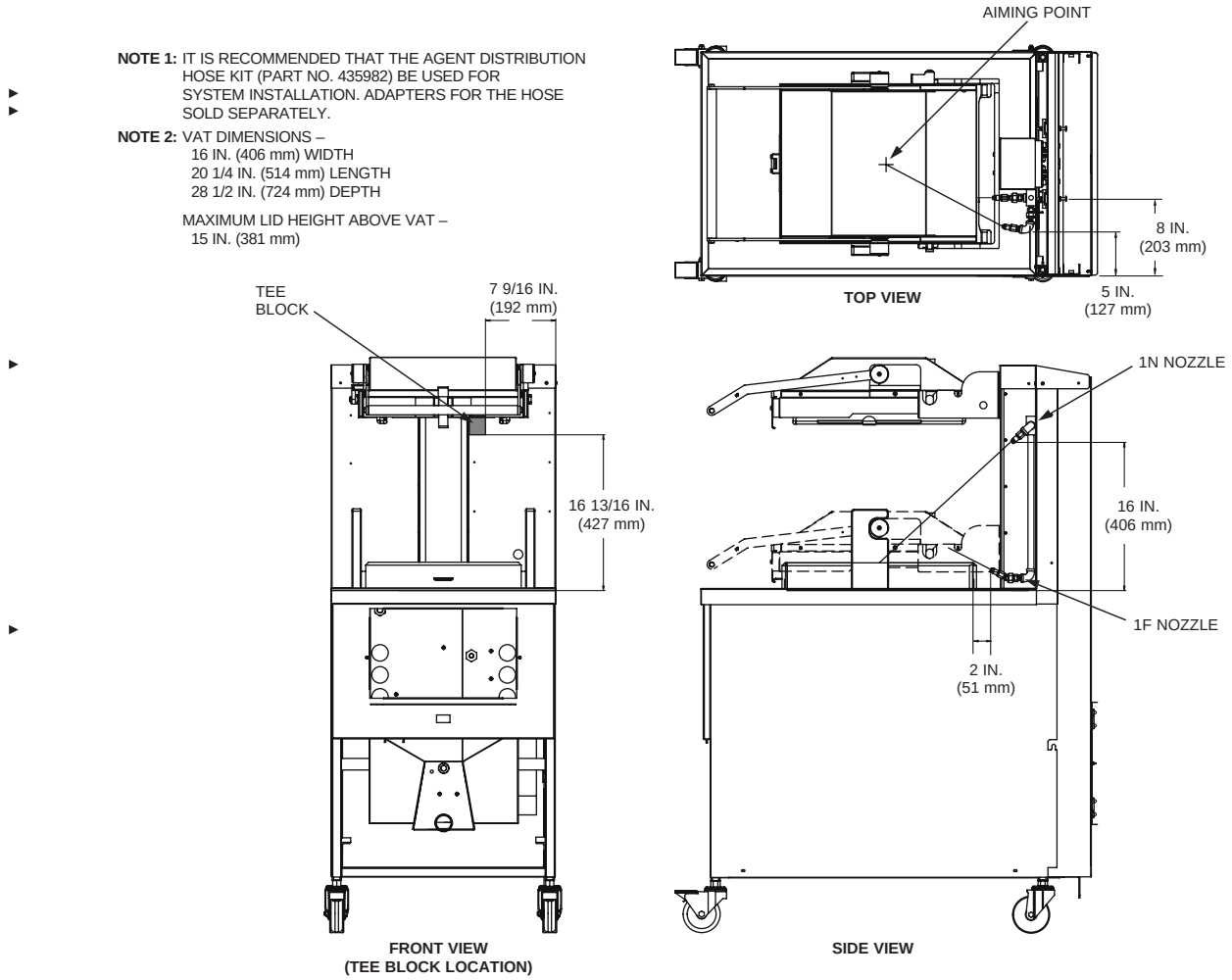


FIGURE 4-78
007516

SPECIFIC APPLICATION BY MODEL (Continued)

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

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

Nozzle Location: See Figure 4-79.

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

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

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat.

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

▸ **System Coverage:** Each fryer requires a dedicated 3 gal (11.4 L) tank of ANSULEX low pH agent discharging through the two one-flow nozzles (1N and 1F).

Note: In this application, up to three 3 gallon tanks can be expelled from one double tank or LT-A-101-30 cartridge. The cartridge utilized for this hazard specific fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection requires an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

▸ **Note:** When protecting the Henny Penny fryers, a regulated actuator assembly is dedicated to discharge up to three side-by-side separately piped 3 gallon tanks with one double-tank nitrogen cartridge. The UL 300 listed limitations require the use of the Henny Penny Piping and Nozzle Kit (Part No. 434455).

NOTE 1: IT IS RECOMMENDED THAT THE AGENT DISTRIBUTION HOSE KIT (PART NO. 435982) BE USED FOR SYSTEM INSTALLATION. ADAPTERS FOR THE HOSE SOLD SEPARATELY.

NOTE 2: VAT DIMENSIONS –
16 IN. (406 mm) WIDTH
20 1/4 IN. (514 mm) LENGTH
28 1/2 IN. (724 mm) DEPTH

MAXIMUM LID HEIGHT ABOVE VAT –
15 IN. (381 mm)

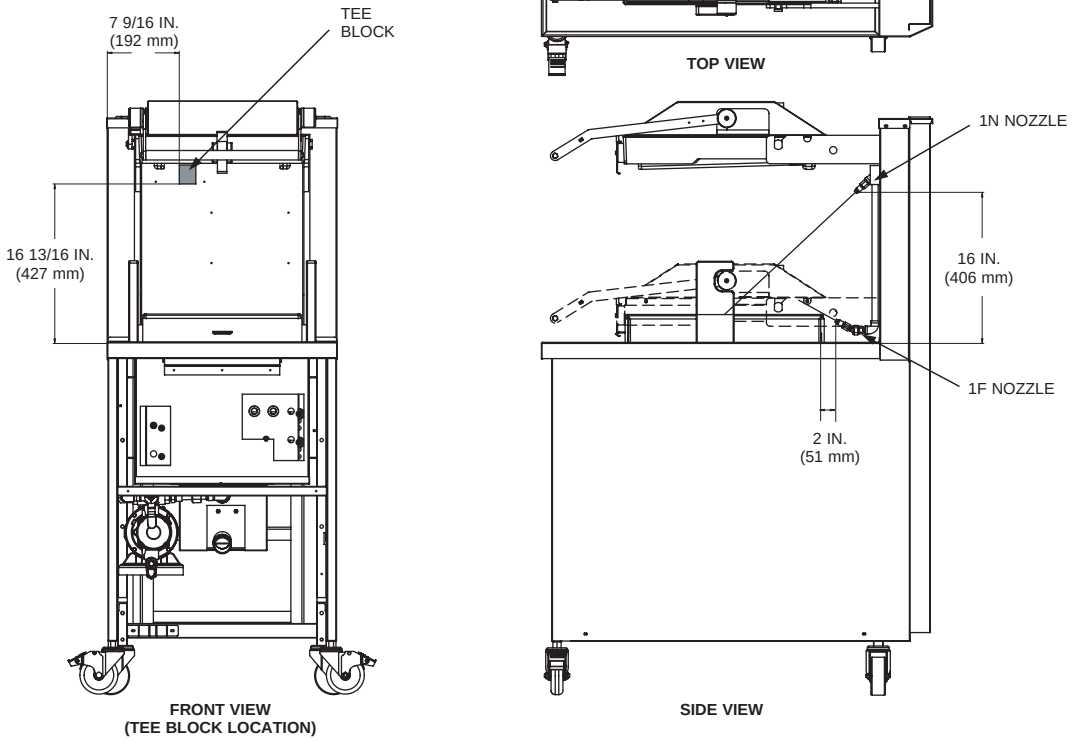


FIGURE 4-79
007515

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Dual Lift System – Model PXE-100

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

Nozzle Location: See Figure 4-80.

1N Nozzle
(Upper position): From the tee block, position nozzle tip 16 3/4 in. (425 mm) up from base of fryer surface and 1 3/4 in. (44 mm) in from right side of appliance back shroud

1F Nozzle
(Lower position): Running down from the tee block to the base of the fryer, position the nozzle tip 2 in. (51 mm) up from the base of the fryer surface, and 2 1/4 in. (57 mm) in from the **right** side of appliance back shroud

Nozzle Aiming Point:

1N Nozzle: At center point of fry vat

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

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

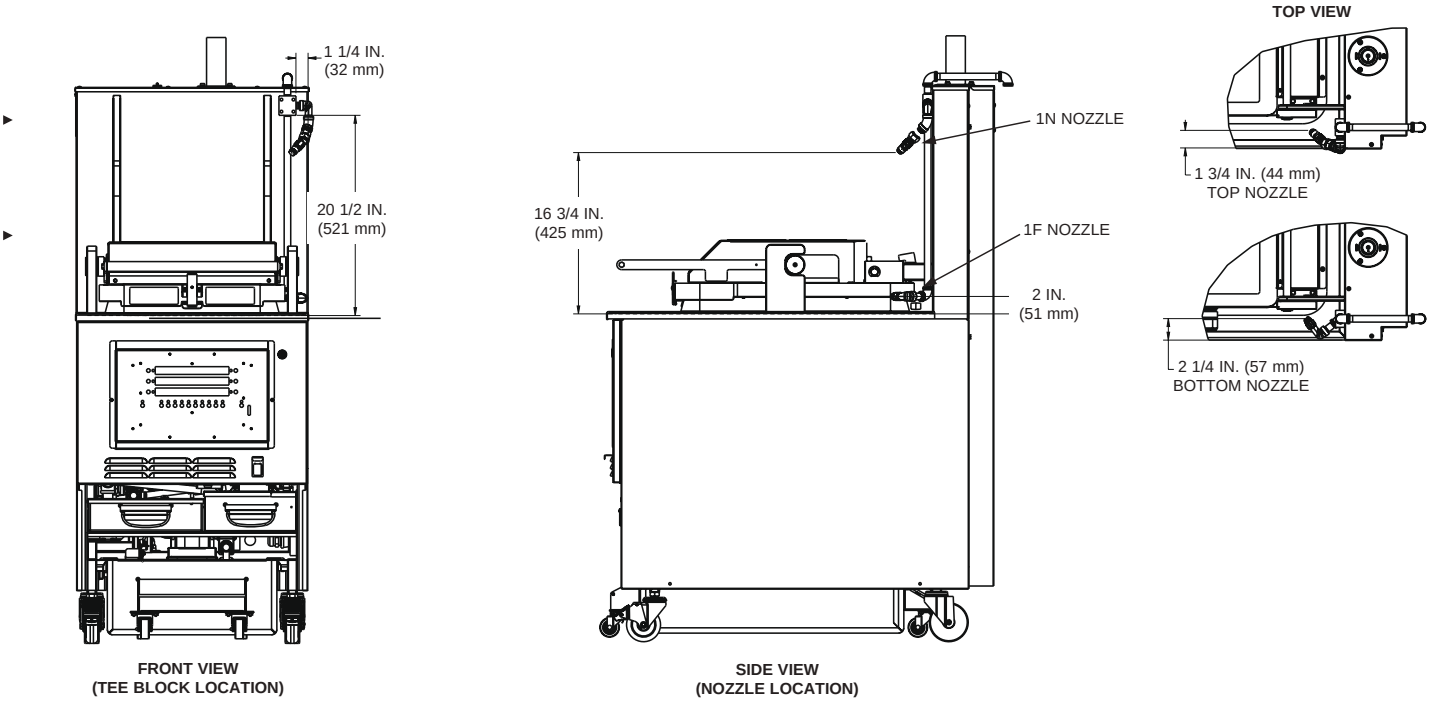
Note: In this application, up to three 3 gallon tanks can be expelled from one double tank or LT-A-101-30 cartridge. The cartridge used for this hazard specific fryer protection cannot be shared with tanks intended for standard R-102 protection. Standard protection requires an expellant gas cartridge installed in another actuation device such as an AUTOMAN regulated release or regulated actuator assembly.

Note: When protecting the Henny Penny fryers, a regulated actuator assembly is dedicated to discharge up to three side-by-side separately piped 3 gallon tanks with one double-tank nitrogen cartridge. The UL 300 listed limitations require the use of the Henny Penny Piping and Nozzle Kit (Part No. 434455).

NOTE 1: IT IS RECOMMENDED THAT THE AGENT DISTRIBUTION HOSE KIT (PART NO. 435982) BE USED FOR SYSTEM INSTALLATION. ADAPTERS FOR THE HOSE SOLD SEPARATELY.

NOTE 2: VAT DIMENSIONS –
14 15/16 IN. (379 mm) WIDTH
20 35/64 IN. (522 mm) LENGTH
17 27/64 IN. (442 mm) DEPTH

HEAT OUTPUT – 17 kW



FRONT VIEW (TEE BLOCK LOCATION)

SIDE VIEW (NOZZLE LOCATION)

FIGURE 4-80
009481

SPECIFIC APPLICATION BY MODEL (Continued)

Henny Penny Flex Fryer – Model FFE-51X
("X" will be 2, 3, or 4 according to the number of wells)

Nozzle Type: One 3N nozzle (Upper position)
One 1F nozzle (Lower position)

Nozzle Location: See Figure 4-81.

3N Nozzle
(Upper position): 21 in. to 36 in. (553 mm to 914 mm) above the center of the fry vat and aim to discharge straight down at the center of the fry vat.

1F Nozzle
(Lower position): 1 3/4 in. (45 mm) from the right side of the fry vat. The 1F nozzle is a flat spray nozzle and the spray must be horizontal to the edge of the back lip of the fry vat.

NOTE: VAT DIMENSIONS –
10 3/4 IN. (273 mm) WIDTH
10 1/2 IN. (266 mm) LENGTH

HEAT OUTPUT: 9 kW

Nozzle Aiming Point:

3N Nozzle: At center point of fry vat

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

Protection is for two open positions - full and intermediate.

Full is defined as having the lid in the fully open position.

Intermediate is defined as having the handle unlocked to release the steam pressure, and the safety hooks still latched, resulting in a small opening between the lid and fry pot at the back of the appliance.

The placement of the nozzle assembly is critical and must be mounted per the design instructions as detailed in Figure 4-81. The Agent Distribution Hose and Restraining Cable Kit (Part No. 435982) should be utilized to allow movement of the appliance for cleaning purposes.

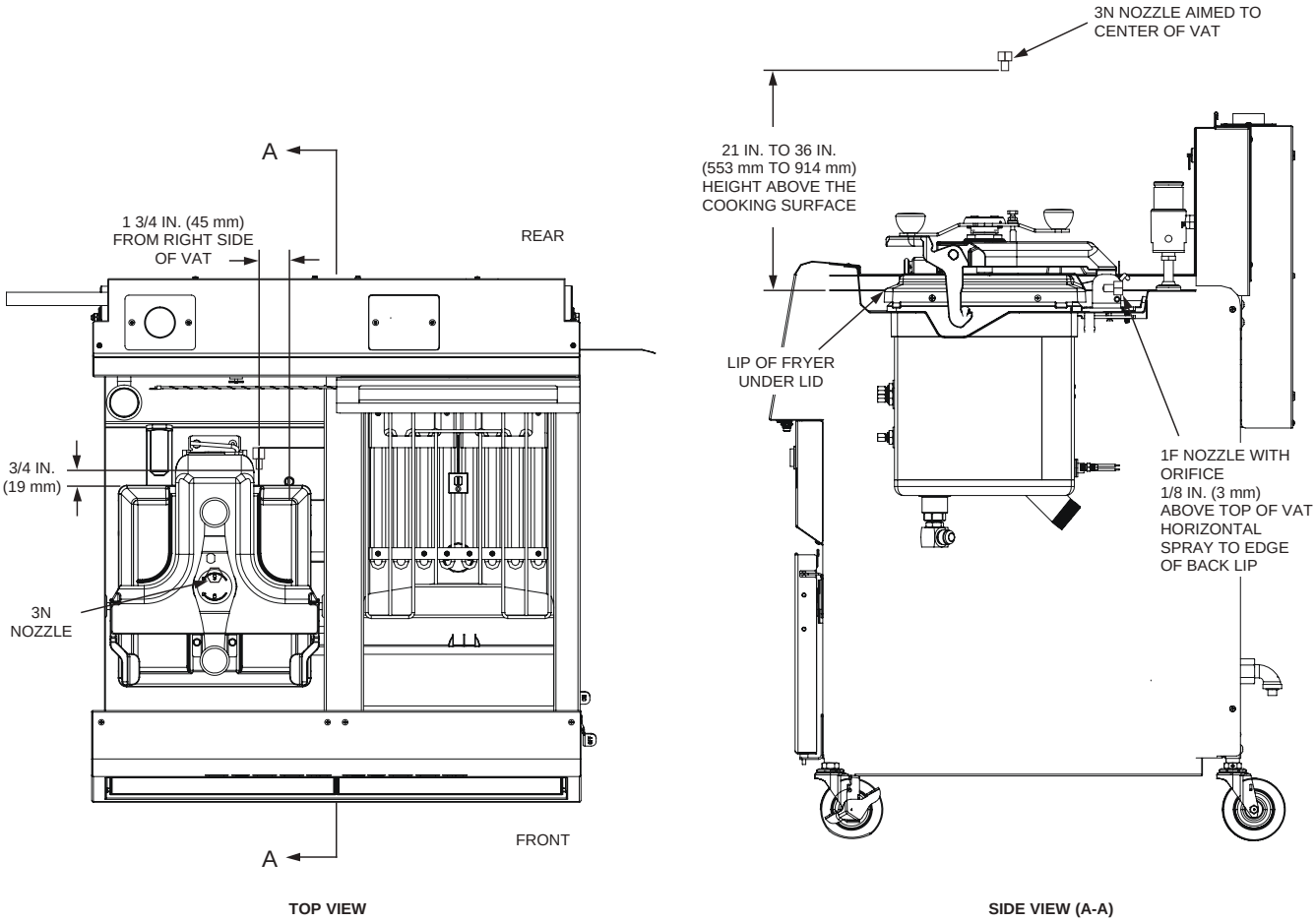


FIGURE 4-81
010682

SPECIFIC APPLICATION BY MODEL (Continued)

Pitco *SPIN*FRESH Fryer – Models MEII, MGII, SE14, SE14R, SE14X, SG144S, SG14RS, SEH50, SEH5017, SGH50, SGH5017, SSH55, SSH55R

Nozzle Quantity/Type: Two 2120 nozzles

- One agent distribution hose and restraining cable kit (Part No. 435982) must be used for each fryer. See Figure 4-82 and Figure 4-85.
- The 3/8 in. "Quik-Seal" mechanical bulkhead fitting adaptor (Part No. 77285) must be used for the connections through fryer cover. See Figure 4-83 for front view nozzle locations. See Figure 4-84 for side view nozzle locations of the "Quik-Seal" bulkhead head fitting.
- Nozzle must be installed with the standard metal blow-off cap (Part No. 439861) or the stainless steel blow-off cap (Part No. 439866).
- Fryer electrical power source must be connected for electrical shutdown upon system actuation through the use of the ANSUL® R-102 snap-action switch kit (Part No. 423878 to 423881).



FIGURE 4-82
009476

NOZZLE CROSS SECTION VIEW

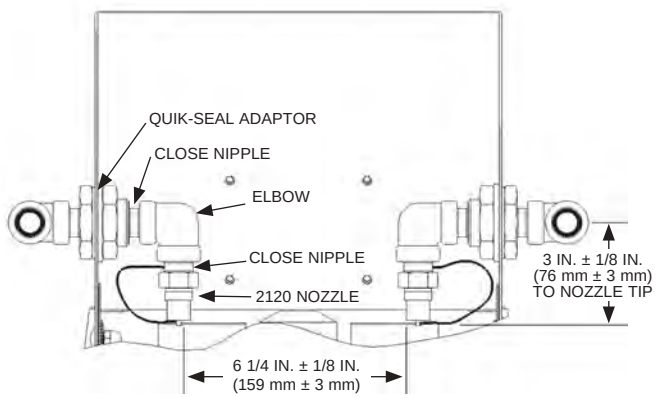


FIGURE 4-83
009459

FRYER FLUE - LOCATION OF NOZZLE ENTRANCE POINT

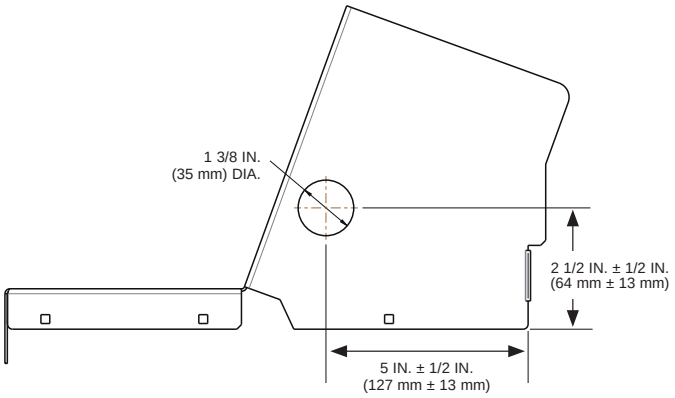


FIGURE 4-84
009460a

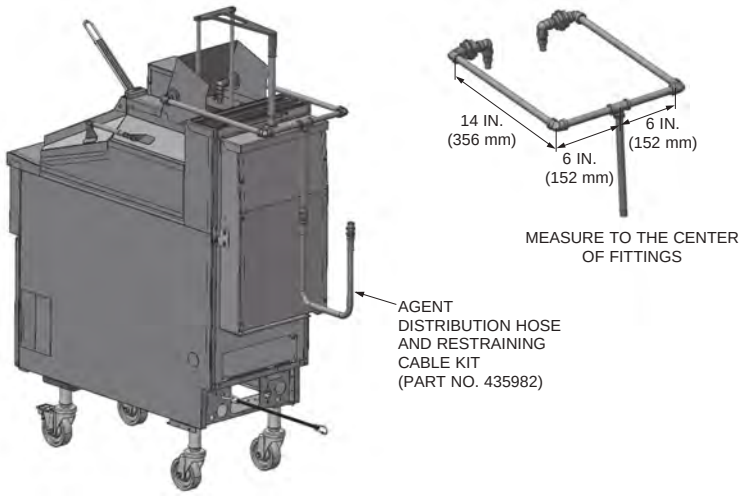


FIGURE 4-85
009477

SPECIFIC APPLICATION BY MODEL (Continued)

BELSHAW Century Fryers - Model numbers in table

Nozzle Type: 3N nozzle

Nozzle Spacing: See Figure 4-86. 11 1/2 in. (292 mm) maximum from end of fryer and 25 1/2 in. (647 mm) maximum on centers

Nozzle Height: 35 in. (889 mm) above top of appliance

Nozzle Position: 2 in. (51 mm) in from inside edge of fry vat

Nozzle Aiming Point: Along the centerline of fry vat

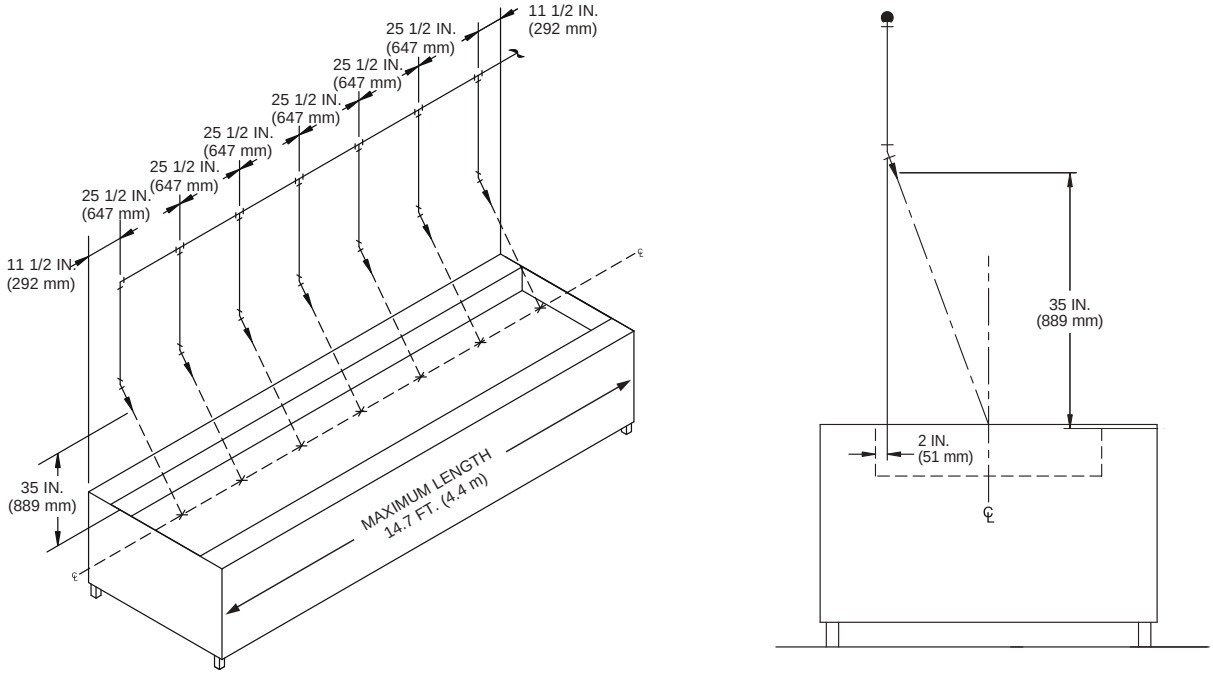


FIGURE 4-86
006908, 006908a

TABLE 4-6: BELSHAW CENTURY FRYERS

Specifications: Fryer Vat Size		**C100 C6-8**	**C200 C6-16**	**C200G C6G-16**	**C300G C6G-24**	**C400 C10-16**	**C400G C10G-16**	**C600 C10-24**	**C600G C10G-24**
Length	in. (mm)	65 (1,651)	65 (1,651)	65 (1,651)	65 (1,651)	122 1/4 (3,105)	122 (3,099)	122 1/4 (3,105)	122 (3,099)
Width	in. (mm)	12 (305)	20 (508)	20 (508)	31 1/4 (794)	20 29/64 (514)	21 1/4 (540)	31 (787)	31 1/4 (794)
Depth	in. (mm)	5 1/4 (133)	5 1/4 (133)	9 3/4 (248)	9 3/4 (248)	6 1/4 (159)	11 1/4 (286)	7 1/8 (181)	11 (279)
BTU Rating	K	-	-	188	200	-	350	-	360
Vat Oil Capacity	lb (kg)	110 (49.8)	188 (85.2)	346 (156.9)	700 (317.5)	478 (216.1)	600 (272.1)	675 (306.1)	1,250 (566.9)

SPECIFIC APPLICATION BY MODEL (Continued)

Dunkin Donuts Fryer – Model DD400CGF

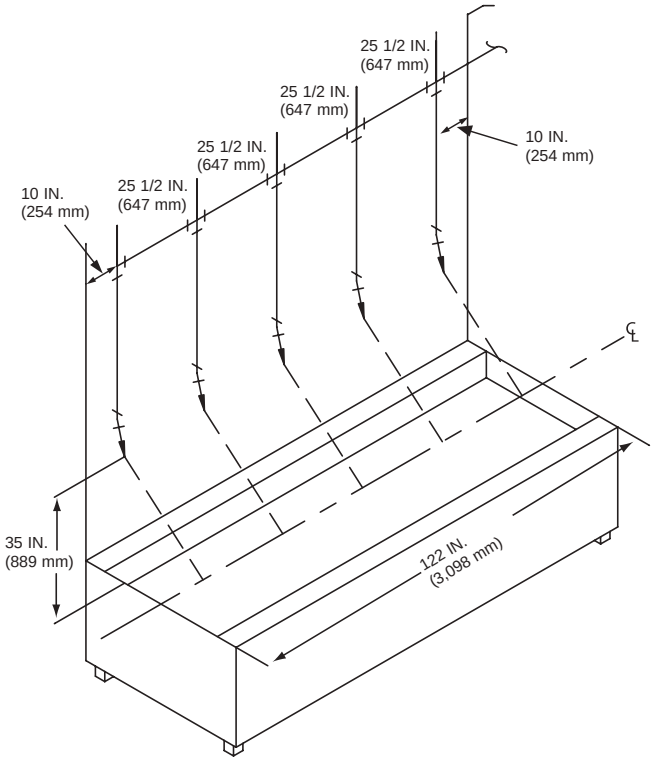
Nozzle Type: 3N nozzle

Nozzle Spacing: See Figure 4-87. 11 1/2 in. (292 mm) maximum from end of fryer and 25 1/2 in. (647 mm) maximum on centers

Nozzle Height: 35 in. (889 mm) above top of appliance

Nozzle Position: 2 in. (51 mm) in from inside edge of fry vat

Nozzle Aiming Point: Along the centerline of fry vat



Fryer Specifications:

- **Vat Size:**
  Length: 122 in. (3,098 mm)
  Width: 31 19/64 in. (795 mm)
  Depth: 11 in. (279 mm)
- **BTU Rating:** 360k
- **Vat Oil Capacity:**
  1,250 lb (566.9 kg)

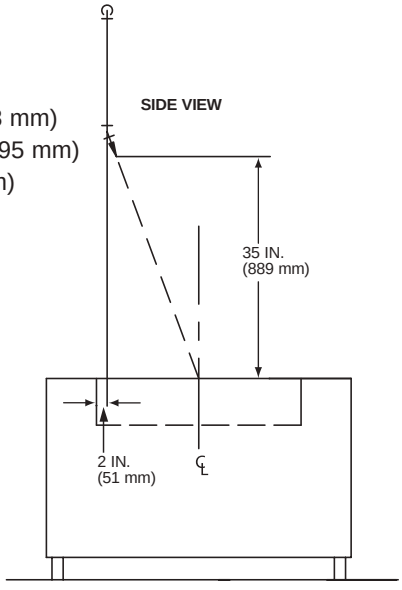


FIGURE 4-87
007505a, 007505

Krispy Kreme Fryers – Models 55M, 65 D/H, 110 D/H, 110M, 150 D/H, 220M, 270 D/H, 600 D/H, and 1000 D/H

Nozzle Type: 3N nozzle

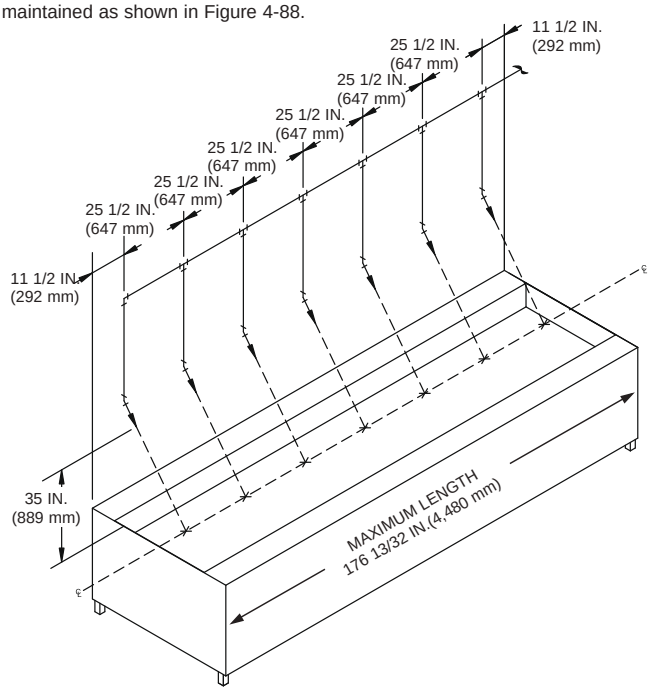
Nozzle Spacing: See Figure 4-88. 11 1/2 in. (292 mm) maximum from end of fryer and on maximum 25 1/2 in. (647 mm) centers

Nozzle Height: 35 in. (889 mm) above top of appliance

Nozzle Position: 2 in. (51 mm) from inside edge of fry vat

Nozzle Aiming Point: Along centerline of fry vat

Note: Figure 4-89 shows maximum size fryer (Model 1000 D/H). Smaller size fryers (Models 150 D/H, 270 D/H, and 600 D/H) can be protected with less nozzles but nozzle spacings, height requirements, and positions, must be maintained as shown in Figure 4-88.



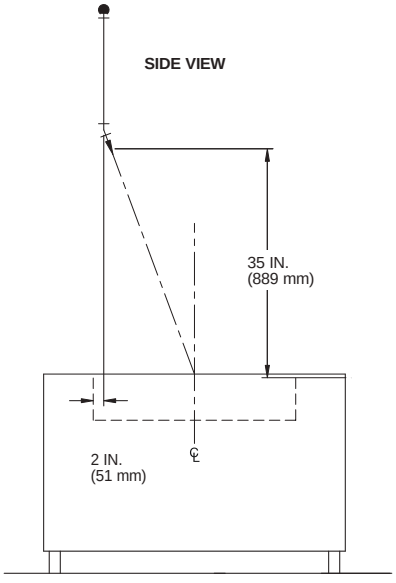


FIGURE 4-88
006908, 006908a

SPECIFIC APPLICATION BY MODEL (Continued)

Garland Electric Dual-Side Clamshell Broiler – Model CXBE12

Nozzle Quantity/Type: One 1N nozzle

Nozzle Height: 12 in. to 15 in. (305 mm to 381 mm) above lower cooking surface

Nozzle Location: See Figure 4-89. 1 in. (26 mm) from side of appliance at 12 in. (304.8 mm) up.

1 in. to 3 in. (26 mm to 76 mm) from side of appliance at 15 in. (381 mm) up.

Nozzle Aiming Point: Center of lower cooking surface

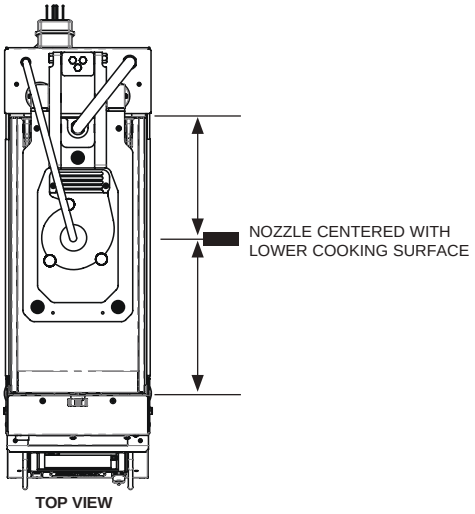


FIGURE 4-89
010810, 010812

Garland Electric Dual-Side Clamshell Broiler – Model CXBE12

Nozzle Quantity/Type: One 230 nozzle

Nozzle Height: 24 in. to 26 in. (610 mm to 660 mm) above the cooking surface

Nozzle Location: 0 in. to 2 in. (0 mm to 51 mm) from front edge of cooking surface

See Figure 4-90.

Nozzle Aiming Point: Center of lower cooking surface.

Top Cooking Surface: 10 13/64 in. x 22 13/32 in. (259 mm x 568 mm)

Bottom Cooking Surface: 10 51/64 in. x 22 13/64 in. (274 mm x 564 mm)

Total Load: 16 kW

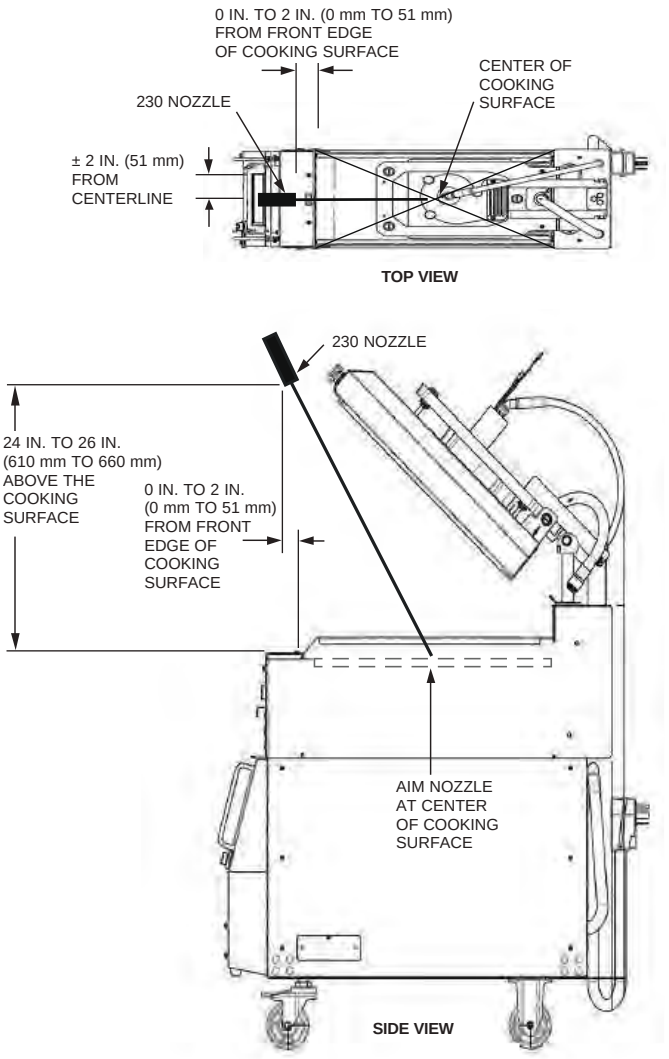


FIGURE 4-90
009654, 009655

SPECIFIC APPLICATION BY MODEL (Continued)

DUKE Chain Broiler – Model FBB-High Proximity

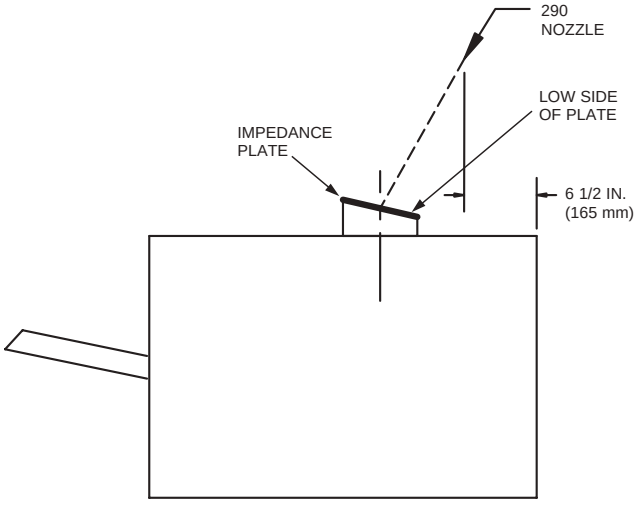
▸ **DUKE Chain Broiler With or Without Catalyst**

Nozzle Quantity/Type: One 290 nozzle

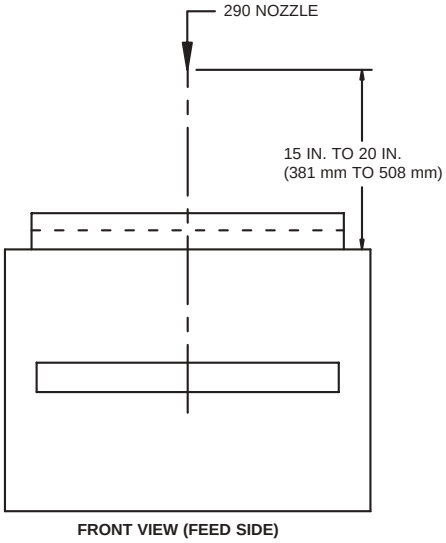
Nozzle Height: 15 in. to 20 in. (381 mm to 508 mm) above top of appliance

Nozzle Location: Centered 6 1/2 in. (165 mm) back from front feed edge of appliance. Nozzle must be oriented to spray onto impedance plate. See Figure 4-91.

Nozzle Aiming Point: Aimed at center of impedance plate



SIDE VIEW



FRONT VIEW (FEED SIDE)

FIGURE 4-91
007414

▸ **DUKE Chain Broiler With or Without Catalyst**

Exhaust Deflector Size – 6.25 in. (159 mm) x 26.75 in. (679 mm):

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm) above top of appliance

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

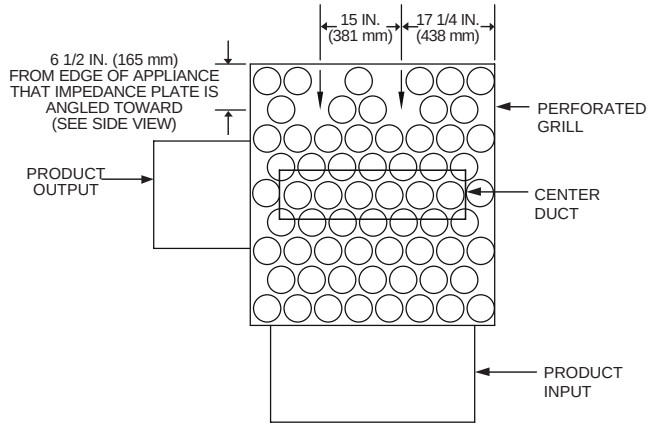
First nozzle positioned 17 1/4 in. (438 mm) from right side of broiler (facing broiler)

Second nozzle positioned 15 in. (381 mm) from first nozzle

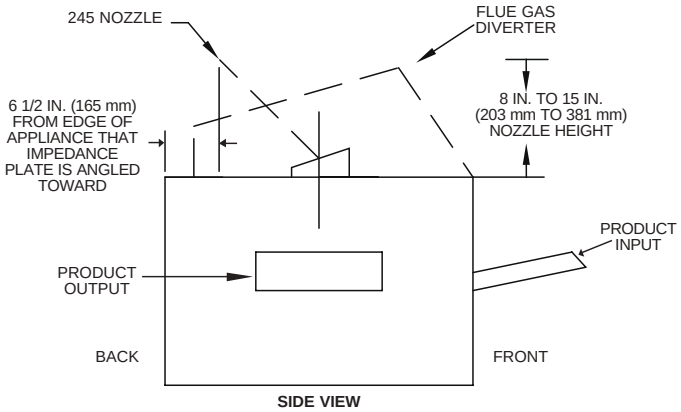
Nozzle must be oriented to spray onto impedance plate. See Figure 4-92.

Nozzle Aiming Point: Aimed at center of impedance plate

Note: If the deflector or flue gas diverter is rotated 180 degrees, the nozzles must also rotate to discharge into the opening.



TOP VIEW



SIDE VIEW

FIGURE 4-92
008100, 008099

SPECIFIC APPLICATION BY MODEL (Continued)

DUKE Electric Broiler – Model FBB – High Proximity

▸ **DUKE Electric Broiler with or without Catalyst**

Nozzle Quantity/Type: Two 1N nozzles

Nozzle Height: 18 in. (457 mm)

Nozzle Location: 6 1/2 in. (165 mm) from edge of appliance that impedance plate is angled toward

First nozzle positioned 5 in. (127 mm) to left of opening centerline

Second nozzle positioned 5 in. (127 mm) to right of opening centerline

See Figure 4-93.

Nozzle Aiming Point: Aimed at center of opening

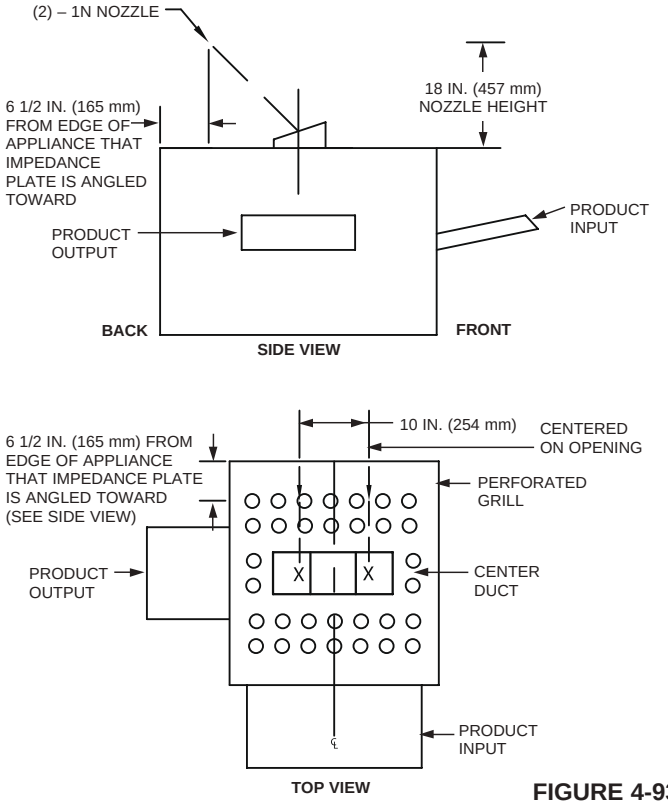


FIGURE 4-93
008365, 008366

DUKE Electric Broiler – Model FBB – High Proximity

▸ **DUKE Electric Broiler without Catalyst**

Nozzle Quantity/Type: One 290 nozzle

Nozzle Height: 15 in. to 20 in. (381 mm to 508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from edge of appliance that impedance plate is angled toward

See Figure 4-94.

Nozzle Aiming Point: Aimed at center of opening

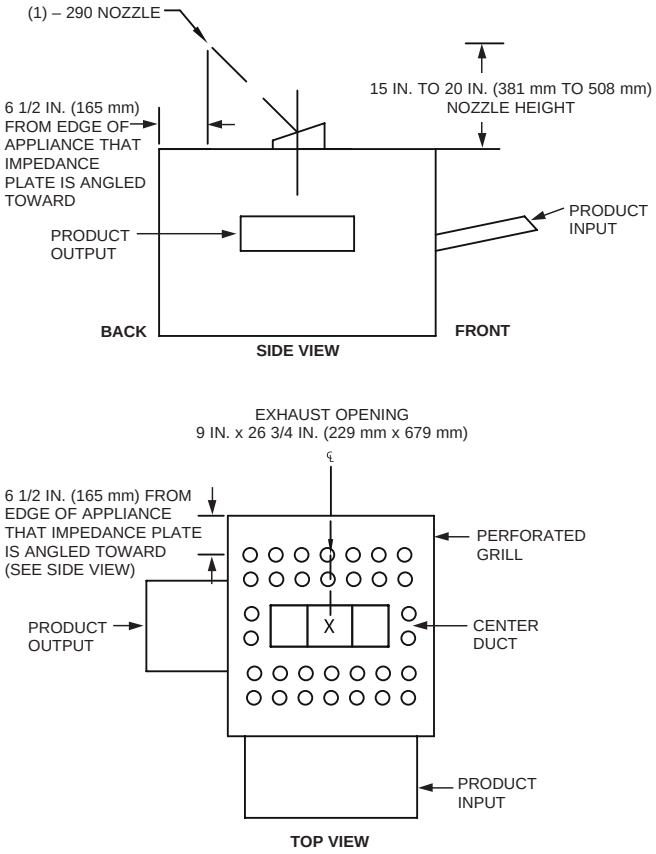


FIGURE 4-94
008365, 008366

SPECIFIC APPLICATION BY MODEL (Continued)

DUKE Electric Broiler – Model FBB – Low Proximity

▸ **DUKE Electric Broiler with or without Catalyst**

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from edge of appliance that impedance plate is angled toward

First nozzle positioned 17 1/2 in. (444 mm) from right side of broiler (facing broiler)

Second nozzle positioned 15 in. (381 mm) from first nozzle

Figure 4-95.

Nozzle Aiming Point: Aimed at center of opening

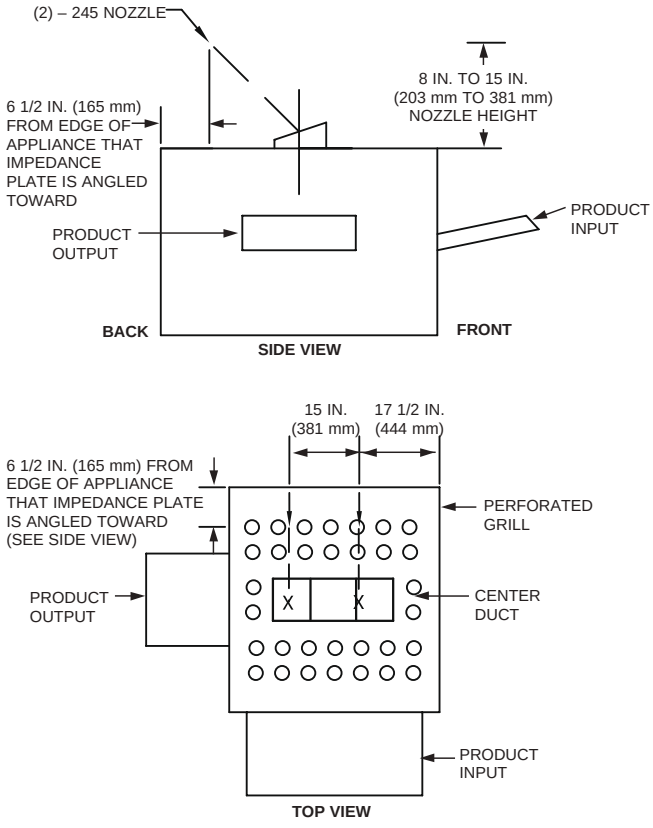


FIGURE 4-95
008365, 008368

▸ **Nieco Broiler Model 940, 962 or 960 With Catalyst Protection**

▸ **Note:** Nieco broilers without catalyst protection use standard chain broiler protection options.

▸ Certain models of the Nieco broiler (Models 940, 962, and 960) are equipped with catalysts to comply with new clean air laws. Because of the catalyst, it is necessary to protect these broilers in a special way. The guidelines for protecting these broilers are as follows:

- The maximum internal broiling area is 29 in. x 23 1/2 in. (737 mm x 596 mm).
- ▸ Use an R-102 3-gallon system with a maximum of six flow numbers.
- Each individual broiler must be protected with a minimum of two 1N nozzles. The nozzles must be located as shown in Figure 4-96.
- The broiler must be fitted with two 1 in. (25 mm) high agent barriers on the angled surface of the broiler. If these have not been completed by the equipment supplier, they must be added in the field.

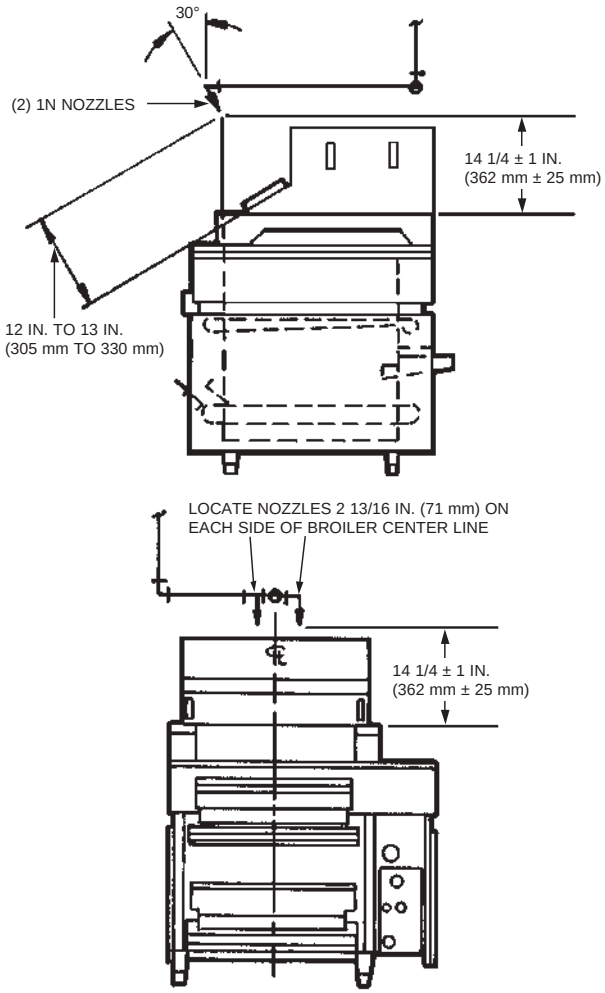


FIGURE 4-96
000250, 000774

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model 950, 960, 980, 1424

Nozzle Quantity/Type: One 2W nozzle

Nozzle Height: 20 in. (508 mm) above top of appliance. See Figure 4-97.

Nozzle Location: 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-98

Nozzle Aiming Point: Aimed at center of opening. See Figure 4-98

▸ **Nieco Broiler – Model 950, 960, 980, 1424 (with Catalyst)**

Nozzle Quantity/Type: Two 2W nozzles

Nozzle Height: 20 in. (508 mm) above top of appliance. See Figure 4-98

Nozzle Location: 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-98

Nozzle Aiming Point: Aimed at center of opening. See Figure 4-98 – Side View

Nozzle Aiming Point: Aimed at point 3 in. (76 mm) each side of center. See Figure 4-98 – Front View

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

Nozzle Quantity/Type: Two 2W nozzles

Nozzle Height: 20 in. (508 mm) above top of appliance. See Figure 4-99

Nozzle Location for Large Chamber: 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-99

Nozzle Location for Small Chamber: Nozzle to be located 6.50 in. (165 mm) back from front edge of appliance and 12 in. (305 mm) over from large chamber nozzle

Nozzle Aiming Point for Large Chamber: Aimed at center of opening. See Figure 4-99

Nozzle Aiming Point for Small Chamber: Nozzle to be aimed 12 in. (305 mm) over from large chamber nozzle aiming point

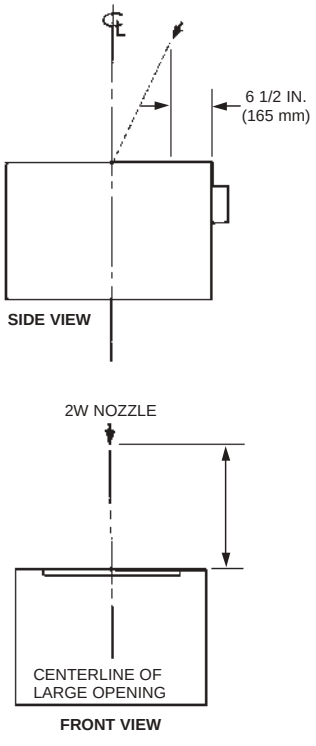


FIGURE 4-97
006486

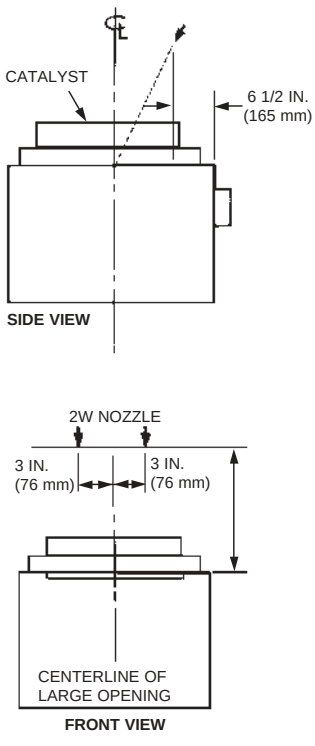


FIGURE 4-98
007034

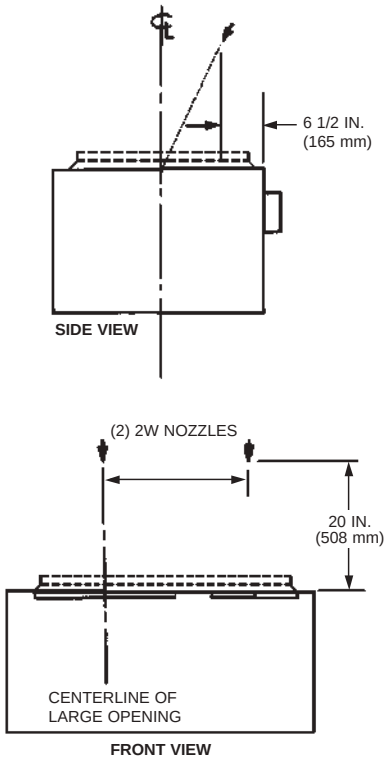


FIGURE 4-99
007010

SPECIFIC APPLICATION BY MODEL (Continued)

▸ **Nieco Broiler – Model 9025 (With or Without Catalyst)**

Nozzle Quantity/Type: Two 2W nozzles

Nozzle Height: 20 1/2 in. (520 mm) above top of appliance. See Figure 4-100

Nozzle Location: 6 1/2 in. (165 mm) back from front edge of appliance. See Figure 4-100

Nozzle Aiming Point: Aimed at center of each opening. See Figure 4-100

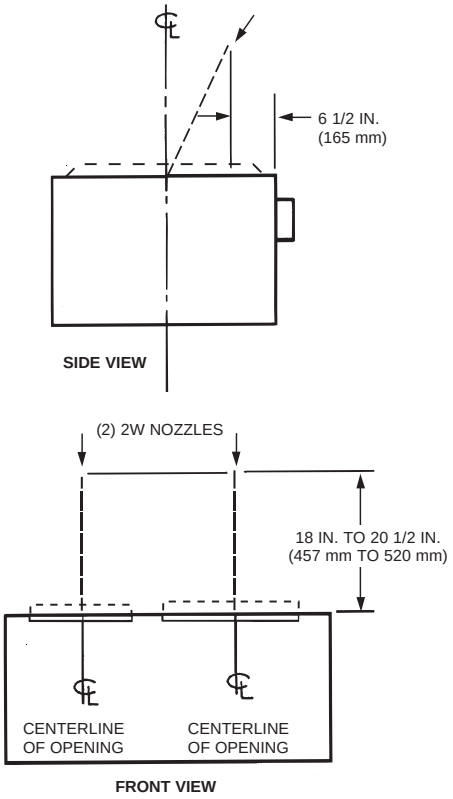


FIGURE 4-100
004355

▸ **Nieco Broiler – Model MPB94 and MPB84 – High Proximity (With or Without Catalyst)**

Nozzle Quantity/Type: One 2W nozzle

Nozzle Height: 20 in. (508 mm) above top of catalyst. See Figure 4-101

Nozzle Location: Centered 6 1/2 in. (165 mm) back from any edge of the appliance. See Figure 4-101

Nozzle Aiming Point: Aimed at center of opening. See Figure 4-101

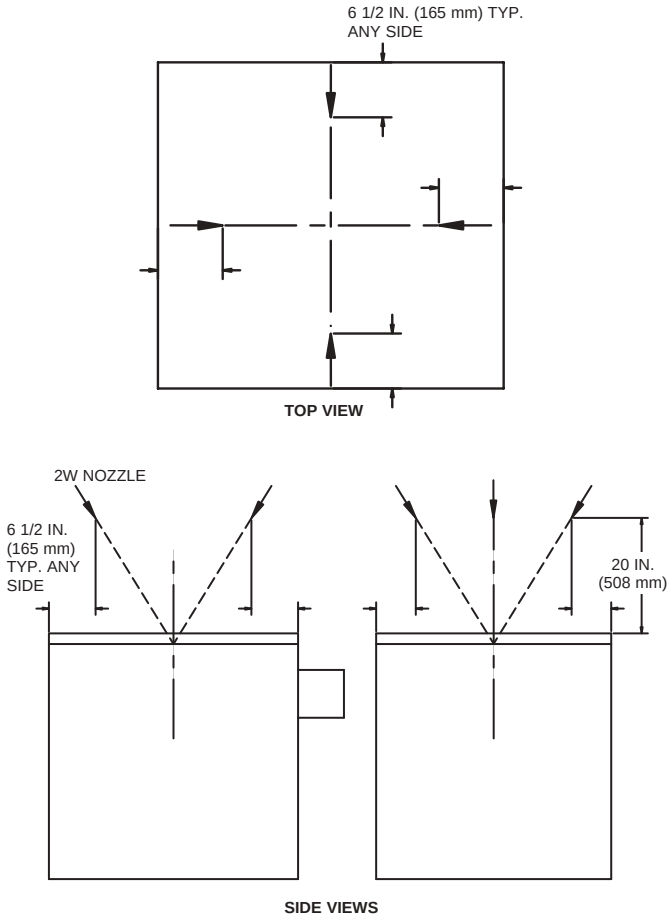


FIGURE4-101
007322, 007323

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model MPB94 – Low Proximity (With or ► Without Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm) measured from top of catalyst

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

First nozzle positioned 7 1/2 in. (190 mm) to the right from center of hazard

Second nozzle positioned 7 1/2 in. (190 mm) to the left from center of hazard

See Figure 4-102

Nozzle Aiming Point: Aimed at opening on respective center lines

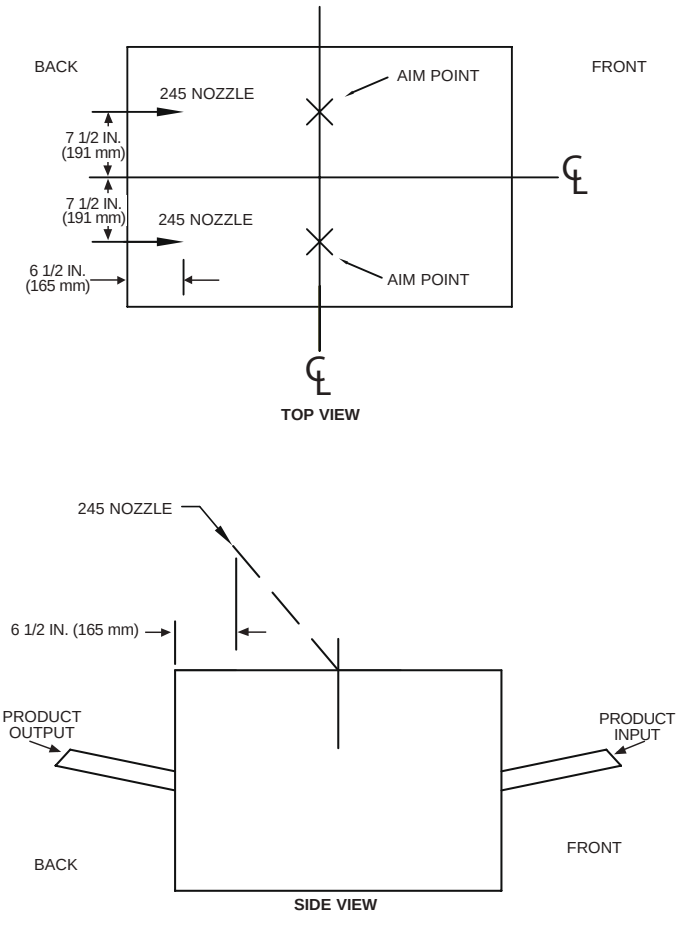


FIGURE4-102
008097, 008098

Nieco Broiler – Model MPB84 – Low Proximity (With ► Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm) measured from top of catalyst

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

First nozzle positioned 7 1/2 in. (190 mm) to the right from center of hazard

Second nozzle positioned 7 1/2 in. (190 mm) to the left from center of hazard

See Figure 4-103

Nozzle Aiming Point: Aimed at opening on respective center lines

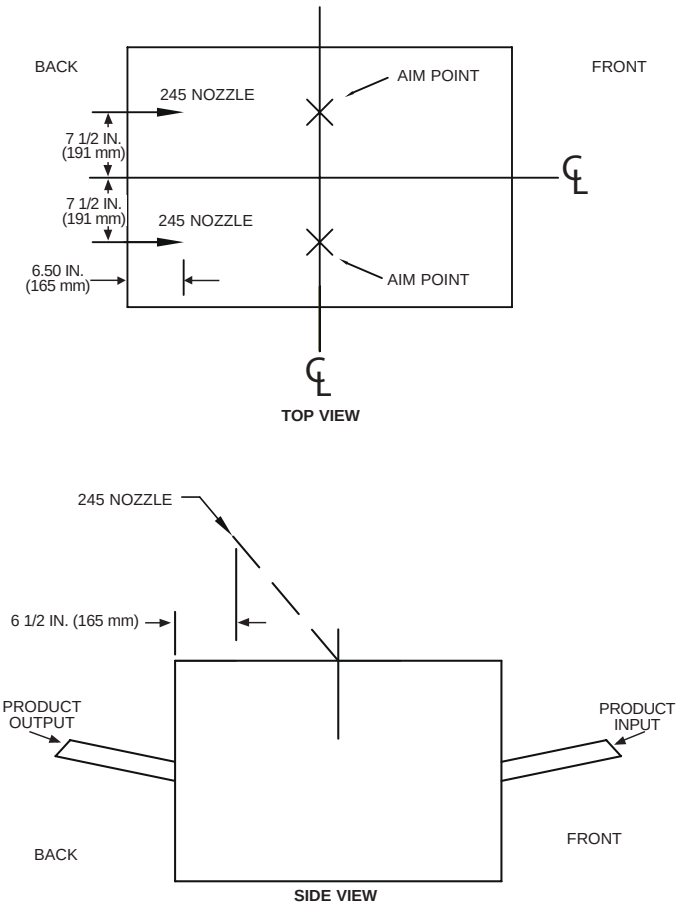


FIGURE 4-103
008097, 008098

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model MPB84 and MPB94 – High Proximity (With Perforated Cap OR with Catalyst and Chimney)

Nozzle Quantity/Type: Two 1N nozzles

Nozzle Height: 18 in. to 20 in. (457 mm to 508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

First nozzle positioned 5 in. (127 mm) to left of opening centerline

Second nozzle positioned 5 in. (127 mm) to right of opening centerline

See Figure 4-104

Nozzle Aiming Point: Aimed at center of opening

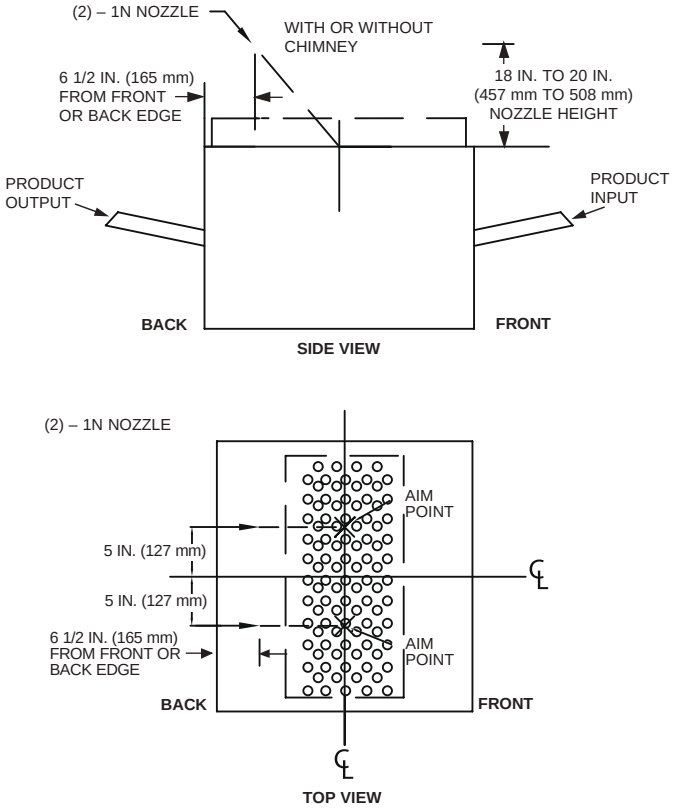


FIGURE 4-104
008369, 008370

Nieco Broiler – Model MPB84 and MPB94 – Low Proximity (With Perforated Cap OR with Catalyst and Chimney)

Nozzle Quantity/Type: Two 245 nozzles

Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

First nozzle positioned 7 1/2 in. (190 mm) to the right of hazard centerline

Second nozzle positioned 7 1/2 in. (190 mm) to the left of hazard centerline

See Figure 4-105

Nozzle Aiming Point: Aimed at center of opening

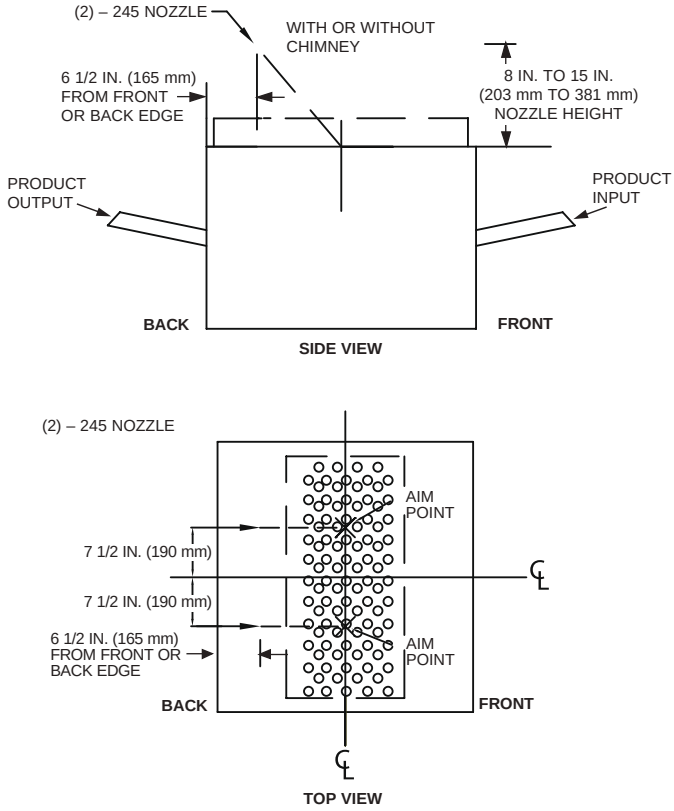


FIGURE 4-105
008369, 008370

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler Model FH64 and FH94 Broilers - Two Nozzles - High Proximity

Nozzle Quantity/Type:	Two 1N nozzles
Nozzle Height:	18 in. (457 mm) to 20 in. (508 mm)
First Nozzle Location:	6.5 in. (165 mm) from front or back edge of hazard
	5 in. (127 mm) to left of opening centerline
Second Nozzle Location:	6.5 in. (165 mm) from front or back edge of hazard
	5 in. (127 mm) to right of opening centerline
Nozzle Direction:	Aimed at center of opening
	See Figure 4-106.

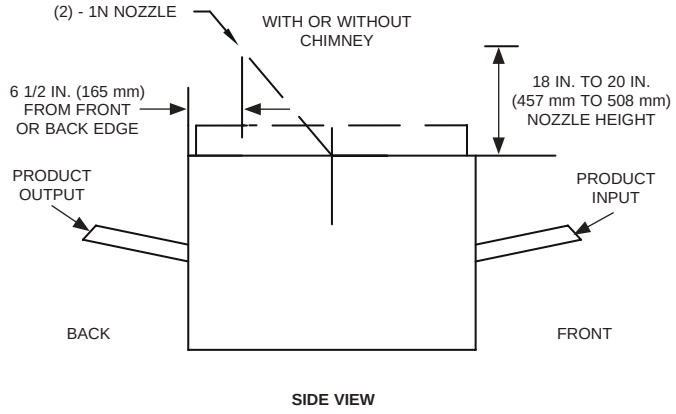


FIGURE 4-106
008369, 008370

Nieco Broiler Model FH64 and FH94 Broilers - Two Nozzles - Low Proximity

Nozzle Quantity/Type:	Two 245 nozzles
Nozzle Height:	8 in. (203 mm) to 15 in. (381 mm)
First Nozzle Location:	6.5 in. (165 mm) from front or back edge of hazard
	7.5 in. (191 mm) to the right of hazard centerline
Second Nozzle Location:	6.5 in. (165 mm) from front or back edge of hazard
	7.5 in. (191 mm) to the left of hazard centerline
Nozzle Direction:	Aimed at center of opening
	See Figure 4-107.

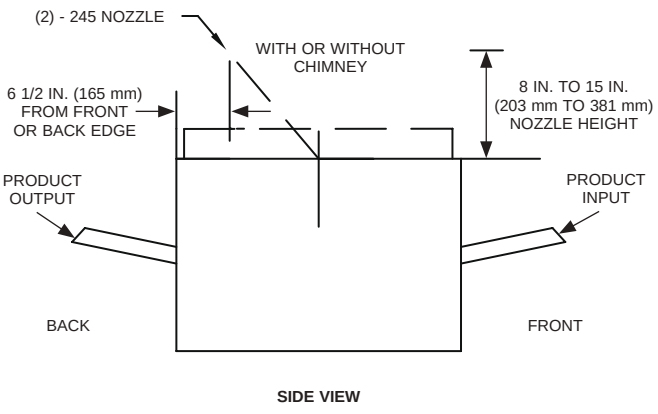


FIGURE 4-107
008369, 008370

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler Model FH64 and FH94 Broilers - One Nozzle - High Proximity

Nozzle Quantity/Type:	One 2W nozzle
Nozzle Height:	20 in. (508 mm)
Nozzle Location:	Centered 6 1/2 in. (165 mm) from any edge of the appliance
Nozzle Direction:	Aimed at center of opening
	See Figure 4-108.

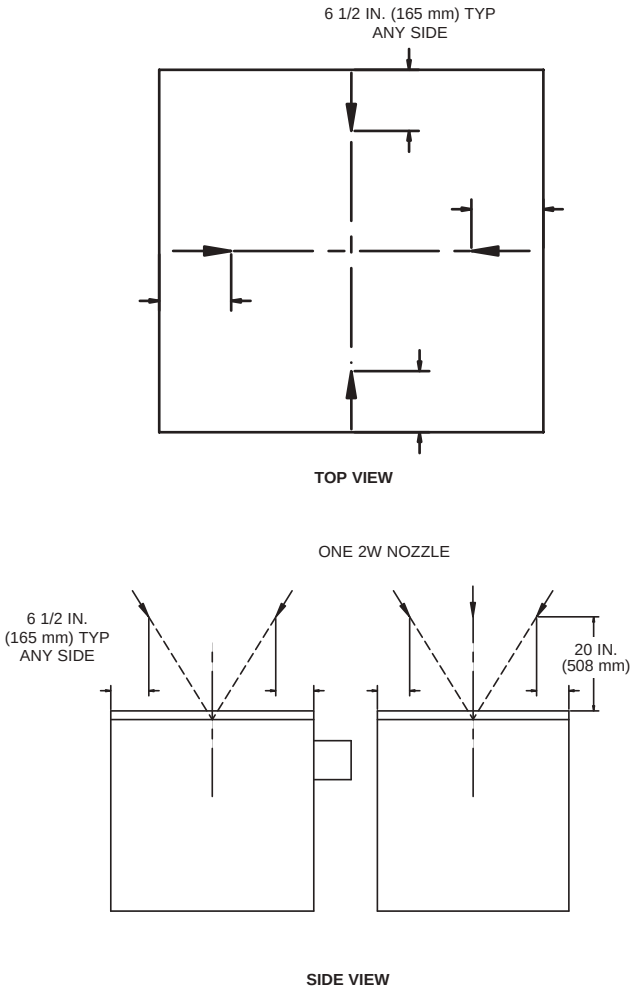


FIGURE 4-108
007322, 007323

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Broiler – Model JF94E Electric Broiler – High Proximity (With Catalyst)

Nozzle Quantity/Type: Two 230 nozzles

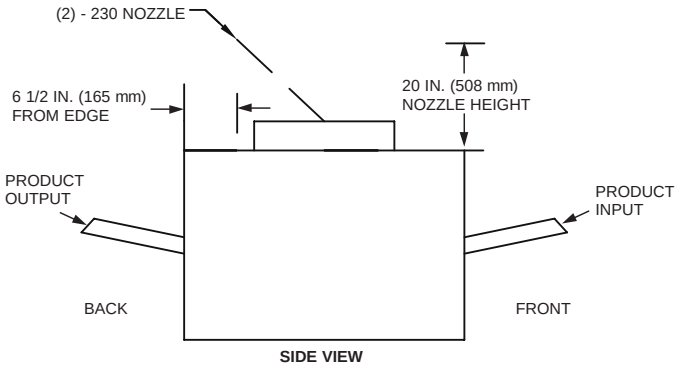
Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

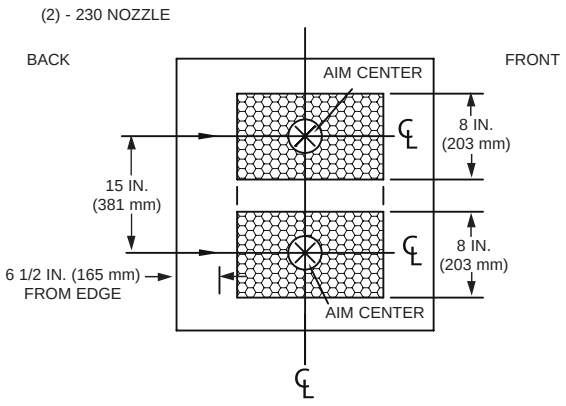
Nozzles positioned 15 in. (381 mm) apart

See Figure 4-109.

Nozzle Aiming Point: Center of catalyst



SIDE VIEW



TOP VIEW

FIGURE 4-109
008434, 008429

Nieco Broiler – Model JF94E Electric Broiler – Low Proximity (With Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

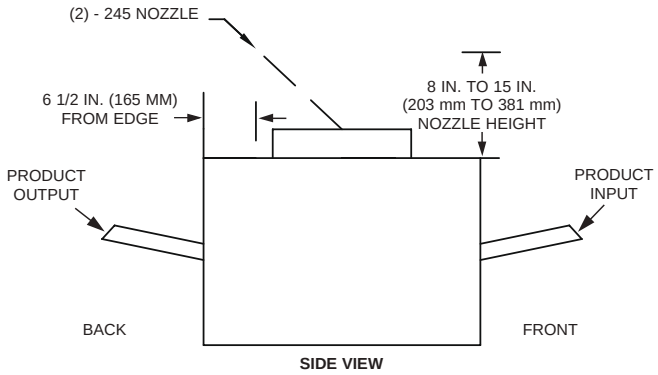
Nozzle Height: 8 in. to 15 in. (203 mm to 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

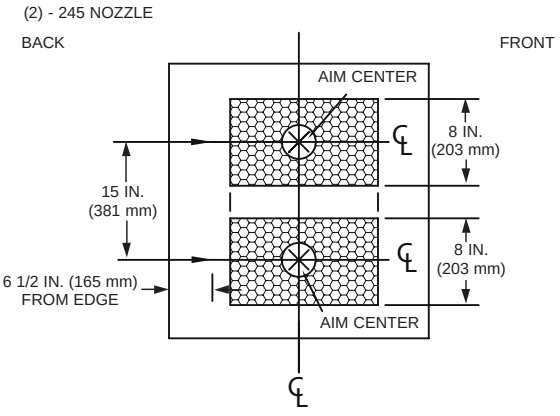
Nozzles positioned 15 in. (381 mm) apart

See Figure 4-110.

Nozzle Aiming Point: Center of catalyst



SIDE VIEW



TOP VIEW

FIGURE4-110
008430, 008431

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Jet Flow Automatic Chain Broilers – Models JF62, JF63, JF92, JF93, JF143 (With or Without Catalyst)

Nozzle Quantity/Type: One 245 nozzle

Nozzle Height: 20 in. to 25 in. (508 mm to 635 mm)

Nozzle Location: Centered above the catalyst to 5 in. (127 mm) forward of catalyst front edge. See Figure 4-111

Nozzle Aiming Point: Center of catalyst

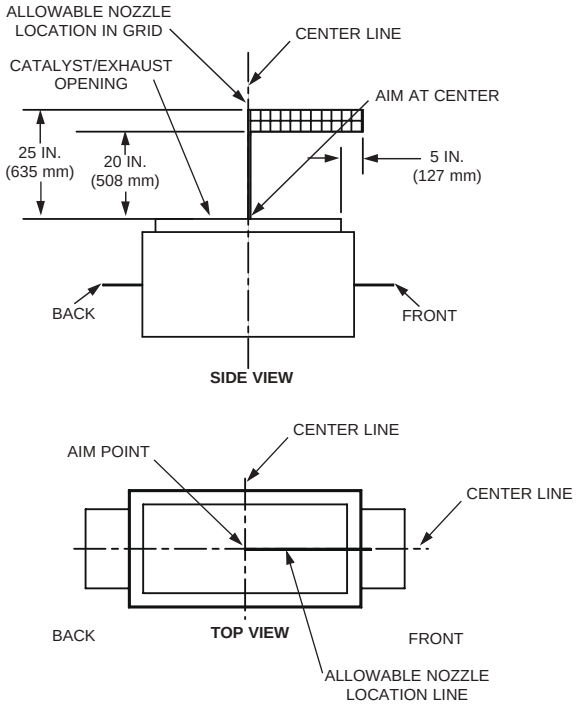


FIGURE 4-111
008910, 008911

Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – High Proximity (With or Without Catalyst)

Nozzle Quantity/Type: Two 230 nozzles

Nozzle Height: 20 in. (508 mm)

Nozzle Location: 6 1/2 in. (165 mm) from front or back edge of hazard

Nozzles positioned 15 in. (381 mm) apart. See Figure 4-112

Nozzle Aiming Point: Center of catalyst front to back; 6 in. (152 mm) in from each side of catalyst

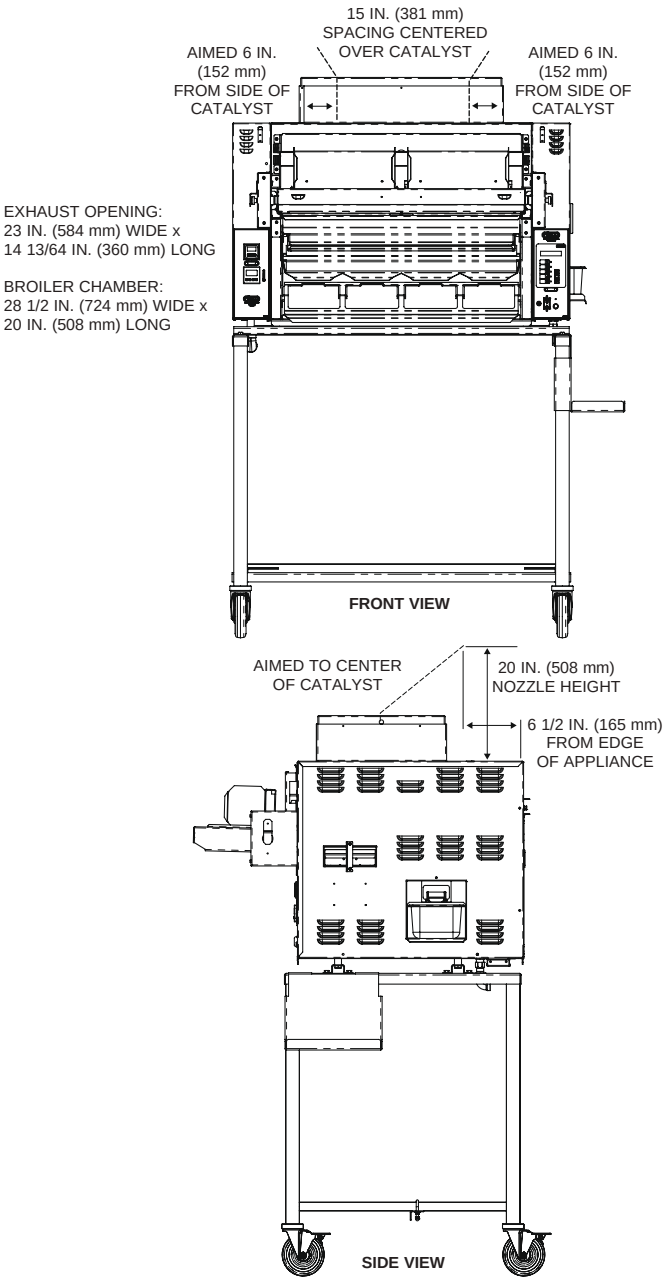


FIGURE 4-112
009482

SPECIFIC APPLICATION BY MODEL (Continued)

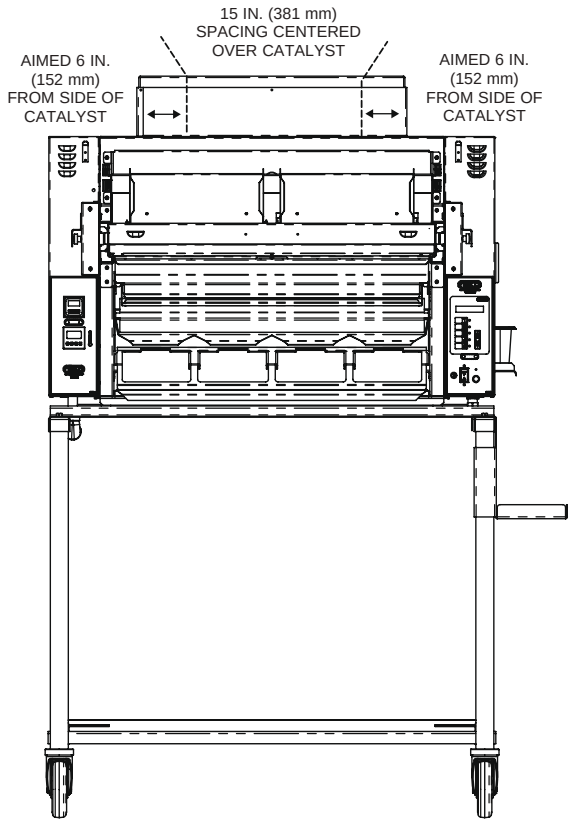
Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – Low Proximity, Nozzles Rear-Mounted Facing Forward (With or Without Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

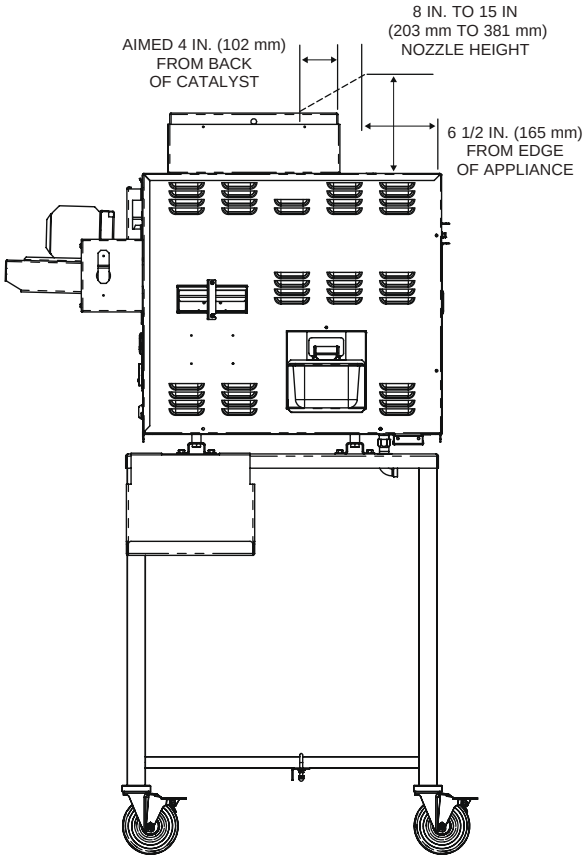
Nozzle Height: 8 in. to 15 in. (203 mm x 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from back edge of hazard. Nozzles positioned 15 in. (381 mm) apart. See Figure 4-113.

Nozzle Aiming Point: 4 in. (102 mm) from back edge of catalyst; 6 in. (152 mm) in from each side of catalyst



► **FRONT VIEW**



► **SIDE VIEW**

FIGURE 4-113
009483

SPECIFIC APPLICATION BY MODEL (Continued)

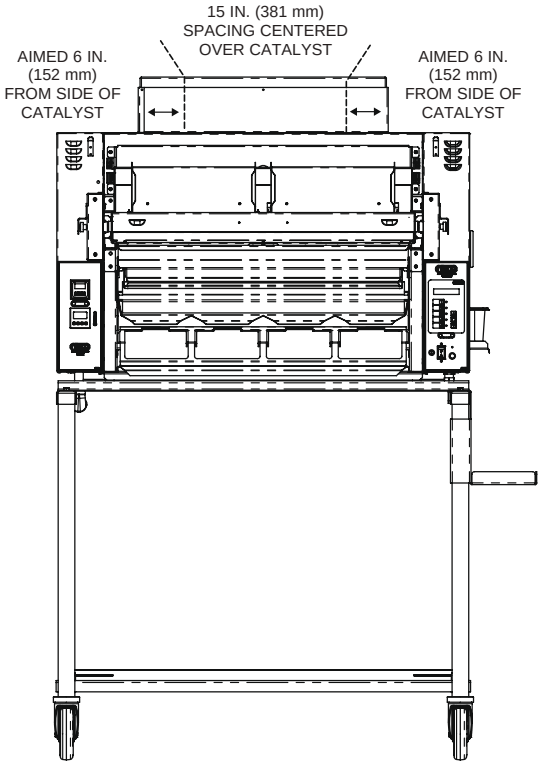
Nieco Jet Flow Automatic Chain Broilers – Models JF64G, JF84G, JF94G – Low Proximity, Nozzles Front-Mounted Facing Rearward (With or Without Catalyst)

Nozzle Quantity/Type: Two 245 nozzles

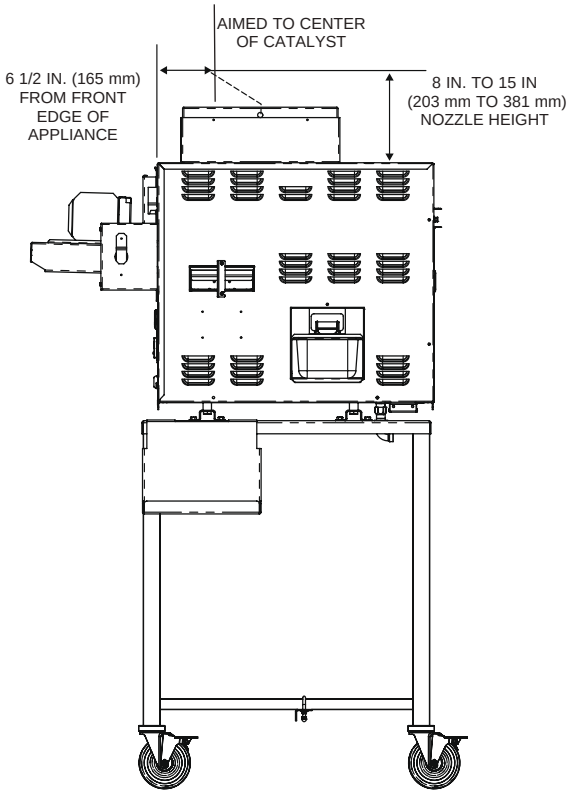
Nozzle Height: 8 in. to 15 in. (203 mm x 381 mm)

Nozzle Location: 6 1/2 in. (165 mm) from back edge of hazard. Nozzles positioned 15 in. (381 mm) apart. See Figure 4-114.

Nozzle Aiming Point: Center of catalyst front to back; 6 in. (152 mm) in from each side of catalyst



FRONT VIEW



SIDE VIEW

FIGURE 4-114
009484

SPECIFIC APPLICATION BY MODEL (Continued)

Nieco Automatic Chain Broiler – Models PB93G and PB63G with catalyst filters installed in the exhaust opening

Nozzle Quantity/Type: Two 230 nozzles

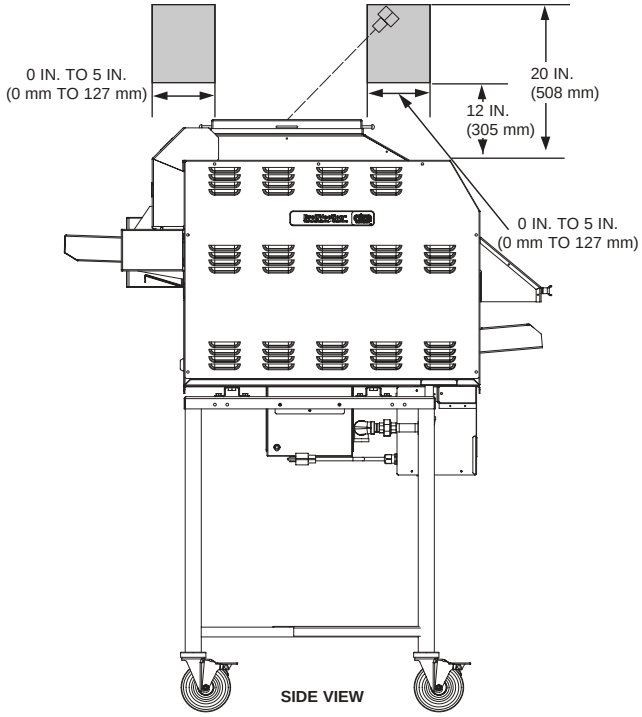
Nozzle Height: 12 in. to 20 in. (305 mm to 508 mm)

Nozzle Location: 0 in. to 5 in. (127 mm) from front or back edge of exhaust opening

Nozzles positioned 17 1/4 in. (438 mm) apart

0 in. to 4 in. (101 mm) right or left of center of exhaust opening

Nozzle Aim Point: Center of exhaust opening front to back and center left to right.



SIDE VIEW

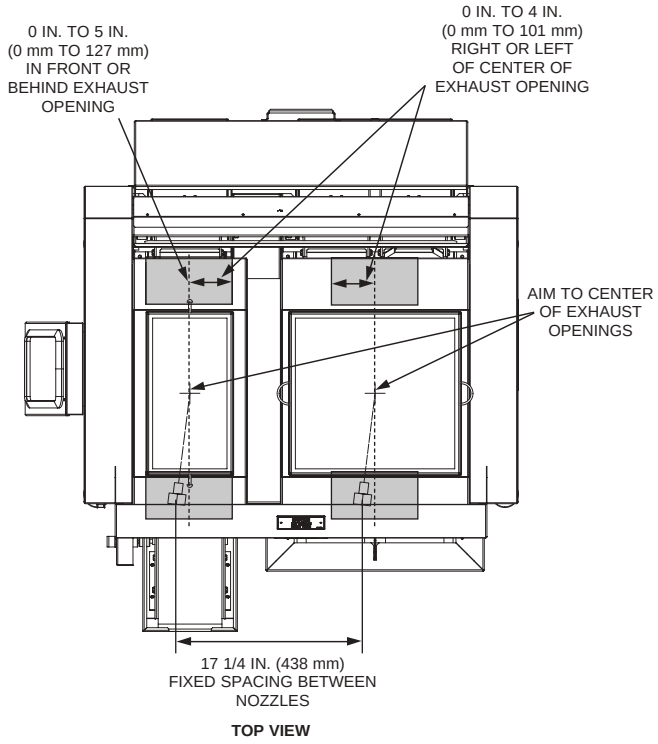
Specifications

Broiler Chamber Size: 25 1/16 in. x 8 in.
(637 mm x 204 mm)
25 1/16 in. x 15 in.
(637 mm x 381 mm)

Exhaust Opening Size: 16 in. x 15 3/16 in.
(406 mm x 386 mm)
8 in. x 15 3/16 in.
(204 mm x 386 mm)

Output Rating: 120,000 BTU/Hr

See Figure 4-115.



TOP VIEW

FIGURE 4-115
010169, 010170

SPECIFIC APPLICATION BY MODEL (Continued)

Garland 2-platen - Models MWE/G2W, MWE2S, MWE/G L/R 9501 E/D/CE, MWGJ 9801, MWE 9801 E/D/CE

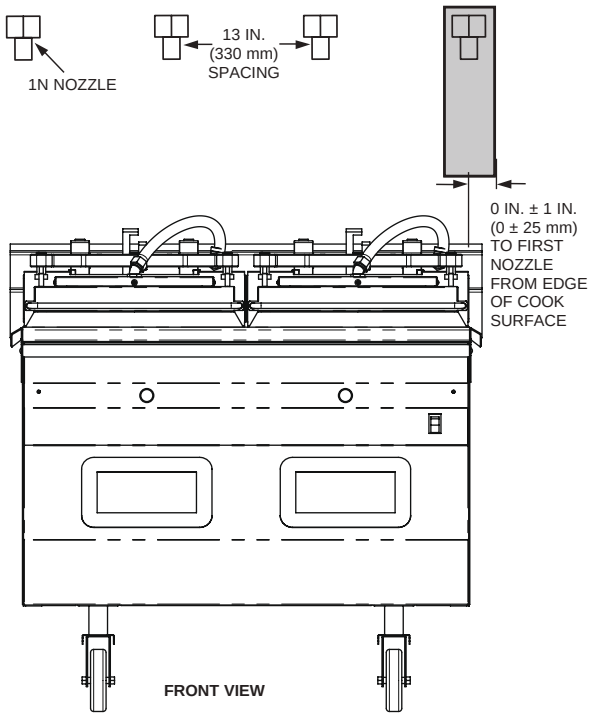
Nozzle Quantity/Type: Four 1N nozzles*. See Figure 4-116.

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

Nozzle Location: 0 in. to 14 in. (356 mm) forward of back edge of cooking surface.
Nozzles positioned 13 in. (330 mm) apart
0 in. to 1 in. (0 mm to 25 mm) right or left of side of cooking surface

Nozzle Aiming Point: Front to back centerline of cooking surface

Cooking Surface
Size: 24 in. x 36 in. (610 mm x 914 mm)
Heat Output: 26.2 kW, 70,000 btu



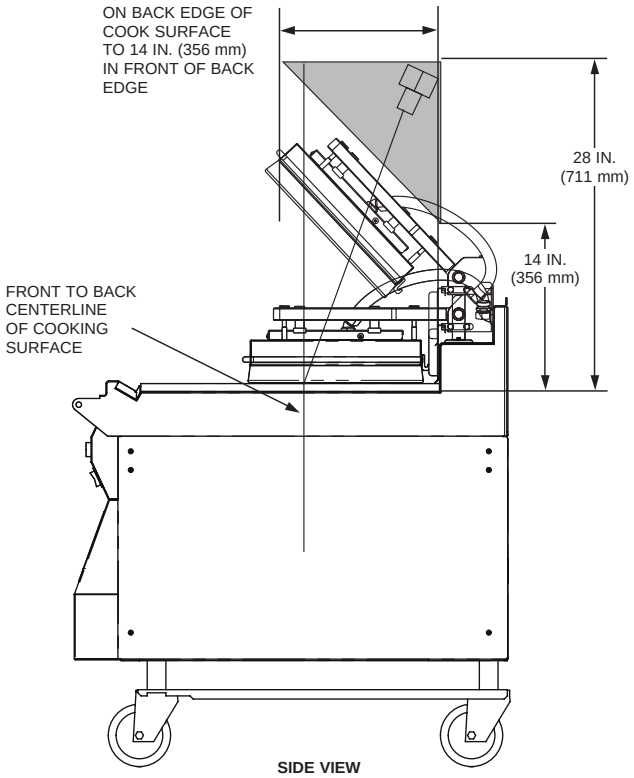


FIGURE 4-116
010867

* This protection is a modular type for the listed models. In the case of multiple units installed directly adjacent to each other, only one nozzle is required between the two units, while maintaining the nozzle spacing over each appliance.

SPECIFIC APPLICATION BY MODEL (Continued)

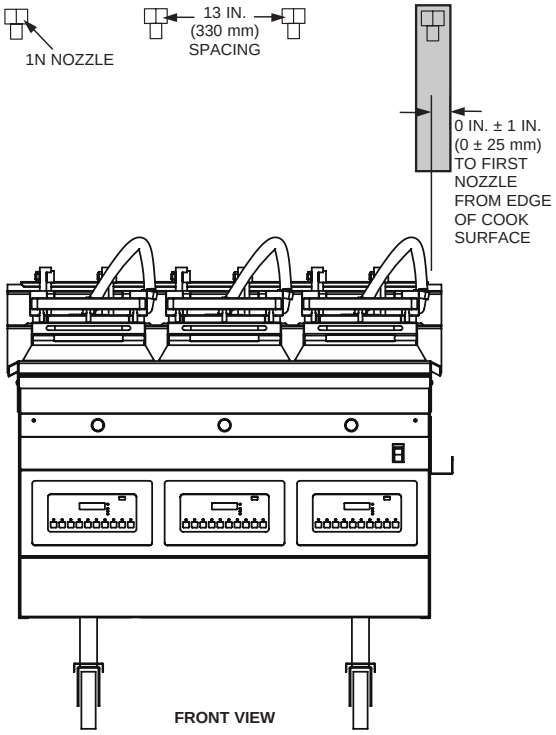
Garland 3-platen - MWE/G 3W, MWE 3WS

Nozzle Quantity/Type: Four 1N nozzles*

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

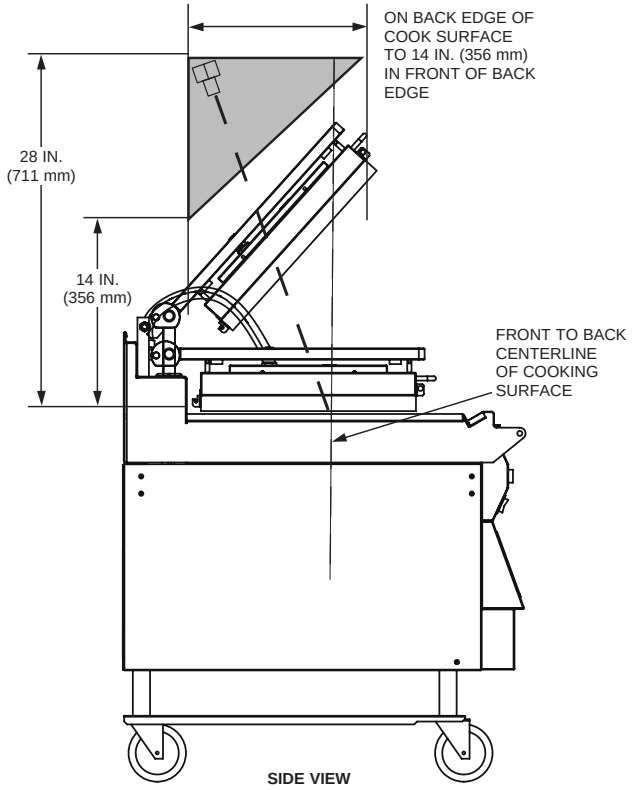
Nozzle Location: 0 in. to 14 in. (0 mm to 356 mm) forward of back edge of cooking surface.
Nozzles positioned 13 in. (330 mm) apart
0 in. to 1 in. (0 mm to 25 mm) right or left of side of cooking surface

Nozzle Aiming Point: Front to back centerline of cooking surface. See Figure 4-117.



Cooking Surface Size: 24 in. x 36 in. (610 mm x 914 mm)

Heat Output: 22.95 kW, 96,000 btu



* This protection is a modular type for the listed models. In the case of multiple units installed directly adjacent to each other, only one nozzle is required between the two units, while maintaining the nozzle spacing over each appliance.

FIGURE 4-117
010868

SPECIFIC APPLICATION BY MODEL (Continued)

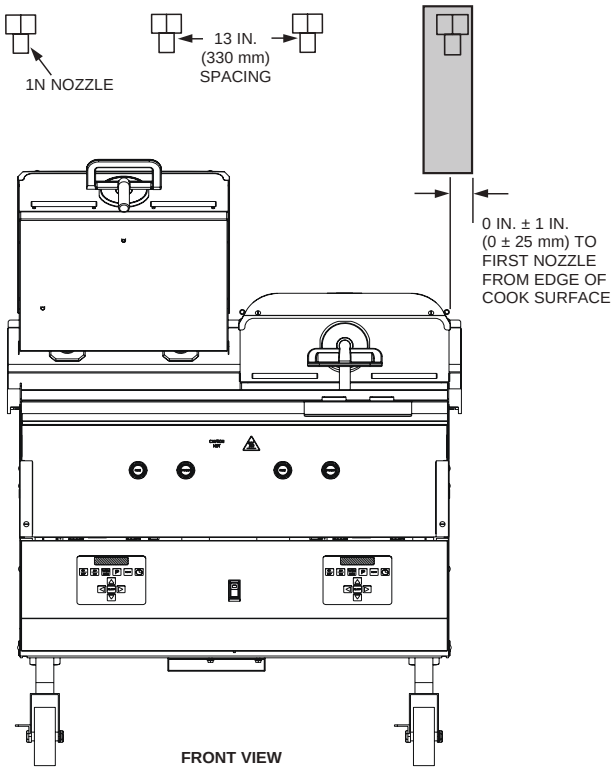
Taylor 2-platen - Models 32, 34, 35, C832, C834, C835

Nozzle Quantity/Type: Four 1N nozzles*

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

Nozzle Location: 0 in. to 14 in. (356 mm) forward of back edge of cooking surface. Nozzles positioned 13 in. (330 mm) apart. See Figure 4-118.
0 in. to 1 in. (0 mm to 25 mm) right or left of side of cooking surface

Nozzle Aiming Point: Front to back centerline of cooking surface



Cooking Surface Size: 24 in. x 36 in. (610 mm x 914 mm)

Heat Output: 22.2 kW, 60,000 btu

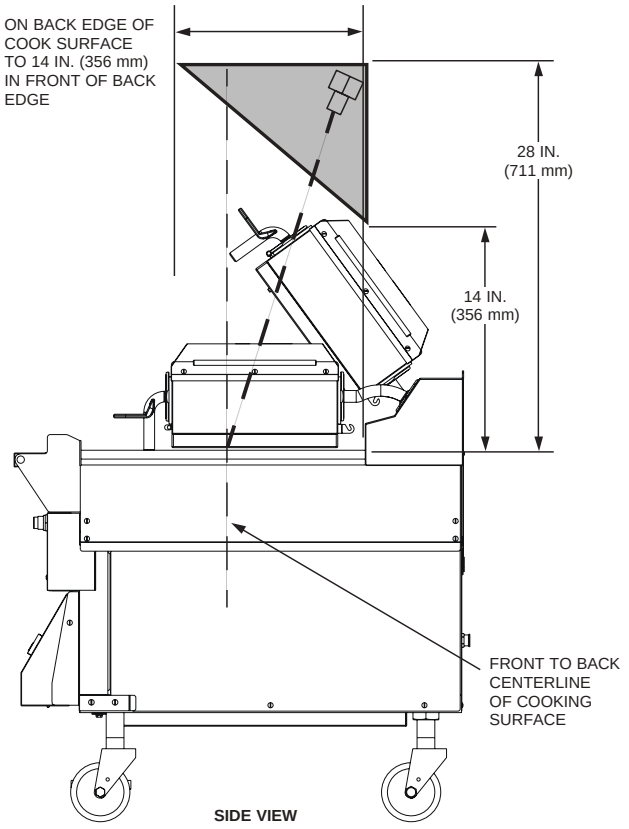


FIGURE 4-118
010869

* This protection is a modular type for the listed models. In the case of multiple units installed directly adjacent to each other, only one nozzle is required between the two units, while maintaining the nozzle spacing over each appliance.

SPECIFIC APPLICATION BY MODEL (Continued)

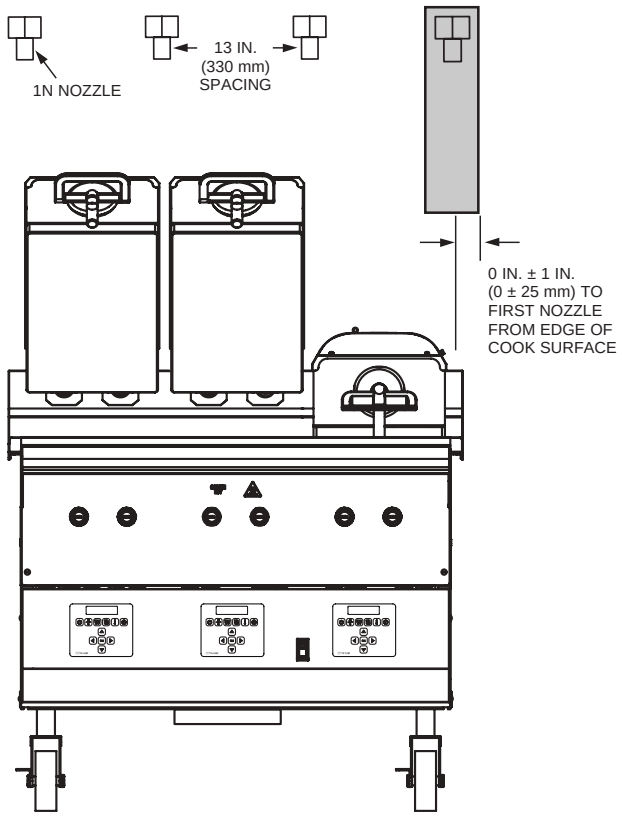
Taylor 3-platen - C842, C844, C845

Nozzle Quantity/Type: Four 1N nozzles*

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

Nozzle Location: 0 in. to 14 in. (356 mm) forward of back edge of cooking surface.
Nozzles positioned 13 in. (330 mm) apart
0 in. to 1 in. (0 mm to 25 mm) right or left of side of cooking surface

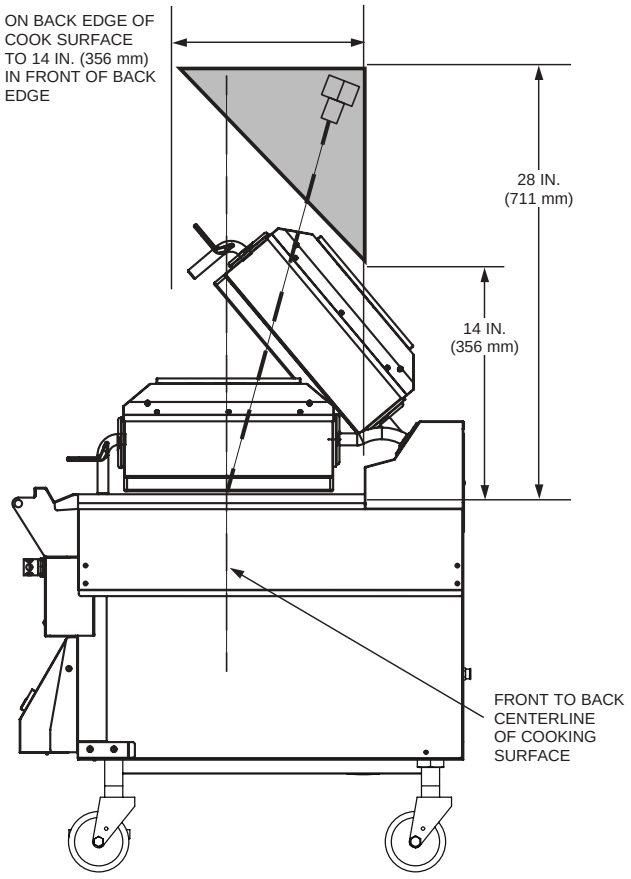
Nozzle Aiming Point: Front to back centerline of cooking surface. See Figure 4-119.



FRONT VIEW

Cooking Surface
Size: 24 in. x 36 in. (610 mm x 914 mm)

Heat Output: 25 kW, 75,000 btu



SIDE VIEW

FIGURE 4-119
010870

* This protection is a modular type for the listed models. In the case of multiple units installed directly adjacent to each other, only one nozzle is required between the two units, while maintaining the nozzle spacing over each appliance.

SPECIFIC APPLICATION BY MODEL (Continued)

Garland Three-platen Clamshell Grill ME/G-1P, ME/G-2P, ME/G-3PX

Nozzle Type: 1N

Nozzle Quantity: 4 (or 1 more nozzle than the number of total platens)*

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

Nozzle Location: 0 in. to 14 in. (356 mm) forward of back edge of cooking surface

Nozzles positioned 13 in. (330 mm) apart 0 in. to 1 in. (25 mm) right or left of side of cooking surface. See Figure 4-120.

Nozzle Aim Point: Front to back centerline of cooking surface

Upper platen size: 11 1/2 in x 17 1/2 in (292 mm x 445 mm) each

Lower cook surface size: ME/G-1P - 11 3/4 in. x 22 in. (298 mm x 559 mm)

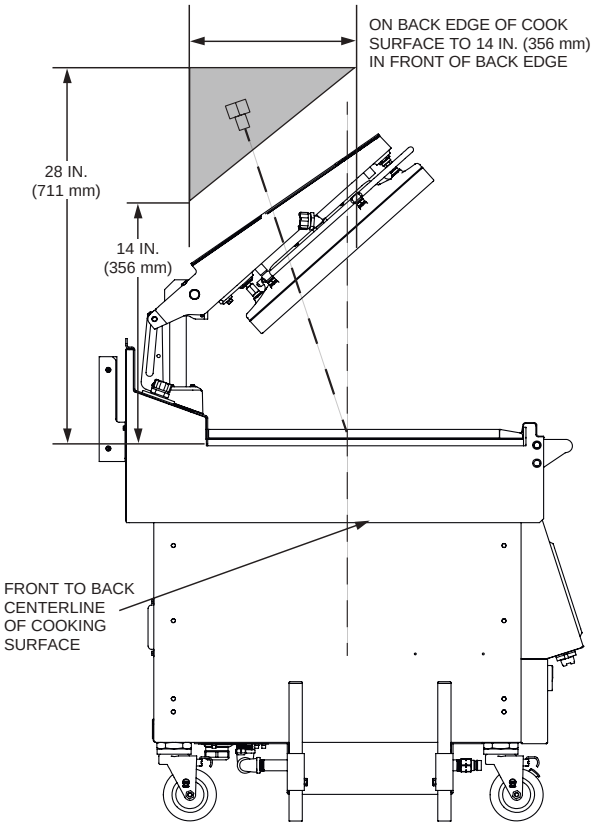
ME/G-2P - 23 3/4 in. x 22 in. (603 mm x 559 mm)

ME/G-3PX - 23 3/4 in. x 22 in. (603 mm x 559 mm) and 11 3/4 in. x 22 in (298 mm x 559 mm)

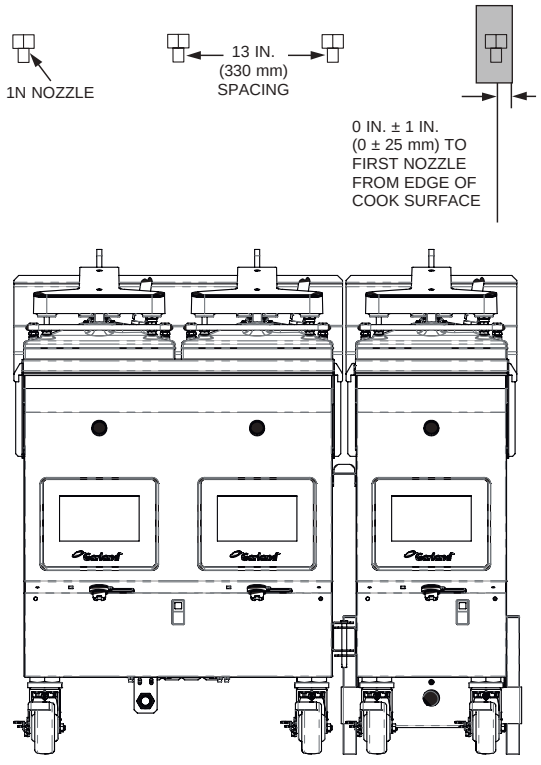
Heat Output: ME/G-1P Electric - 7.8 kW, Gas - 24,000 btu

ME/G-2P Electric - 15.6 kW, Gas - 48,000 btu

ME/G-3PX Electric - 23.4 kW, Gas - 72,000 btu



SIDE VIEW



FRONT VIEW

FIGURE 4-120
010191

* This protection is a modular type for the listed models. In the case of 1, 2 or 3 platens, or multiple units installed directly adjacent to each other, one additional nozzle is required when compared to the number of total platens.
Example 1: A 2-platen grill will require 3 total nozzles.
Example 2: Two 3-platen grills installed directly adjacent to each other will require 7 total nozzles.

SPECIFIC APPLICATION BY MODEL (Continued)

Taylor Three-platen Clamshell Grill C850, C851, C852, C855, C857, C858

Nozzle Type: 1N

Nozzle Quantity: 4 (or 1 more nozzle than the number of total platens)*

Nozzle Height: 14 in. to 28 in. (356 mm to 711 mm)

Nozzle Location: 0 in. to 14 in. (356 mm) forward of back edge of cooking surface

Nozzles positioned 13 in. (330 mm) apart 0 in. to 1 in. (25 mm) right or left of side of cooking surface. See Figure 4-121.

Nozzle Aim Point: Front to back centerline of cooking surface

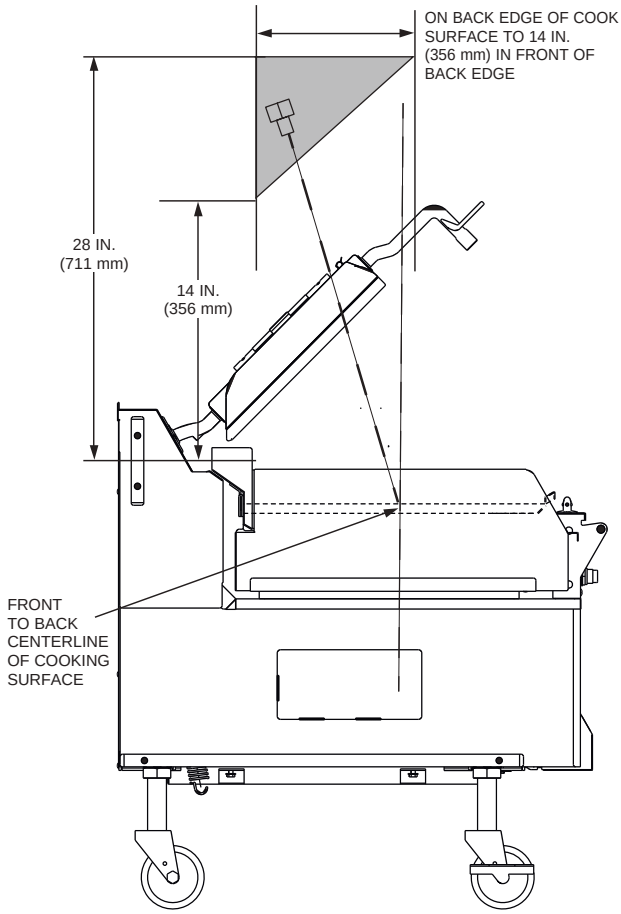
Upper platen size: 11 in. x 17 19/64 in (279 mm x 439 mm) each

Lower cook surface size: 11 13/32 in. x 24 in (290 mm x 610 mm) each

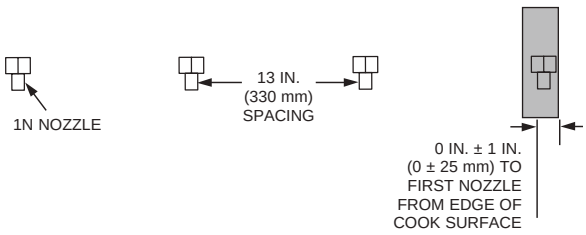
Heat Output: C850 - 8 kW C851 - 25,000 btu

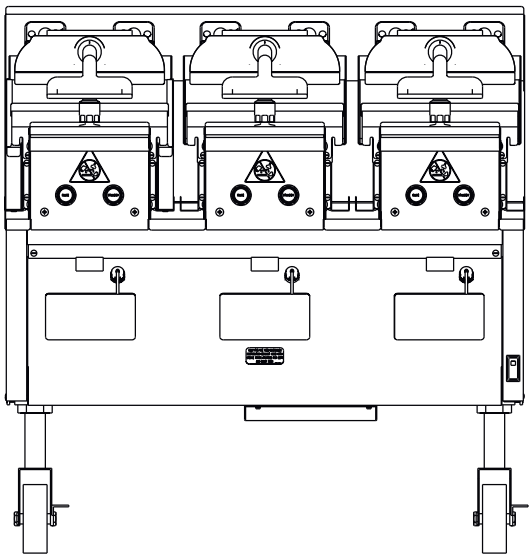
C852 - 15 kW C855 - 50,000 btu

C858 - 22 kW C857 - 75,000 btu



SIDE VIEW





FRONT VIEW

FIGURE 4-121

010192

* This protection is a modular type for the listed models. In the case of 1, 2 or 3 platens, or multiple units installed directly adjacent to each other, one additional nozzle is required when compared to the number of total platens.
Example 1: A 2-platen grill will require 3 total nozzles.
Example 2: Two 3-platen grills installed directly adjacent to each other will require 7 total nozzles.

SPECIFIC APPLICATION BY MODEL (Continued)

Garland Electric Dual Side Clamshell Grill - Model CXPB12

Nozzle Type: 230 Nozzle

Nozzle Quantity: One

Nozzle Height: 24 in. to 26 in. (610 mm to 660 mm) above the cooking surface

Nozzle Location: 0 in. to 2 in. (0 mm to 51 mm) from front edge of cooking surface

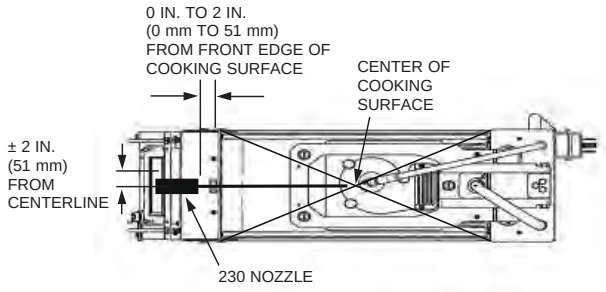
Nozzle Aim Point: Aim nozzle at center of cooking surface. See Figure 4-122.

Top Cooking Surface: 11 1/4 in. x 20 1/2 in. (286 mm x 521 mm)

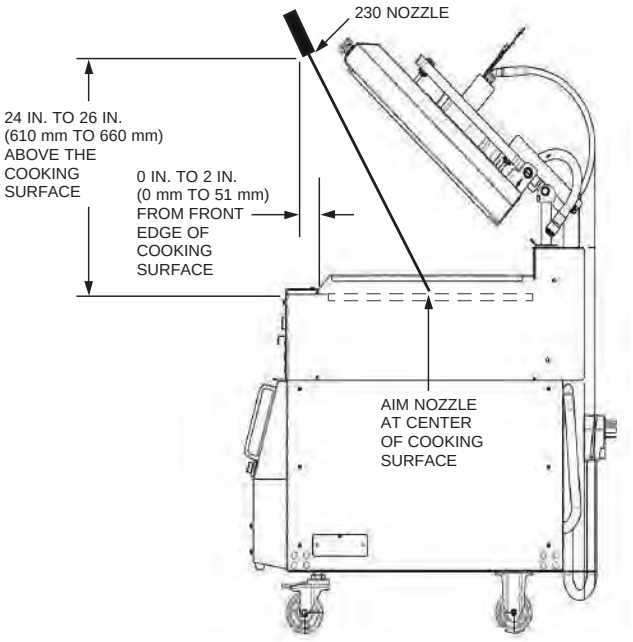
Bottom Cooking Surface: 11 1/4 in. x 20 1/2 in. (286 mm x 521 mm)

Total Load:

Voltage (V)	200	208	220	230	240
Total Power (kW)	8.3	9	8.8	9.2	9



Grill Top View



Grill Side View

FIGURE 4-122
009654, 009655

Overlapping System Piping Limitations

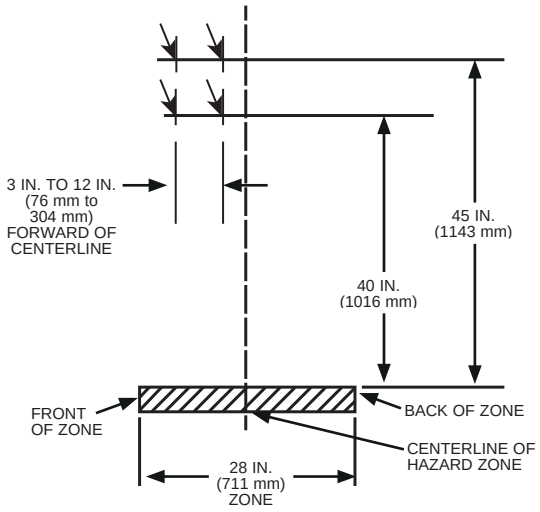
System Size	3 Gal (11.4 L)	6 Gal (22.7 L)	9 Gal (34.1 L)
Total Flow Numbers	6	12	18
Max. 3/8 in. Pipe Length	75 ft (22.9 m)	75 ft (22.9 m)	75 ft (22.9 m)
Max. No. of Elbows	25	25	25
Max. Elevation Rise	10 ft (3 m)	10 ft (3 m)	10 ft (3 m)
Cartridge Size	LT-30-R	Double Tank / LT-A-101-30*	Double Tank / LT-A-101-30*

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

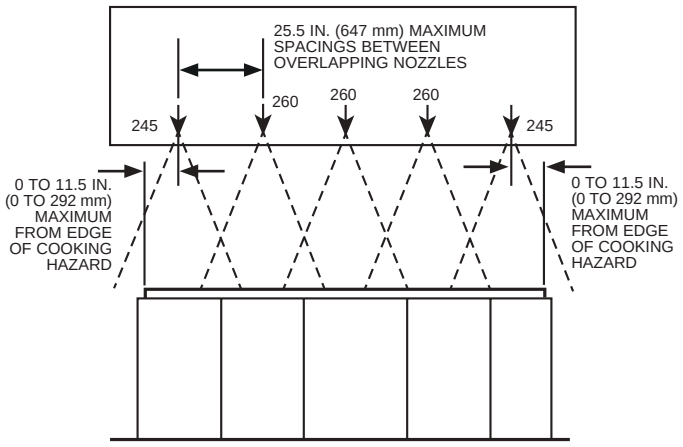
50 ft (15.2 m) maximum pipe after the split on a split system.

*Use the regulated actuator only

Overlapping Coverage Option



Note: 245 nozzle must be used for “end of zone” protection.



FULL HOOD CONTINUOUS APPLIANCE PROTECTION

FIGURE 4-123
007537, 007538

SPECIFIC APPLICATION BY MODEL (Continued)

Bakers Pride Broiler – Models CH6, CH8, CH10, XX6, XX8, XX10 (With Wood Smoker Box and Chip Holders)

Nozzle Quantity/Type: Two 3N nozzles

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

Nozzle Location: Each nozzle is to protect half of the hazard area and located within 1 in. (25 mm) of the center of the respective cooking area, aimed at the center of that hazard area

See Figure 4-124

Note: Smoker Box and Chip Holders cannot exceed logs 4 in. (101 mm) in diameter and a maximum allowable wood depth of 4 in. (101 mm).

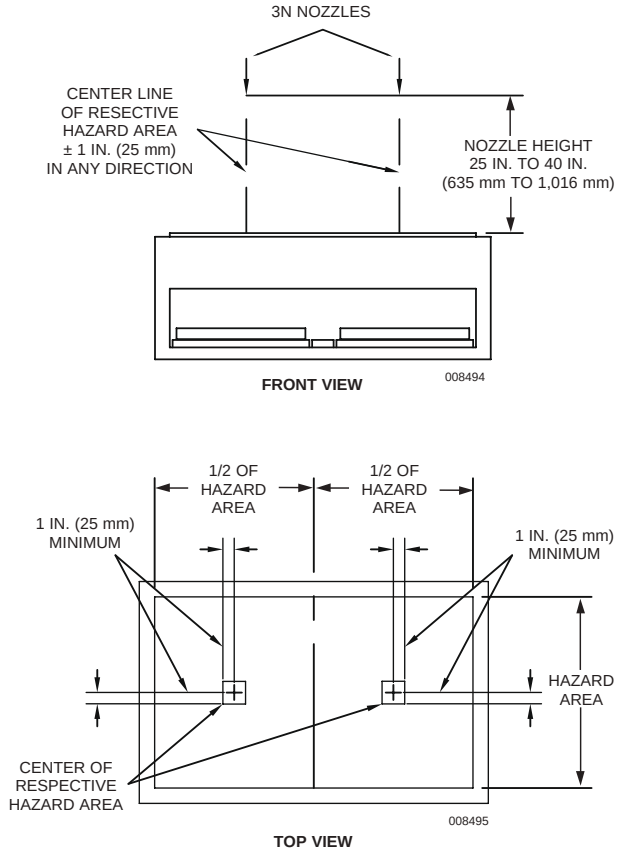


FIGURE 4-124
008494, 008495

Magikitch'n Gas Radiant Char-Broiler with Smoker Box – Models FM-RMB-660, FM-RMB-648, FM-RMB-636 (With Wood Smoker Box and Chip Holders)

Nozzle Quantity/Type: Three 3N nozzles

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

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

See Figure 4-125

Note: Smoker Box and Chip Holders cannot exceed logs 4 in. (101 mm) in diameter and a maximum allowable wood depth of 4 in. (101 mm).

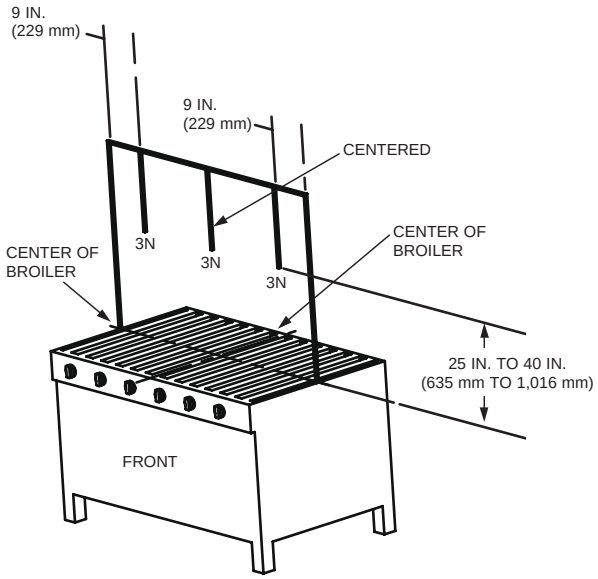


FIGURE 4-125
010811

SPECIFIC APPLICATION BY MODEL (Continued)

Imperial Gas Radiant Char-broilers – Models IABR-36 (with Wood Smoker Box and Chip Holders*)

Nozzle Quantity/Type: Two 3N nozzles

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

Nozzle Location: Each nozzle protects half of the hazard area. The nozzles are located within 1 in. (25 mm) of the center of the respective cooking area, aimed at the center of that hazard area. See Figure 4-126.

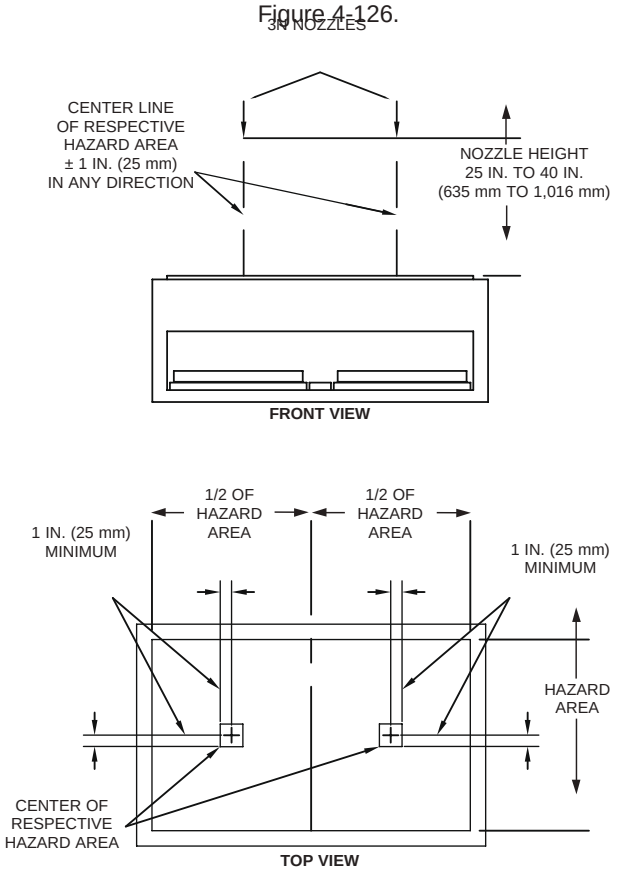


FIGURE 4-126
008494, 008495

Model	Grate Dimension	Gas Output
IABR-36	32 1/2 in. x 21 in. (825 mm x 533 mm)	90,000 BTU

* The Smoker Box and Chip Holders shall not exceed a depth of logs greater than 4 in. (102 mm) or a maximum allowable wood chip depth of 4 in. (102 mm).

Imperial Gas Radiant Char-broilers – Models IABR-48, and IABR-60 (with Wood Smoker Box and Chip Holders*)

Nozzle Quantity/Type: Three 3N nozzles

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

Nozzle Location: All three nozzles are to be centered front to back above the broiling surface. The middle nozzle is to be centered left to right above the broiling surface. The remaining two nozzles are to be located 9 in. (229 mm) inside the broiler sides. See Figure 4-127.

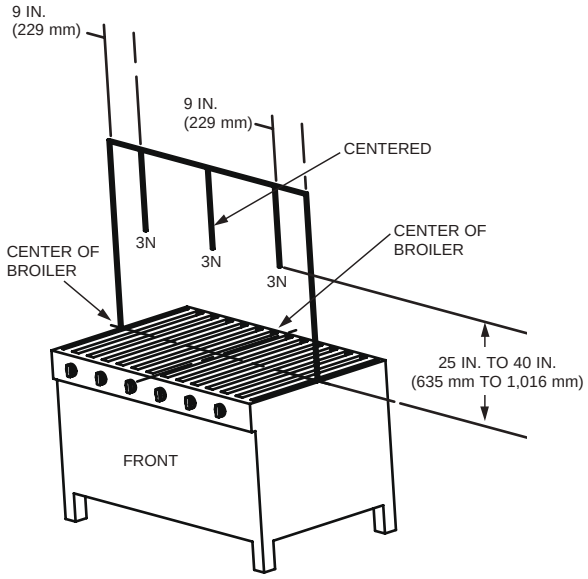


FIGURE 4-127
009867

Model	Grate Dimension	Gas Output
IABR-48	44 1/2 in. x 21 in. (1,130 mm x 533 mm)	120,000 BTU
IABR-60	56 1/2 in. x 21 in. (1,435 mm x 533 mm)	150,000 BTU

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

SPECIFIC APPLICATION BY MODEL (Continued)

Marshall Air – Model 2001BK Multi-Chamber Broiler

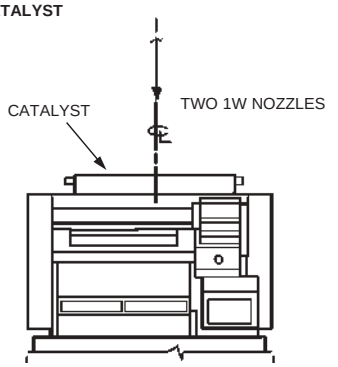
Nozzle Quantity/Type: Two 1W nozzles

Nozzle Location: Front nozzle tip must be located 14 in. (355 mm) directly above the appliance, aligned with the front face and centerline of the catalyst. The aim point is 4 in. (101 mm) back from the front edge of the catalyst on the centerline.

The rear nozzle tip is a mirror image of the front. The rear nozzle is located 14 in. (355 mm) vertically above the appliance, aligned with the rear face and centerline of the catalyst. The aim point is 4 in. (101 mm) forward of the rear edge of the catalyst on the centerline. See Figure 4-128.

System Limitation: Maximum of five flows for a 3.0 gallon system: Remaining flow points available may be used to protect other hazards.

CENTERED ON CATALYST



NOZZLE ALIGNED WITH FRONT OF CATALYST

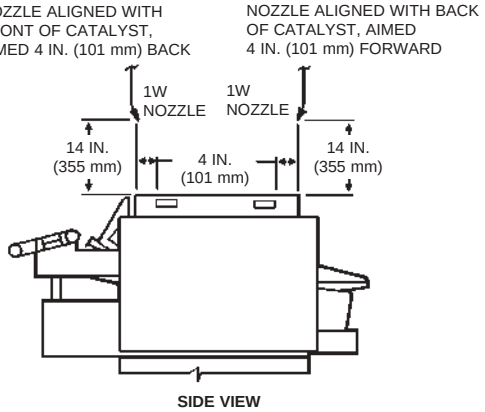


FIGURE 4-128
003418a, 003418b

Marshall Air Electric Broiler – Model FR14B AutoBroil

Nozzle Quantity/Type: One 260 Nozzle

Nozzle Height: 15 in. to 20 in. (381 mm to 508 mm) above the top of the broiler

Nozzle Location: The nozzle must be centered above the front edge of the broiler

Nozzle Aiming Point: Aimed at the center of the exhaust opening of the broiler. See Figure 4-129.

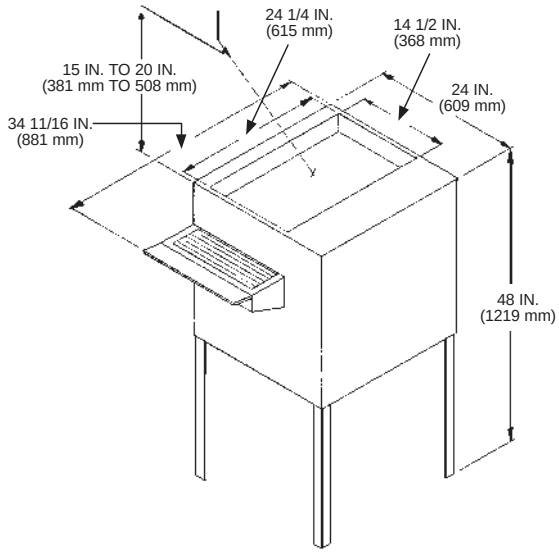
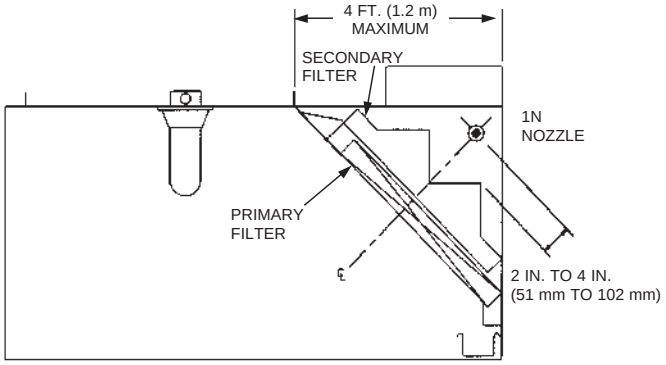


FIGURE 4-129
006737

Grease Grabber-80* Two Stage Filtration System

The Grease Grabber-80 Two Stage Filtration System consists of two components: The primary filter (The Grease-X Tractor*) and the secondary filter (The Grease Grabber-80).

The protection required for this application is the same as the standard plenum/filter protection: One 1N nozzle protecting 10 (3.0 m) linear feet of plenum length by 4 ft (1.2 m) of plenum chamber depth (width), positioned 2 in. to 4 in. (51 mm to 102 mm) from peak of secondary filter. See Figure 4-130.



NOTE: TWO NOZZLES MUST BE USED FOR V-BANK FILTER ARRANGEMENT.

FIGURE 4-130
006526

* Grease Grabber-80 and the Grease-X Tractor are trademarks of Accurex, LLC.

OVERLAPPING COVERAGE - OPTION 1

For each group of protected appliances under a common hoods, the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 6 in. (152 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 12 in. (304 mm).

Hazard Zone
The hazard zone is defined as a theoretical, flat and level, rectangular surface, that includes all of the cooking hazards of the protected appliances under common hoods. The purpose of the hazard zone is to provide a means of locating the appliances and the overlapping nozzles, as well as aiming the overlapping nozzles. The hazard zone measures 28 in. (711 mm) deep by the length of the cooking hazards. The centerline of the hazard zone must bisect the 28 in. (711 mm) depth (from front to back) and run from right-to-left for the full width of the hazard zone.

Overlapping Nozzle Appliance Protection
Overlapping Nozzle Appliance Protection is defined as protection of cooking appliances by nozzles spaced uniformly at uniform elevations under a common hoods. Overlapping protection of appliances is continuous for the full length of the hood or divided when groups of protected appliances are separated by counters or appliances not requiring protection.

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

Group protection is defined as overlapping nozzle appliance protection that protects individual hazard zones located under a common hood. These *groups* of appliances may be separated by appliances not requiring protection, such as steam equipment or work tables, or by dedicated appliance protection, such as, but not limited to, salamander broilers.

See Figure 4-134 (full hood continuous protection) and Figure 4-135 (multiple group protection).

Dedicated Nozzle Appliance Protection
Appliance protection using dedicated nozzle coverage is defined as protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

General Design Limitations

- Maximum depth of zone is 28 in. (711 mm).
- The 245 nozzle is the only approved nozzle for overlapping (zone) protection.
- Nozzle must be located 0 in. to 6 in. (0 mm to 152 mm) forward of zone centerline, aimed back at the zone centerline.
- Nozzles must be spaced a maximum of 6 in. (152 mm) from each end of hazard and then a maximum of 12 in. (304 mm) on center for the remaining overlapping nozzles until the complete hazard is covered.
- For appliance hazard surfaces **with listed protection** exceeding the standard hazard zone of 28 in. (711 mm) in depth, the hazard surfaces must be aligned with the back edge of the hazard zone, with the front edge overhanging the front edge of the zone. See Table 4-7: Overlapping Nozzle Coverage (Zone Protection).
- For appliance hazard surfaces that **exceed the listed protection** sizes, multiple zones must be used. Align entire hazard surface area within the multiple zones.
- All standard R-102 piping parameters are used for the overlapping appliance option.
- All appliance protection currently listed in this manual is also approved protection. Zone protection can be considered optional protection.

TABLE 4-7: OVERLAPPING NOZZLE COVERAGE (ZONE PROTECTION)

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (864 mm) Deep x 835.2 in.^{2} (0.538 m^2)
Griddle	30 in. (762 mm) Deep x Unlimited Length
Range	28 in. (711 mm) Deep x Unlimited Length
Wok, Maximum	30 in. (762 mm) Diameter x 8 in. (203 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/ Tilt Skillet*	34 in. (864 mm) Deep x Unlimited Length
Lava Rock Char-Broiler	32 in. (812 mm) Deep x Unlimited Length
Charcoal Broiler	32 in. (813 mm) Deep x Unlimited Length (4 in. (102 mm) Maximum Fuel Depth)
Mesquite Wood Broiler	32 in. (812 mm) Deep x Unlimited Length (12 in. (304 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	34 in. (864 mm) Deep x 20 in. (508 mm)

* See Figure 4-132 for nozzle location

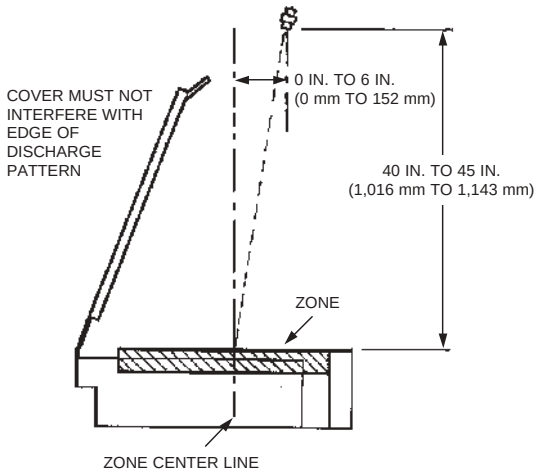


FIGURE 4-131
006927

OVERLAPPING COVERAGE - OPTION 1 (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations

1. All overlapping appliance nozzles must be the 245 nozzle and must be located under a common hood at the same height above the hazard zone, in a straight line from right to left and aimed at the centerline of the hazard zone. The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
2. The hazard zone must be positioned (located) so that all appliance hazard surfaces are within the zone. For appliance hazard surfaces with listed protection exceeding the standard hazard zone size of 28 in. (711 mm) in depth (see Table 4-7), the hazard surfaces must be aligned with the back edge of the hazard zone, with the front edge overhanging the front of the zone.
3. The overlapping appliance nozzles must be located 40 in. to 45 in. (1,016 mm to 1,143 mm) above the top surface of the protected appliances. See Figure 4-133.

   Exception No. 1: Nozzle dimensions for wok protection are measured to bottom of wok. Exception No. 2: When using overlapping appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 4-132.

   Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone and cannot be less than 20 in. (508 mm) above the hazard zone. See Figure Figure 4-132.

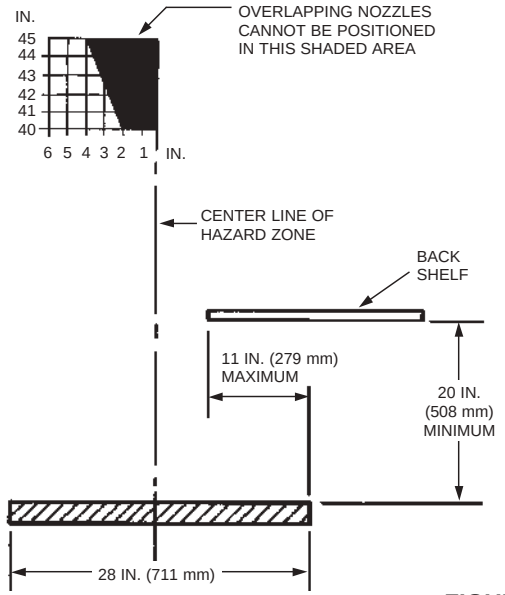


FIGURE 4-132
006914

4. The overlapping appliance nozzles must be located 0 in. to 6 in. (0 mm to 152 mm) forward of the centerline or aimline of the selected hazard zone. See Figure 4-133.

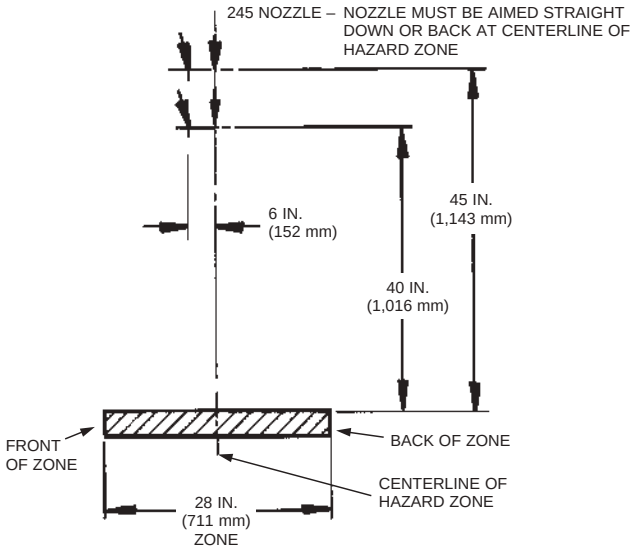


FIGURE 4-133
006915

▸ OVERLAPPING COVERAGE - OPTION 1 (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection

1. For each group of protected appliances under common hoods, the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 6 in. (152 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 12 in. (304 mm). See Figure 4-134 and Figure 4-135.

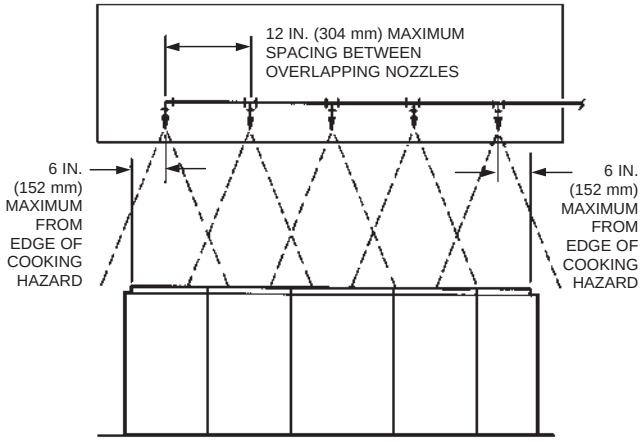


FIGURE 4-134
001710

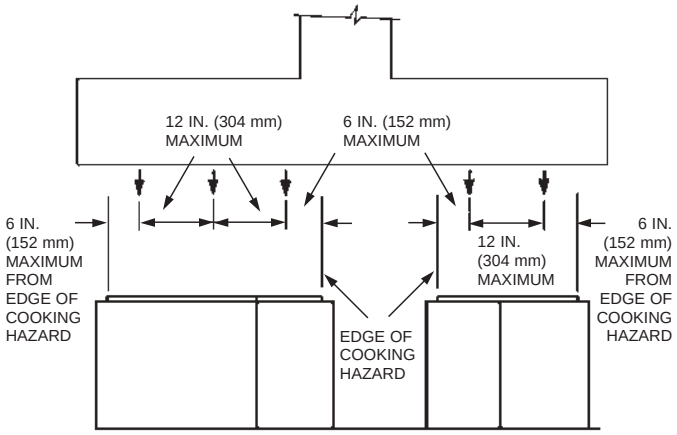


FIGURE 4-135
001720

2. When obstructions are located adjacent to appliances protected by overlapping nozzles, the overlapping appliance nozzle spacing must start with the appliances adjacent to the obstruction. See Figure 4-136.

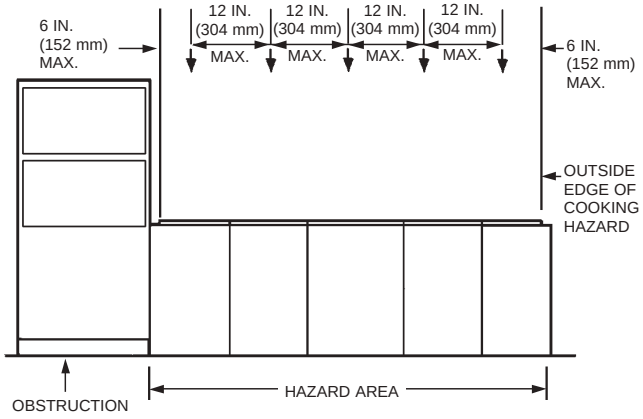


FIGURE 4-136
001713

3. When an appliance requires dedicated protection with a protected area intended for overlapping appliance nozzle protection, the group protection option is required for appliances on either side of the appliances using dedicated protection. Group protection using overlapping appliance nozzles must begin with the protected appliances adjacent to the dedicated appliance protected. An overlapping appliance nozzles must be positioned within 6 in. (152 mm) of the edges of the appliance hazard surface areas adjacent to the dedicated nozzle protection. See Figure 4-137.

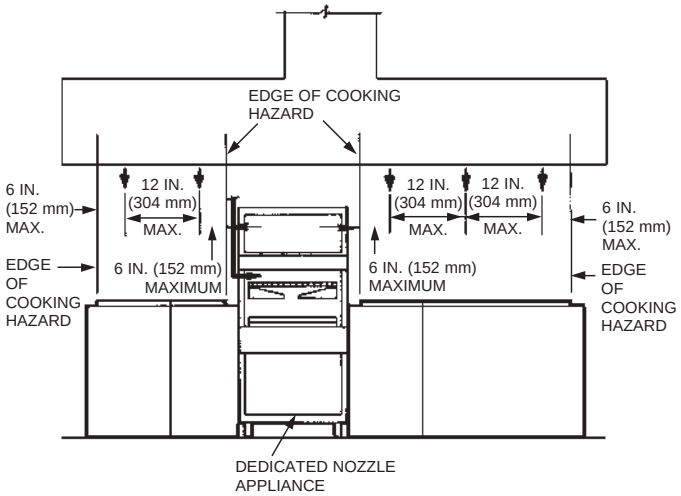


FIGURE 4-137
001756

▸ OVERLAPPING COVERAGE - OPTION 1 (Continued)

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection (Continued)

4. On protected appliances, all hazard surfaces located in a group must be within 40 in. to 45 in. (1,016 mm to 1,143 mm) from the nozzles. Once that dimension is exceeded, a new group must be started. See Figure 4-138.

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

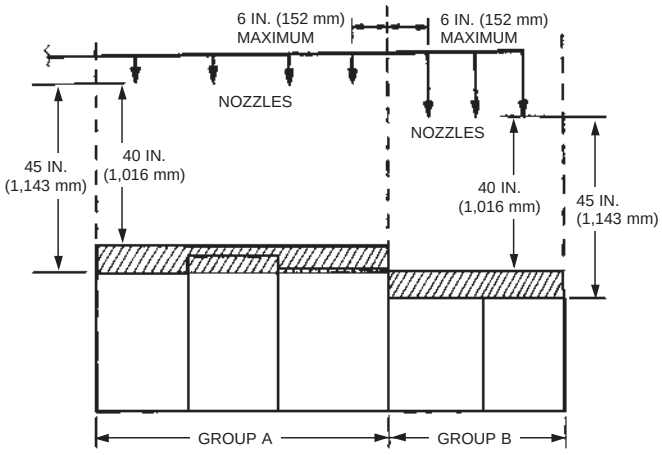


FIGURE 4-138
006917

Detection Requirements For Overlapping Appliance Protection

When utilizing overlapping appliance protection, fusible link detectors must be installed on a maximum of 2 ft (0.6 m) centers, starting with detectors located in (under) the duct openings.

Starting from the detector under the duct opening, add detectors on 2 ft (0.6 m) maximum spacing until the complete length of the plenum area is covered, from one end to the other. The location of the last detector on each end of the plenum must not exceed 2 ft (0.6 m) from end of plenum.

▸ **Note:** Standard detector placement can also be used when applying overlapping
▸ protection. See pages 4-86 to 4-88 for detector placement.

OVERLAPPING COVERAGE - OPTION 2

For each group of protected appliances under a common hoods, the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 11 1/2 in. (292 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 25 1/2 in. (647 mm).

Hazard Zone

The hazard zone is defined as a theoretical, flat and level, rectangular surface, that includes all of the cooking hazards of the protected appliances under a common hoods. The purpose of the hazard zone is to provide a means of locating the appliances and the overlapping nozzles, as well as aiming the overlapping nozzles. The hazard zone measures 28 in. (711 mm) deep by the length of the cooking hazards. The centerline of the hazard zone must bisect the 28 in. (711 mm) depth (from front to back) and run from right-to-left for the full width of the hazard zone.

Overlapping Nozzle Appliance Protection

Overlapping Nozzle Appliance Protection is defined as protection of cooking appliances by nozzles spaced uniformly at uniform elevations under a common hoods. Overlapping protection of appliances is continuous for the full length of the hood or divided when groups of protected appliances are separated by counters or appliances not requiring protection.

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

Group protection is defined as overlapping nozzle appliance protection that protects individual hazard zones located under a common hood. These *groups* of appliances may be separated by appliances not requiring protection, such as steam equipment or work tables, or by dedicated appliance protection, such as but not limited to, salamander broilers.

See Figure 4-142 (full hood continuous protection) and Figure 4-143 (multiple group protection).

Dedicated Nozzle Appliance Protection

Appliance protection using dedicated nozzle coverage is defined as protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

General Design Limitations

- If overlapping appliance protection is mixed with dedicated appliance protection on the same pipe system, **the overlapping appliance protection piping requirements must be followed.**
- Overlapping protection requires the use of 3.0 gal (11.4 L) tanks and a maximum of six flows per tank.
- In installations using tanks only intended for overlapping protection, a single double tank expellant gas cartridge can be utilized with up to three 3.0 gal (11.4 L) tanks.
- In installations using both overlapping protection and conventional non-overlapping protection (ex. hood/duct or dedicated appliance protection), a single double tank expellant gas cartridge can be utilized with up to three 3.0 gal (11.4 L) tanks, as long as none of the 3.0 gal (11.4 L) tanks exceed a total flow output of more than six flows.
- If more than six flows are used in a conventional non-overlapping tank, it cannot share the same cartridge as tanks intended for overlapping protection. In this case, an additional regulated actuator assembly with another expellant gas cartridge is required.
- The 245 nozzle must be used for *end of zone* protection.
- The 260 nozzle must be used for zone protection.
- Maximum depth of zone is 28 in. (711 mm).
- See overlapping system piping requirements listed in Table 4-9.
- Nozzle must be located 0 in. to 12 in. (0 mm to 304 mm) forward of zone centerline, aimed back at the zone centerline.
- Nozzles must be spaced a maximum of 11 1/2 in. (292 mm) from each end of hazard and then a maximum of 25.5 in. (647 mm) on center for the remaining overlapping nozzles until the complete hazard is covered.
- For appliance hazard surfaces **with listed protection** exceeding the standard hazard zone of 28 in. (711 mm) in depth, the hazard surfaces must be aligned with the back edge of the hazard zone, with the front edge overhanging the front edge of the zone. See Appliance Chart, Table 4-8.
- For appliance hazard surfaces that **exceed the listed protection** sizes, multiple zones must be utilized. Align entire hazard surface area within the multiple zones.
- All hood, duct, and individual appliance protection are as specified in this manual.
- All appliance protection currently listed in this manual are approved protection. Zone protection can be considered optional protection.

▸ **OVERLAPPING COVERAGE - OPTION 2 (Continued)**

TABLE 4-8: OVERLAPPING NOZZLE COVERAGE (ZONE PROTECTION)

Appliance Type	Maximum Cooking Hazard
Fryer	34 in. (863 mm) Deep x 835.2 in.^{2} (0.538 m^2)
Griddle	30 in. (762 mm) Deep x Unlimited Length
Range	30 in. (762 mm) Deep x Unlimited Length
Wok, Maximum	30 in. (762 mm) Diameter x 8 in. (203 mm) Deep
Wok, Minimum	11 in. (279 mm) Diameter x 3 in. (76 mm) Deep
Braising Pan/Tilt Skillet*	34 in. (863 mm) Deep x Unlimited Length
Lava Rock Char-Broiler (see Note)	26 in. (660 mm) Deep x Unlimited Length
Charcoal Broiler	30 in. (762 mm) Deep x Unlimited Length (4 in. (101 mm) Maximum Fuel Depth)
Mesquite Wood Broiler	30 in. (762 mm) Deep x Unlimited Length (6 in. (152 mm) Maximum Fuel Depth)
Gas Radiant Char-Broiler	36 in. (914 mm) Deep x Unlimited Length
Electric Char-Broiler	34 in. (863 mm) Deep x Unlimited Length

* See Figure Figure 4-139 for nozzle location

Note: Always try to place Lava Rock Char-Broilers near the center of the zone. When the Lava Rock Char-Broiler is the first or last appliance in the zone, the outside edge of the broiler must not be more than 6 in. (152 mm) outside the end nozzle.

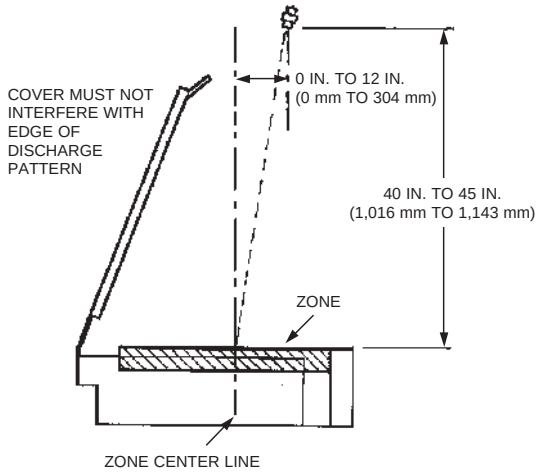


FIGURE 4-139
006927

Overlapping Appliance Nozzle and Hazard Zone Locations

1. All overlapping appliance nozzles must be the 245 nozzle for *end of zone* protection and the 260 nozzle for zone protection, and must be located under a common hood at the same height above the hazard zone, in a straight line from right to left and aimed at the centerline of the hazard zone. The overlapping nozzle is used for both continuous overlapping and multiple group overlapping protection.
2. The hazard zone must be positioned (located) so that all appliance hazard surfaces are within the zone. For appliance hazard surfaces smaller than the standard hazard zone size, the hazard surface can be located anywhere within the standard hazard zone. For appliance hazard surfaces with listed protection exceeding the standard hazard zone size of 28 in. (711 mm) in depth (see Table 4-8), the hazard surfaces must be aligned with the back edge of the hazard zone, with the front edge overhanging the front of the zone.
3. The overlapping appliance nozzles must be located 40 in. to 45 in. (1,016 mm to 1,143 mm) above the top surface of the protected appliances. See Figure 4-141.

   The overlapping appliance nozzles must be located 0 in. to 12 in. (0 mm to 304 mm) forward of the centerline or aimline of the selected hazard zone. See Figure 4-141.

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

   b. Exception No. 2: When using overlapping appliance nozzles in areas where there is a back shelf, the nozzle cannot be positioned in the shaded area as shown in Figure 4-140. Also, back shelf must not extend more than 11 in. (279 mm) over the hazard zone and cannot be less than 18 in. (458 mm) above the hazard zone. See Figure 4-140.

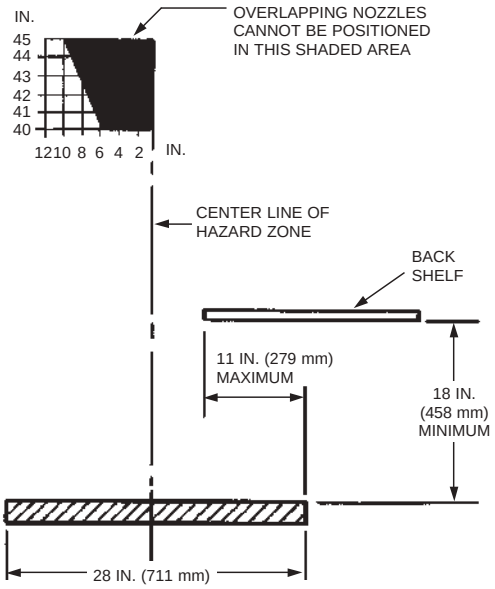


FIGURE 4-140
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► **OVERLAPPING COVERAGE - OPTION 2 (Continued)**

Overlapping Appliance Nozzle and Hazard Zone Locations (Continued)

Step 3.b. (Continued)

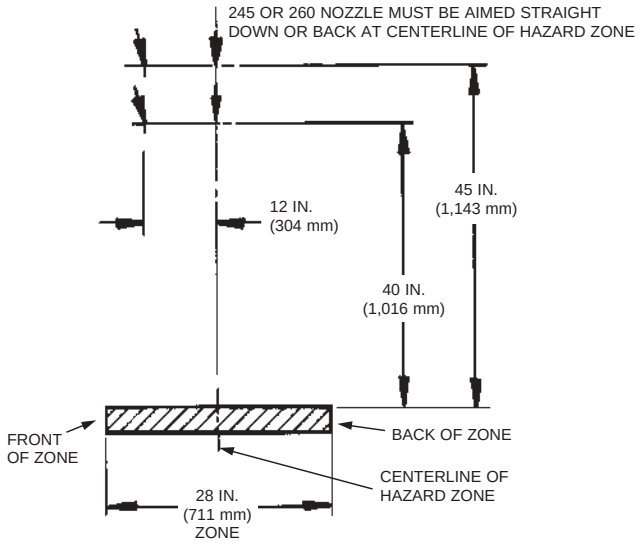


FIGURE 4-141
007537

TABLE 4-9: OVERLAPPING SYSTEM PIPING LIMITATIONS

System Size	Total Flow No.	Max. 3/8 in. Pipe Length (ft (m))	Max. No. of Elbows	Max. Elevation Rise (ft (m))	Cartridge Size
3 Gallon (11.4 L)	6	75 (22.9)	25	10 (3.0)	LT-30-R
6 Gallon (22.7 L) Manifolded	12	75 (22.9)	25	10 (3.0)	Double Tank/ LT-A-101-30*
9 Gallon (34.1 L)	18	75 (22.9)	25	10 (3.0)	Double Tank/ LT-A-101-30*

► ***Only suitable cartridges/tank configurations for overlapping option 2 coverage.
► This configuration will not fit in an AUTOMAN enclosure.

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

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

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection

1. For each group of protected appliances under a common hoods, the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 11 1/2 in. (292 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 25 1/2 in. (647 mm). See Figure 4-142 and Figure 4-143.

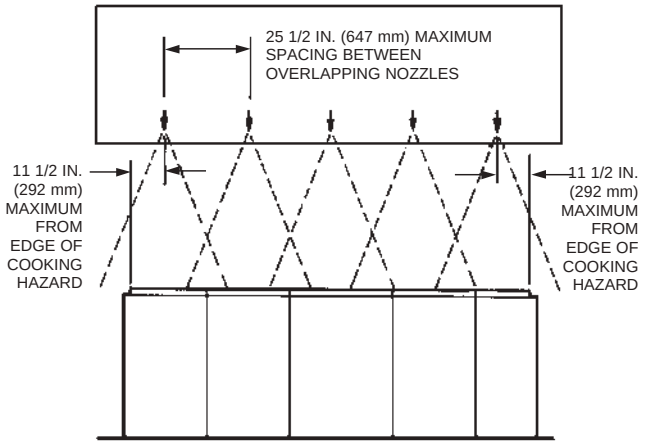
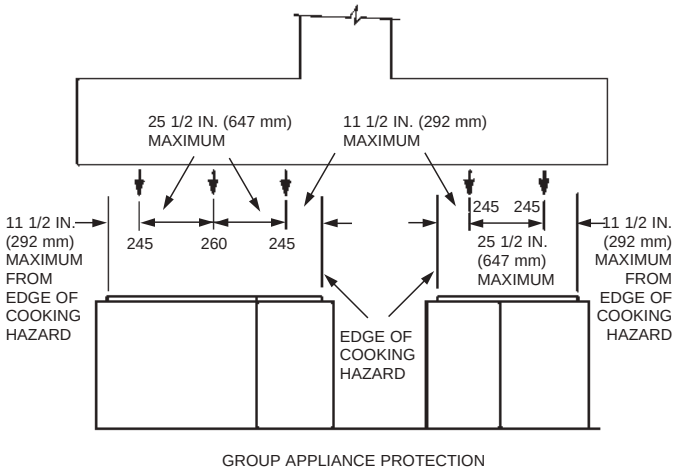


FIGURE 4-142
007538



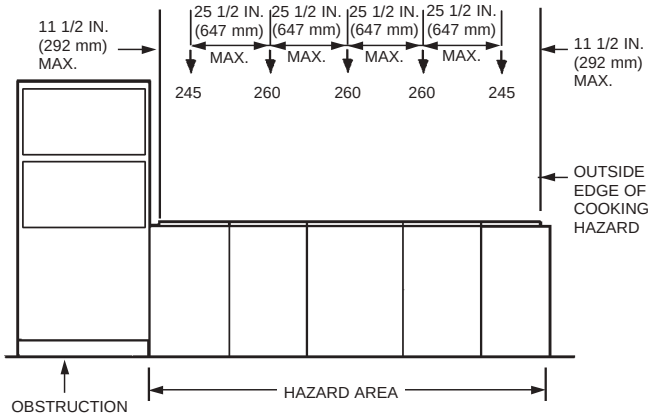
Note: On group appliance protection, start and end of **each** zone group must be protected with a 245 nozzle.

FIGURE 4-143
001720

▸ **OVERLAPPING COVERAGE - OPTION 2 (Continued)**

Overlapping Appliance Nozzle and Hazard Zone Locations – Group Protection (Continued)

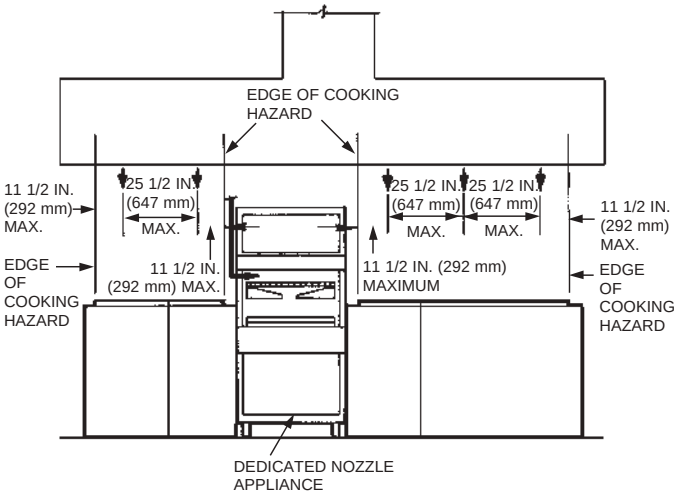
2. When obstructions are located adjacent to appliances protected by overlapping nozzles, the overlapping appliance nozzle spacing must start or end with the appliances adjacent to the obstruction. See Figure 4-144.



Note: On continuous appliance protection, start and end with 245 nozzles and 260 nozzles in the middle.

FIGURE 4-144
001713

3. When an appliance requires dedicated protection with a protected area intended for overlapping appliance nozzle protection, the group protection option is required for appliances on either side of the appliances using dedicated protection. Group protection using overlapping appliance nozzles must begin with the protected appliances adjacent to the dedicated appliance protected. An overlapping appliance nozzles must be positioned within 11 1/2 in. (292 mm) of the edges of the appliance hazard surface areas adjacent to the dedicated nozzle protection. See Figure 4-145.

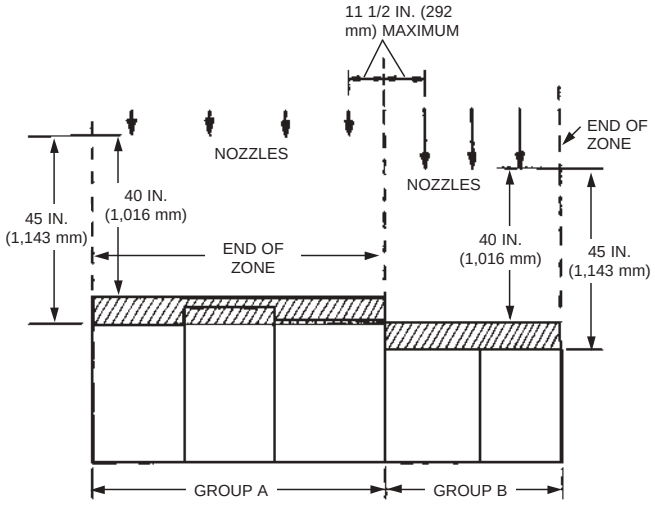


Note: On group appliance protection, start and end of **each** zone group must be protected with a 245 nozzle.

FIGURE 4-145
001756

4. On protected appliances, all hazard surfaces located in a group must be within 40 in. to 45 in. (1,016 mm to 1,143 mm) from the nozzles. Once that dimension is exceeded, a new group must be started. See Figure 4-146.

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



Note: On group appliance protection, start and end of EACH zone group must be protected with a 245 nozzle.

FIGURE 4-146
007539

Detection Requirements For Overlapping Appliance Protection

When utilizing overlapping appliance protection, fusible link detectors must be installed on a maximum of 2 ft (0.6 m) centers, starting with detectors located in (under) the duct openings.

Starting from the detector under the duct opening, add detectors on 2 ft (0.6 m) maximum spacing until the complete length of the plenum area is covered, from one end to the other. The location of the last detector on each end of the plenum must not exceed 2 ft (0.6 m) from end of plenum.

Note: Standard detector placement can also be used when applying overlapping protection. However, the overlapping detector option cannot be used when using standard R-102 protection. See pages 4-86 to 4-88 for detector placement.

OVERLAPPING COVERAGE - OPTION 3

For each group of protected appliances under common hoods, the overlapping nozzles must be located from right to left so that each end nozzle is located a maximum of 11 1/2 in. (292 mm) inside the outside edge of the cooking hazard of each end appliance, and the inside overlapping nozzles must be located between the two end nozzles at a maximum spacing of 25 1/2 in. (647 mm).

Hazard Zone

The hazard zone is defined as a theoretical, flat and level, rectangular surface that includes all the cooking hazards of the protected appliances under a common hood. The purpose of the hazard zone is to provide a means of locating the appliances and the overlapping nozzles, as well as aiming the overlapping nozzles. The hazard zone measures 28 in. (711 mm) deep by the length of the cooking hazards. The centerline of the hazard zone must bisect the 28 in. (711 mm) depth (from front to back) and run from right-to-left for the full width of the hazard zone.

Overlapping Nozzle Appliance Protection

Overlapping Nozzle Appliance Protection is defined as protection of cooking appliances by nozzles spaced uniformly at uniform elevations under a common hood. Overlapping protection of appliances is continuous for the full length of the hood. Divided protection when groups of protected appliances are separated by counters or appliances not requiring protection is not allowed with Option 3.

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

Dedicated Nozzle Appliance Protection

Appliance protection using dedicated nozzle coverage is defined as protection of cooking appliances with enclosed cooking hazards, such as upright broilers, which cannot be protected with overlapping nozzles and therefore must be protected with nozzles dedicated to the appliance.

General Design Limitations

- Overlapping protection requires the use of two manifolded 3.0 gal (11.6 L) tanks and a maximum of 13 total flows. See Figure 4-162.
- A maximum of ten flows shall be used as overlapping coverage nozzles.
- A maximum of three flows shall be used as plenum, duct or dedicated appliance nozzles.
- A single double tank expellant gas cartridge shall be utilized.
- This installation uses both overlapping protection, plenum, duct and dedicated appliance protection.
- A conventional non-overlapping tank cannot share the same cartridge as tanks intended for overlapping protection. In this case, an additional Regulated Actuator Assembly with another expellant gas cartridge will be required.
- The 245 nozzle must be used for *end of zone* protection.
- The 260 nozzle must be used for zone protection.
- Maximum depth of zone is 28 in. (711 mm).
- Nozzle must be located 0 in. to 12 in. (0 mm to 304 mm) forward of zone centerline, aimed back at the zone centerline.
- Nozzles must be spaced a maximum of 11 1/2 in. (292 mm) from each end of hazard and then a maximum of 25.5 in. (647 mm) on center for the remaining overlapping nozzles until the complete hazard is covered.
- For appliance hazard surfaces with listed protection exceeding the standard hazard zone of 28 in. (711 mm) in depth, the hazard surfaces must be aligned with the back edge of the hazard zone, with the front edge overhanging the front edge of the zone. See Table 4-7.
- For appliance hazard surfaces that exceed the listed protection sizes, multiple zones must be utilized. Align entire hazard surface area within the multiple zones.
- All plenum, duct, and individual appliance protection is specified in this manual.
- All appliance protection currently listed in this manual is also approved protection. Zone protection can be considered optional protection.
- See Table 4-7 for Appliance Type and Maximum Cooking Hazards.

OVERLAPPING COVERAGE - OPTION 3 (Continued)

General Design Limitations (Continued)

- For Overlapping Appliance Nozzle and Hazard Zone Locations, see Items 1-4 on page 4-66.
- When obstructions are located adjacent to the appliances protected by overlapping nozzles, the overlapping appliance nozzle spacing must start or end with the appliances adjacent to the obstruction. See Figure 4-144.
- See overlapping system piping requirements listed in the table below.

TABLE 4-10: OVERLAPPING COVERAGE - OPTION 3 (FOR APPLIANCE, DUCT, AND PLENUM COVERAGE)

Piping Limitations	Max. Flow Numbers	Max. 3/8 in. Pipe Length	Max. No. of Elbows	Max. Elevation Rise
Total Combined Pipe Network	13	68 ft (20.7 m)	25	10 ft (3.0 m)
Appliance Protection	10	-	-	-
Duct/Plenum or Dedicated Appliance Protection. Only 1N, 1W or 2W nozzles are allowed	3	-	-	-

Notes: Double tank cartridge only.
45 ft (13.7 m) maximum pipe between nozzles.
If supply line is split, appliance branches must be on the through side of the tee.

TANK AND CARTRIDGE REQUIREMENTS

Once the hazard analysis is completed and the total nozzle flow numbers are established, the quantity and size of agent tanks and cartridges needed to supply the nozzles with the proper volumes of agent at the proper flow rates can be determined. For cartridges used in the regulated release mechanism, flow capacities, tank quantities and sizes, and regulated release cartridge options are given in the table below.

Total Flow Numbers*	Quantity and Size of Tanks	Regulated Release Cartridge Options	
		Nitrogen	Carbon Dioxide
1-5	(1) 1.5 Gallon	LT-20-R	101-10
6-11	(1) 3.0 Gallon	LT-30-R	101-20
11-16	(1) 1.5 Gallon (1) 3.0 Gallon	Double	101-30
16-22	(2) 3.0 Gallon	Double	101-30**
16-22	(2) 3.0 Gallon (Manifolded)	Double	-
22-23	(3) 3.0 Gallon	Double	-

When one or more regulated actuators are used, the following tank and cartridge combinations apply for each regulated actuator:

Regulated Actuator Tanks	Regulated Actuator Cartridge Options	
	Nitrogen	Carbon Dioxide
(1) 1.5 Gallon	LT-20-R	101-10
(1) 3.0 Gallon	LT-30-R	101-20
(1) 1.5 Gallon and (1) 3.0 Gallon	LT-A-101-30 or Double	101-30**
(2) 3.0 Gallon	LT-A-101-30 or Double	101-30**
(2) 3.0 Gallon (Manifold)	LT-A-101-30 or Double	-
(3) 3.0 Gallon	LT-A-101-30 or Double	-

* For exceptions to maximum flow numbers, see Distribution Piping Requirements for 1.5 gallon and 3.0 gallon systems in this Section.

** The 101-30 cartridge can not be used when two 3.0 gallon tanks are manifolded together.

For higher total flow numbers (23 to 110), multiple cartridges and regulated actuators are required as shown in the System Selection Guide in *Appendix* Section.

ACTUATION AND EXPELLANT GAS LINE REQUIREMENTS

This section contains the guidelines for installing the actuation and expellant gas lines between the regulated release mechanism regulator, each regulated actuator regulator, and each agent tank. These limitations should be considered when selecting the component mounting locations.

The **actuation gas line** is the length of pipe and/or hose that is run from either the AUTOMAN regulated release assembly or the remote release assembly that directs high pressure from the cartridge in the release to actuate one or more additional regulated actuator assemblies. The actuation gas line can consist of 1/4 in. Schedule 40 black iron, chrome-plated, stainless steel, or galvanized steel pipe and fittings, and/or factory supplied stainless steel braided actuation hose.

The **expellant gas line** is the length of pipe and/or hose that is run from the regulator in either the AUTOMAN regulated release assembly or a regulated actuator assembly that directs regulated pressure to the agent storage tanks to pressurize the tank and discharge the agent. The expellant gas line shall consist of 1/4 in. Schedule 40 black iron, chrome-plated, stainless steel, or galvanized steel pipe and fittings.

Actuation Gas Line – 6 to 8* Tanks Maximum

* 8 Tank maximum reflects the utilization of 3 tank regulated actuators.

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings.
2. The actuation gas line piping is installed from the regulated release mechanism to each regulated actuator connected within the system. The total length of the actuation gas line from the regulated release assembly to the regulated actuator assemblies **must not exceed 20 ft (6.0 m)** when using an LT-20-R, an LT-30-R nitrogen cartridge, or a 101-10 or a 101-20 carbon dioxide cartridge. See Figure 4-147.

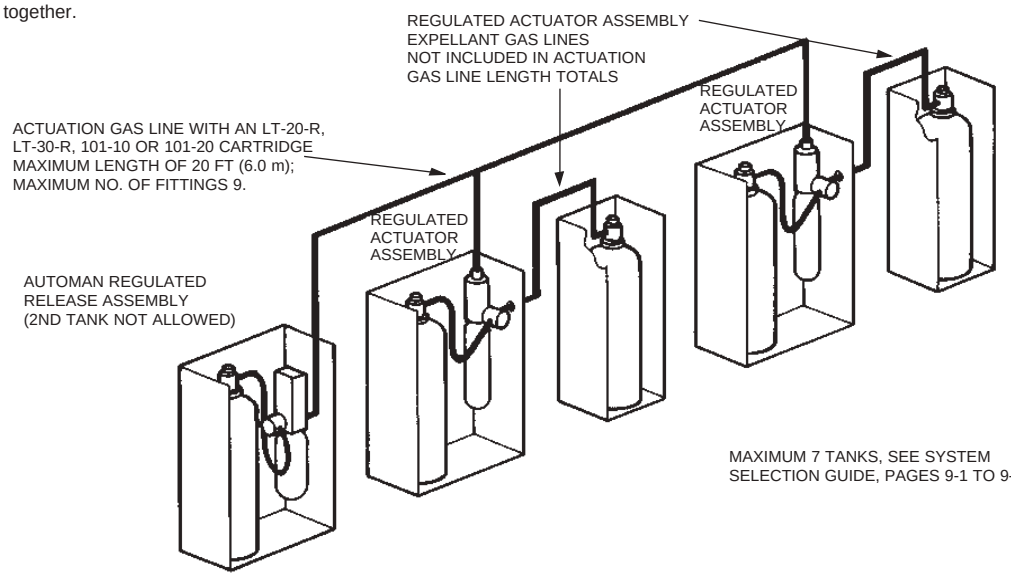


FIGURE 4-147
000775

ACTUATION AND EXPELLANT GAS LINE REQUIREMENTS (Continued)

Actuation Gas Line – 6 to 8* Tanks Maximum (Continued)

3. If an expellant gas line is connected to the regulated release assembly along with an actuation gas line, the total combined length of the actuation and expellant gas line **must not exceed 30 ft (9.1 m)** when using a double-tank nitrogen cartridge or a LT-A-101-30 nitrogen cartridge or a 101-30 carbon dioxide cartridge. See Figure 4-148.
4. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

► Actuation Gas Line – 10 to 15* Tanks Maximum

► * 15 Tank maximum indicates five regulated actuators each having 3 tanks.

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings.
   Note: Stainless steel hose and fittings can also be used. See Component Section for detailed information.

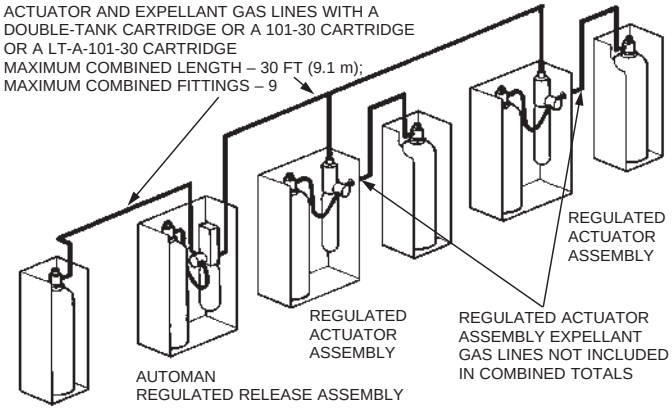


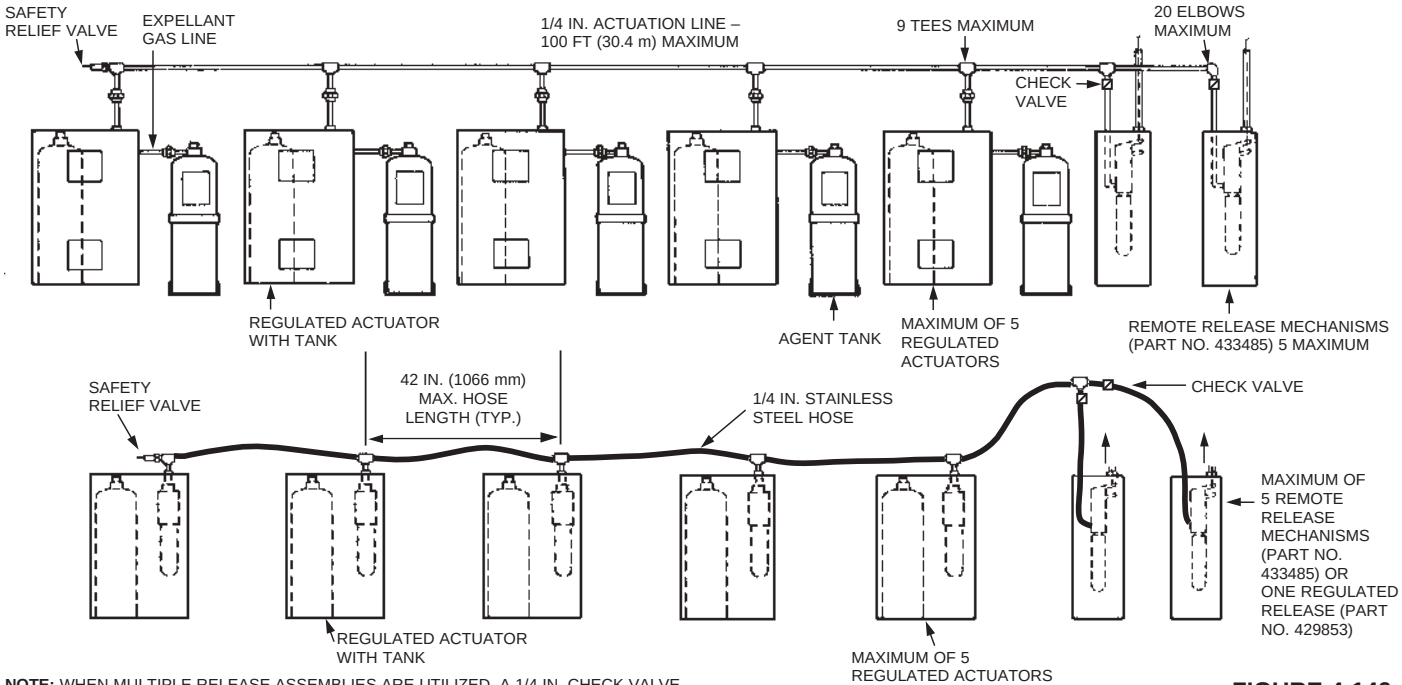
FIGURE 4-148
000262

2. The actuation gas line piping is installed from the remote mechanical release to each R-102 regulated actuator assembly. The total length of the actuation gas line from the remote mechanical release to the regulated actuator assemblies must not exceed 100 ft (30.4 m).
3. A combined total of 20 elbows and 9 tees may be used in these lines. Two 45° elbows equal one 90° elbow. See Figure 4-149.
4. Use either a 101-10 carbon dioxide cartridge or the LT-20-R nitrogen cartridge in the remote mechanical release.
5. A safety vent relief valve (Part No. 15677) is required in the actuation gas line to relieve residual pressure after actuation.

Actuation Gas Line – Using 1/4 in. Stainless Steel Hose

► * 15 Tank maximum indicates five regulated actuators each having 3 tanks.

1. Maximum total length of hose cannot exceed 17.5 ft (5.3 m).
   Note: A combination of 1/4 in. stainless steel braided hose and 1/4 in. NPT pipe can be used as long as the total combined actuation gas line length does not exceed 17.5 ft (5.3 m). **Stainless steel braided hose cannot be used for expellant gas lines.** See Figure 4-137 for additional details.
2. Maximum of five regulated actuators allowed.
3. Actuated with remote release (Part No. 433485) or Regulated Release Assembly (Part No. 429853).



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

FIGURE 4-149
000301, 001641b

ACTUATION AND EXPELLANT GAS LINE REQUIREMENTS (Continued)

Expellant Gas Line

1. The Expellant Gas Line is installed from the regulated release mechanism in double, three, and multiple-tank systems, and from the regulated actuator assembly in multiple-tank systems. The expellant gas line is the piping and/or hose between the regulator and the tank-enclosure/tank-bracket assembly. The total length of the expellant gas line from the regulated release mechanism or each regulated actuator assembly **must not exceed** 30 ft (9.1 m) when using a double-tank cartridge, an LT-A-101-30 Cartridge, or a 101-30 Cartridge. See Figure 4-150 and Figure 4-151.

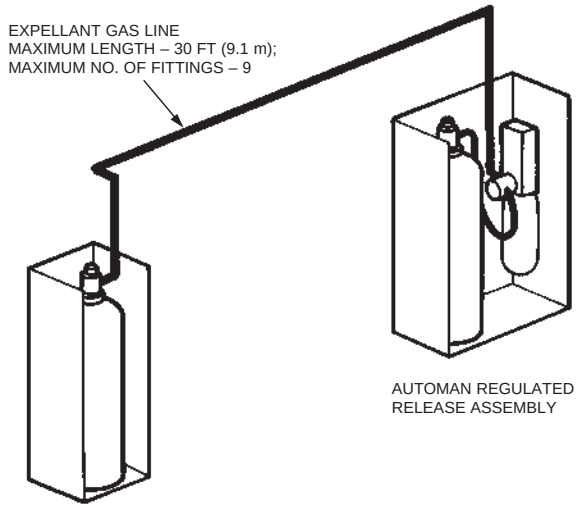


FIGURE 4-150
000776

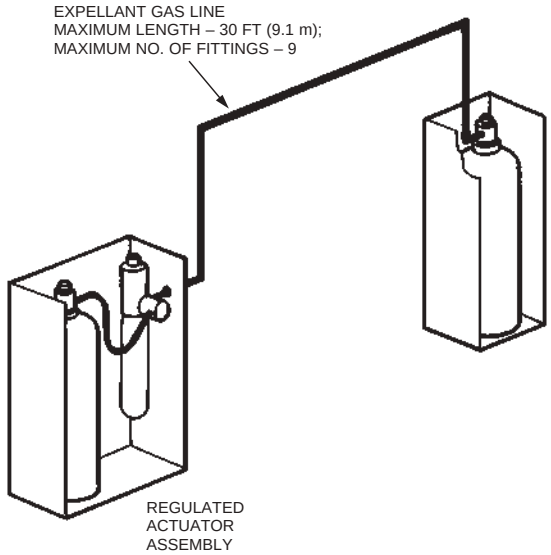


FIGURE 4-151
000777

2. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.
3. If two tanks are connected to the regulated release assembly in a multiple-tank system arrangement, the total combined length of the actuation and expellant gas lines **must not exceed** 30 ft (9.1 m) when using a double-tank nitrogen cartridge, an LT-A-101-30 nitrogen cartridge, or a 101-30 carbon dioxide cartridge. See Figure 4-148.
4. If three 3.0 gallon tanks are connected to the regulator in either a regulated release or regulated actuator assembly, utilize factory supplied expellant gas hose assemblies only. See Distribution Piping Requirements – 9.0 Gallon System, page 4-85 for additional design requirements.

DISTRIBUTION PIPING REQUIREMENTS

Once the nozzle placement and quantity of tanks has been determined, it is then necessary to determine the piping configurations between the tank adaptor and each discharge nozzle. This section contains the guidelines and limitations for designing the distribution piping so that the liquid agent discharges from the nozzles at a proper flow rate. These limitations should also be referred to when selecting the mounting location for the regulated release mechanism and agent tank.

Distribution Piping Definitions

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

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

General Piping Requirements

1. All R-102 system piping is straight line. Therefore, the need for critical lengths and balancing is minimized.
2. Two 45° elbows count as one 90° elbow.
3. Each branch line includes the tee or elbow leading to it, and all fittings within the branch line itself.
4. The minimum piping length of Schedule 40, 3/8 in. pipe from the tank outlet to any nozzle protecting a range, fryer, or wok must be 6 ft (1.9 m).

DISTRIBUTION PIPING REQUIREMENTS (Continued)

General Piping Requirements (Continued)

5. Pipe lengths are measured from center of fitting to center of fitting. See Figure 4-152.

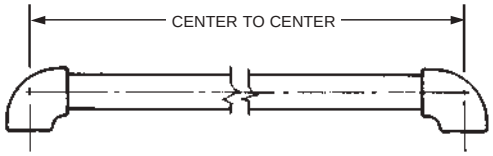


FIGURE 4-152
000778

6. All distribution piping* must be 3/8 in. Schedule 40 black iron, chrome-plated, or stainless steel. **Do not use hot dipped galvanized pipe on the distribution piping.**
7. All threaded connections located in and above the protected area must be sealed with pipe tape. Tape should be applied to male threads only. Make certain tape does not extend over the end of the thread, as this could cause possible blockage of the agent distribution.
8. Optional: Before installing blow-off caps on nozzles, apply a small amount of HP-300 grease across the opening in the nozzle tip.
9. Tees used in the distribution piping can be used as thru tees, side outlet tees, or bull tees.

* Press-fit Piping option:

- ProPress Stainless (304) fittings (1/2 in.) must be used with 1/2 in. ID x 0.065 in. wall thickness (~5/8 in. OD) Stainless Steel Welded or Seamless (304) pipe in accordance with ASTM A312 or ASTM A554, and is to be sourced directly from Viega.
- NPT to ProPress Stainless transition fittings must still be used for agent tank and nozzle connections for the agent distribution piping.
- ProPress Stainless pipe and fittings can be installed under the hood provided the ambient temperature does not exceed 250 °F (121 °C) and the pipe and fittings are not subjected to direct flame impingement during normal cooking operations.

Additional Application Use for Flexible Agent Distribution Hose

Approved locations for installation are as follows:

- Under the hood in the hazard area
- Without the restraining cable in stationary piping instances such as:
  - Non-castered or stationary appliances
  - Back to back hoods
  - Nozzle drops

GENERAL INSTALLATION REQUIREMENTS

- All existing flow requirements still apply to installing the hose.
- Hose is to be installed in a way that does not cause kinking or collapse.
- The use of the Agent Distribution Hose (Part No. 435982) must comply with the agent distribution piping requirements.
- Hose installed in stationary distribution piping does not require the restraining cable.

  Note: Castered appliances will still need the restraining cable, as the appliances are designed to move regularly for cleaning.
- Bend radius of installed hose to be no less than 3 in. (76 mm) or 6 in. (152 mm) in diameter.
- Each fitting on the hose must be hard mounted to solid surfaces to avoid damage at hose-to-fitting connections and to avoid changing of nozzle aim points.
- Hose installation must avoid direct contact with flame. If the hose is ever subject to flame, it must be replaced immediately.
- Hose to pipe connection fittings no longer need to be placed in vertical down position.
- Hose ends do not require an offset of 6 in. to 8 in. (152 mm to 203 mm).

SUPPLY LINES INSTALLATION REQUIREMENTS

- When the flexible hose is installed anywhere in the supply line, each hose has an equivalent length of 5 ft (1.5 m) of 3/8 in. pipe.

APPLIANCE BRANCH LINE INSTALLATION REQUIREMENTS

- When the flexible hose is installed anywhere in an appliance branch line, each hose has an equivalent length 5 ft (1.5 m) of 3/8 in. pipe.

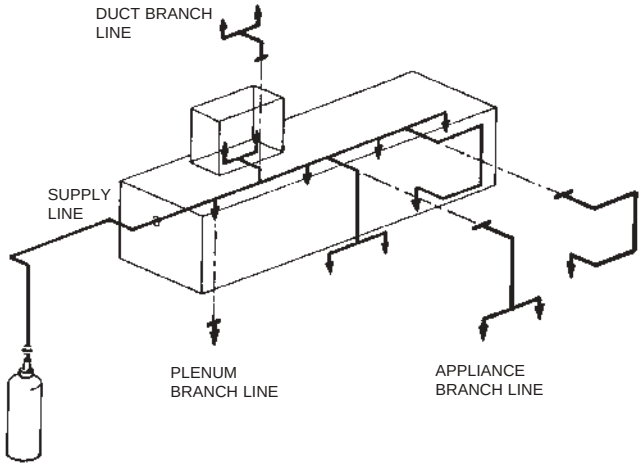
BACK-TO-BACK INSTALLATION REQUIREMENTS

- Hood penetration seal is to be used to connect each fitting of the hose to the hood. The hose is not to pass through the hood, as sharp edges of the hood can cause damage to the hose coating. Each fitting on the hose must be hard mounted to solid surfaces to avoid damage at hose-to-fitting connections and to avoid changing of nozzle aim points.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Supply and Branch Line Identification

The R-102 distribution piping network is broken down into four specific pipe runs: the Supply Line, the Duct Branch Line, the Plenum Branch Line, and the Appliance Branch Line. See Figure 4-153.



NOTE: THIS IS A CONCEPTUAL DRAWING ONLY. THIS IS NOT AN ACTUAL INSTALLATION.

FIGURE 4-153
000779

SUPPLY LINE

The Supply Line is defined as the length of pipe which runs from the agent tank outlet to the last branch line whether a duct, appliance, or plenum branch line. This includes all supply line fittings except for the tees or elbows leading to the branch lines. See Figure 4-153 and Figure 4-154.

NOTE: THESE ARE EXAMPLES ONLY. OTHER CONFIGURATIONS CAN BE DESIGNED.

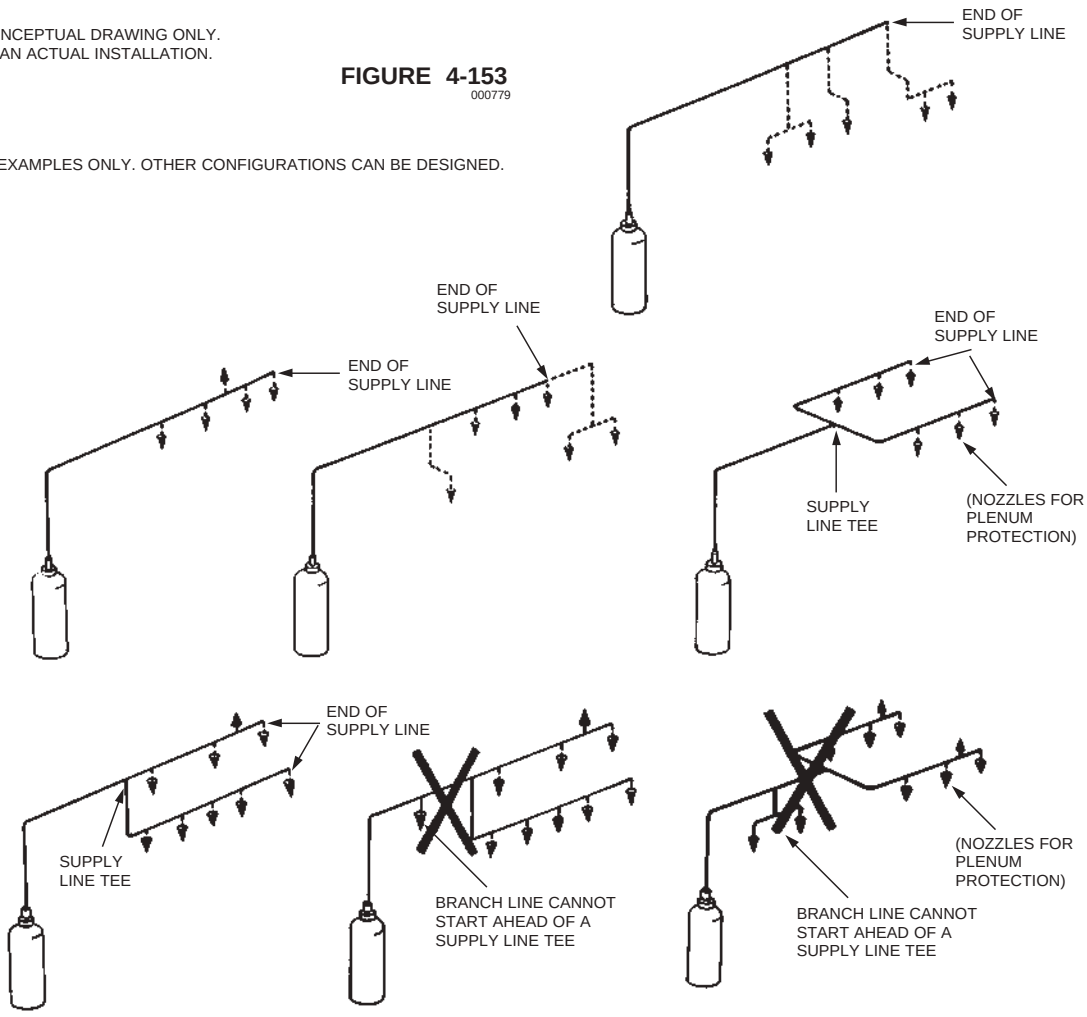


FIGURE 4-154
000780

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Supply and Branch Line Identification (Continued)

DUCT BRANCH LINE

NOTICE

Branch lines cannot start ahead of a supply line tee.

The Duct Branch Line is defined as the length of pipe which runs from the supply line to the duct nozzles. This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figure 4-154 and Figure 4-155.

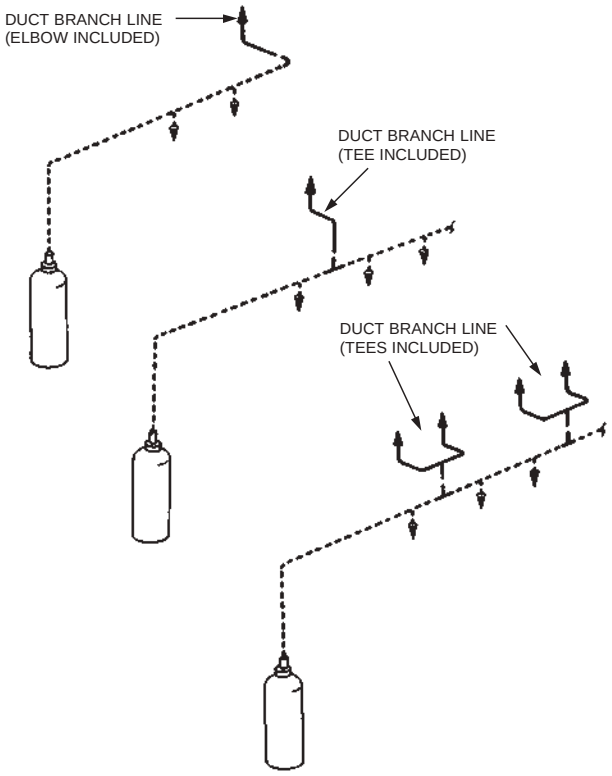


FIGURE 4-155
000781

PLENUM BRANCH LINE

The Plenum Branch Line is defined as the length of pipe which runs from the supply line to the plenum nozzles. This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figure 4-154 and Figure 4-156.

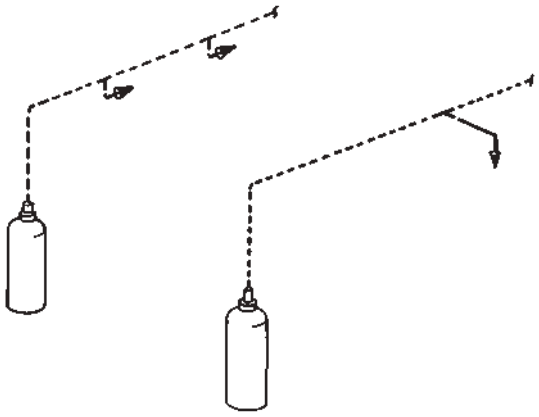


FIGURE 4-156
000782

APPLIANCE BRANCH LINE

The Appliance Branch Line is defined as the length of pipe which runs from the supply line to the appliance nozzles. This includes all branch line fittings as well as the tee or elbow used to start the branch line. See Figure 4-154 and Figure 4-157.

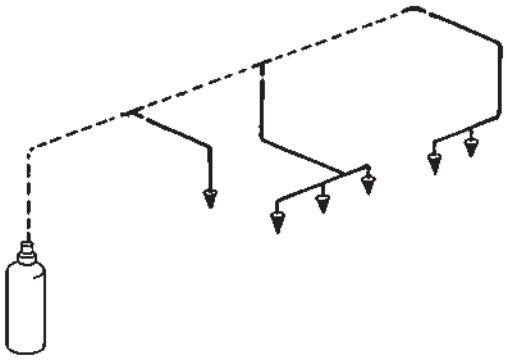


FIGURE 4-157
000783

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 1.5 Gallon System

DUCT, PLENUM, AND APPLIANCE PROTECTION

1. This option allows for duct protection, plenum protection, appliance protection, or any combination. However, only one duct nozzle may be used, either a 1W or a 2W, nozzle.
2. All distribution piping, supply and branch, must be 3/8 in. Schedule 40 black iron, chrome-plated, or stainless steel.
3. Each 1.5 gallon tank allows a maximum of five flow numbers.*
4. The pipe length between the start of the first branch line and the start of the last branch line must not exceed 8 ft (2.4 m). When the supply line is split, the **combined length** of both legs of the supply line, start of first branch line to start of last branch line, must not exceed 8 ft (2.4 m). See Figure 4-158.
5. The combined length of all branch lines must not exceed 22 ft (6.7 m). See Figure 4-159.
6. The requirements of the following table must not be exceeded:

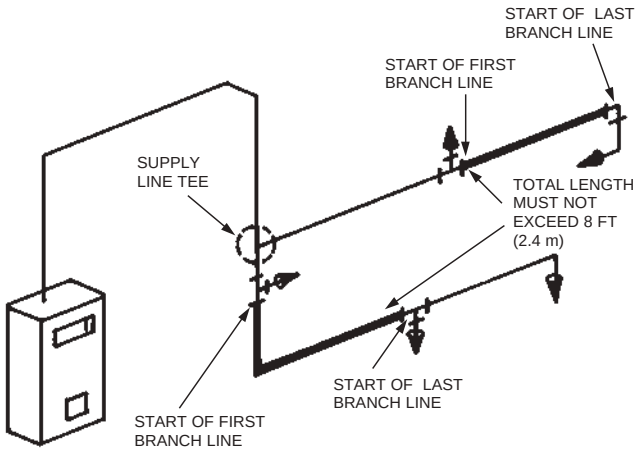


FIGURE 4-158
000784

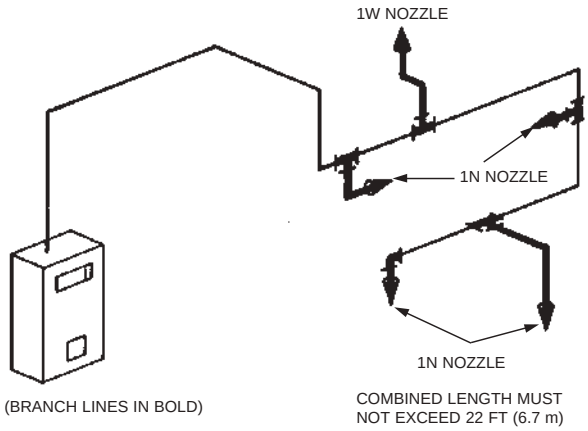


FIGURE 4-159
000785

1.5 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	6 ft (1.8 m)	4 ft (1.2 m)	10 ft (3.0 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)**	2 ft (0.6 m)**	2 ft (0.6 m)**
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	1	2	3
Maximum Flow Numbers	5*	2	2	3

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

** Maximum rise above Supply Line.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 3.0 Gallon System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m). See Figure 4-160.
2. The total length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-160.
3. A maximum of two nozzles are allowed per duct branch line.
4. The requirements of the following table must not be exceeded:

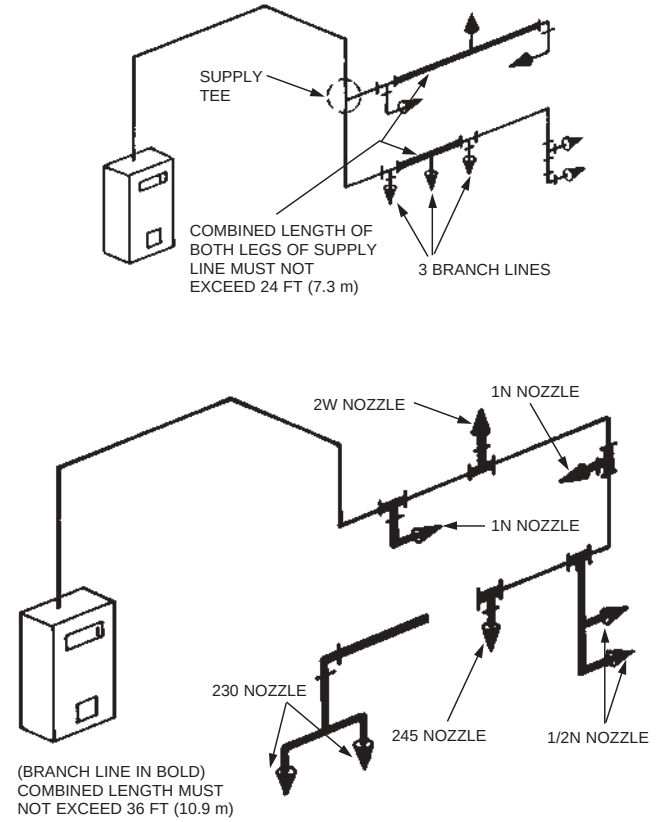


FIGURE 4-160
000266, 000502

3.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
▸ Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)**	2 ft (0.6 m)**	2 ft (0.6 m)**
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

* **Exceptions:**

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

Special Instructions:

1. Twelve flow numbers are allowed when four Dean Industries GTI Gas Fryers are protected at low proximity as shown in Figure 4-66 on page 4-25. The discharge piping must be as shown in Figure 4-68 on page 4-26.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one 2W duct nozzle, one 1/2N electrostatic precipitator nozzle, one 1N plenum nozzle, and four two-flow appliance nozzles. Contact the Applications Engineering Department for additional information.

▸ ** Maximum rise above Supply Line.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 6.0 Gallon Manifolded System

As an option to piping two 3.0 gallon tanks separately, two 3.0 gallon tanks can be manifolded together to share a common agent distribution line. Only 3.0 gallon tanks connected to the same regulator can be manifolded. The following requirements must be met when manifolding:

1. All piping must be 3/8 in. Schedule 40.
2. See Figure 4-163 for tank connections.
3. The length of supply line piping between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). See Figure 4-161. When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m).
4. The combined length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-161.
5. A maximum of 22 flow numbers are allowed.
6. The requirements of the following table must not be exceeded.

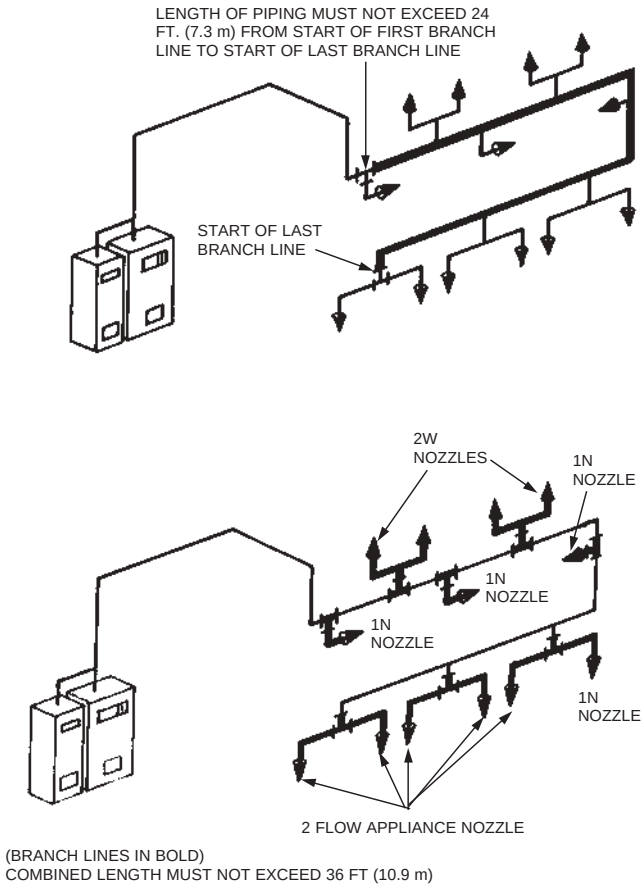


FIGURE 4-161
000267

6.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	32 ft (9.7 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
► Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)*	2 ft (0.6 m)*	2 ft (0.6 m)*
Maximum 90° Elbows	8	4	4	6
Maximum Tees	2	2	2	4
Maximum Flow Numbers	22	4	2	4

► * Maximum rise above Supply Line.

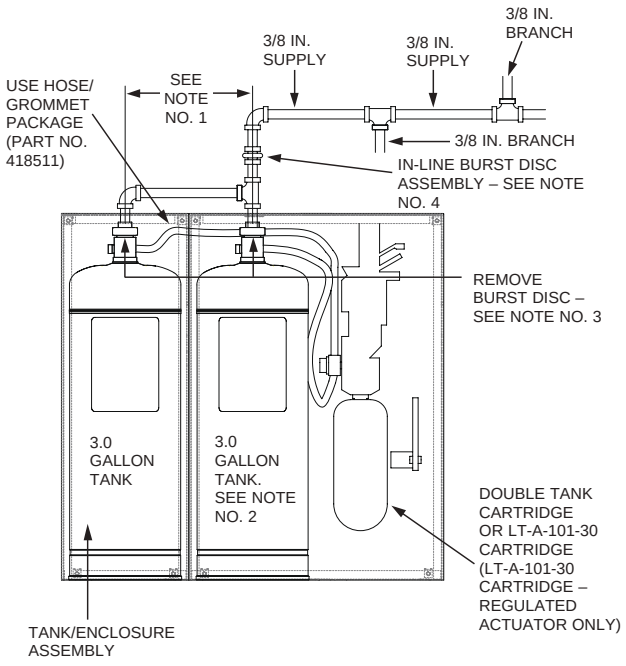
DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 6.0 Gallon Manifolded System (Continued)

This configuration consists of two 3 gallon tanks. Both tanks are connected to a common manifold tee and are pressurized ► from one double tank or LT-A-101-30 cartridge in the regulated release assembly. See Figure 4-162.

Note: A tank mounting bracket can be utilized instead of the tank/enclosure assembly.

► **Note:** LT-A-101-30 will not fit in AUTOMAN enclosures (Part No. 429853 and 429856).



NOTE 1: THE PIPE CONNECTION FROM TANK CENTER TO TANK CENTER CANNOT EXCEED 8 1/2 IN. (215 mm). ALSO, OEM RELEASE/BRACKET ASSEMBLY CAN BE UTILIZED WHEN MANIFOLDING 3.0 GALLON TANK.

NOTE 2: ONLY 3 GALLON TANKS CAN BE MANIFOLDED.

NOTE 3: THE BURST DISC THAT IS PART OF THE TANK ADAPTOR/BURST DISC ASSEMBLY MUST BE REMOVED AND MODIFIED. SEPARATE THE ALUMINUM DISC MATERIAL FROM THE PLASTIC GASKET. DISCARD THE ALUMINUM DISC MATERIAL AND REINSTALL THE PLASTIC GASKET BACK INTO THE TANK ADAPTOR/BURST DISC ASSEMBLY.

NOTE 4: THE IN-LINE BURST DISC ASSEMBLY (PART NO. 416970) IS TO BE MOUNTED AS CLOSE TO THE TANK OUTLET AS POSSIBLE. AFTER SYSTEM DISCHARGE, THE ASSEMBLY MUST BE DISASSEMBLED AND A NEW BURST DISC INSTALLED.

FIGURE 4-162
008127

Distribution Piping Requirements – With Independent Pipe Runs

Independent pipe runs can also be used with the regulated release assembly and the tank/enclosure assembly or tank mounting brackets. See Figure 4-163. When manifolding is not used, each of the two 3 gallon tanks utilize the piping limitations of a single tank system.

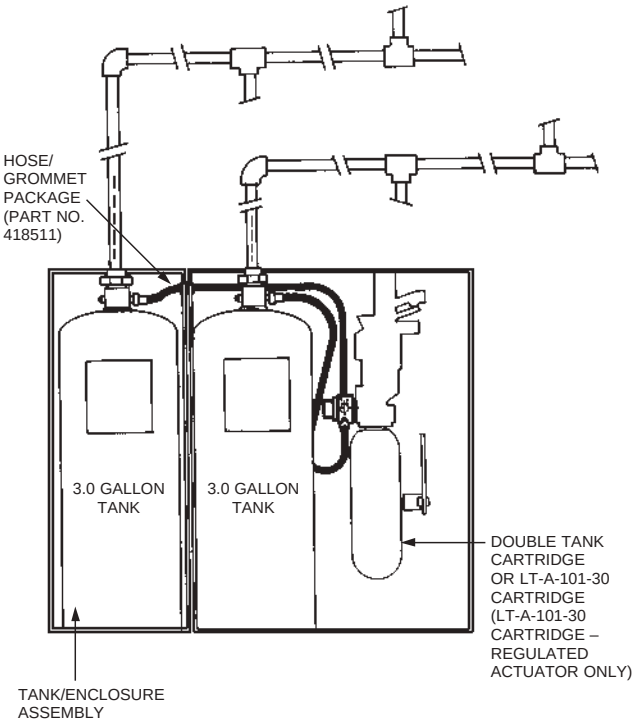


FIGURE 4-163
000786

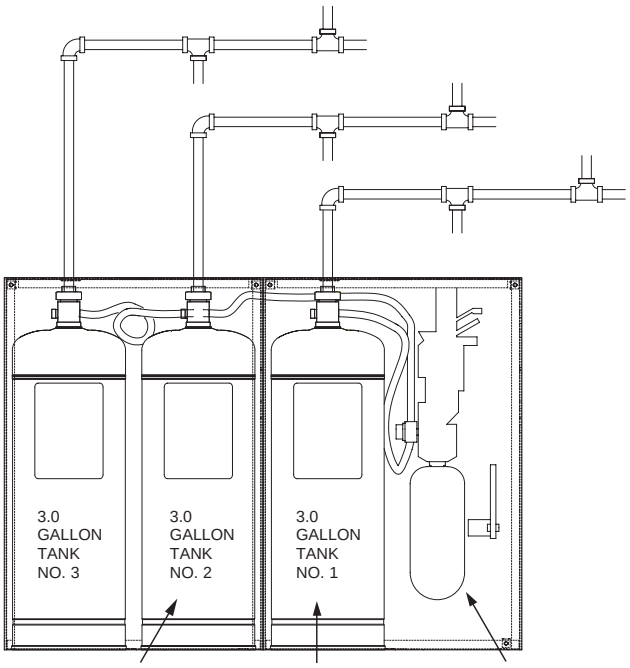
Note: If an expellant gas hose is to be used for a second tank in an adjacent tank enclosure or tank bracket assembly, install the second tank on the left side of the AUTOMAN Regulated Release, with the outlets a maximum of 8 1/2 in. (215 mm) from center to center, similar to the manifolded system in Figure 4-162. Otherwise, the second tank requires 1/4 in. NPT pipe instead of expellant gas hose.

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 9.0 Gallon System

This optional configuration consists only of three 3-gallon tanks, all pressurized from a single double-tank nitrogen cartridge with expellant gas hoses connected as shown in Figure 4-165. Tanks No. 1 and No. 2 must be connected directly to the regulator with separate expellant gas hoses and Tank No. 3 must be connected to Tank No. 2 with a third expellant gas hose as shown in Figure 4-162. Each tank must be connected to an independent distribution piping network as shown in Figure 4-166. Distribution piping requirements for each network must be as follows:

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m). See Figure 4-160.
2. The total length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-164.
3. A maximum of two nozzles are allowed per duct branch line.
4. When using this 9.0 gallon system configuration, **no manifolding** of distribution piping is allowed.
5. When an AUTOMAN Regulated Release is utilized in this configuration, additional regulator actuators cannot be used.
6. Only 3-gallon tanks can be utilized in this configuration.
7. The requirements of the following table must not be exceeded for each 3-gallon tank:



NOTE 1: WHEN THREE 3.0 GALLON TANKS ARE CONNECTED TO ONE AUTOMAN REGULATED RELEASE ASSEMBLY, NO ADDITIONAL REGULATED ACTUATOR ASSEMBLIES CAN BE USED.

NOTE 2: IF THREE 3.0 GALLON TANKS ARE CONNECTED TO THE REGULATOR IN EITHER A REGULATED RELEASE OR REGULATED ACTUATOR ASSEMBLY, UTILIZE FACTORY SUPPLIED EXPELLANT GAS HOSE ASSEMBLIES ONLY.

NOTE 3: LT-A-101-30 WILL NOT FIT INTO AUTOMAN ENCLOSURES (PART NO. 429853 AND 429856).

FIGURE 4-164
008126

9.0 GALLON SYSTEM

Requirements	Supply Line	Duct Branch Line	Plenum Branch Line	Appliance Branch Line
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)**	2 ft (0.6 m)**	2 ft (0.6 m)**
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

* **Exceptions:**

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

Special Instructions:

1. When four Dean Industries GTI Gas Fryers are protected at low proximity as shown in Figure 4-67 on page 4-26, the discharge piping must be as shown in Figure 4-68 on page 4-26.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one 2W duct nozzle, one 1/2N electrostatic precipitator nozzle, one 1N plenum nozzle, and four two-flow appliance nozzles. Contact the Applications Engineering Department for additional information.

** Maximum rise above Supply Line.

DETECTION SYSTEM REQUIREMENTS

Once the fire suppression system design has been determined, a detection system design must be completed. This section contains guidelines and limitations for detection system installation.

Stainless Steel Wire Rope: The 1/16 in. stainless steel with blue tracer cable is run between the terminal detector, through conduit, all series detectors and pulley elbows, and into the regulated release mechanism trip lever. When any fusible link separates, the tension on the cable is released, and the trip lever actuates the regulated release mechanism.

Detector Identification

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

1. The Terminal Detector is the last in a series of detectors, or the only detector used in a single-detector system. This detector is thus named because it is at the point at which the wire rope ends, or *terminates*.
2. A Series Detector is any detector located in-line between the regulated release mechanism and the terminal detector.

Detector/Pulley Elbow/Conduit Offset Design Limitations

1. Conduit runs, pulley elbows, and number of detectors per system must be within the approved system guidelines. The following requirements must not be exceeded:

	Maximum Number of Detectors per System	Maximum Number of Elbows per System	Maximum Wire Rope Length
Scissors Style Detector (Without Offset Conduit)	15	20	150 ft (45.7 m)
Scissors Style Detector (With Offset Conduit)	15	16	150 ft (45.7 m)

2. If the hazard requires more than 15 detectors, up to five 101 Remote Releases (Part No. 433485) can be used for system actuation. Each 101 remote release allows the use of a maximum of 15 scissor style detectors (14 series and 1 terminal) for a total of 75 detectors if needed.

Detector Placement Requirements

EXHAUST DUCTS

Each exhaust duct must have at least one detector installed in the duct entrance, located in the airstream of the cooking vapors, or at a maximum of 20 ft (6.0 m) into the duct opening. See Figure 4-165.

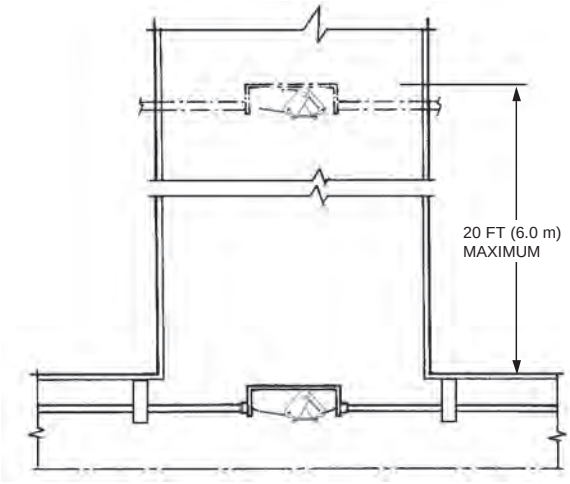


FIGURE 4-165
000271

NOTICE

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

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

ELECTROSTATIC PRECIPITATOR

If an electrostatic precipitator is located at or near the base of the exhaust duct, it is necessary to locate a detector below the precipitator, at the base of the duct, and also locate one in the duct, just above the precipitator. See Figure 4-166.

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

Note: On secondary filtration units utilizing multiple filter stages/media, contact Technical Services for instructions.

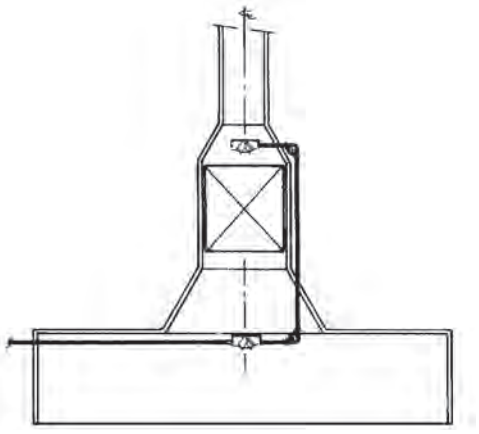


FIGURE 4-166
000268

DETECTION SYSTEM REQUIREMENTS (Continued)

Detector Placement Requirements (Continued)

COOKING APPLIANCES

If the cooking appliance is located under an exhaust duct where a detector has been mounted, it is normally not necessary to utilize another detector for that cooking appliance, provided the detector is not more than 12 in. (304 mm) into the duct and the appliance has no larger cooking surface than 48 in. x 48 in. (1,219 mm x 1,219 mm). See Figure 4-167.

Note: If two appliances are located under a duct opening where a detector has been mounted and both appliances together do not exceed a cooking surface of 48 in. x 48 in. (1,219 mm x 1,219 mm) and the detector is located above both the protected appliances, it is not necessary to utilize an additional detector provided the duct detector is not more than 12 in. (304 mm) into the duct opening.

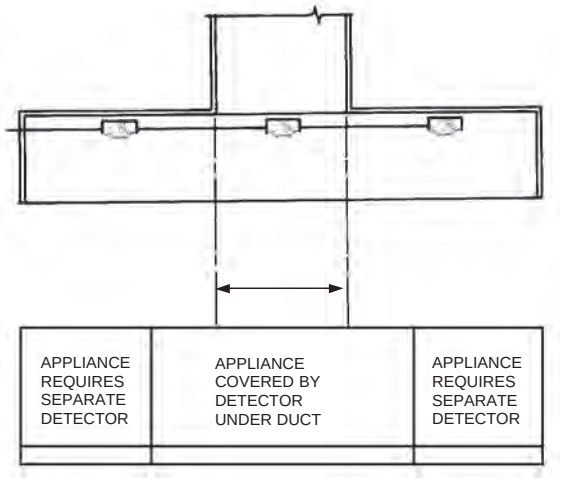


FIGURE 4-167
000269

Each cooking appliance with a continuous cooking surface not exceeding 48 in. x 48 in. (1,219 mm x 1,219 mm) can be protected by a minimum of **one** detector. Cooking appliances with a continuous cooking surface exceeding 48 in. x 48 in. (1,219 mm x 1,219 mm) must be protected by at least **one detector per 48 in. x 48 in. (1,219 x 1,219 mm) cooking area.** Detectors used for cooking appliances must be located above the protected appliance toward the exhaust duct side of the appliance. Locate the detector in the air stream of the appliance to enhance system response time.

Note: For overlapping appliance protection detector coverage, see page 4-72 for design requirements.

Detection Line Requirements

CONDUIT

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

NOTICE

The conduit offset can be used at the top of the regulated and remote release assemblies to change direction of the conduit. All other changes in direction must be made by using ANSUL® approved pulley elbows. See Figure 4-168.

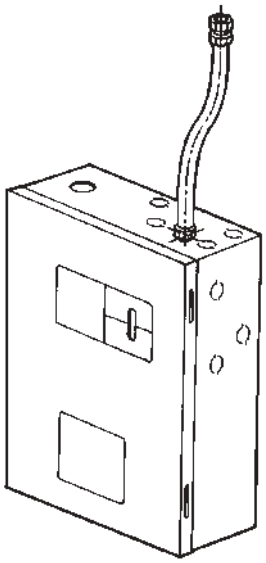


FIGURE 4-168
000270

Fusible Link Selection

When possible, take temperature readings at each detector location to determine correct fusible link temperature rating. Temperature can be recorded using either a maximum registering thermometer (Part No. 15240) temperature tape or any other accurate thermometer.

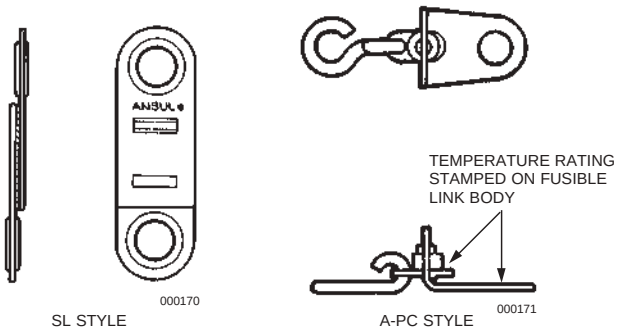


FIGURE 4-169
000170, 000171

Select correct UL Listed fusible links for installation in detectors according to the temperature condition. Two styles are available. See Figure 4-169. See *Component Section* for detailed temperature ratings.

DETECTION SYSTEM REQUIREMENTS (Continued)

Electric Thermal Detector

When electric thermal detection is used, the detection circuit must be supervised in accordance with NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*. Electric thermal detectors must be used in conjunction with either the AUTOPULSE 542R control panel (Part No. 433607) or the AUTOPULSE Z-10 control panel (Part No. 430525), and the 24 VDC regulated release assembly (Part No. 429859).

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

Note: Panels Z-10 and 542R only have a UL approval rating. A ULC rating is not available.

After determining the maximum ambient temperature at the thermal detector location, select the correct thermal detector according to the temperature condition chart in the *System Components* section.

Note: For installation instructions for 24 VDC AUTOMAN (AUTOMAN II-C) regulated release, the AUTOPULSE control panels, and/or electric thermal detection, refer to the appropriate manuals:

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

MANUAL PULL STATION REQUIREMENTS

A remote manual pull station allows the R-102 system to be manually operated at some point distant from the regulated release assembly. Install the pull station at a height of 42 in. to 48 in. (1,067 mm to 1,219 mm), in accordance with the requirements of the American Disabilities Act (ADA) and the Authority Having Jurisdiction (AHJ). and located in the path of egress. The pull station is the only source of manual actuation of the regulated release assembly.

The total length of the cable used for each manual pull station within a system must not exceed 150 ft (45.7 m).

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

One pulley tee is allowed per cable system.

The maximum length of cable from the AUTOMAN releasing device to a pull station is 150 ft (45.7 m) with a maximum of 20 pulley elbows used per side of the tee. As the tee is located farther from the AUTOMAN releasing device, the 150 ft (45.7 m) maximum must be observed, however as pulley elbows are placed between the AUTOMAN releasing device and the tee, the pulley elbows must be deducted from the available pulley elbows (20) allowed on each side.

Example: If 10 pulley elbows are placed between the AUTOMAN releasing device and the pulley tee, the maximum available pulley elbows left for use on each side of the tee is 10 per side. See Figure 4-170 for three different examples.

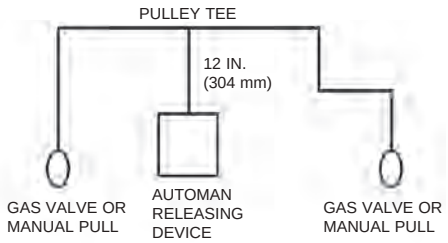
Note: Both must be gas valves or both must be pull stations. Mixing is not allowed.

Note: Unbalanced system are acceptable as long as the maximum length is not exceeded.

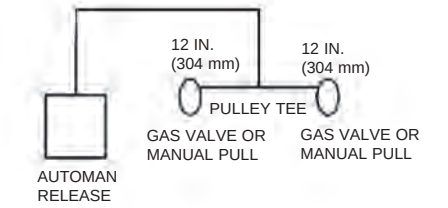
NOTICE

The conduit offset (see Figure 4-168) can be used at the top of the regulated and remote release assemblies to change direction of the conduit. The conduit offset cannot be used with pulley tees. All other changes in direction must be made by using ANSUL® approved pulley elbows.

Tee close to AUTOMAN releasing device (Example)



Tee close to gas valves or manual pull (Example)



Tee halfway between AUTOMAN Release and gas valves or manual pull (Example)

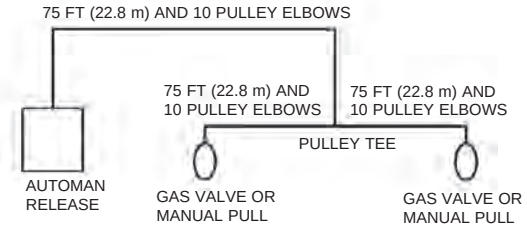


FIGURE 4-170
004907a

Manual Pull Station – Part No. 435960 or 434618

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

Description	Part No.
Remote Manual Pull Station Assembly (with 50 ft (15.2 m) wire rope)*	435960
Remote Manual Pull Station Assembly	434618
Pulley Elbow Compression Style (50 pack)	423251
Pulley Elbow Socket Style (50 pack)	415671
Pulley Tee	427929

* Assembly includes parts listed below:

1/16 in. Stainless Steel Wire Rope 50 ft (15.2 m)	-
Stop Sleeve (1)	-
Break Rod (1)	-

MECHANICAL GAS VALVE REQUIREMENTS

An ANSUL® gas valve or ANSUL® approved mechanical gas shut-off valve system can be attached to the R-102 system. The system works both mechanically and pneumatically by use of an air cylinder located inside the regulated release assembly. Upon actuation of the fire suppression system, a pneumatically-operated air cylinder assembly mechanically closes the gas shut-off valve.

The total length of the cable for each mechanical gas valve must not exceed 150 ft (45.7 m). The maximum number of pulley elbows that may be used is 20 for each valve.

One pulley tee is allowed per cable system.

The maximum length of cable from the AUTOMAN releasing device to a gas valve is 150 ft (45.7 m) with a maximum of 20 pulley elbows used per side of the tee. As the tee is located farther from the AUTOMAN releasing device, the 150 ft (45.7 m) maximum must be observed but as pulley elbows are placed between the AUTOMAN releasing device and the tee, they must be deducted from the available pulley elbows (20) allowed on each side.

Example: If 10 pulley elbows are placed between the AUTOMAN releasing device and the pulley tee, the maximum available pulley elbows left for use on each side of the tee is 10 per side. See Figure 4-170 for three different examples.

Parts that may be used for installation of a Mechanical Gas Shut-off Valve are:

Description	Part No.
Gas Valve/Actuator 3/4 in. Assembly (ANSUL®)*	55598
Gas Valve/Actuator 1 in. Assembly (ANSUL®)*	55601
Gas Valve/Actuator 1 1/4 in. Assembly (ANSUL®)*	55604
Gas Valve/Actuator 1 1/2 in. Assembly (ANSUL®)*	55607
Gas Valve/Actuator 2 in. Assembly (ANSUL®)*	55610
Gas Valve/Actuator 2 1/2 in. Assembly (ASCO)*	25937
Gas Valve/Actuator 3 in. Assembly (ASCO)*	25938
Pulley Elbow Compression Style (50 pack)	423251
Pulley Elbow Socket Style (50 pack)	415671
Pulley Tee	427929
1/16 in. Stainless Steel Cable 50 ft (15.2 m) or 500 ft (152.4 m) roll	15821 or 79653
Oval Press-To-Crimp Sleeve	4596
Stop Sleeve (2)	26317

* Assembly includes parts listed below:

Air Cylinder Assembly	15733
Air Cylinder	-
Tubing Assembly	-
Copper Tubing, 1/8 in.	-
Male Elbow	-
Male Connector	-
Machine Screw (2)	-
Hex Nut (2)	-
Lockwasher (2)	-
Lead Wire Seal (2)	-

All valves in the previous table are UL listed and approved. They may be mounted in any position. Pipe threads are type NPT. Ambient operating temperature range of all valves is 32 °F to 130 °F (0 °C to 54 °C). The valves are not weather-proof and must be located indoors in areas approved by the authority having jurisdiction.

NOTICE

The conduit offset can be used at the top or bottom of the regulated and remote release to change direction of the conduit. The conduit offset cannot be used with pulley tees. All other changes in direction must be made by using ANSUL® approved pulley elbows. See Figure 4-168.

ELECTRICAL GAS VALVE REQUIREMENTS

A UL Listed electrically-operated gas shut-off valve can be attached to the R-102 system to provide an electrical means of shutting off the gas line at a predetermined point. If an electric gas shut-off valve is used in the system it must be attached with both an electric (snap-action) switch and a manual reset relay. For more information on the types of electric (snap-action) switches, see the *Electrical Switch, Field Installation* section. The manual reset relay is reviewed in this section.

All electrical connections should be performed by a **qualified electrician** and in accordance with authority having jurisdiction.

The following is a brief explanation of how the R-102 system operates with an Electric Gas Shut-off Valve attached:

With the regulated release cocked in the ready condition, the normally closed contacts in the snap-action switch allow current to flow to the manual reset relay. With the relay coil energized, normally open contacts in the reset relay close, allowing the solenoid in the gas valve to be energized.

Once the R-102 system is activated, the normally closed contacts in the snap-action switch opens, de-energizing the reset relay. This opens the contacts in the relay which causes the gas valve to become de-energized and close.

The system must be re-armed and the **push to reset** button on the reset relay must be operated to reopen the gas valve.

It is important to note that a power failure or an electrical power interruption causes the gas valve to close even though the system was not fired.

In either case, whether in a fired condition or when a power failure has occurred, the manual reset relay and electric gas shut-off valve must be reset to resume a normal operating condition. **For resetting, see the *Recharge and Resetting Procedures* section.**

ELECTRICAL GAS VALVE REQUIREMENTS (Continued)

Approvals

ANSUL® gas valves listed in this section are UL listed and approved for 110 VAC. If more information is required, refer to the Gas and Oil Equipment List of Underwriters Laboratories, Inc. under *Electrically Operated Valves Guide No. 440 A5* or
► consult Johnson Controls, Marinette, Wisconsin 54143-USA.

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

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

Note: For electrical wiring diagrams, see *Installation Instructions* Section, pages 5-43 through 5-45.

Parts that may be used for installation of a 110 VAC Gas Shut-off Valve are:

Description	Part No.
Electric Solenoid Valve, 3/4 in. NPT*	13707
Electric Solenoid Valve, 1 in. NPT*	13708
Electric Solenoid Valve, 1 1/4 in. NPT*	550360
Electric Solenoid Valve, 1 1/2 in. NPT*	13709
Electric Solenoid Valve, 2 in. NPT*	13710
Electric Solenoid Valve, 2 1/2 in. NPT*	550363
Electric Solenoid Valve, 3 in. NPT*	17643
Manual Reset Relay (110 VAC)	426151

* Valves are normally closed when de-energized.

ALARM INITIATING SWITCH REQUIREMENTS

The Alarm Initiating Switch can be field mounted within the AUTOMAN release. The switch must be used to close a supervised alarm circuit to the building main fire alarm panel when the AUTOMAN release actuates. This action signals the fire alarm panel that there was a system actuation in the kitchen area. The switch kit contains all necessary mounting components along with a mounting instruction sheet. See page 5-42 for wiring information.

The switch is rated 50 mA, 28 VDC.

Description	Part No.
Alarm Initiating Switch Kit	428311

ELECTRICAL SWITCH REQUIREMENTS

Note: Electrical connections shall not be made in the AUTOMAN releasing device.

The electric (snap-action) switches for the R-102 system are specially designed to fit the regulated release assembly. The switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices, and other electrical devices that are designed to shut off or turn on when the fire suppression system is actuated. (See Figures 5-122 through 5-124 in *Installation* Section for reference).

Contractors shall supply "UL listed, enclosed industrial control equipment or magnetic switch having a rating matching that of the cooking appliance, coil 110 VAC/60 Hz or 24 VAC/60 Hz."

All electrical connections should be performed by a **qualified electrician** and in accordance with authority having jurisdiction.

Electric (Snap-Action) Switches that may be field installed are:

Description	Part No.
One Switch Kit	423878
Two Switch Kit	423879
Three Switch Kit	423880
Four Switch Kit	423881
Two Switch Kit (no wire leads)	436770

Each switch has a set of single-pole, double throw contacts rated at 21 amp, 1 HP, 125, 250, 277 VAC or 2 HP, 250, 277 VAC.

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

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

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

If supervision of the electrical detection, electrical actuation or electrical power supply circuit is provided, it shall give prompt audible or visual indication of trouble and shall be distinctive from alarms or indicators indicating operation or hazardous conditions as specified in NFPA 17A.

INSTALLATION INSTRUCTIONS

The installation information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the installation of the R-102 system must be trained and hold a current ANSUL® certificate in an R-102 training program.

Before attempting any installation, determine the entire system design. This includes the following features of the system design:

- Nozzle Placement
- Tank Quantity
- Actuation and Expellant Gas Piping
- Distribution Piping
- Detection System Requirements
- Installation sketch should be completed

INSTALLING RELEASE ASSEMBLY COMPONENTS

For successful system performance, the regulated release assembly, regulated actuator assemblies, and tank-enclosures or tank-bracket assemblies used must be located in areas where the air temperature does not fall below 32 °F (0 °C) or exceed 130 °F (54 °C). The R-102 system is limited to interior applications only. Arrange the components to conform to the actuation and expellant gas line, and the distribution piping guidelines noted in *System Design*. To install the Release Assembly Components, complete the following steps:

1. **CAUTION**

   Use only an AUTOMAN regulated release assembly or OEM release/bracket assembly. The regulator in this assembly is specifically designed to allow a regulated flow of expellant gas into the agent tanks. Absence of this regulator could cause the tanks to rupture or create an improper system discharge.

   Mount the regulated release assembly, OEM release assembly, and each regulated actuator assembly required by completing the following steps: See Figure 5-1, Figure 5-2, and Figure 5-3.

   a. Select a rigid surface for mounting the enclosure. The mounting locations must allow the regulated release assembly and the regulated actuator assemblies to be within the limitation of the actuation and expellant gas line lengths and must be able to support the weight of the assemblies. When the OEM release assembly or OEM regulated actuator assembly is mounted inside a cabinet, clearances shall be provided for unrestricted movement of the release assembly components within the closed cabinet.

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

   c. Secure the enclosure box to selected mounting location using the four mounting holes. Use the appropriate type of fasteners depending on the mounting surface.

   d. When mounting a 6 gal (22.71 L) manifolded system (or a 9 gal (34 L) system) it is critical that each mounting box is located as shown in Figure 5-3. There must be a 5/16 in. (7.9 mm) space between each box. Less than 5/16 in. (7.9 mm) causes interference with the covers, and more than 5/16 in. (7.9 mm) causes a gap between the two hose grommets which exposes the hose to possible tampering or damage.

      Remove the 7/8 in. (22 mm) knockout on the left side of the AUTOMAN release box and remove the 7/8 in. (22 mm) knockout on the right side of the tank enclosure box. Install grommets in each (use ANSUL® hose/grommet package (Part No. 418511)). Remove the 1/4 in. plug from the back side of the R-102 regulator, apply pipe tape, and install the end of the secondary expellant gas hose (included in the hose/grommet package) in 1/4 in. regulator outlet and wrench tighten.

      If not already done, mount both of the boxes to a rigid surface using the appropriate fasteners.

      Fill the tanks as described in Steps 3 and 4 on page 5-3.

      Next, route the hose through grommets, apply pipe tape, and wrench tighten into the 1/4 in. inlet of the adaptor on the tank in the tank/enclosure assembly. Also install the hose to tank adaptor in the regulated release and wrench tighten. See Figure 4-149 in *System Design* for details of hose routing.

REGULATED RELEASE ASSEMBLY/REGULATED ACTUATOR ASSEMBLY/DOUBLE TANK ENCLOSURE

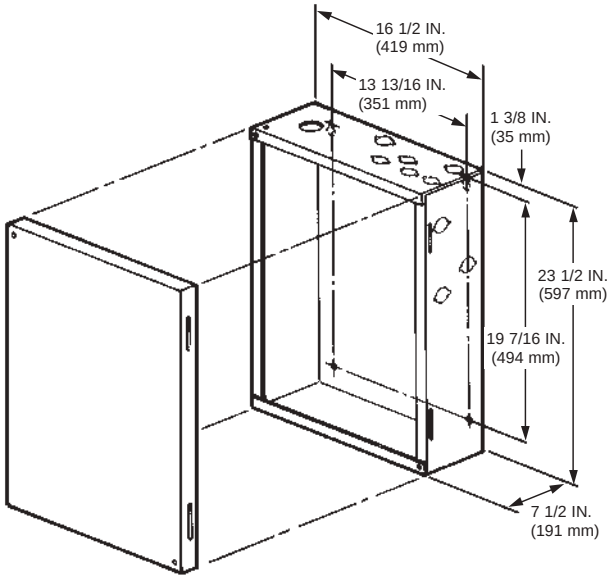


FIGURE 5-1
000287

▸ INSTALLING RELEASE ASSEMBLY COMPONENTS (Continued)

Step 1.d. (Continued)

OEM RELEASE/BRACKET ASSEMBLY

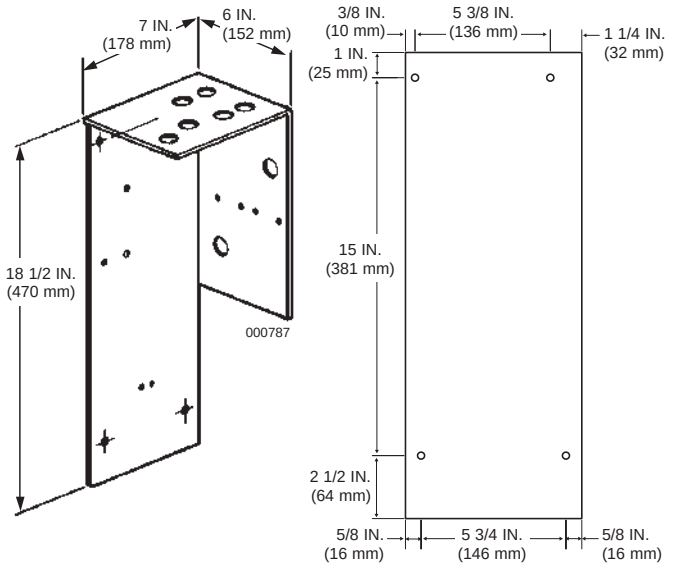


FIGURE 5-2
009478

MOUNTING HOLE DIMENSIONS

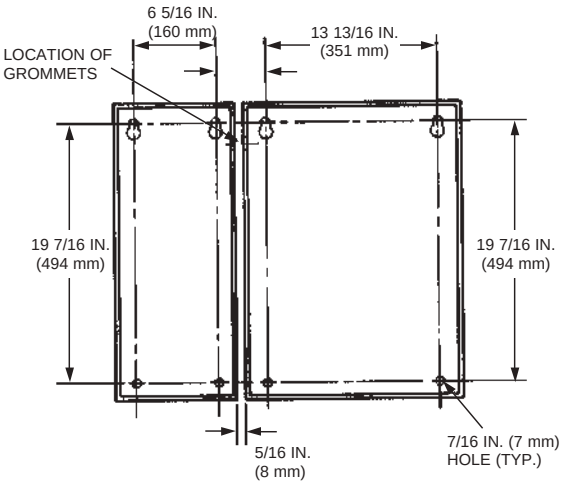


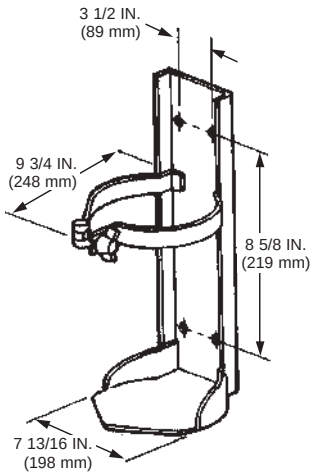
FIGURE 5-3
000788

CAUTION

Do not install the cartridge at this time. Failure to comply may result in accidental system actuation.

2. Mount each tank-enclosure or tank-bracket assembly by completing the following steps:
   a. Select a rigid, vertical surface for mounting the enclosure or bracket. Keep in mind that the 3 gal tank is taller than the bracket. Allow sufficient space for convenient piping and removal. See Figure 5-4.
   b. Remove the tank from the enclosure or bracket, and secure the enclosure or bracket to the mounting location using the four mounting holes. Use the appropriate type of fasteners depending on the mounting surface.

3 GALLON TANK BRACKET



SINGLE TANK ENCLOSURE/REMOTE RELEASE

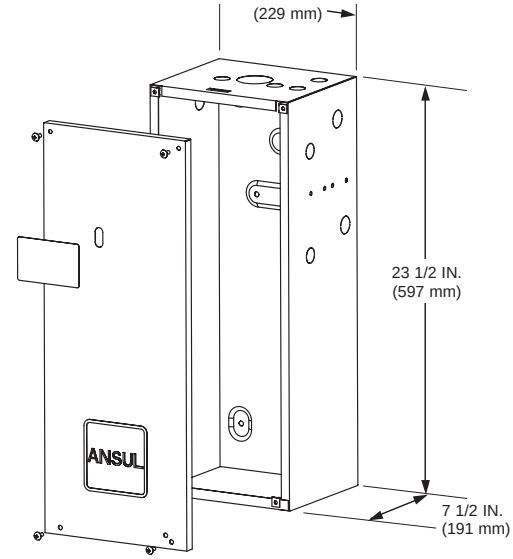


FIGURE 5-4
000499, 000290

► INSTALLING RELEASE ASSEMBLY COMPONENTS (Continued)

3. Fill each agent tank by completing the following steps:
   a. Remove the tank adaptor/tube assembly from the tank fill opening. Visually inspect the tank adaptor to determine bursting disc is in place and that the silver side is away from the tank. See Figure 5-5.

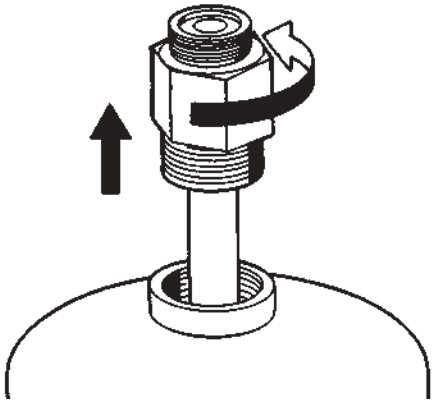


FIGURE 5-5
000291

► **⚠ WARNING**

Safety glasses should be worn during transfer operations of ANSULEX Low pH Liquid Fire Suppressant. Avoid contact with skin or eyes. In case of contact, flush immediately with water for 15 minutes. If irritation persists, contact a physician. Do not take internally. If taken internally do not induce vomiting. Dilute with water or milk and contact a physician immediately.

   b. Place plastic funnel in fill opening and fill tank with 1.5 gal (5.8 L) or 3.0 gal (11.6 L) of only ANSULEX low pH liquid fire suppressant. See Figure 5-6 for detailed filling tolerances.

Note: Use a funnel with a screen to stop any foreign material from entering the tank. See Figure 5-6.

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **Do not fill with cold agent. Do not overfill.** Overfilling may result in agent entering gas hoses and regulator potentially causing system malfunction.

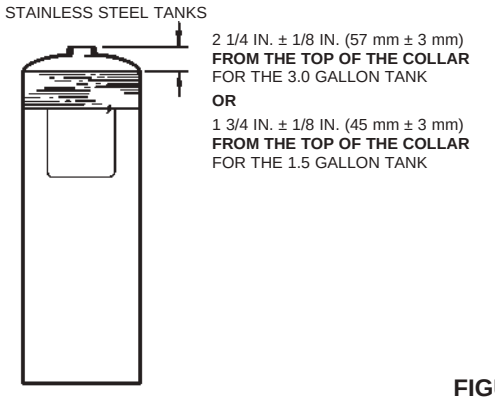


FIGURE 5-6
000292

   c. Reinstall adaptor/tube assembly to tank by tightening until metal to metal contact is achieved between bottom of adaptor and tank collar.

4. Place each tank into its enclosure or bracket.

INSTALLING THE DISTRIBUTION PIPING

Before the following procedures can be completed, determine the piping design and install the actuation and expellant gas lines from the regulated release, each regulated actuator, and each tank-enclosure or tank-bracket assembly.

These installation instructions are identical for single, double, and multiple-tank systems except for the quantity of tanks and hazard areas to be covered.

General Piping Requirements

1. Use Schedule 40 black iron, chrome-plated, or stainless steel pipe and fittings.

   NOTICE

   Do not use hot-dipped galvanized iron pipe or fittings in the agent distribution piping.

2. Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.
3. The distribution piping and fitting connections, located in or above the hood or the protected area, must be sealed with pipe tape. When applying pipe tape, start at the second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening.

   NOTICE

   Do not overlap the pipe opening with tape as the pipe and nozzles could become plugged.

   Thread sealant or compound must not be used as it could plug the nozzles.

4. Distribution piping may be run independently or two agent tanks may be manifolded together and run to the predetermined hazard area. Only agent tanks expelled from the same cartridge may be manifolded.

   NOTICE

   Closely follow the piping requirements for each size system, as detailed in the *System Design* section, when installing distribution piping.

5. Branch line tees can be used to create more than one branch and can be installed as a thru tee, side outlet tee or bull tee.

Pipe Hanger Guidelines

1. Space hangers as follows:

Pipe Size	Maximum Distance Between Hangers
3/8 in.	5 ft (1.5 m)

2. Place hangers between elbows when the distance is greater than 2 ft (0.6 m).

Installing the Pipe Network

1. Starting at the tank, pipe directly from the union located on the tank adaptor. A reducing fitting may be necessary to conform to the distribution piping.
2. Based on the piping sketch developed in the *System Design* section of this manual, install the supply line and position the tees at points where branch lines must be installed. See Figure 5-7.
3. Run all branch lines to the hazard area and connect each nozzle. Make certain all piping is securely bracketed.

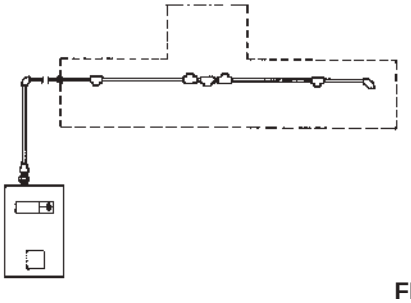


FIGURE 5-7
000302

4. Make certain all threaded connections are properly tightened. Threaded connections located in the protected areas and above the hood must be sealed with TEFLON* pipe tape, as a minimum. Apply pipe tape to male threads only. Make certain tape does not extend over the end of the thread, as this could cause blockage of the agent distribution.

   Pipe tape minimizes friction between the bearing surfaces of the threads when threading pipe to fittings. The resulting heat may expand the pipe threads before the joint is properly made. When the pipe threads cool and contract in the fitting, the joint may become loosened causing cooking grease to migrate into the distribution piping, and/or leakage at the fitting during a pressure test or agent discharge.

   Note: When required to provide pressure testing of the pipe or a system discharge test, use TEFLON pipe tape for all pipe connections.

5. Install the correct nozzles for each hazard area as previously designed. Some nozzles are required to be properly oriented before they are positioned for aiming.

* TEFLON is a trademark of Chemours.

INSTALLING THE DISTRIBUTION PIPING (Continued)

Installing the Pipework (Continued)

6. Aim the nozzles to a pre-determined aim point in accordance with the instructions in the *System Design* section. Using the nozzle aiming device aids in the aiming process. The device clamps to the nozzle and emits a small laser light that reflects on the surface where it is aiming. If the nozzle is used with a swivel adapter, the nozzle with the aiming device can be rotated to the exact aiming point and then tightened to hold that angle.
7. Optional: Before installing blow-off caps on nozzles, apply a small amount of HP-300 Grease across the opening in the nozzle tip. Also apply a small amount to coat the exterior of the blow-off cap. **Do not force the grease into nozzle tip opening or fill cap with grease.**
8. Make certain a blow-off cap is in place over each nozzle tip. These blow-off caps are designed to keep grease from building-up on the nozzle orifice and inhibiting the agent flow. See Figure 5-8.

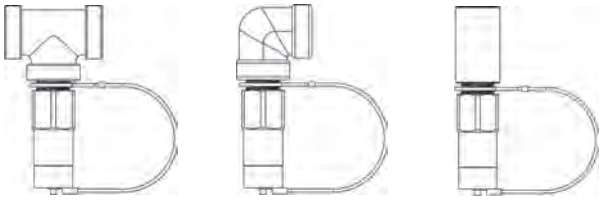


FIGURE 5-8
011883, 011885, 011884

INSTALLING THE AGENT DISTRIBUTION HOSE

The agent distribution hose can be used in the supply line or appliance branch line to allow a castered cooking appliance with castered supports with nozzles attached directly to the appliance, to be moved out of its normal operating position for service or cleaning. See page 4-80 for installation/design limits for the agent distribution hose.

CAUTION

The following instructions must be followed in their entirety. Failure to do so may result in the R-102 Fire Suppression System not functioning properly due to incorrect installation.

Critical Installation Requirements

1. The agent distribution hose shall not be concealed within or run through any wall, floor, or partition, and shall not have any direct exposure to excessive heat or radiant flame from the cooking appliances.
2. Strong cleaning solutions or chemical substances must not come in contact with the agent distribution hose. These may include acids, solvents, fluxes with zinc chloride, or other chlorinated chemicals. In case of contact, rinse down the agent distribution hose with water and dry thoroughly.
3. Contact with foreign objects, sharp edges, wiring, or substances must be avoided.
4. Bending and flexing of the agent distribution hose on moveable appliances (factory equipped with casters) should be limited to pulling and pushing the appliances in or out for cleaning or maintenance. The hose shall never be installed or bent tighter than a 3 in. (76 mm) radius (6 in. (152 mm) diameter) loop.
5. The agent distribution hose must not be kinked, twisted, or have sharp bends when installed or when equipment is pulled away from the wall.
6. Make sure that all fittings are tightened properly.
7. Adequate means must be provided to limit the movement of castered appliances. A 36 in. (914 mm) long restraining cable supplied with the agent distribution hose is required to be used for all castered appliances using the agent distribution hose. See restraining cable Installation Instructions.
8. The restraining cable requires periodic maintenance to help ensure proper operation.
9. The restraining cable must be attached to the wall and appliance anytime the distribution hose is connected to the appliance.
10. Do not over-extend the agent distribution hose when moving equipment for cleaning, maintenance and other activities.

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS

Before proceeding, **carefully** read all instructions, including all *Critical Installation Requirements* (see previous page).

General Requirements

1. The agent distribution hose (which is part of the discharge hose and restraining cable kit (Part No. 435982)), is 1/2 in. (13 mm) diameter x 60 in. (1,524 mm) long and is provided with two male NPT swivels for ease of installation.
2. Maximum of six agent distribution hoses can be used in each agent distribution piping network.
3. Maximum of two agent distribution hoses are allowed in the supply line.
4. Maximum of two agent distribution hoses are allowed in the branch line. An acceptable installation scenario would be providing separate protection of two (side-by-side) appliances, each with its own agent distribution hose and tether, supplied from the same appliance branch.
5. The agent distribution hose is never to be used to manifold two 3 gal (11.4 L) tanks.

Installation Requirements

1. Agent distribution hose must be connected to 3/8 in. NPT black iron, chrome-plated, or stainless steel fittings. The connection from hose to fitting requires a 1/2 in. x 3/8 in. reducing coupling (Part No. 436228). All agent distribution hose connections must be sealed with pipe tape. When applying pipe tape, start at the second male thread on the swivel ends of the hose. Wrap the tape (two turns maximum) clockwise around the threads, away from the hose end fitting opening.
2. All connections of distribution piping to agent distribution hose for castered appliances, with distribution nozzles installed to the appliance, must be located behind the cooking equipment in an area protected from obstructions and possible wear or damage.
3. Run the 3/8 in. schedule 40 pipe from the hose connection to the distribution nozzles installed to the appliance. Install the pipe adequately secured at a height at or below the cooking surface of the appliance. (See Figure 5-14.)
4. All existing distribution pipe and fitting limitations must be observed and followed. Each flexible distribution hose used is to be considered as an equivalent length of 3/8 in. pipe when calculating the acceptable length of allowable distribution pipe. Each hose is 5 ft (1.5 m) long.
5. Hose is to be installed in a way that does not cause kinking or collapse. The bend of the installed hose to be no less than a 3 in. (76 mm) bend radius (6 in. (152 mm) diameter).
6. Each fitting on the hose must be hard mounted to solid surfaces to avoid damage at hose-to-fitting connections and to avoid changing of nozzle aim points.
7. Hose installation must avoid direct contact with flame. If the hose is ever subject to flame, it must be replaced immediately.
8. Hood penetration seal is to be used to connect each fitting of the hose to the hood. The hose is not to pass through the hood, as sharp edges of the hood can cause damage to the hose coating.

NOTICE

For all castered appliances, place all hose-to-pipe connection fittings in a vertical down position. See Figure 5-9.

9. Position the hose connections below an elevation where the hose could be exposed to the radiant or convected heat generated by normal cooking operations, such as the horizontal plane of appliance's cooking surface, or to heat from appliance exhaust. As a minimum height, the hose connection shall be no lower than 30 in. (762 mm) from the floor. The distribution piping shall be supported and secured in accordance with local plumbing practices.
10. Hose ends are to be offset 6 in. to 8 in. (152 mm to 203 mm) center to center of fittings (See Figure 5-9) to maximize hose life expectancy and facilitate appliance movement. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (76 mm) bend radius (6 in. (152 mm) diameter). For stationary installations the fittings do not need to be placed in vertical down position and hose ends do not require an offset of 6 in. to 8 in. (152 mm to 203 mm).

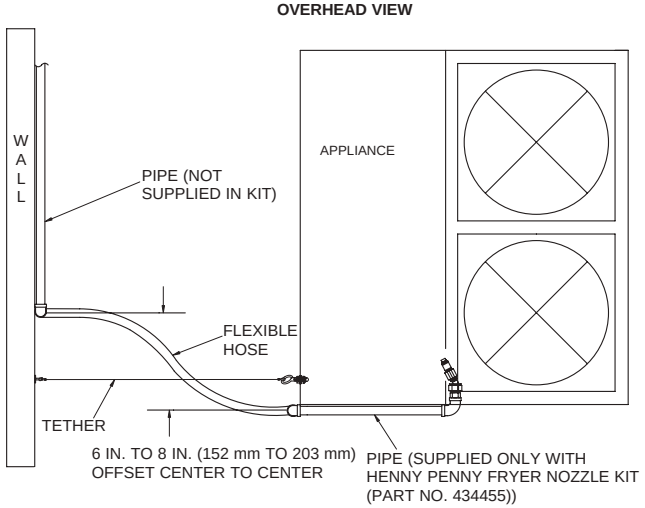


FIGURE 5-9
007828

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)

Installing the Restraining Cable

Important: A restraining cable (for movable equipment only) shall always be permanently attached to the appliance and wall directly behind the appliance when the agent distribution hose is installed. Removal of this cable shall only occur when the agent distribution hose is not installed to the appliance.

See Figure 5-10 for mounting the restraining cable to the wall. See Figure 5-11 for mounting the restraining cable to the back of an appliance.

RESTRAINING CABLE - WALL-MOUNTED OPTION

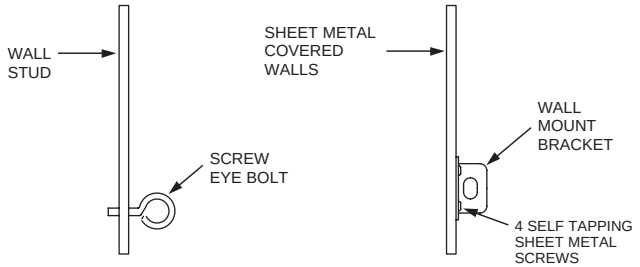


FIGURE 5-10
008088

RESTRAINING CABLE - APPLIANCE-MOUNTED OPTION

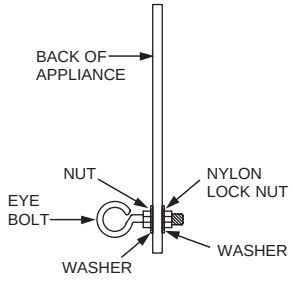


FIGURE 5-11
008089

RESTRAINING CABLE - HENNY PENNY-MOUNTED OPTION

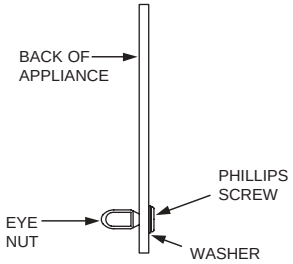


FIGURE 5-12
008090

1. Connect the restraining cable from the appliance to the wall or some other structurally sound object capable of restraining the castered appliance from being able to be pulled or pushed out to a point that results in strain or stress to the agent distribution hose.
2. Install the restraining cable in line with the agent distribution hose.
3. For sheet metal covered walls, the restraining cable assembly includes four 3/4 in. x #8 self tapping sheet metal screws, and a restraining cable bracket. Securely attach the restraining cable bracket to the sheet metal covered wall using the 3/4 in. x #8 self tapping metal screws provided.
4. For mounting to wall studs, the restraining cable assembly includes one screw eye lag bolt, 5/16 in. x 2 1/2 in. (64 mm) long.
5. Locate a structural area or frame on the rear side of the equipment that is in line with the wall attachment.

   Note: It may be necessary to contact the appliance manufacturer for a suitable location. Use caution when drilling hole, so that internal components are not damaged.

   Drill a 5/16 in. (7.9 mm) diameter hole.
6. The restraining cable assembly also includes a 5/16 in. threaded eye-bolt, 5/16 in. hex head nut, 5/16 in nylon lock nut, and two 5/16 in. flat washers. Thread the included hex nut onto the eye-bolt. Slide one washer onto the eye-bolt threads next to the nut. Then, slide the eye-bolt through the drilled hole and place a washer and nylon locknut onto the eye-bolt on the inside frame of the equipment. Tighten securely.
7. Attach one of the snap hooks included in the restraining cable package on the end of the restraining cable to the wall bracket and the other snap hook to the eye-bolt (See Figure 5-13). After snap-hooking the assembly, seal the restraining cable loops to the wall bracket and appliance connection hardware with lead wire seal (Part No. 197).

   Note: For the Henny Penny Pressure Fryers that utilize the ANSUL® Henny Penny fryer nozzle kit (Part No. 434455) the 5/16 in. Phillips screw supplied in the Henny Penny fryer nozzle kit, the 5/16 in. eye nut, and 5/16 in. washer included in the restraining cable assembly kit, must be used (See Figure 5-12).

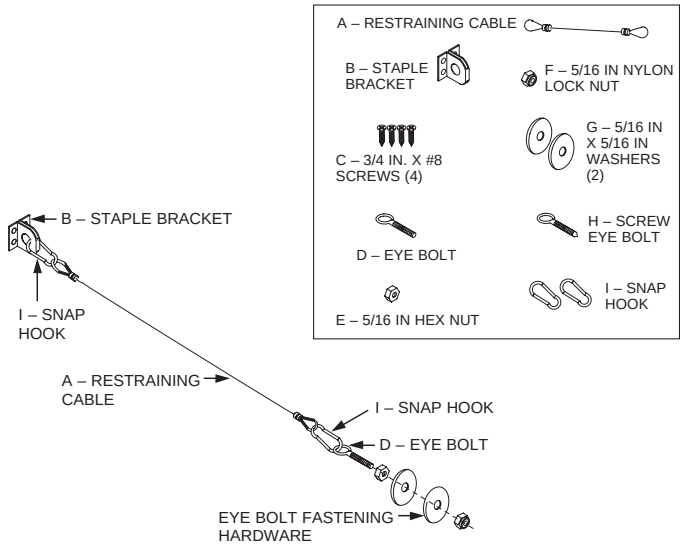


FIGURE 5-13
007829

AGENT DISTRIBUTION HOSE INSTALLATION INSTRUCTIONS (Continued)

Final Installation Guidelines and Checkout Procedures

After the agent distribution hose and the restraining cable is properly installed, carefully push the appliance back to its normal operating position. Check that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance.

1. Verify the restraining cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the agent distribution hose or hose-to-pipe connections.
2. Make certain there are no sharp bends and kinks in the hose when pulling out the cooking equipment.
3. The agent distribution hose should always be in a vertical natural loop, never having any bends smaller than a 3 in. (76 mm) radius (6 in. (152 mm) diameter), hose twists, or sharp bends (See Figure 5-14). If any of these conditions exist, the hose and/or hose connections require installation modifications.

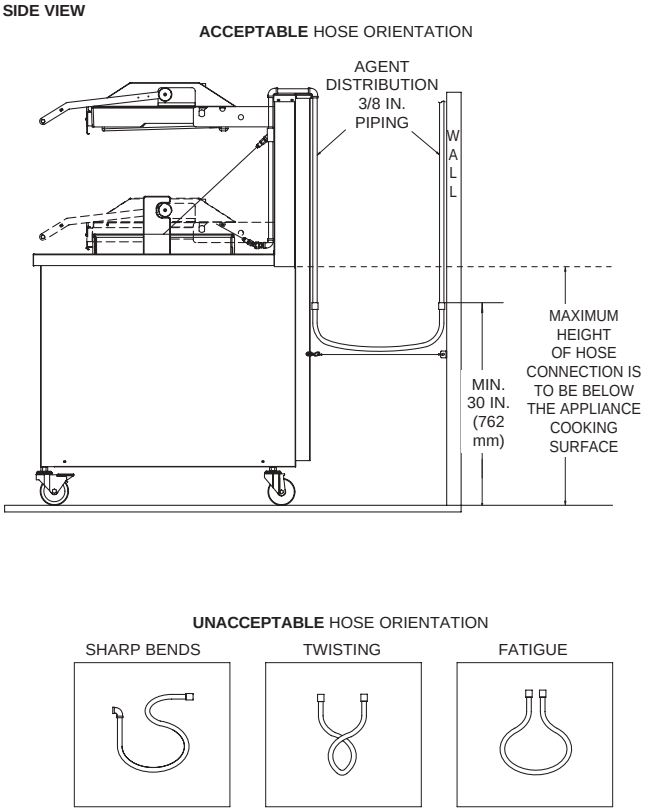


FIGURE 5-14
007830

4. Return the appliance to its normal operating position in accordance with NFPA 17A. Means shall be provided to verify that the appliance returns to its original designed positioning. Failure to do so may result in undue stress and fatigue of the hose and hose connections.

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE

Determine the design before installing any actuation or expellant gas line. Confirm the regulated release assembly, each regulated actuator assembly and each tank-bracket assembly are securely mounted.

General Piping Requirements

1. Use only 1/4 in. Schedule 40 black iron, hot-dipped galvanized, chrome-plated, or stainless steel pipe and fittings.

CAUTION

Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.

2. The piping and fitting connections must be sealed with pipe tape. When applying pipe tape, start at the second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening.

NOTICE

Do not overlap the pipe opening with the tape as this could cause possible blockage of the gas pressure.

Thread sealant or compound must not be used.

3. When connecting actuation or expellant gas line piping, install a 1/4 in. union near the tank inlet for easy disassembly later.

Note: Expellant gas line cannot use stainless steel braided hose.

Actuation Gas Line

Install actuation gas line from the regulated release mechanism high pressure side outlet (side opposite regulated outlet) through the appropriate knockout in the enclosure by completing the following steps:

1. Remove the 1/4 in. plug from high pressure side outlet. Install the appropriate fitting for additional equipment attachment as required.
2. Run piping or hose up through the regulated release assembly enclosure knockout to the inlet on top of each regulated actuator assembly used within the system. Depending on number of devices being actuated, see Figure 5-15 for connection methods.

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

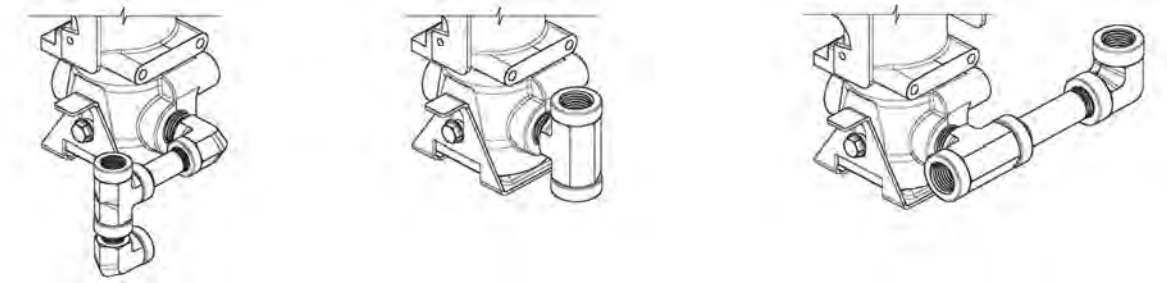
Actuation Gas Line (Continued)

3. The total combined length of the 1/4 in. actuation gas line from the regulated release assembly to all regulated actuator assemblies must not exceed 20 ft (6 m) of 1/4 in. pipe or 17 1/2 ft (5.3 m) of 1/4 in. Stainless Steel (SS) actuation hose. When using an LT-20-R nitrogen cartridge, an LT-30-R nitrogen cartridge, a 101-10 CO_2 cartridge, or a 101-20 CO_2 cartridge. See Figure 5-16.
4. If an expellant gas line is connected to the regulated release assembly along with an actuation gas line, the total combined length of the actuation and expellant gas line **must not** exceed 30 ft (9.1 m) of 1/4 in. pipe when using a double-tank nitrogen cartridge or a LT-A-101-30 nitrogen cartridge or a 101-30 carbon dioxide cartridge. See Figure 5-17.
5. A combined total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

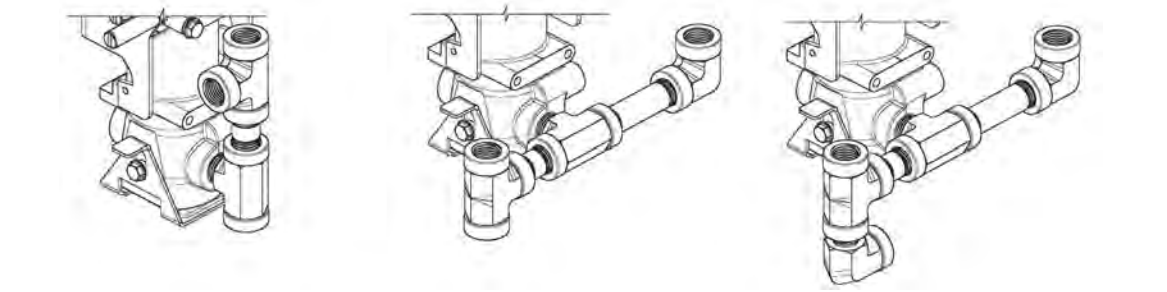
TYPICAL ARRANGEMENTS FOR A ONE DEVICE CONNECTION TO CARTRIDGE RECEIVER



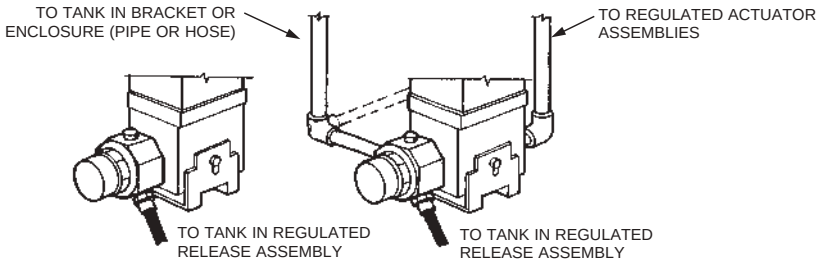
TYPICAL ARRANGEMENTS FOR A TWO DEVICE CONNECTION TO CARTRIDGE RECEIVER



TYPICAL ARRANGEMENTS FOR A THREE DEVICE CONNECTION TO CARTRIDGE RECEIVER



TYPICAL ARRANGEMENTS FOR REGULATOR CONNECTIONS



NOTE: WHEN PIPE IS USED, ALL PIPE AND FITTINGS SHALL BE SCHEDULE 40 (STANDARD WEIGHT) BLACK IRON, HOT-DIPPED GALVANIZED, CHROME-PLATED, OR STAINLESS STEEL.

FIGURE 5-15
011164, 011163, 011162, 000296

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

Actuation Gas Line (Continued)

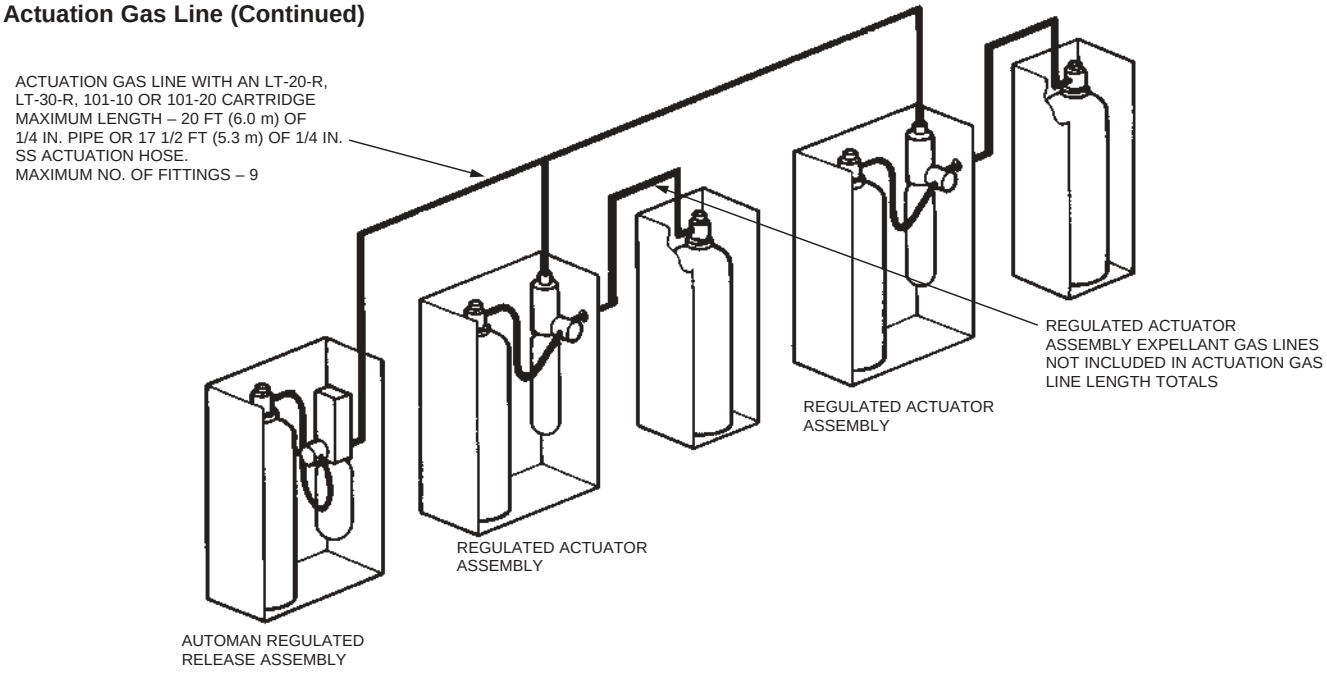


FIGURE 5-16
000775

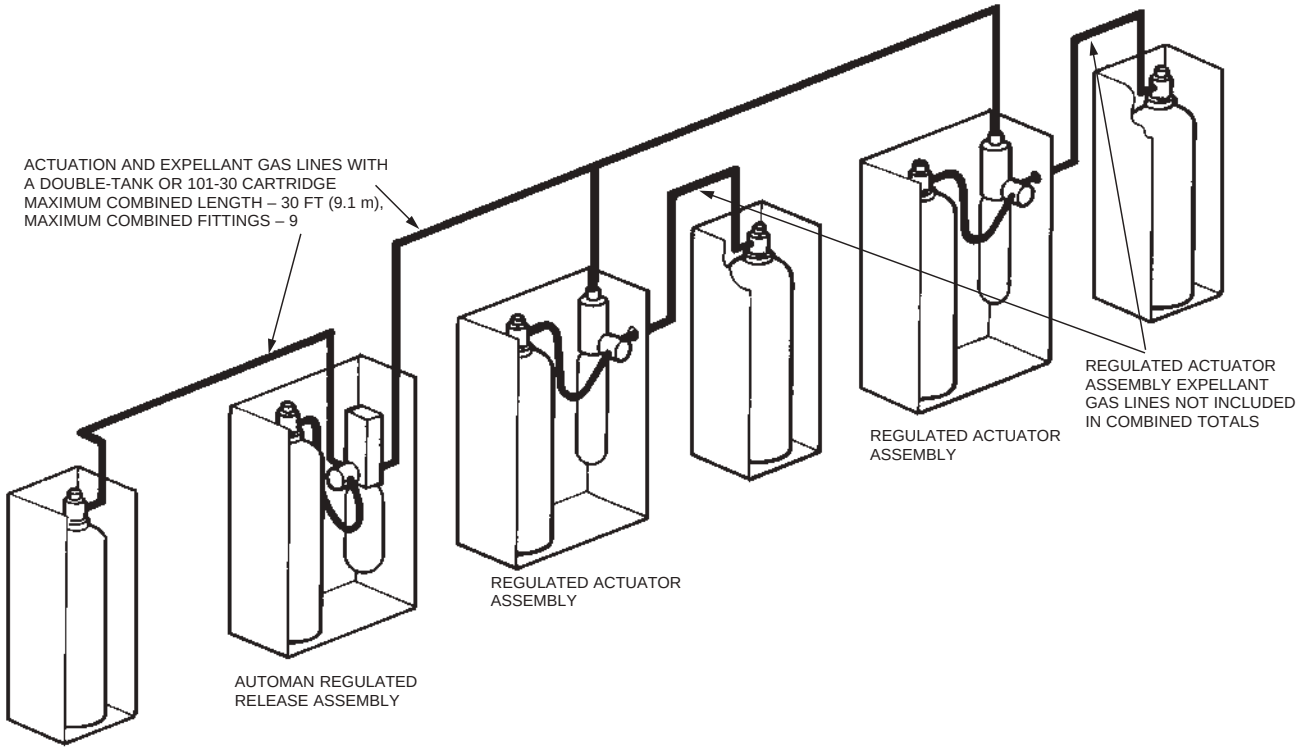


FIGURE 5-17
000298

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

Expellant Gas Line from the Regulated Release Assembly

Install the expellant gas line from the regulated release assembly regulator in the enclosure by completing the following steps:

1. The regulated release assembly is shipped with a factory-installed regulator. The regulator has two 1/4 in. outlets, one at the back and one at the bottom. The bottom outlet connects the expellant gas hose to the agent tank that is mounted inside the enclosure. The back outlet is sealed with a 1/4 in. plug.
2. Connect expellant gas hose to the agent tank mounted inside the enclosure.

NOTICE

If the expellant gas piping is required because of a multiple tank system, remove the plug installed in the back outlet. (See Figure 5-15 for typical arrangements for regulator connections.)

3. Pipe the 1/4 in. expellant gas line from the regulator back outlet through one of the knockouts provided in the enclosure.

   The total length of the expellant gas line from the regulated release assembly **must not** exceed 30 ft (9.1 m) when using a double-tank nitrogen cartridge or a 101-30 CO_2 cartridge. See Figure 5-18.

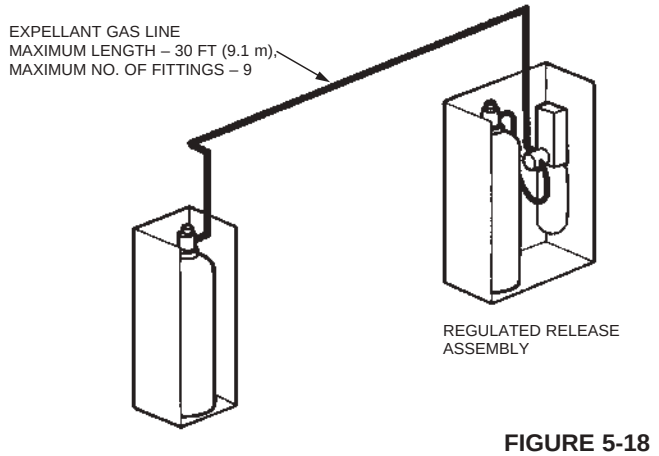


FIGURE 5-18
000776

4. If an actuation gas line is connected to the regulated release assembly along with an expellant gas line, the total combined length of the gas lines **must not** exceed 30 ft (9.1 m) when using a double-tank nitrogen cartridge or a 101-30 CO_2 cartridge. See Figure 5-17.
5. A combined total of nine fittings may be used in these lines, eight 90° elbows, and one tee. Two 45° elbows equal one 90° elbow.

Expellant Gas Line from the Regulated Actuator Assembly

Install expellant gas piping from the regulated actuator assembly regulator through the appropriate knockout in the enclosure by completing the following steps:

1. The regulated actuator is shipped with a factory-installed regulator. The regulator has two 1/4 in. outlets 135° from each other. One outlet is sealed by a 1/4 in. plug and the other contains the expellant gas hose for the agent tank is mounted within the enclosure. Connect the expellant gas hose to the agent tank that is mounted inside the enclosure.
2. Remove the 1/4 in. pipe plug from the regulator side outlet and pipe the 1/4 in. expellant gas line from the regulator through the knockout provided in the enclosure to a tank-enclosure or tank-bracket assembly.

   The maximum length of the expellant gas line from the regulated actuator to the tank-bracket assembly must not exceed 30 ft (9.1 m). See Figure 5-19.
3. A total of nine fittings may be used in these lines, eight 90° elbows and one tee. Two 45° elbows equal one 90° elbow.

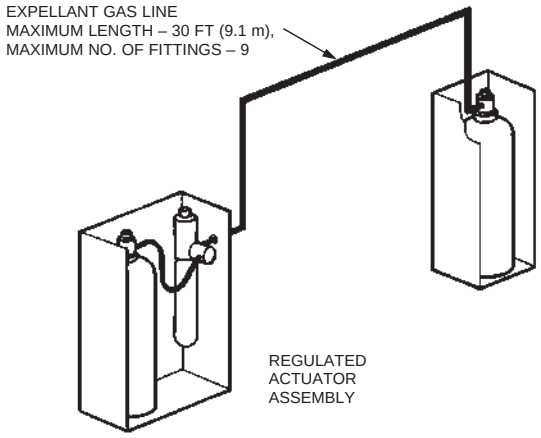


FIGURE 5-19
000777

INSTALLING THE ACTUATION AND EXPELLANT GAS LINE (Continued)

Actuation Gas Line From Remote Releases to Regulated Actuators

HARD PIPE OPTION

Install the actuation gas piping from the remote mechanical releases (max. 5) to the regulated actuators (max. 5) by completing the following:

1. Pipe the 1/4 in. actuation gas line from the 1/4 in. outlet in the remote release receiver, through the knockout provided in the top of the release enclosure, to each regulated actuator assembly.

   The maximum length of the actuation gas line from the remote release to all regulated actuators **must not** exceed 100 ft (30.4 m). See Figure 5-20.

2. A maximum of nine tees and twenty elbows are allowed in the actuation piping. Two 45° elbows equal one 90° elbow. See Figure 5-20.

3. A safety relief valve (Part No. 15677) must be installed in the actuation piping. See Figure 5-20.

ACTUATION GAS LINE – 15* TANKS MAXIMUM – USING 1/4 IN. STAINLESS STEEL HOSE

Note: Not for use with expellant gas line.

1. Maximum total hose length cannot exceed 17.5 ft (5.3 m). See Figure 5-21.

2. Maximum hose length is 42 in. (1,066 mm) between regulated actuators and releases.

3. Maximum of five regulated actuators allowed.

4. Actuated with a maximum of five remote mechanical releases (Part No. 433485) or one regulated release assembly (Part No. 429853).

5. A safety relief valve (Part No. 15677) must be installed in the actuation piping. See Figure 5-21.

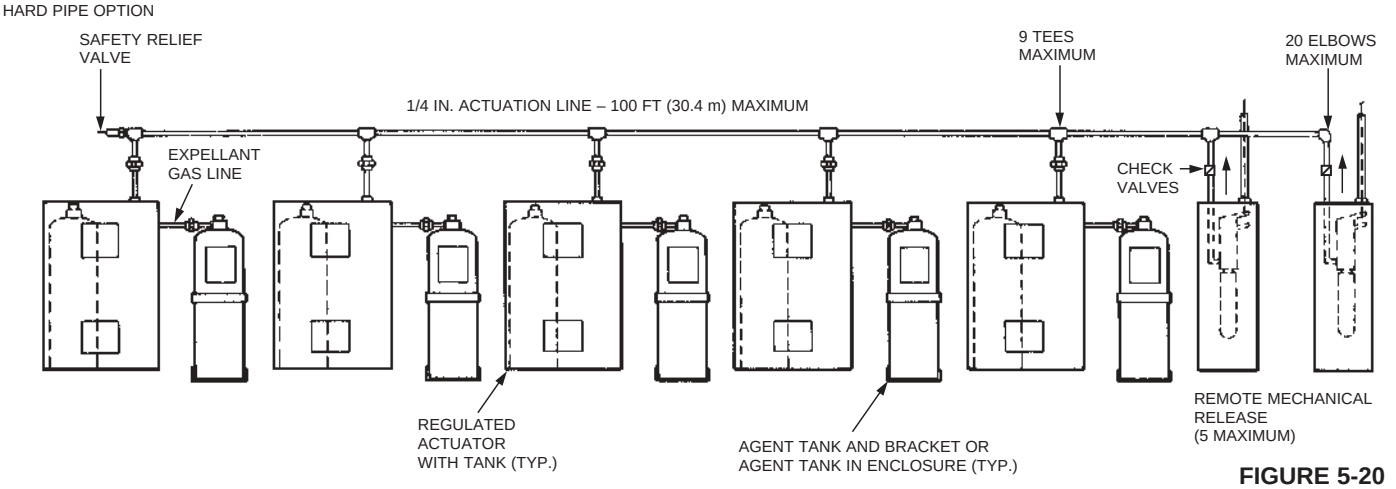
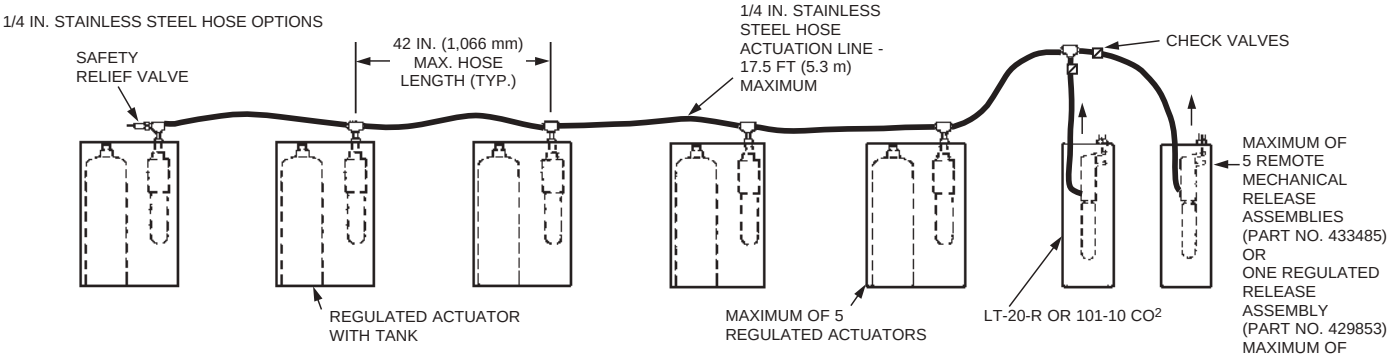


FIGURE 5-20
000301



NOTE: WHEN MULTIPLE REMOTE MECHANICAL RELEASE ASSEMBLIES ARE USED, A 1/4 IN. CHECK VALVE (PART NO. 25627) IS REQUIRED AFTER EACH RELEASE.

*** NOTE:** 15 TANKS MAXIMUM REQUIRES FIVE REGULATED ACTUATORS EACH HAVING THREE TANKS.

FIGURE 5-21
001641b

INSTALLING THE DETECTION SYSTEM

Before completing the following procedures, ensure the detection design is complete. These installation instructions are identical for single, double, and multiple-tank systems except for the number of hazard areas to be covered.

NOTICE

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

NOTICE

No attempt is to be made to disassemble, repair, or clean a Model SL or Model A-PC fusible link. The complete assembly must be replaced if there is any sign of potential malfunction.

1. Based on the requirements listed in the *System Design* section, mount the detectors in their predetermined locations.
2. Run 1/2 in. EMT conduit from the regulated release mechanism trip hammer assembly knockout hole to locations selected for mounting the detectors.

CAUTION

Before assembling the conduit and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and dirt.

When changing the direction of conduit, use only ANSUL® pulley elbows (compression type pulley elbows are recommended) except at the top of the regulated release, it is acceptable to use the conduit offset assembly.

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

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

Part No. 435546 and 435547 are the scissor style series and terminal detector assemblies. These detector assemblies use a detector linkage assembly which does not require the wire rope to be threaded through the linkage assembly while it is being fed through the detection system.

Scissor Style Linkage Installation

1. Secure the conduit to the detector bracket using the two 1/2 in. steel compression fittings on the series detector bracket or the single 1/2 in. steel compression fitting on the terminal detector bracket. See Figure 5-22.

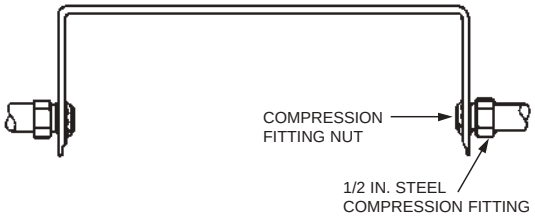


FIGURE 5-22
000306

NOTICE

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

2. For a terminal detector located in a duct or header opening, secure both sides of the detector bracket with conduit, as shown in Figure 5-23.

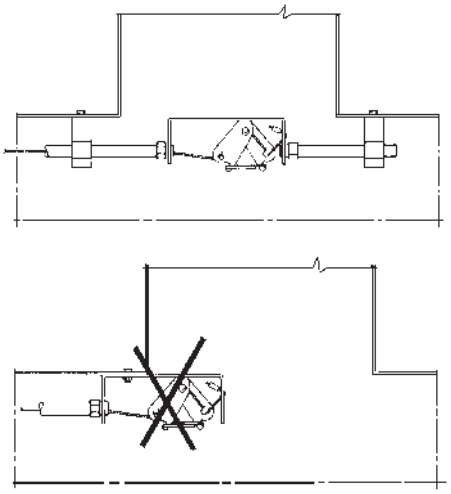


FIGURE 5-23
002463, 002464

INSTALLING THE DETECTION SYSTEM (Continued)

Scissor Style Linkage Installation (Continued)

3. Starting at the release assembly, feed the wire rope through the hole in the release mechanism locking clamp, allowing the excess wire rope to hang down. Do not tighten set screws in locking clamp at this time. See Figure 5-24.

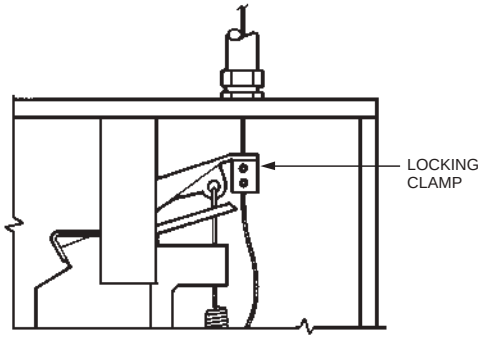


FIGURE 5-24
000309

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

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

5. Feed the wire rope through the terminal detector bracket as shown in Figure 5-25 or as shown in Figure 5-26 if the terminal detector is mounted within a duct or header opening, and install the stop sleeve approximately 2 in. to 3 in. (51 mm to 76 mm) from the end of the wire rope. See Figure 5-27. Use the National Telephone Supply Company Nicopress Sleeve Tool (Stock No. 51-C-887) or equal to properly crimp the stop sleeve.

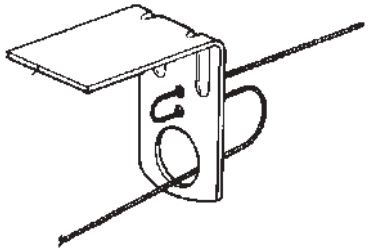


FIGURE 5-25
000310

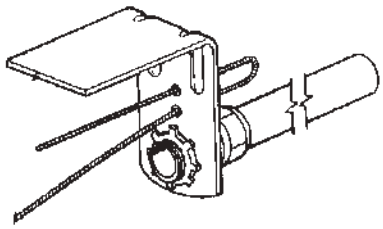


FIGURE 5-26
000311

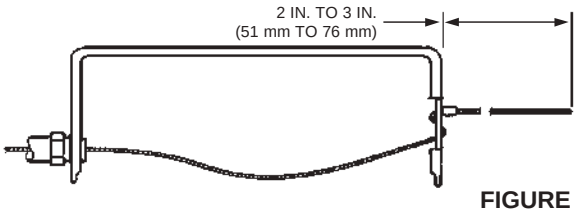


FIGURE 5-27
000312

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

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

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

7. Install detector scissor assembly as shown in Figure 5-28. Note that the AUTOMAN release or remote release assembly is located on the left side of the detector bracket. **Slightly** crimp the two assembly boot-hooks over the cable with pliers so the cable is captured under each hook but the whole assembly can move from side to side. Center the assembly in the detector bracket.

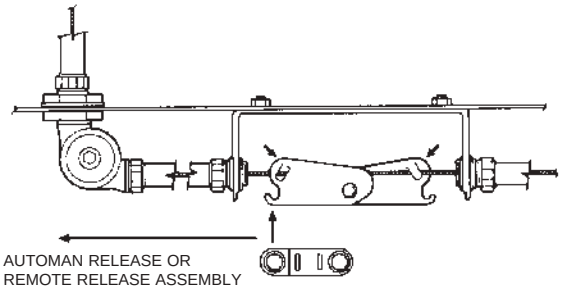


FIGURE 5-28
000503

INSTALLING THE DETECTION SYSTEM (Continued)

Scissor Style Linkage Installation (Continued)

8. Hook the fusible link on the AUTOMAN release or remote release assembly side of the hook assembly, then pull the fusible link to the opposite side and complete the hookup as shown in Figure 5-29 and Figure 5-30. The top of the hook assembly must be inside the bracket stiffeners. The hook assembly with the ANSUL® fusible link in place must be located toward the terminal detector side of the bracket.

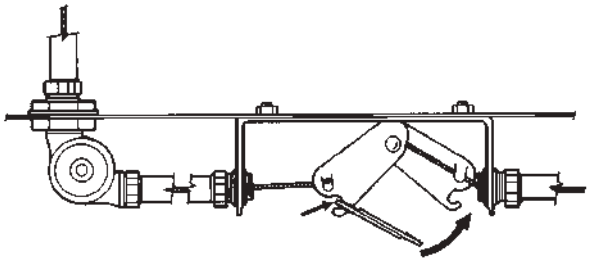


FIGURE 5-29
000504

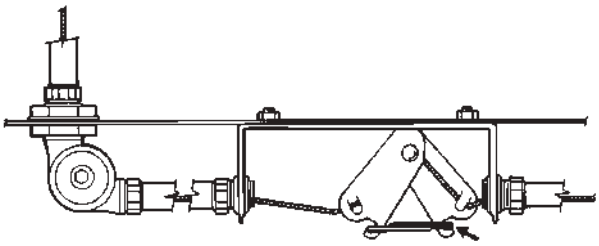


FIGURE 5-30
000324

9. Install the linkage and the correct ANSUL® approved fusible link in the remainder of the detector brackets. Make certain all detector linkages are positioned against either the front or back upper lip of the formed detector bracket. See Figure 5-31.

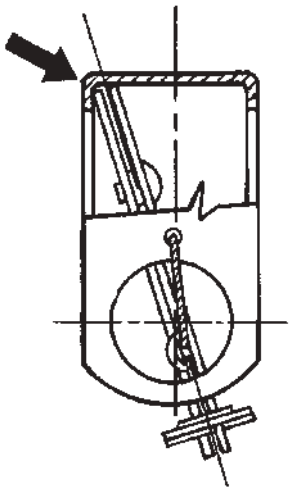


FIGURE 5-31
004429

10. Insert the cocking lever (Part No. 441042 or Part No. 441041) on the left side of the release mechanism, with the movable flange resting securely against the corner of the cartridge receiver and spring housing, and with the notched lever portion engaging the cocking pin on **both** sides of the release mechanism. See Figure 5-32.

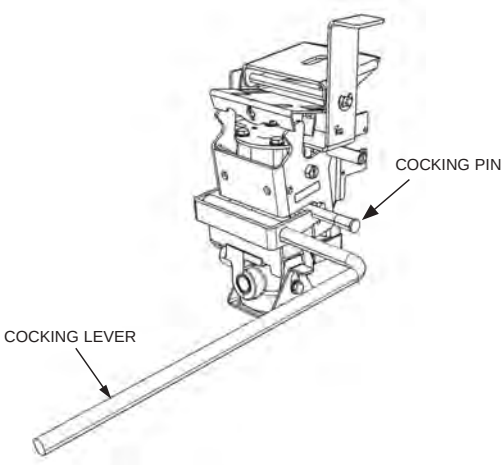


FIGURE 5-32
009461

11. Using the long handle cocking lever (Part No. 441041) or wrench on short handle cocking lever (Part No. 441042), pull down to raise cocking pin until the trip lever indented surface moves underneath the pin and locks the pin in the **Up** position. See Figure 5-33.

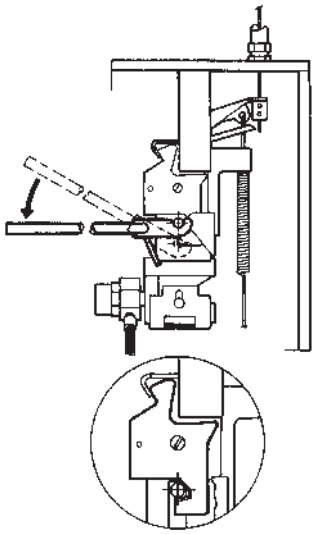


FIGURE 5-33
000320

INSTALLING THE DETECTION SYSTEM (Continued)

Scissor Style Linkage Installation (Continued)

12. Remove cocking lever and fully insert the lock pin (Part No. 438031) through the hole in the trip lever on the left side of the release. The release mechanism cannot be actuated, nor can enclosure cover be replaced until the lock pin is removed. See Figure 5-34.

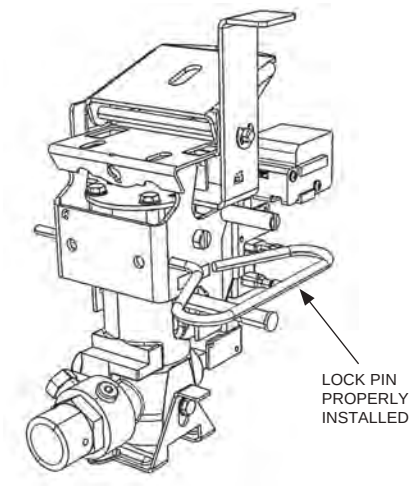


FIGURE 5-34
009462

13. Make certain tension lever is in the **Up** position. See Figure 5-35.

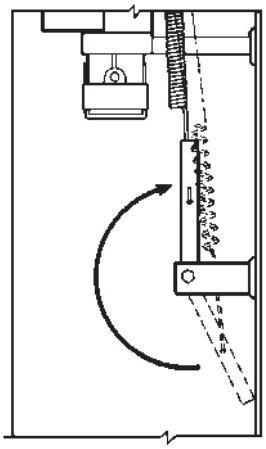


FIGURE 5-35
000322

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

NOTICE

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

15. Re-adjust trip hammer 3/8 in. to 1/2 in. (9.5 mm to 12.7 mm), pull all slack out of wire rope, and tighten the set screws on locking clamp.
16. Lower tension lever to **Down** position and inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 5-36. If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever, loosen set screws on locking clamp and repeat Steps 15 and 16.

CAUTION

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

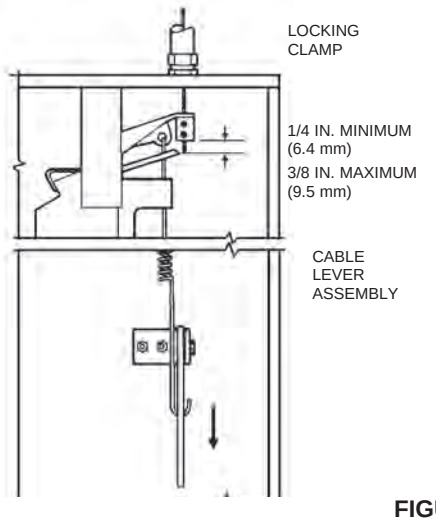


FIGURE 5-36
000329a

CAUTION

Do not install cartridge at this time as an accidental actuation could cause system discharge.

17. Test the detection system in accordance with the *Testing and Placing in Service* Section, pages 6-3 to 6-4, of this manual.
18. When testing has been completed, cut off excess wire rope in the regulated release assembly, leaving approximately 2 in. (51 mm) of wire rope below the locking clamp.

INSTALLING REMOTE MANUAL PULL STATION

General Installation Requirements

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

1. Make certain that the regulated release assembly enclosure cover is detached and that the lock pin is properly inserted within the regulated release mechanism.

   NOTICE

   Failure to follow these instructions may lead to system actuation.

2. Verify that the cartridge has been removed from the regulated release assembly and that the regulated release assembly is in the cocked position.

   If the regulated release assembly does not have the lock pin inserted or the cartridge removed, see *Semi-Annual Maintenance Examination*, page 8-1, in *Maintenance Examination* section, and complete Steps 2 and 3 before completing the following installation steps.

3. Select a convenient location in the path of egress for mounting the pull stations to the wall. Install the pull station at a height of 42 in. to 48 in. (1,067 mm to 1,219 mm) in accordance with the authority having jurisdiction and the Americans with Disabilities Act (ADA) requirements.

   A maximum of two manual pull stations can be connected to each AUTOMAN release.

Installation For Remote Manual Pull Station Using EMT Conduit Only

1. The total length of the wire rope used for each manual pull station within a system must not exceed 150 ft (45.7 m).

   The maximum number of pulley elbows that may be used for each with each manual pull station is 20.

2. If a junction box is used, fasten a 4 in. (102 mm) junction box to wall or in wall where pull station is to be mounted, with mounting screws positioned so that when pull station cover is positioned in place, the printing appears right side up and readable.

3. Install and secure the 1/2 in. conduit, pulley tee (if required), and the pulley elbows from each pull station junction box to regulated release assembly as necessary. See Figure 5-37.

   See Figure 5-38, Figure 5-39, and Figure 5-40 for optional methods of installing wire rope when utilizing a pulley tee.

REMOTE MANUAL PULL STATION SINGLE APPLICATION

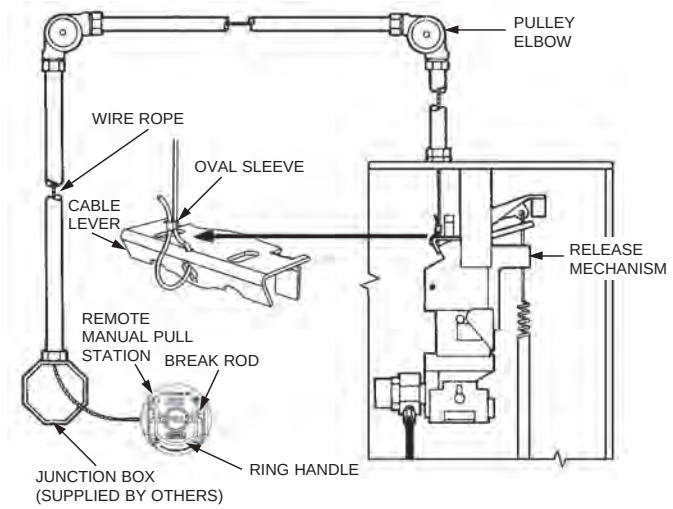


FIGURE 5-37
009463

REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 1 (ONE WIRE ROPE CONNECTED TO CABLE LEVER ASSEMBLY)

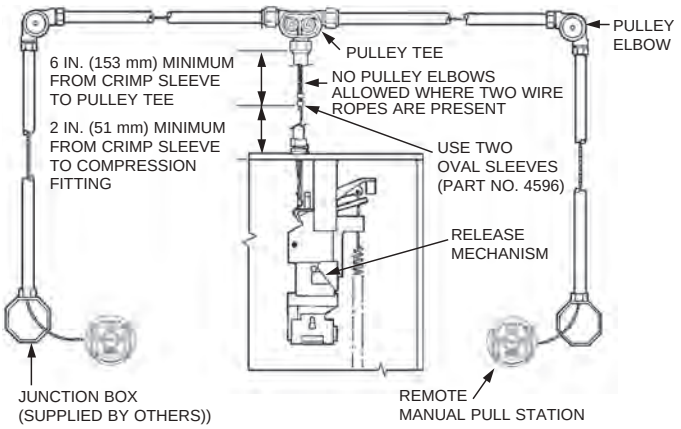


FIGURE 5-38
009464

FIGURE 5-1REMOTE MANUAL PULL STATION DUAL APPLICATION – OPTION 2 (TWO WIRE ROPES CONNECTED TO CABLE LEVER ASSEMBLY)

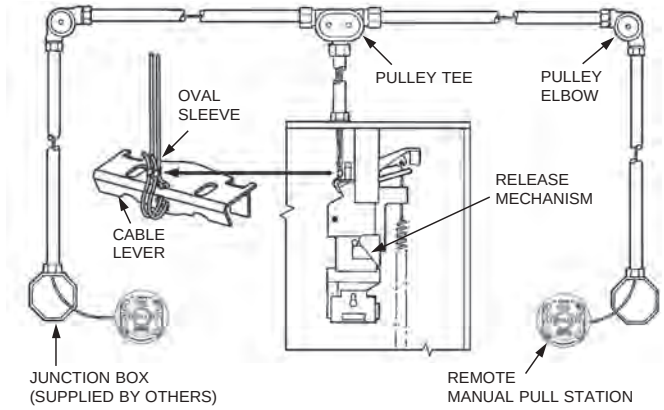


FIGURE 5-39
009465

INSTALLING REMOTE MANUAL PULL STATION (Continued)

Installation For Remote Manual Pull Station Using EMT Conduit Only (Continued)

Step 3 (Continued)

FIGURE 5-1REMOTE MANUAL PULL STATION APPLICATION OPTION 3

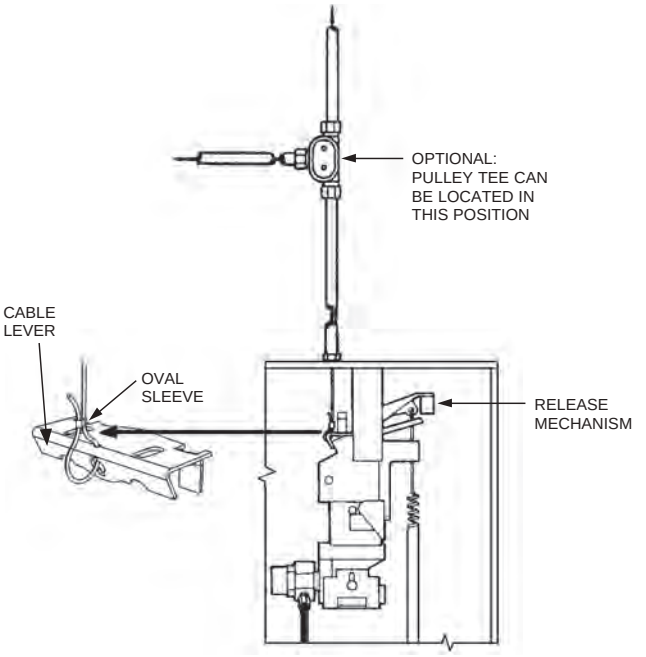
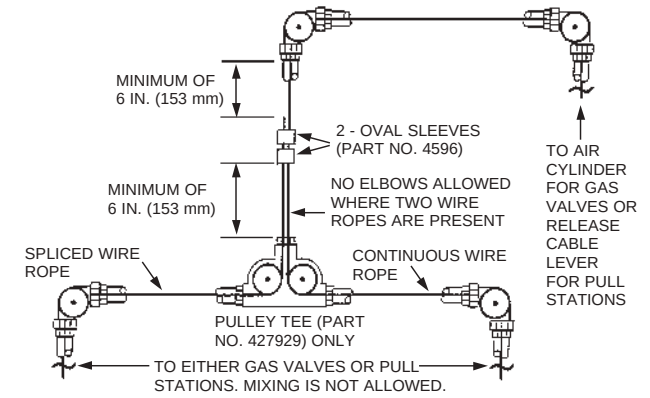


FIGURE 5-40
009466



TWO WIRE ROPES CONNECTED BETWEEN A PULLEY ELBOW AND A PULLEY TEE

FIGURE 5-41
008393

4. Feed the wire rope from the AUTOMAN release through the conduit, the pulley elbows, and the pulley tee, if provided, to the pull station junction box. Follow the instructions for assembling the pull station and block assembly and attaching the wire rope to the pull station pull knob (see Figure 5-70 through Figure 5-85).

NOTICE

Make certain that wire rope rides on top and in center of pulley sheave. If the 50 ft (15.2 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 6 in. (153 mm) of any pulley elbow or conduit adaptor.

5. Fasten the pull station assembly to each junction box if a junction box is used.
6. Slide the oval crimp sleeve onto the wire rope. Loop the wire rope through the cable lever guide holes and back through the oval crimp sleeve. See Figure 5-37.
7. Pull the slack out of each wire rope and crimp sleeve. Use the National Telephone Supply Company Nicopres Sleeve Tool, Stock No. 51-C-887 or equal to properly crimp stop sleeve. See Figure 5-37.

Note: When utilizing the flexible conduit for remote manual pull station or mechanical gas valve installation, see *Installing the Remote Manual Pull Station or Mechanical Gas Valve Using Flexible Conduit* instructions on pages 5-22 through 5-37.

INSTALLING MECHANICAL GAS VALVE

NOTICE

Mechanical gas valves are designed for indoor installation only.

To install each Mechanical Gas Shut-off Valve complete the following steps. All gas valve installation and testing shall be made in accordance with the authority having jurisdiction.

Note: Mechanical gas valve air cylinders can be installed in regulated release assemblies and also regulated actuator assemblies. Installation in either is the same.

1. Make certain that regulated release assembly enclosure cover is detached and lock pin is properly inserted in the regulated release mechanism.

NOTICE

Failure to follow these instructions may lead to system actuation.

2. Verify that the cartridge has been removed from the regulated release assembly and that the regulated release mechanism is in the cocked position.

   If the regulated release mechanism does not have the lock pin inserted or cartridge removed, see *Semi-Annual Maintenance Examination*, page 8-1, in *Maintenance Examination* section, and complete Steps 2 and 3 before completing the following installation steps.

INSTALLING MECHANICAL GAS VALVE (Continued)

3. Remove the plug from cartridge receiver. See Figure 5-42.

FIGURE 5-1CARTRIDGE RECEIVER

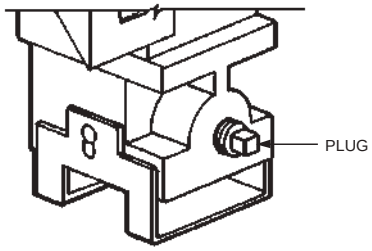


FIGURE 5-42
000339

4. Locate the air cylinder and the bracket assembly over the two 7/32 in. (5.6 mm) holes on right side of the enclosure. Assemble with screws, lockwashers, and nuts. Wrench tighten. See Figure 5-43. Air cylinders can also be mounted in the inverted position, allowing for direct exit out the knockouts in the bottom of the enclosure. See Figure 5-44.

FIGURE 5-1MOUNTING ONE MECHANICAL GAS VALVE

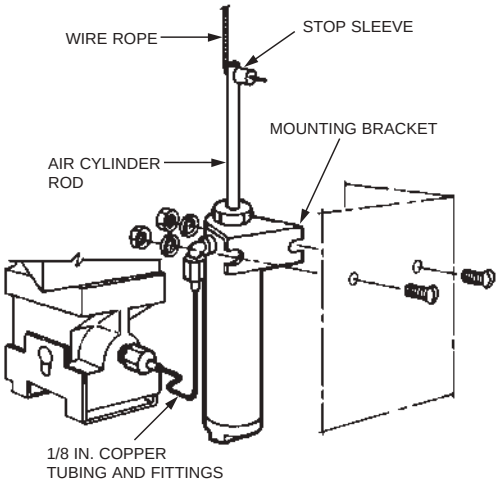


FIGURE 5-43
000340

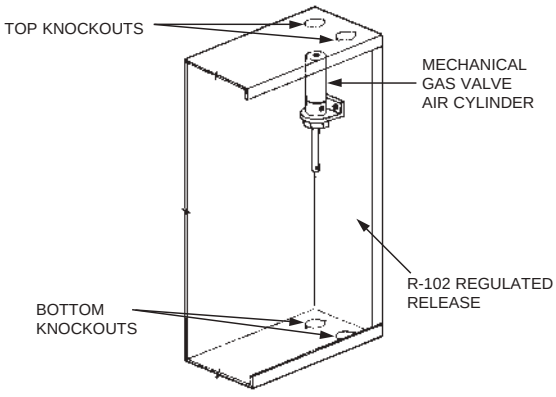


FIGURE 5-44
000341

Note: Two air cylinders are necessary only if the old style pulley tee (Part No. 15342) is utilized. If new style pulley tee (Part No. 427929) is utilized, only one air cylinder is required. Individual wire ropes can be run from each gas valve to a single air cylinder. See Figure 5-45.

5. To install second mechanical gas valve shut-off system, locate second air cylinder and bracket assembly adjacent to first assembly and over the two remaining 7/32 in. (6 mm) holes provided on right side of the enclosure. Assemble second cylinder with screws, lockwashers, and nuts as required. Wrench tighten. See Figure 5-45.

FIGURE 5-1SYSTEMS USING PULLEY TEE (PART NO. 15342)

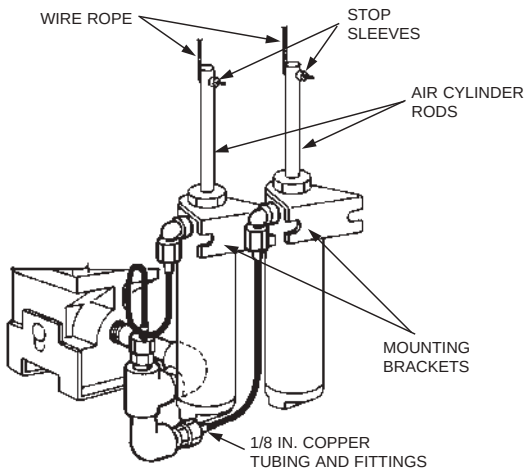
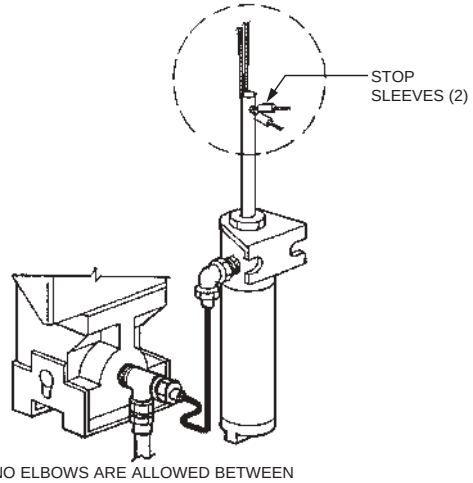


FIGURE 5-1SYSTEMS USING PULLEY TEE (PART NO. 427929)



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

FIGURE 5-45
000342, 004655

INSTALLING MECHANICAL GAS VALVE (Continued)

6. Install the necessary 1/8 in. copper tubing and fittings for each air cylinder to the accessories piping arrangement on the regulated release mechanism. See Figure 5-43 and Figure 5-45.

NOTICE

Do not kink the 1/8 in. copper tubing or form a bend too close to a fitting. Secure each fitting without over tightening. Over tightening could result in pressure leakage or line separation at actuation.

7. **⚠ WARNING**

To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve. Failure to comply may result in serious personal injury or death. Gas valve installation shall be performed by qualified individuals in accordance with local jurisdiction requirements.

Install mechanical gas valve to its selected location in gas line so that it ensures safe shut-off to all predetermined appliances being protected upon actuation of the system. Mechanical gas valves may be mounted in any convenient horizontal or vertical position. See Figure 5-46.

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

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

c. Wrench tighten pipe to gas valve. **Do not use gas valve as a lever when installing or valve damage may occur.** See Figure 5-46.

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

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

f. The total length of wire rope allowed for each valve must not exceed 150 ft (45.7 m).

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

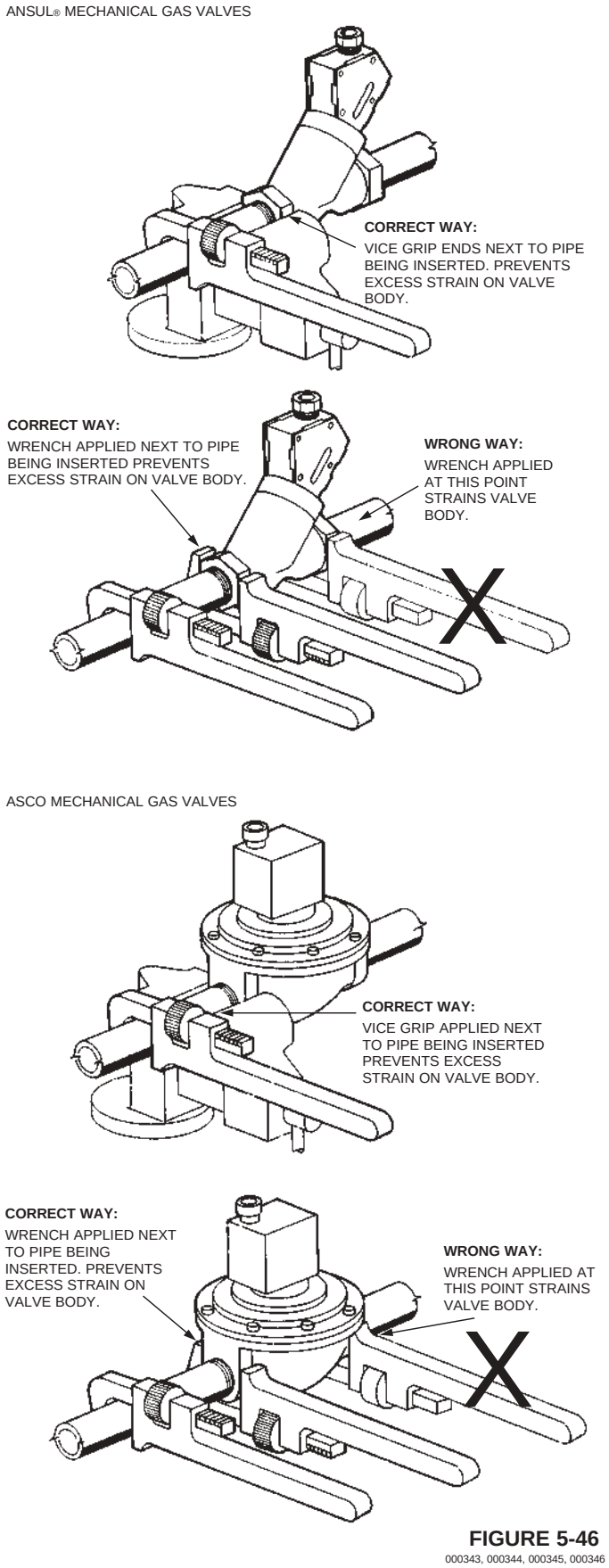


FIGURE 5-46
000343, 000344, 000345, 000346

INSTALLING MECHANICAL GAS VALVE (Continued)

8. Install the 1/2 in. conduit, and the pulley elbows from the mechanical gas valve to the regulated release assembly enclosure as necessary.
9. Beginning at the regulated release assembly, thread the end of the wire rope through hole provided in air cylinder rod. See Figure 5-43.
10. Feed the end of wire rope through conduit and each pulley elbow.

    Make certain that the wire rope rides on top and in center of pulley sheave. If the 50 ft (15.2 m) wire rope has been spliced to accommodate a longer run, do not allow the spliced ends to be within 12 in. (305 mm) of any pulley elbow or conduit adaptor.
11. Remove the side cover on the gas valve and thread the end of wire rope through the hole in the cocking lever. Slide the stop sleeve (Part No. 26317) on to the wire rope and crimp. Use the National Telephone Supply Company Nicopress Sleeve Tool, Stock No. 51-C-887 or equal to properly crimp stop sleeve. Make certain crimp is on top of trigger, with the wire rope curled under lever. See Figure 5-47.

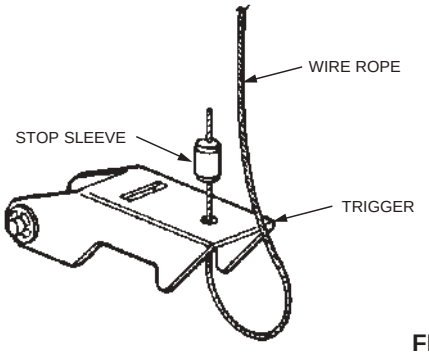
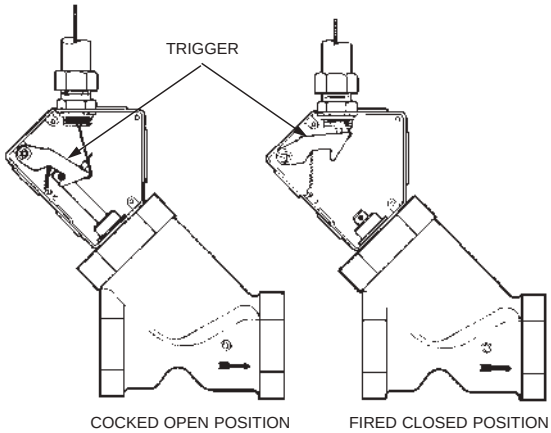


FIGURE 5-47
000347

12. With the end of wire rope already threaded through the hole in air cylinder rod, slide stop sleeve (Part No. 26317) onto wire rope and leave loose. Do not crimp stop sleeve at this time. See Figure 5-43.
13. Cock the mechanical gas valve as shown in Figure 5-48.
    Note: A valve cocking tool is available. Order Part No. 416018.



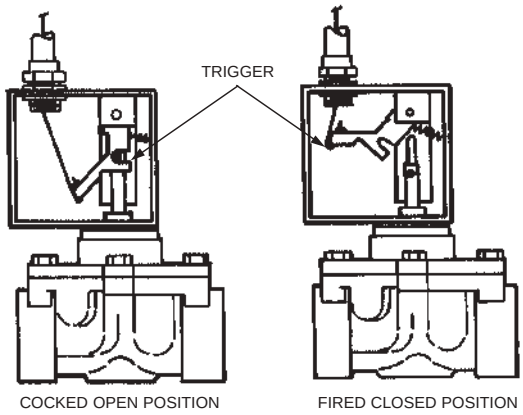


FIGURE 5-48
000348, 000349

14. Raise the air cylinder rod **Up** to its maximum extended position. See Figure 5-43.
15. Manually pull the wire rope to remove excess slack.

NOTICE

Do not actuate the mechanical gas valve. Each Mechanical Gas Valve System must have gas valve cocked and air cylinder rod extended **Up** to its maximum extension before completing next step.

16. Slide the stop sleeve against the air cylinder rod, make certain all slack is removed from the wire, and the crimp stop sleeve. See Figure 5-43.
17. Cut off any excess wire rope approximately 3/4 in. (19 mm) from end of the stop sleeve.
18. **Note:** If utilizing a pulley tee to operate either a single mechanical gas valve from two AUTOMAN releases or two mechanical gas valves from one air cylinder in an AUTOMAN release, see Figure 5-49 and Figure 5-50 for installation instructions. Maximum length of the wire rope to each AUTOMAN release must not exceed 150 ft (45.7 m) and maximum number of elbows must not exceed 20.

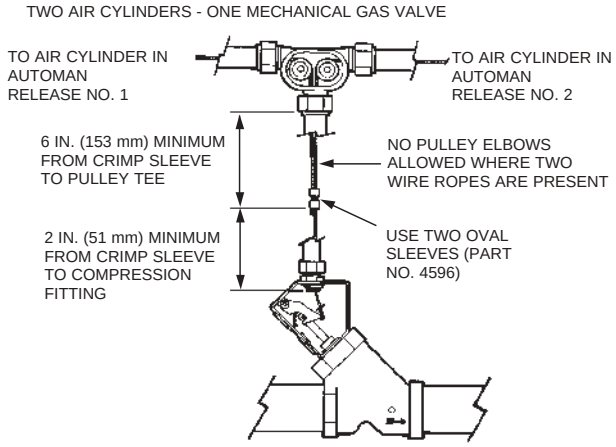


FIGURE 5-49
001091

INSTALLING MECHANICAL GAS VALVE (Continued)

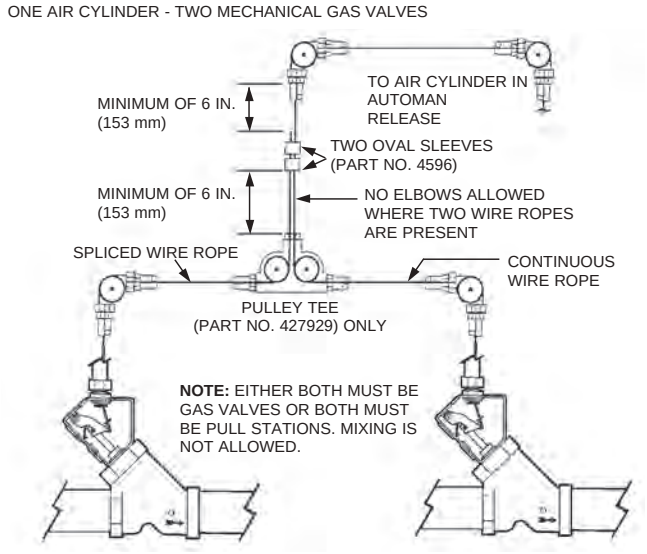


FIGURE 5-50
008394

NOTICE

When connecting two mechanical gas valves to one air cylinder, make certain both gas valves properly operate (close) when the air cylinder rod is in the down (operated) position.

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT

The flexible conduit is convenient for routing the cable over, under and around obstacles and for quicker installations.

Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

NOTICE

Flexible conduit can be used only with remote pull station (Part No. 434618) and mechanical gas valve installations. **Flexible conduit is intended for indoor use only.**

These instructions address the components and installation of both the pull station (Part No. 434618) and the flexible conduit.

Design Requirements (See Table 5-1)

- Flexible conduit **cannot** be utilized in detection systems.
- Flexible conduit inserts (Part No. 434347) can **only** be used with the flexible conduit system.
- The maximum distance from an AUTOMAN release to a pull station is 140 ft (42.6 m) with a maximum of 360° of bends* in the flexible conduit, one pulley tee, two splices** and 15 pulley elbows.

  * For example, three 90° and two 45° bends, or two 90° and four 45° bends.

  ** See pages 5-34 to 5-37 for splicing instructions.

Note: When installing flexible conduit, make sure to feed wire rope through conduit directly from the spool. **Do not** pre-cut wire rope. Feeding pre-cut rope through flexible conduit causes excessive kinks in the rope, making it difficult to install.

- The maximum distance from an AUTOMAN release to a mechanical gas valve is 75 ft (22.8 m) with a maximum of 4 to 90° bends in the flexible conduit and four pulley elbows.
- Any portion of the flexible conduit system can be substituted with EMT conduit provided the proper connections are used to join the two types of conduit.
- All bends in the flexible conduit system must have a minimum bend diameter of 6 in. (153 mm).
- When the flexible conduit is used to make 90° bends between an AUTOMAN release and a mechanical gas valve, the bends **must start at the gas valve**. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When the flexible conduit is used to make 90° bends between an AUTOMAN release and a pull station, the bends **must start at the AUTOMAN release**. No pulley elbows can be used between the bends. If more than 360° of bends are needed, then pulley elbows can be used.
- When not utilizing a conduit offset two 45° bends in the flexible conduit are allowed between the strain relief fitting on top of the AUTOMAN release, and the location where the flexible conduit is supported.
- When installing the flexible conduit, secure the conduit at intervals not to exceed 5 ft (1.5 m) before and after each bend. The flexible conduit **cannot** slide in the clamps used for mounting. Make certain mounting clamps do not pinch the conduit. The following style clamp, P-clip, (Part No. 436150) is a suitable type for use on flexible conduit. See Figure 5-51.

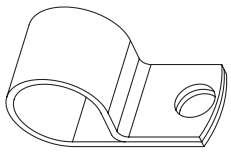


FIGURE 5-51
008141

TABLE 5-1: DESIGN REQUIREMENTS

	Manual Pull	Mechanical Gas Valve	Detection
90° Cable Bends	4	4	N/A
Bend Diameter – in. (mm)	6 (153)	6 (153)	N/A
Mechanical Corner Pulley	15	4	N/A
Conduit Secured Max. ft (m)	5 (1.5)	5 (1.5)	N/A
Conduit Max. Length ft (m)	140 (42.6)	75 (22.8)	N/A
Conduit Offset / 2 to 45° Bends (Only between strain relief fitting and support location)	1	0	N/A
Pulley Tees	1	0	N/A
Splices	2	0	N/A

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Installation Instructions

Note: Do not add any type of lubricants inside or on the flexible conduit. Make certain stainless steel wire rope is clean and is free of debris.

Route the flexible conduit along the same path that the EMT conduit would normally be run. Route the stainless steel wire rope through the flexible conduit as it is in EMT conduit.

Do not cut the wire rope to length before feeding it into the flexible conduit. **Feed the wire rope directly from its spool through the flexible conduit.** This method helps avoid possible kinking of the wire rope which can make it difficult to feed.

⚠ CAUTION

The flexible conduit must not be located within 6 in. (153 mm) of the hood or in areas exceeding 130 °F (54 °C). Also, do not route the flexible conduit in areas where the conduit can be crushed, pinched, or broken.

The flexible conduit can be used to connect an AUTOMAN release to a remote pull station or mechanical gas valves.

Before starting the system installation, take a few minutes to plan the layout of the system. This minimizes the amount of components needed to complete the installation. Once the path of the flexible conduit has been determined, verify that the layout does not exceed the design requirements. Electrical Junction Box is required when terminating the flexible conduit into a remote pull station.

Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Junction Box, or Mechanical Gas Valve

1. Lay out the flexible conduit and secure it in place. See Figure 5-52.

   Note: If the inner liner is crimped, turn a drywall screw into the end to open it.

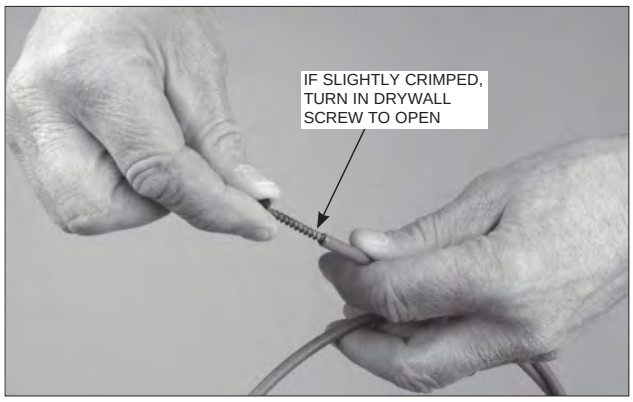


FIGURE 5-52
007985

2. Starting at the AUTOMAN release, connect the conduit connector using the supplied nut. Use only ANSUL® conduit fittings (Part No. 55813). See Figure 5-53.

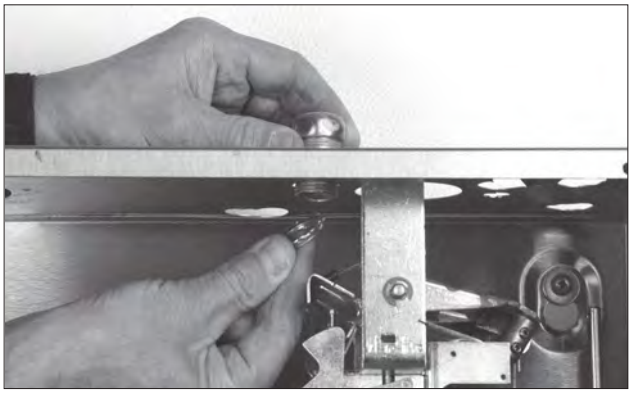


FIGURE 5-53
007986

3. Unscrew the nut from the EMT conduit connector and remove the compression ring. Discard the ring. See Figure 5-54.

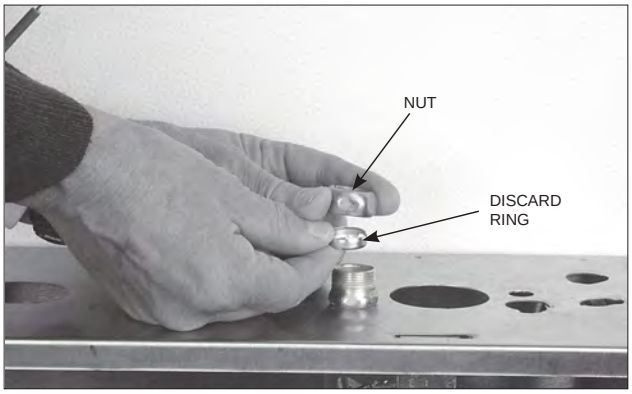


FIGURE 5-54
007987

4. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain that the thread in the flexible conduit insert is facing out toward the end of the connector. See Figure 5-55.

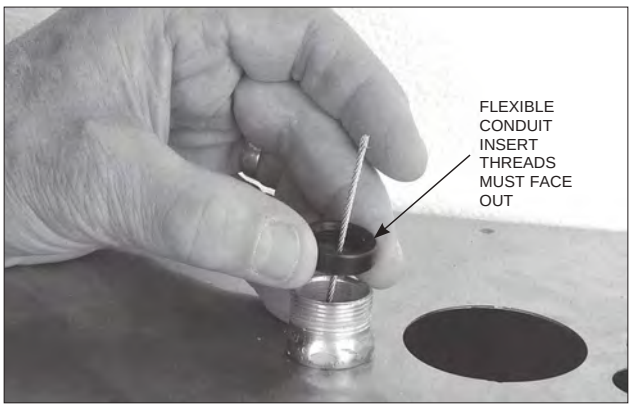


FIGURE 5-55
007988

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

5. Tighten the nut to the connector body, locking the flexible conduit insert in place. See Figure 5-56.

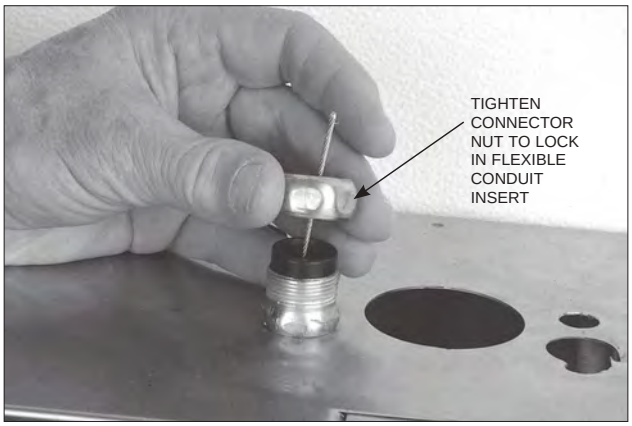


FIGURE 5-56
007989

6. Loosen the nut on the strain relief and thread the wire rope through a strain relief. See Figure 5-57.

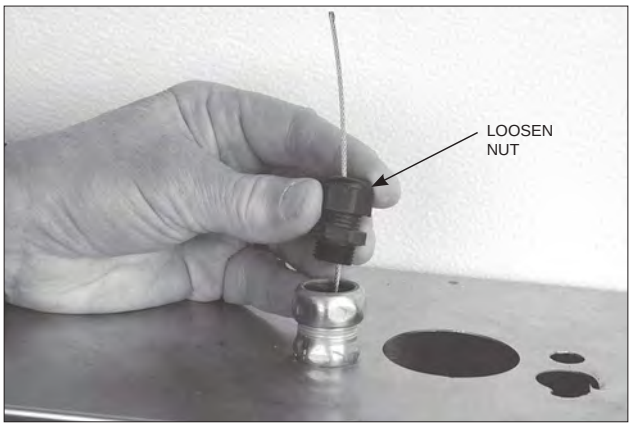


FIGURE 5-57
007990

7. Tighten the body of the strain relief to the conduit connector. See Figure 5-58.

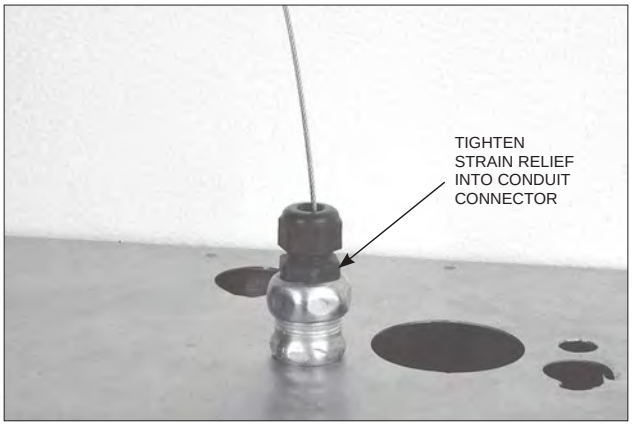


FIGURE 5-58
007991

8. Thread the wire rope through the flexible conduit. See Figure 5-59. If a splice is required in the flexible conduit, proceed to *Splicing Installation Instructions*.

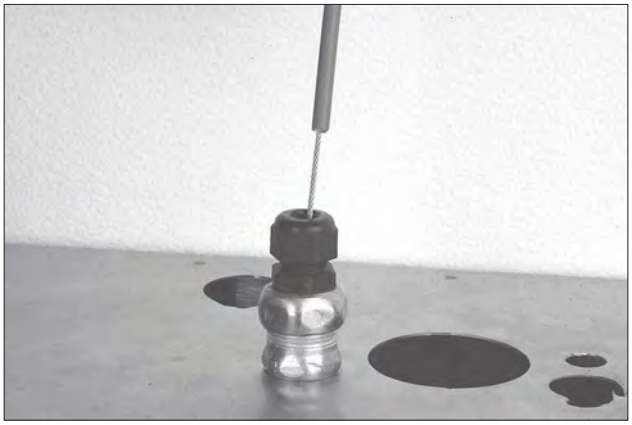


FIGURE 5-59
007992

9. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 5-60.

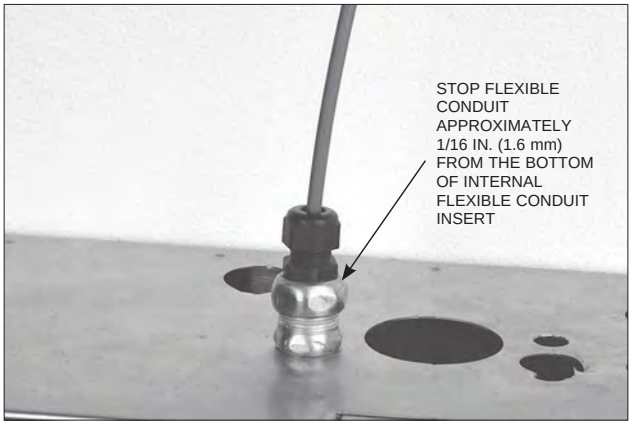


FIGURE 5-60
007993

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

10. Tighten the strain relief nut onto the strain relief. See Figure 5-61.

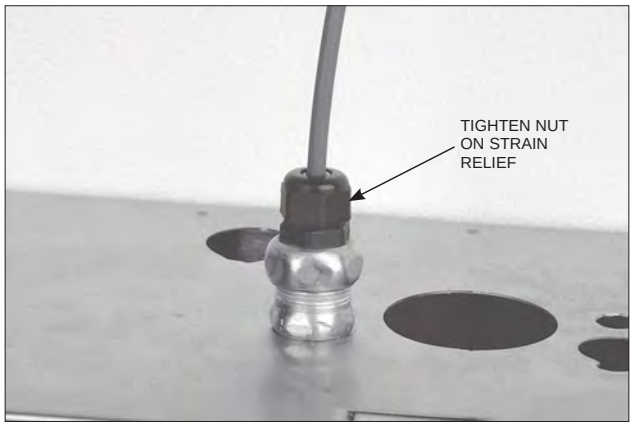


FIGURE 5-61
007994

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

1. Unscrew the nut from the pulley elbow, pulley tee, or EMT conduit connector and remove the compression ring. Discard the ring. See Figure 5-62.

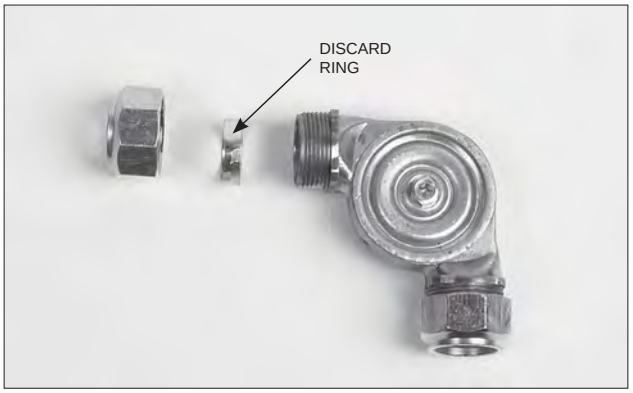


FIGURE 5-62
007995

2. Thread the stainless steel wire rope through the EMT conduit connector and flexible conduit insert. Make certain that the thread in flexible conduit insert is facing out toward end of connector. See Figure 5-63.

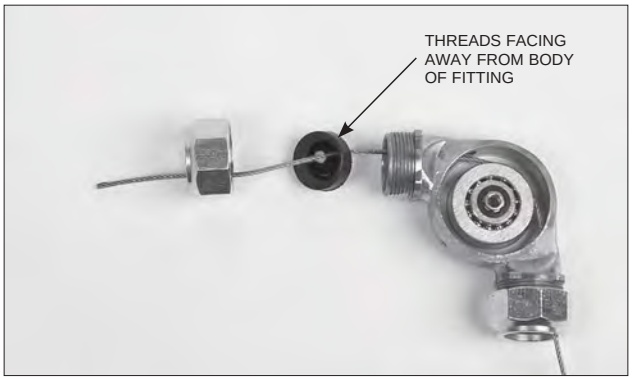


FIGURE 5-63
007996

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

3. Tighten the nut to the connector conduit body, locking the flexible conduit insert in place. See Figure 5-64.

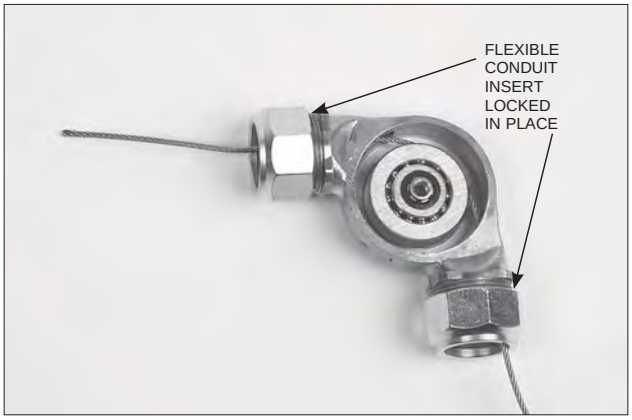


FIGURE 5-64
007997

4. Loosen the nut on the strain relief and thread the wire rope through the strain relief. See Figure 5-65.

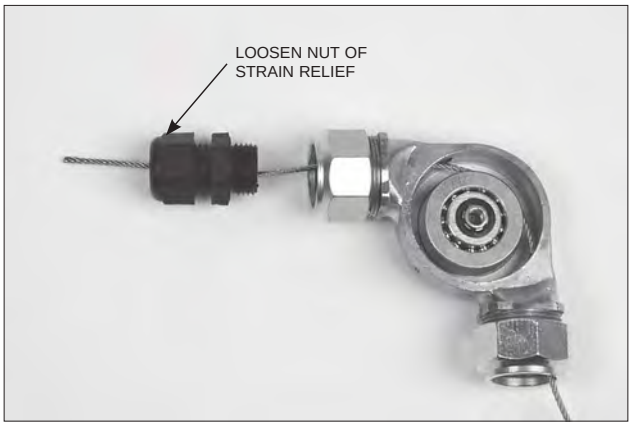


FIGURE 5-65
007998

5. Tighten the body of the strain relief to the conduit connector. See Figure 5-66.

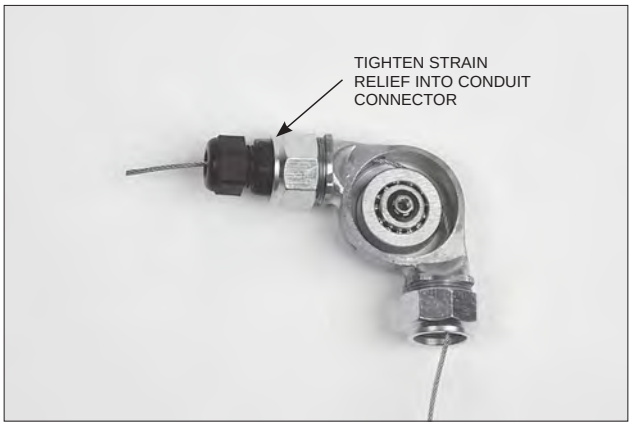


FIGURE 5-66
007999

6. Push the wire rope into the flexible conduit. See Figure 5-67.

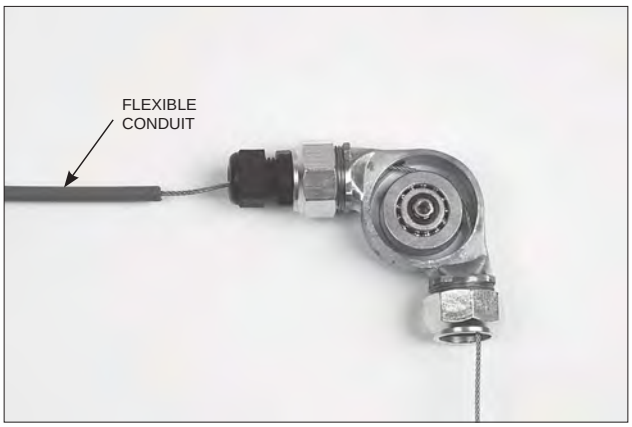


FIGURE 5-67
008000

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

7. Slide the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert. See Figure 5-68.

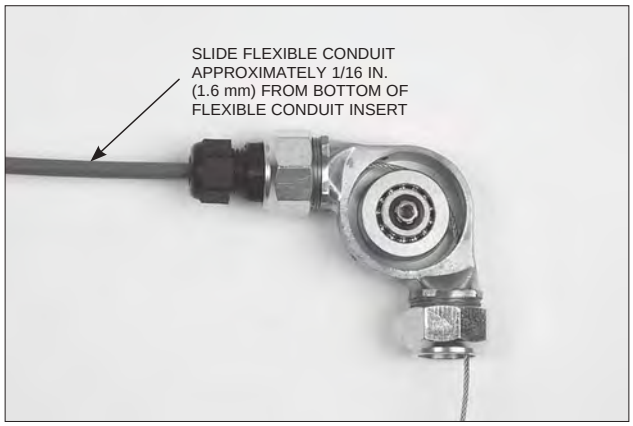


FIGURE 5-68
008001

8. Tighten the strain relief nut onto the strain relief. See Figure 5-69.

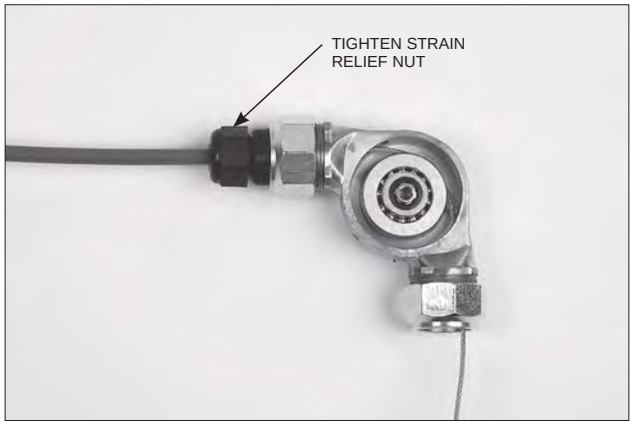


FIGURE 5-69
008002

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

Assembling the Block

Note: For installations that do not require the tee block, see page 5-37 for instructions.

1. Connect the flexible conduit and wire rope to the electrical box as described in *Connecting the Flexible Conduit to the AUTOMAN Release, Electrical Box, or Mechanical Gas Valve*. See Figure 5-70.

   Note: For a 1 1/2 in. (38 mm) deep electrical box, install the bearing in the block's shallow box location.

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

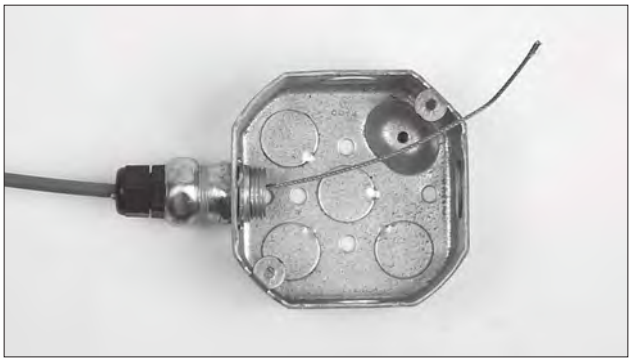


FIGURE 5-70
008003

2. Thread the wire rope through the small end of the block into the bearing area to be used. See Figure 5-71.

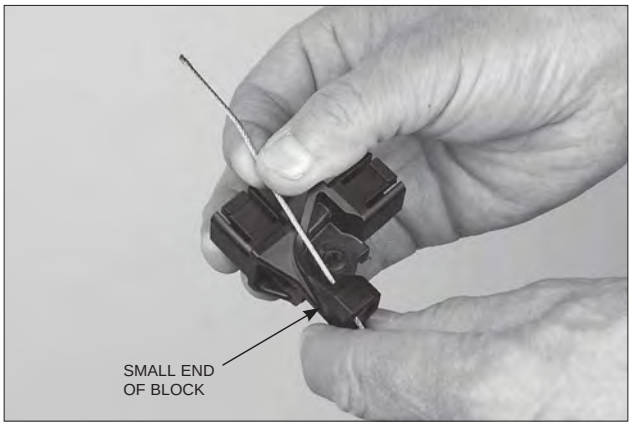


FIGURE 5-71
008004

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Assembling the Block (Continued)

3. Pull the slack, make a loop and insert the rope through the larger opening in the bearing area. See Figure 5-72.

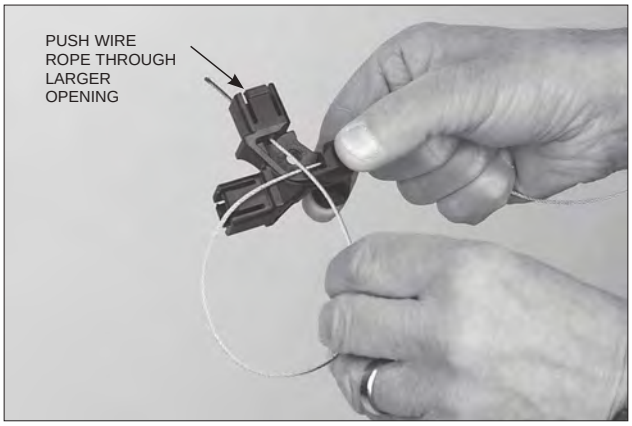


FIGURE 5-72
008005

4. Pull the wire rope out of the large end of the block. See Figure 5-73.

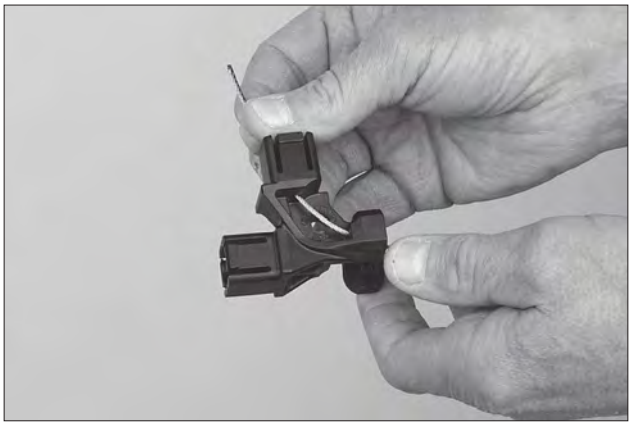


FIGURE 5-73
008006

5. Place the bearing against the wire rope. Make certain that the wire rope is in the bearing groove. See Figure 5-74.

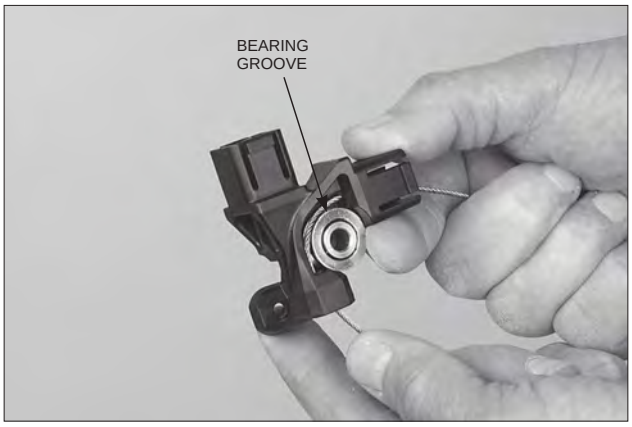


FIGURE 5-74
008007

6. Align the bearing against the wire rope so that the bearing center and the hole in the block line up. See Figure 5-75.

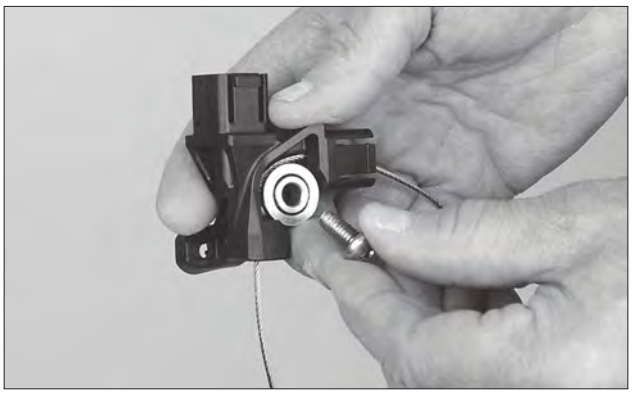


FIGURE 5-75
008008

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Assembling the Block (Continued)

7. Insert the supplied bolt into the bearing and tighten securely. Take care not to strip the thread. See Figure 5-76.

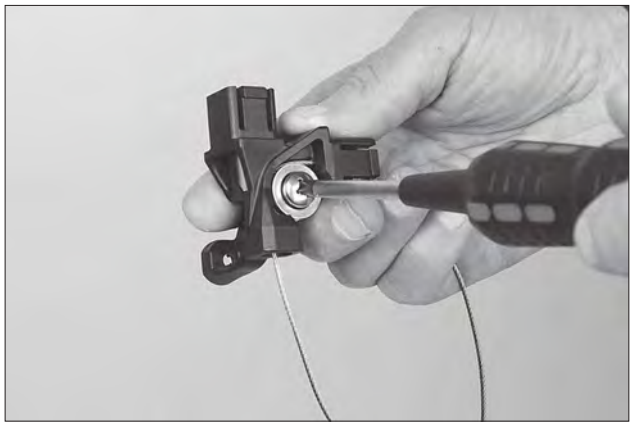


FIGURE 5-76
008009

Connecting the Block and the Faceplate

1. The block can be inserted into the faceplate at 90° intervals. See Figure 5-77.

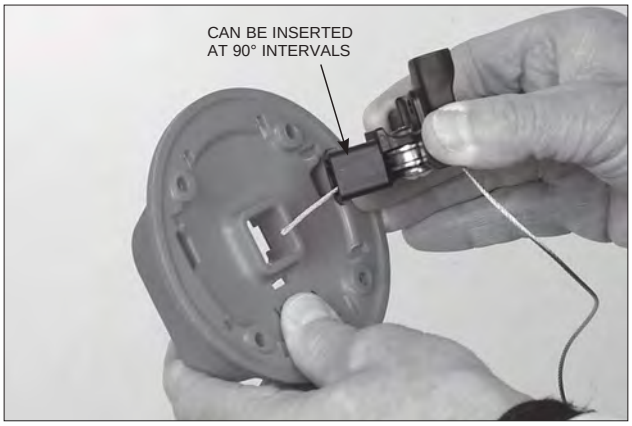


FIGURE 5-77
008010

2. Thread the wire rope through the faceplate. Insert the block by depressing the tabs and pushing the block into the faceplate until it snaps in place. See Figure 5-78.

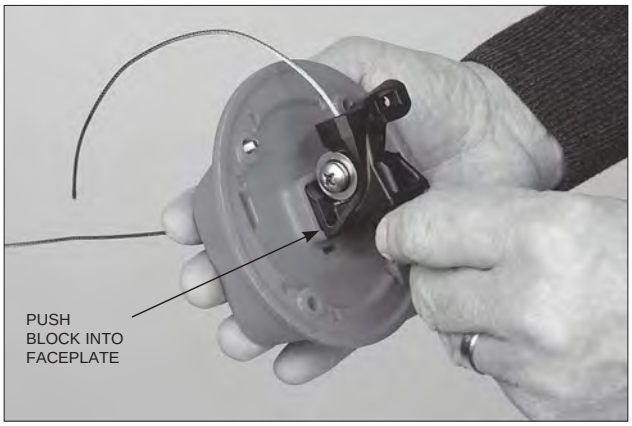


FIGURE 5-78
008011

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Connecting the Block and the Faceplate (Continued)

3. Place the faceplate over the top of the electrical box and insert the two screws to secure the faceplate. See Figure 5-79.



FIGURE 5-79
008012

4. Thread the wire rope through the pull knob. See Figure 5-80.



FIGURE 5-80
008013

5. Thread the wire rope through stop sleeve and leave approximately 1/4 in. to 3/8 in. (6.4 mm to 9.5 mm) extended past sleeve. Crimp the stop sleeve twice using Crimping tool, National Telephone Supply Co. Nicopress Sleeve Tool (Stock No. 51-C-887). Verify the stop sleeve is secure on wire rope. See Figure 5-81.



FIGURE 5-81
008014

6. Insert the break rod into the two holes toward the top of the pull knob. See Figure 5-82.



FIGURE 5-82
008015

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Connecting the Block and the Faceplate (Continued)

7. Pull the excess slack back to the AUTOMAN release. This pulls the pull knob assembly in place. See Figure 5-83.



FIGURE 5-83
008016

8. Hold the pull knob assembly against the faceplate. Rotate the pull knob assembly counterclockwise until the break rod and pull knob snap in place. See Figure 5-84.

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



FIGURE 5-84
008017

9. Snap the pull tab onto the pull knob so it is legible. See Figure 5-85.



FIGURE 5-85
008018

10. Test the Remote Manual Pull Station and Mechanical Gas Valves in accordance with the *Testing and Placing in Service – Testing Manual Pull Station and Testing Mechanical Gas Valves* section of this manual.

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Installing Flexible Conduit Through a Conduit Offset

1. Starting at the AUTOMAN release, connect the conduit connector using the supplied nut. Use only ANSUL® conduit fittings (Part No. 55813). See Figure 5-86.

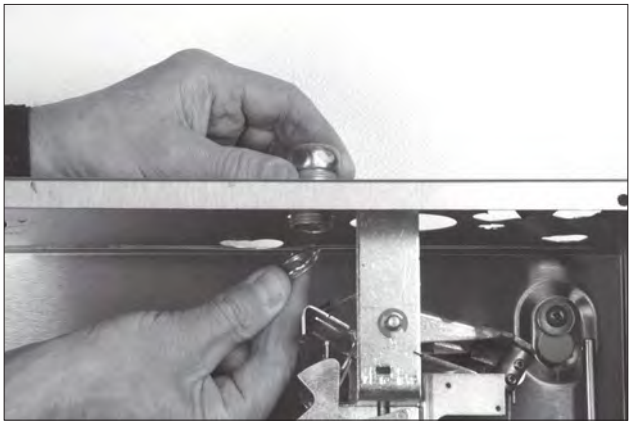


FIGURE 5-86
007986

2. Install the conduit offset (Part No. 435961) into the conduit connector and tighten the nut. See Figure 5-87.



FIGURE 5-87
008039

3. Install the compression union to the opposite end of the conduit offset. Tighten securely. See Figure 5-88.



FIGURE 5-88
008040

4. Install the conduit required to get above the ceiling. See Figure 5-89.



FIGURE 5-89
008041

5. Install the compression union to the top of the conduit riser. See Figure 5-90.

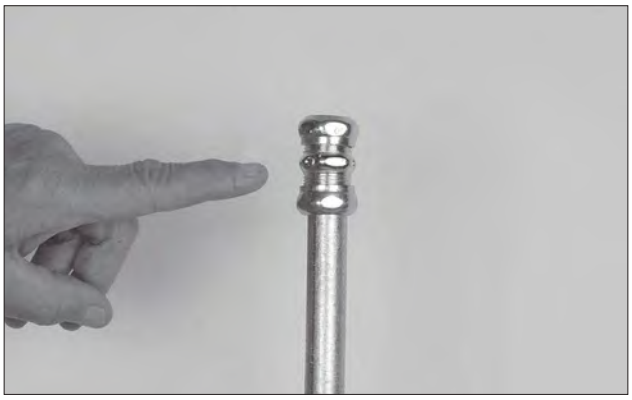


FIGURE 5-90
008042

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Installing Flexible Conduit Through a Conduit Offset (Continued)

6. Remove the union nut and ring. Discard the ring. Do not reinstall the nut at this time. See Figure 5-91.

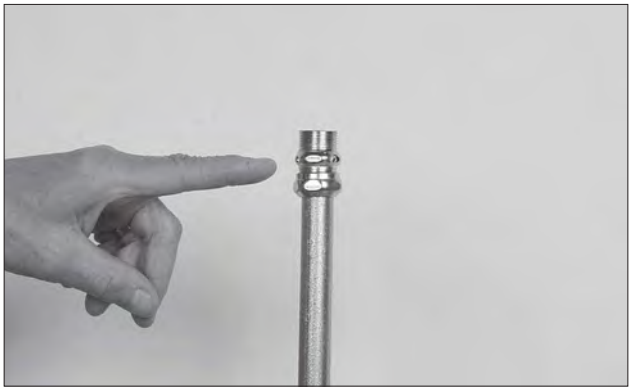


FIGURE 5-91
008043

7. Remove the strain relief nut and install the strain relief body into the compression union. See Figure 5-92.



FIGURE 5-92
008044

8. Install the union nut over the strain relief body and tighten the nut. See Figure 5-93.



FIGURE 5-93
008045

9. Install the strain relief nut onto the strain relief body. Do not tighten the nut at this time. See Figure 5-94.



FIGURE 5-94
008046

10. Push the flexible conduit completely through the conduit offset. Stop the flexible conduit flush or +/– 1/2 in. (13 mm) from the bottom conduit fitting in AUTOMAN release. See Figure 5-95.

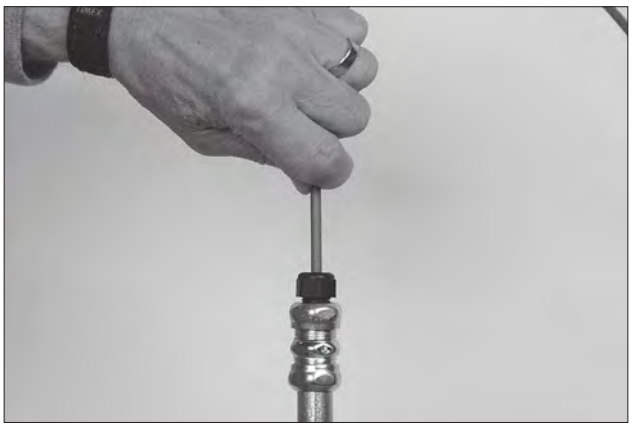


FIGURE 5-95
008047

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Installing Flexible Conduit Through a Conduit Offset (Continued)

11. Tighten the nut on the strain relief on top of the conduit riser. See Figure 5-96.

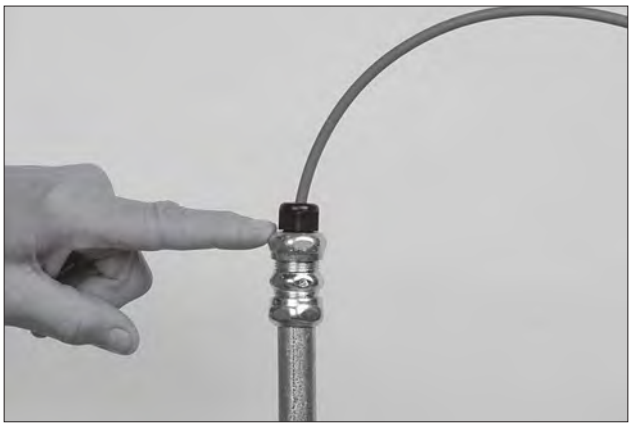


FIGURE 5-96
008048

12. Complete the remainder of the flexible conduit and wire the rope installation to the pull station or the gas valve.

Flexible Conduit Splicing (Allowed on Pull Station Installations Only)

Note: Wire rope cannot be spliced together, only the flexible conduit.

Flexible conduit can be spliced together using EMT compression fitting union (Part No. 79827).

1. Remove the rings from both ends of the compression union. See Figure 5-97.

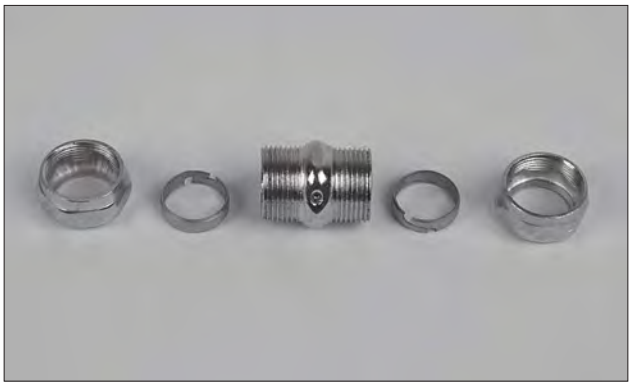


FIGURE 5-97
008061

2. Install the strain relief nut, strain relief, compression union nut, flexible conduit insert and compression union over the flexible conduit with the wire rope installed. See Figure 5-98.

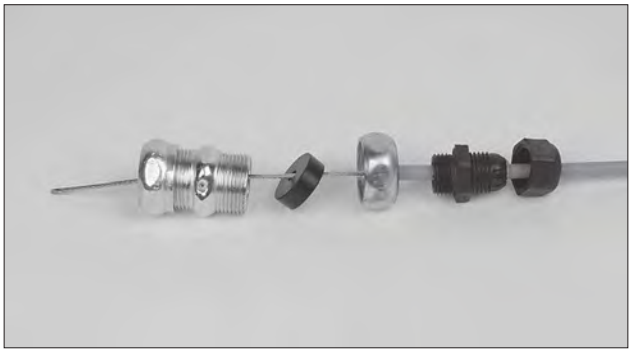


FIGURE 5-98
008049

3. Tighten the compression union nut onto the union body, locking the flexible conduit insert in place. See Figure 5-99.

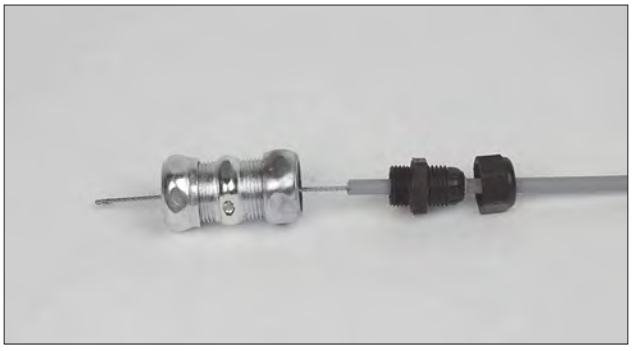


FIGURE 5-99
008050

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

4. Install the strain relief body into the compression union and tighten. See Figure 5-100.



FIGURE 5-100
008051

5. Push the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert, then tighten the strain relief nut onto the strain relief body. See Figure 5-101.



FIGURE 5-101
008052

6. Starting on the opposite end of the compression union, remove the nut. See Figure 5-102.



FIGURE 5-102
008053

7. Install the strain relief nut, strain relief, and compression union nut on the remaining section of the flexible conduit and install the flexible conduit insert on the wire rope. See Figure 5-103.

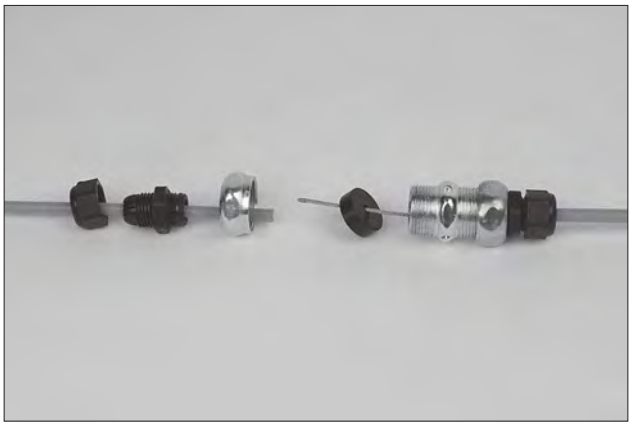


FIGURE 5-103
008054

8. Push the wire rope completely through the remaining section of the flexible conduit. See Figure 5-104.

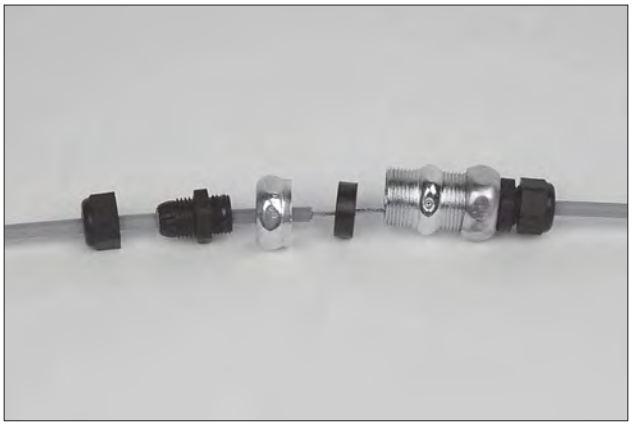


FIGURE 5-104
008055

9. Tighten the compression union nut onto the union body, securing the flexible conduit insert in place. See Figure 5-105.



FIGURE 5-105
008056

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

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

10. Tighten the strain relief into the compression union. See Figure 5-106.



FIGURE 5-106
008057

11. Push the flexible conduit into the strain relief until it is approximately 1/16 in. (1.6 mm) from the bottom of the flexible conduit insert, then tighten the strain relief nut onto the strain relief body. See Figure 5-107.



FIGURE 5-107
008058

12. Complete the remainder of the flexible conduit and wire rope installation to the pull station or the gas valve.

Component Removal Instructions

REMOVAL OF BLOCK

Using thumbs on the clips on each side of the block, press firmly in the direction of the center of the block, at the same time pressing in a slightly downward direction. As the clips on the side of the block release from the pull station cover, the block releases and is free to be removed from the backside of the cover. See Figure 5-108.



FIGURE 5-108
007884

REMOVAL OF PULL KNOB

Insert a small screwdriver into the slot at the bottom of the pull knob. Push slightly on the screwdriver and turn the pull knob clockwise, then pull the knob can be removed without breaking the glass rod. See Figure 5-109.

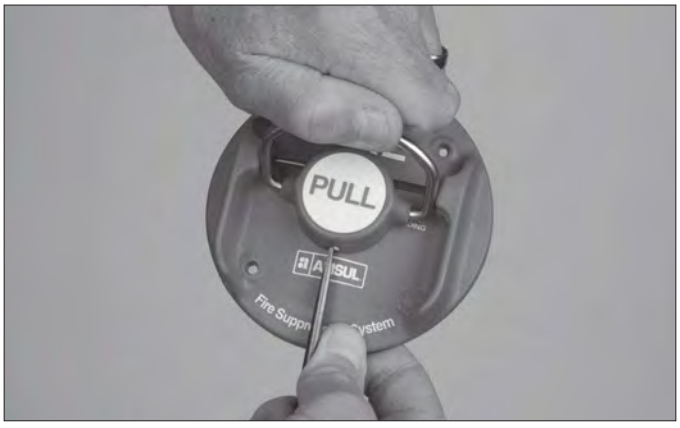


FIGURE 5-109
008059

INSTALLING THE REMOTE MANUAL PULL STATION OR MECHANICAL GAS VALVE USING FLEXIBLE CONDUIT (Continued)

Component Removal Instructions (Continued)

REMOVAL OF PULL CAP

Using a small screwdriver or other blunt object, push on the backside of the pull cap. This frees the cap from the pull knob. See Figure 5-110.

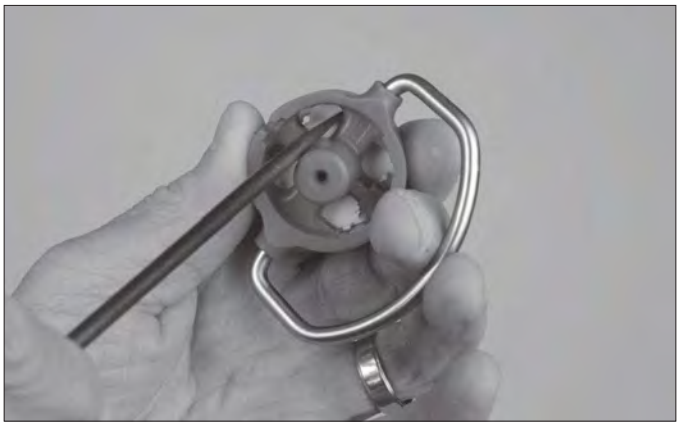


FIGURE 5-110
008060

Pull Station Installation without Pulley Block Assembly

Note 1: When using this installation option, the distance from the back of the faceplate and the connection to the 1/2 in. EMT conduit compression fitting must not exceed 6 in. (152 mm).

Note 2: To provide for a straight run of wire rope from the pull station, an octagonal junction box with a center knockout in the back of the junction box is needed. See Figure 5-111. If a pre-fabricated box or enclosure is to be used, it must allow the pull station face plate to be firmly attached to the box or enclosure, with a hole or knockout suitable for a 1/2 in. EMT threaded conduit compression connector to be installed directly in line with the center of the pull station pull knob.

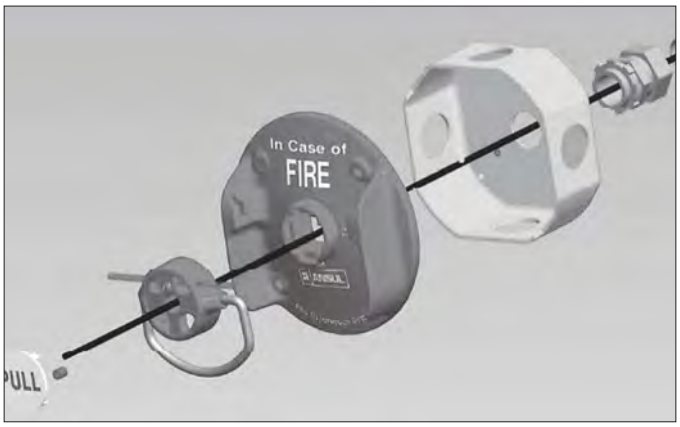


FIGURE 5-111
008415

1. Attach a 1/2 in. EMT conduit compression fitting (Part No. 55813) to the back center knock out of the junction box. If something other than a junction box is to be utilized, a method of securing the flexible conduit or EMT conduit directly in line with the center of the pull station pull knob must be used. This ensures that in the event of manual operation the wire rope, exiting the back of the pull station faceplate, is pulled straight out without binding or resulting in undue additional pull force due to friction loss.
2. Remove the block assembly from the pull station face plate. Thread the wire rope from either flexible conduit or 1/2 in. EMT conduit attached to the back of the junction box or fabricated enclosure through the back side of the pull station faceplate and through the pull knob.
3. Thread the wire rope through the stop sleeve (Part No. 26317) and leave approximately 1/4 in. to 3/8 in. (6.4 mm to 9.5 mm) extending past the sleeve.
4. Crimp the stop sleeve twice using the crimping tool National Telephone Supply Co. Nicopress Sleeve Toll (Stock No, 51-C-887). Verify the sleeve is secure on the wire rope.

INSTALLING ELECTRICAL GAS VALVES

NOTICE

Electric gas valves are designed for indoor installation only.

The following instructions and schematics illustrate methods of procedures for installing the 110 VAC electric gas shut-off valves.

1. Make certain that the regulated release assembly enclosure cover is detached and the lock pin is properly inserted within the regulated release mechanism.

   NOTICE

   Failure to follow these instructions may lead to system actuation.

2. Verify that the cartridge has been removed from the regulated release assembly and that the regulated release mechanism is in the cocked position.

   If the regulated release mechanism does not have the lock pin inserted or the cartridge removed, see *Semi-Annual Maintenance Examination*, page 8-1, in the *Maintenance Examination* section, and complete Steps 2 and 3 before completing the following installation steps.

3. **⚠ WARNING**

   To reduce the risk of explosion due to leaking gas, make certain that the gas line is turned off before connecting the gas valve. Failure to comply may result in serious personal injury or death. Gas valve installation shall be performed by qualified individuals in accordance with local jurisdiction requirements.

   Install each electric gas valve to its selected location in the gas line so that it ensures safe shut-off to all predetermined appliances being protected upon actuation of the system. Refer to the manufacturer's instructions (if provided). See Figure 5-112.

   a. Use the new properly reamed pipe and clean off metal chips.

   b. Install the valve so that the actuator is above the horizontal pipe line with no more than a five degree (5°) lean either way.

   c. Make certain the gas flow is in the same direction as arrow shown on the gas valve.

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

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

4. Install and secure the 1/2 in. conduit from each of the electric gas valve to the manual reset relay enclosure.

5. Tag and connect the electrical wiring to each electric gas valve. Then, feed the wire through the conduit to manual reset relay. Tape or place a wire nut on any unused wire leads in accordance with authority having jurisdiction. See Figure 5-122 to Figure 5-125 at the end of this section for typical wiring diagrams.

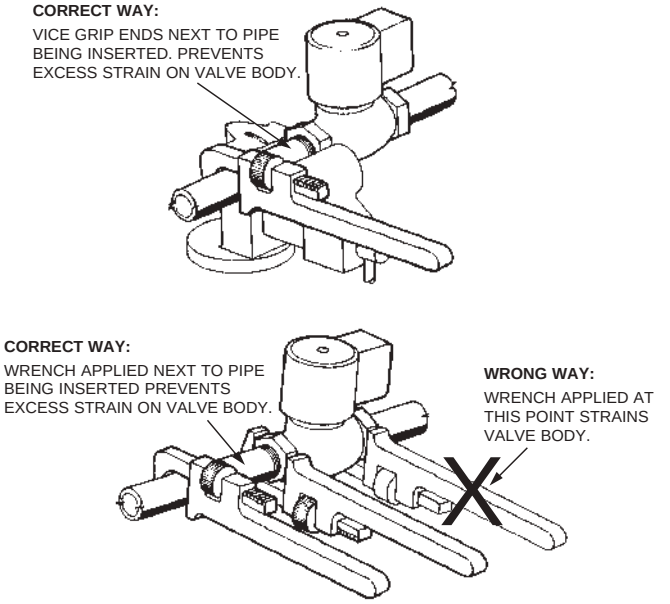


FIGURE 5-112
001092, 001093

6. **⚠ WARNING**

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

   NOTICE

   All electrical wiring/connections shall be performed by qualified individuals in accordance with the local jurisdiction requirements.

   Connect electrical wiring to the manual reset relay along with any contactor, or contractor supplied devices needed. Refer to the manufacturer's instructions and proper figure listed for assistance.

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

8. Install and secure the 1/2 in. conduit from the regulated release assembly enclosure to manual reset relay enclosure.

   If the snap-action switches have not been attached, go to the *Electric Switch* section and install them at this time by completing Steps 3 through 8.

9. Tag and connect the electrical wiring to each electric, or snap-action, switch. Then, feed the wire through the conduit to the manual reset relay.

10. Connect the wiring from each electric (snap-action) switch to manual reset relay terminals. Refer to the manufacturer's instructions, if provided, and proper figure for assistance.

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

12. Properly return electrical power to the system.

INSTALLING ELECTRICAL SWITCHES

The procedure for field installing an electric (snap-action) switch, including the cartridge monitoring switch, is as follows:

⚠ CAUTION

Unused wire leads become hot when the system is operated. Failure to adequately cover exposed wire ends causes electric shock if touched.

⚠ CAUTION

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

NOTICE

Except for the alarm initiating switch, all electrical wiring connections are to be made outside the AUTOMAN release enclosure in suitable enclosures in accordance with the local jurisdiction requirements.

1. Make certain that the regulated release assembly enclosure cover is detached with the lock pin properly inserted within the regulated release mechanism.

   NOTICE

   Failure to follow these instructions may lead to system actuation.

2. Verify that the cartridge has been removed from the regulated release assembly and that the regulated release mechanism is in the cocked position. If the regulated release mechanism does not have the lock pin inserted or cartridge removed, see *Semi-Annual Maintenance Examination*, page 8-1, in *Maintenance Examination* section, and complete Steps 2 and 3 before completing the following installation steps.

   If the regulated release mechanism has a factory installed solenoid, it also has two factory installed switches.

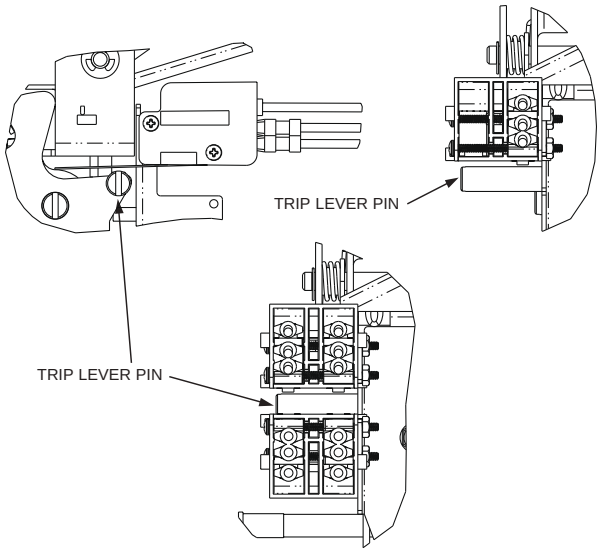


FIGURE 5-113
001621

3. Install one or two of the electrical (snap-action) switches into the switch cover for the upper tab of the switch mounting bracket. See Figure 5-114.

⚠ CAUTION

Never place low voltage alarm initiating switches on the lower tab of the switch mounting bracket.



FIGURE 5-114
009128

INSTALLING ELECTRICAL SWITCHES (Continued)

4. Slide the switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5-115.

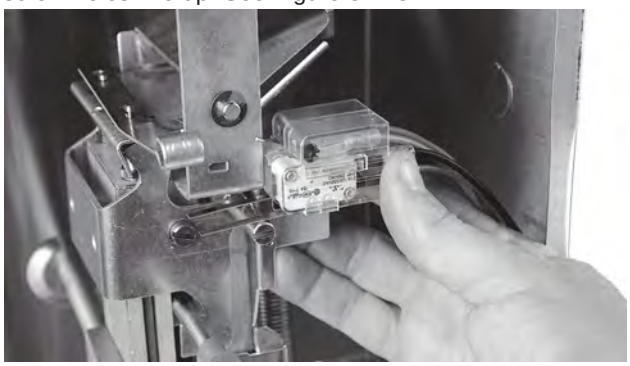


FIGURE 5-115
009129

5. Install the two switch screws, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. See Figure 5-116. Tighten screws securely.

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

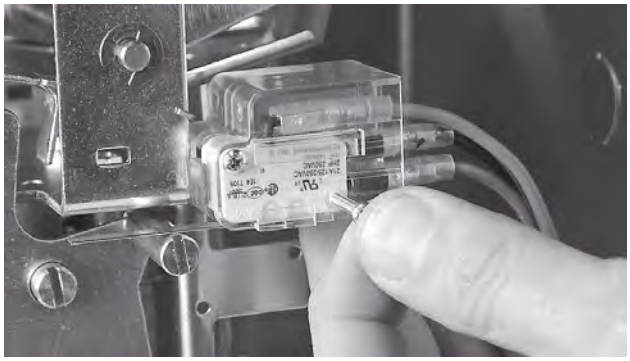


FIGURE 5-116
009130

6. Wire the upper switches according to the switch wiring diagram provided with each release mechanism. See Figure 5-117.

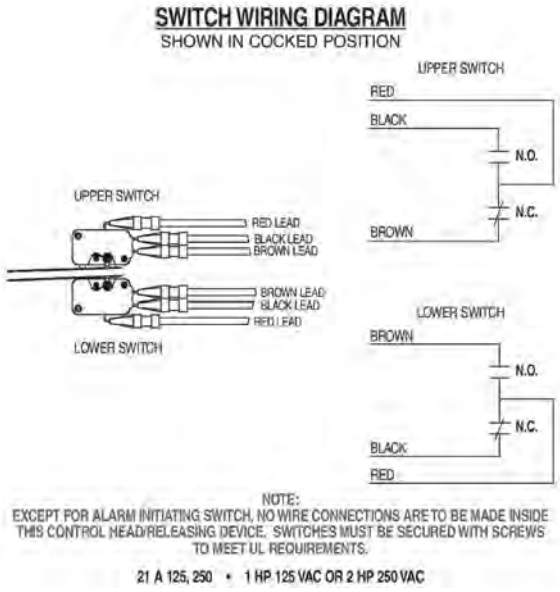


FIGURE 5-117
009145

7. If necessary, install one or two snap-action switches into the switch cover for the lower tab of the switch mounting bracket. These switches are oriented opposite to the upper switches so that the levers are on the top side of the switch when mounted to the lower tab of the switch mounting bracket.

► **⚠ CAUTION**

Never place low voltage alarm initiating switches on the lower tab of the switch mounting bracket.

INSTALLING ELECTRICAL SWITCHES (Continued)

8. Slide the switch cover onto the lower tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up. See Figure 5-118.

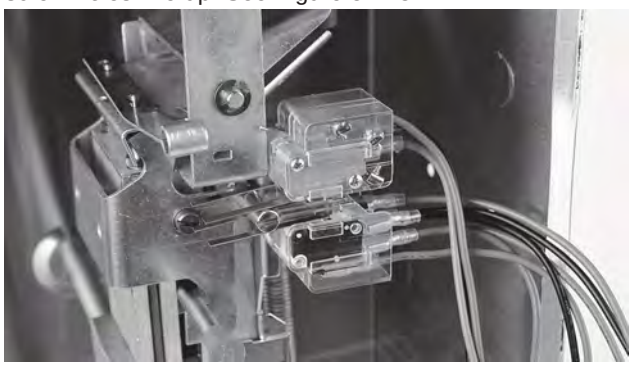


FIGURE 5-118
009131

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

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

10. Wire the lower switches according to the switch wiring diagram provided with each release mechanism. Figure 5-117.

    Note: All wiring to be performed by certified individuals.

11. Restore power to the release assembly.
12. Before proceeding with Step 13, test the electric (snap-action) switches:
    a. Remove the lock pin. With the AUTOMAN release in the cocked or ready position, press the lever of each switch up. If the switch is working properly there should be an audible click. See Figure 5-119.

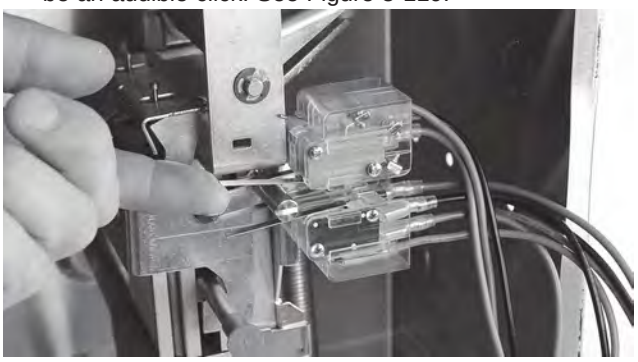


FIGURE 5-119
009133

    b. With the AUTOMAN release in the fired position, press the lever of each switch up. There should be no audible click.

       When installing multiple switches, make certain that all the switches transfer when the release operates. If they do not, readjust their position.

    c. If an audible click is heard in the fired position adjustments can be made by removing the snap action switch and bending the lever slightly.
    d. After adjustments, repeat steps a and b. Then, recock the AUTOMAN release and install the lock pin.

NOTICE

All electrical wiring/connections shall be performed by qualified individuals in accordance with local jurisdiction requirements.

13. The switch may now be connected to the compatible components that are predetermined to shut off or turn on. Refer to the component manufacturer's instructions for proper wiring connections to the compatible components.

NOTICE

All electrical connections must be made in an approved electrical box which also meets NEC article 314.40 (D) Grounding Provisions or local codes.

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

NOTICE

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

15. Turn off the power source and connect the power line to any relay, contactor, or contractor supplied devices where used.

INSTALLING ALARM INITIATING SWITCH

The alarm initiating switch kit (Part No. 428311) consists of the following components:

- Alarm Initiating Switch Assembly – Rated 50 mA 28 VDC (or 0.1 A, 125 VAC)
- Switch Cover
- Mounting Screw with Nut (4)
- Screws (2)
- Trip Lever Pin
- Hex Nut for Trip Lever Pin
- Instruction Sheet

The alarm initiating switch is installed in the AUTOMAN Release on the upper tab of the switch mounting bracket.

1. Install round trip lever pin with hex nut provided.
2. Install the alarm initiating switch into the switch cover for the upper tab of the switch mounting bracket. To install the alarm initiating switch in the switch cover, slide the switch into the large opening of the switch cover, oriented with the switch lever on the bottom side of the switch. See Figure 5-120.

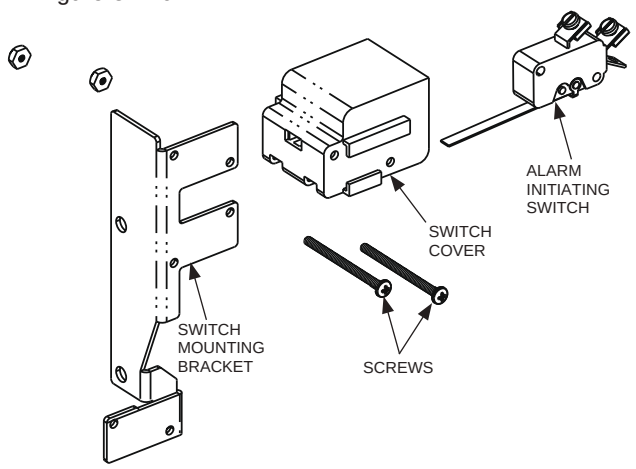


FIGURE 5-120
009137a

NOTICE

The alarm initiating switch must always be installed on the upper tab of the switch mounting bracket.

3. Slide the switch cover onto the upper tab of the switch mounting bracket, ensuring that the tab slides into the channels on the back side of the switch cover, until the screw holes line up.
4. Install two switch screws, ensuring that the screws pass through the holes in the cover, though the mounting holes in each of the switches, and through the holes in the mounting bracket tab. Tighten the screws securely.

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

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

NOTICE

All connections to the fire alarm control panels must be made by trained and qualified personnel in accordance with the fire alarm control panel manufacturer's recommendations.

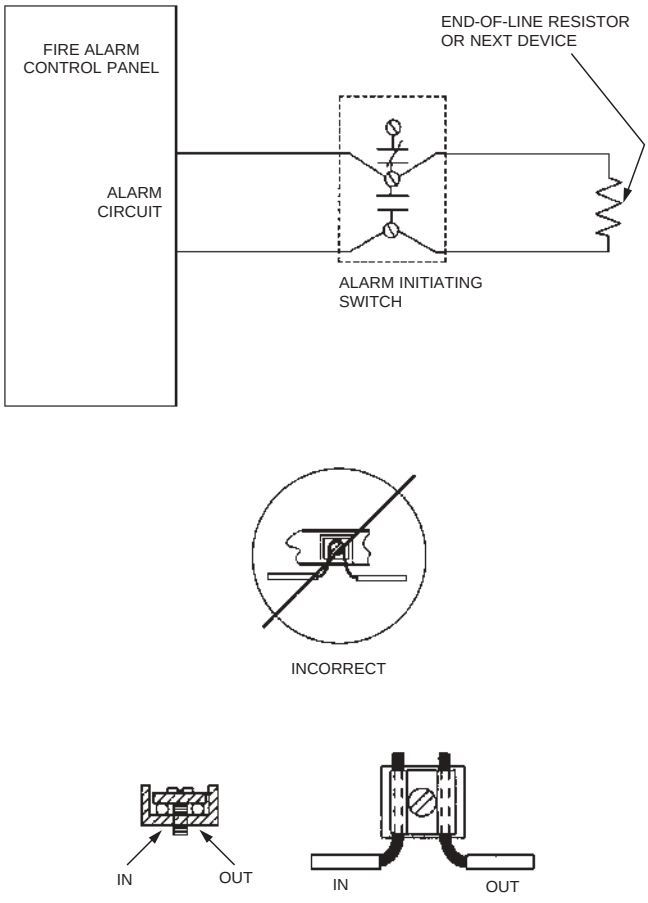


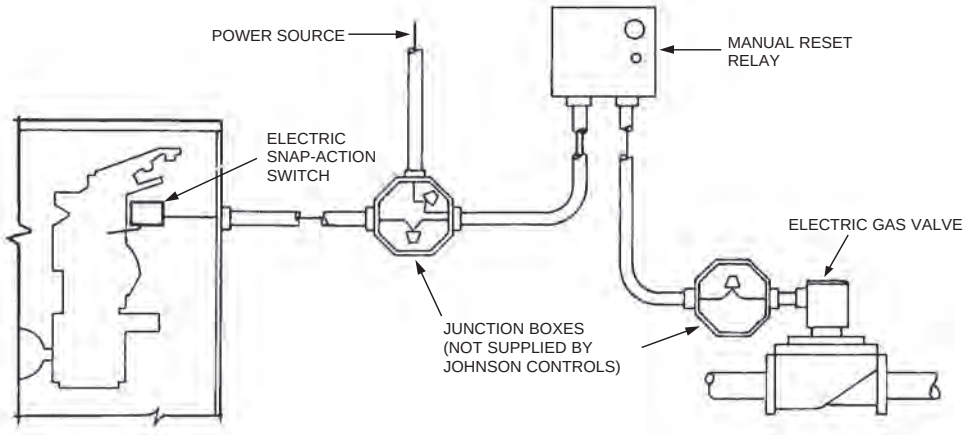
FIGURE 5-121
004891, 004905

Note: All electrical connections must be made in an approved electrical box which also meets NEC article 314.40 (D) Grounding Provisions or local codes.

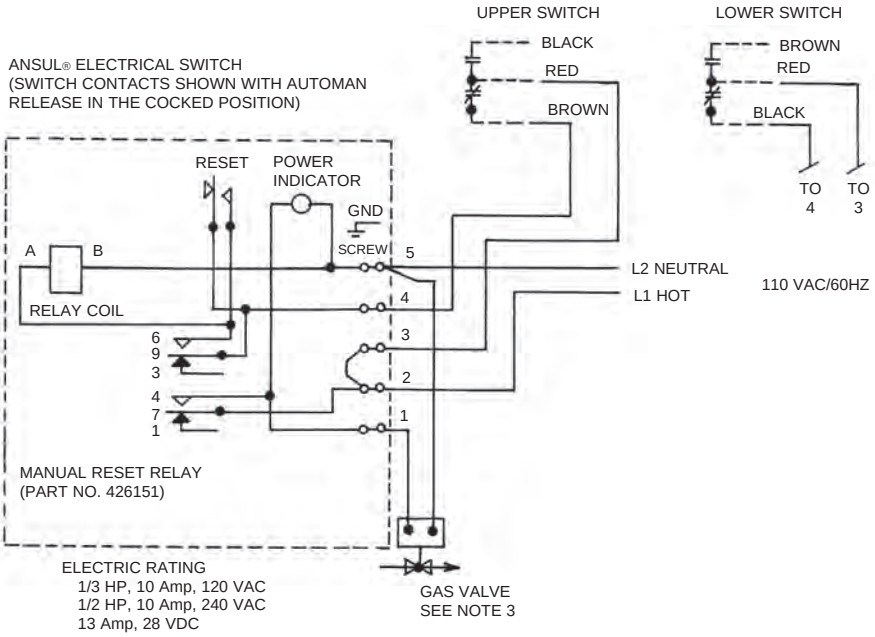
ELECTRICAL SWITCH REQUIREMENTS

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

INSTALLATION OVERVIEW



WIRING SCHEMATIC - RELAY PART NO. 426151



NOTE:

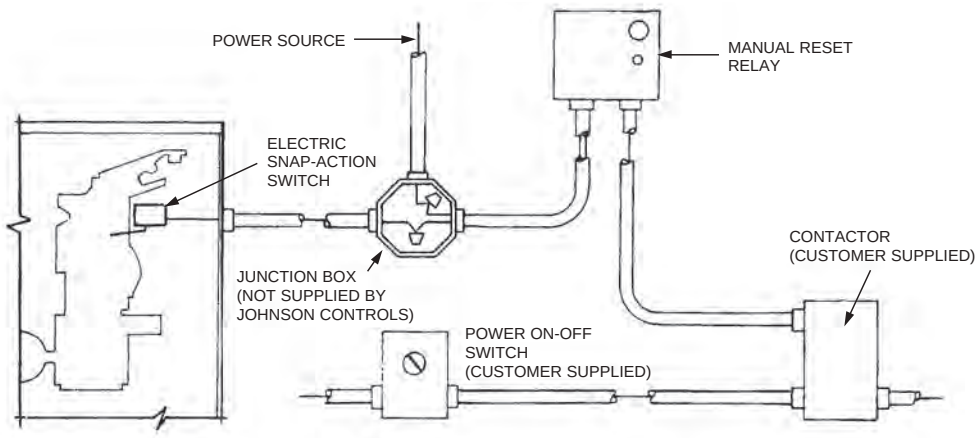
1. _____ DENOTES FIELD INSTALLATION.
2. __ __ __ __ __ DENOTES FACTORY INSTALLATION.
3. CONTRACTORS: "UL LISTED ENCLOSED INDUSTRIAL CONTROL EQUIPMENT OR MAGNETIC SWITCH HAVING A RATING MATCHING THAT OF THE COOKING APPLIANCE COIL, 110 V/60 HZ."
4. DO NOT USE BLACK WIRE ON SNAP-ACTION SWITCH IN NORMAL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

FIGURE 5-122
000273, 002462

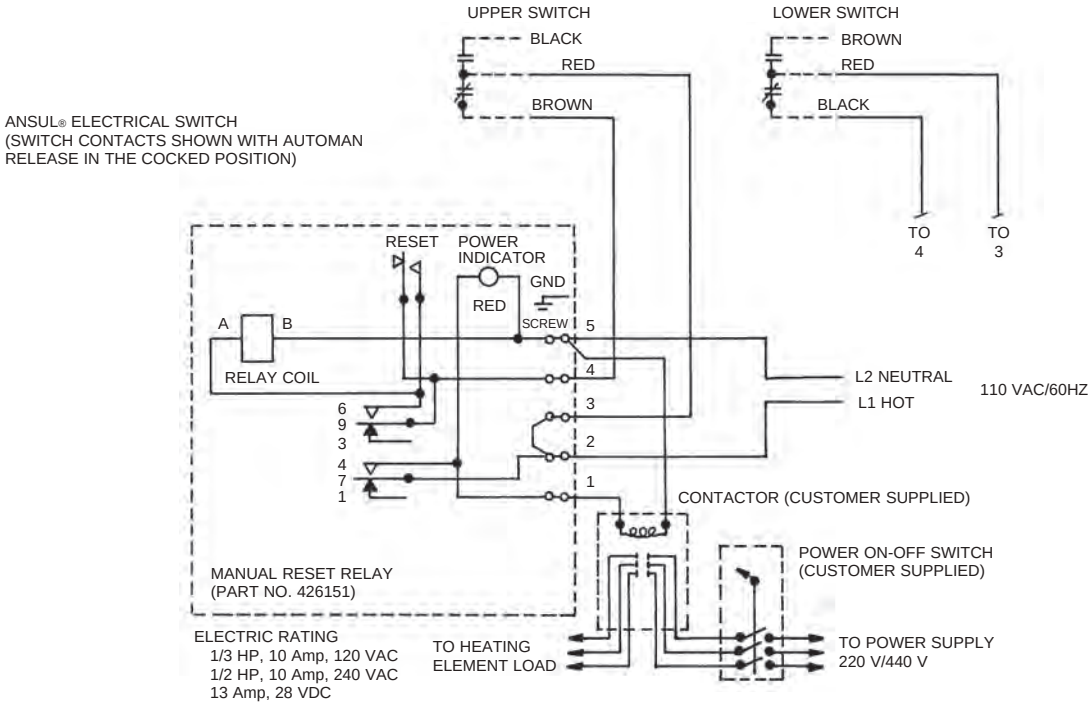
ELECTRICAL SWITCH REQUIREMENTS (Continued)

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

INSTALLATION OVERVIEW



WIRING SCHEMATIC - RELAY PART NO. 426151



NOTE:

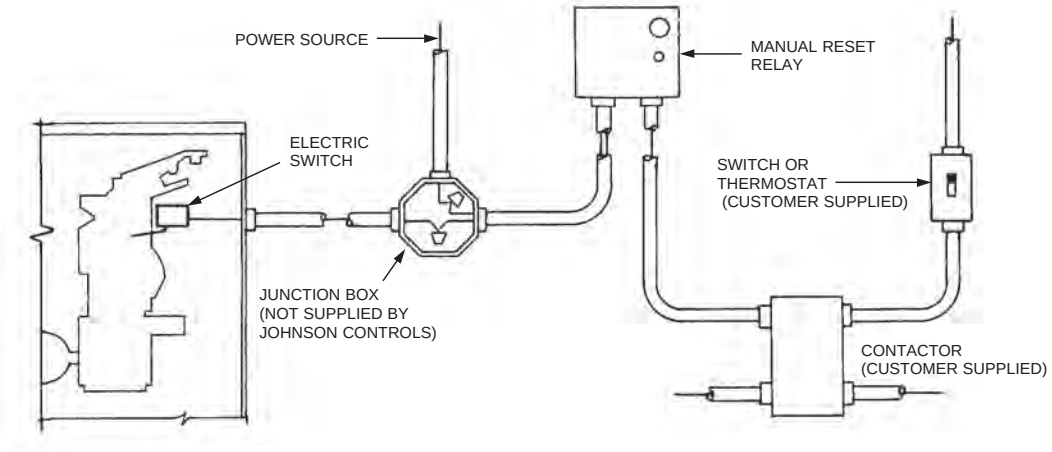
1. _____ DENOTES FIELD INSTALLATION.
2. __ __ __ __ __ DENOTES FACTORY INSTALLATION.
3. GAS VALVES: "UL LISTED ELECTRICALLY-OPERATED SAFETY VALVE FOR NATURAL, OR LP GAS AS NEEDED OF APPROPRIATE PRESSURE AND TEMPERATURE RATING, 110V/60 HZ" OR ANSUL® GAS VALVES, PART NUMBERS 13707, 13708, 550360, 13709, 13710, 550363 AND 17643.
4. DO NOT USE BLACK WIRE ON ELECTRICAL SWITCH IN NORMAL INSTALLATION. BLACK WIRE TO BE USED ONLY FOR EXTRANEOUS ALARM, LIGHT CIRCUITS.

FIGURE 5-123
000276, 002460

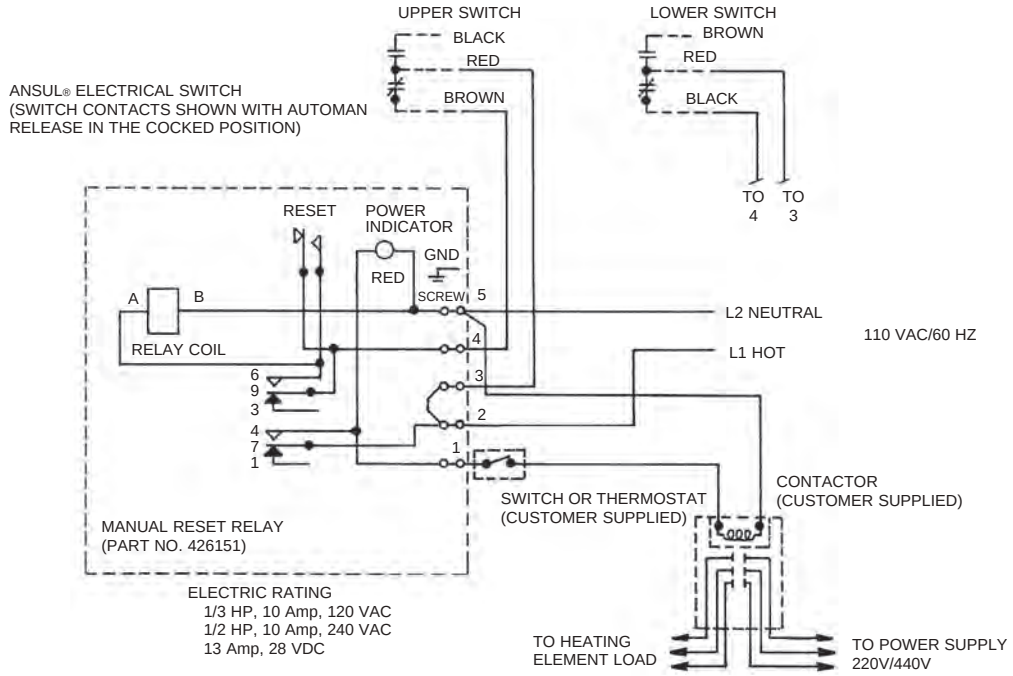
ELECTRICAL SWITCH REQUIREMENTS (Continued)

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

INSTALLATION OVERVIEW



WIRING SCHEMATIC - RELAY PART NO. 426151



NOTE:

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

FIGURE 5-124
000279, 002461

WIRING 24 VDC REGULATED RELEASE ASSEMBLY

CAUTION

Do not install a cartridge or remove a tank assembly unless the release is cocked and the ring pin is in place. Failure to comply may result in accidental system actuation.

If the following occurs during installation, the solenoid for the releasing assembly may be damaged, rendering the system inoperable.

1. If the release is electrically tripped, or fired, with the ring pin inserted such that the release mechanism is pinned in the cocked position.
2. The lever arm (Part No. 26310) of the mounted switch is bent such that the switch does not operate when the release roll pin is bottomed out in the fired position.
3. Trying to recock the release mechanism while power is applied to the release through the alarm contacts.

For complete recharging, inspection, and maintenance instructions, refer to the applicable fire suppression system manual.

⚠ WARNING

Take extreme care when wiring the release assembly. Failure to comply may cause an electrical shock, resulting in possible serious injury or death.

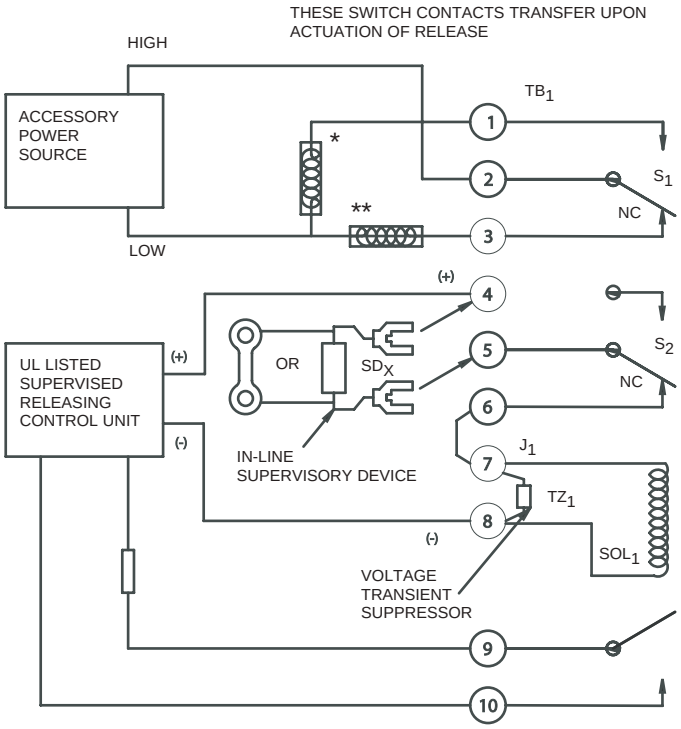
Note: For installation instructions for 24 VDC AUTOMAN (AUTOMAN II-C) Regulated Release, the AUTOPULSE Control Panels, and/or electric thermal detection, refer to the latest version of the appropriate manuals:

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

See the following notes and wiring diagram for instruction on wiring the 24 VDC regulated release assembly.

Notes:

1. To be connected to a nominal 24 VDC releasing circuit. Input power: 750 mA at 24 VDC nominal (1.02 at 30 VDC maximum).
2. Polarization: Observe the polarity when connected to a release circuit; Terminal 4 positive, Terminal 8 negative.
3. All interconnecting wiring number 14 - 18 AWG.
4. S_1 and S_2 contact ratings: 20 A, 125/250 VAC 2 HP, 250 VAC 1 HP, 125 VAC.
5. SOL_1 coil resistance: 28 OHMS +/- 10% at 77 °F (25 °C).
6. Install the in-line supervisory device SD_X across terminals No. 4 and No. 5. See the releasing panel installation instructions for supervisory device requirements. If an in-line supervisory device is not required, install jumper J_2 across terminals No. 4 and No. 5.
7. S_3 contact ratings: 24 VDC, 240 mA maximum.



* AUXILIARY ALARMING DEVICES, SEE S_1 RATINGS

** FUEL SHUT-OFF VALVE, BLOWER MOTOR, DOOR CLOSER, ETC., SEE S_1 RATINGS.

FIGURE 5-125
008468

After the system has been completely installed, and **before installing the cartridge,** the system must be tested at the regulated release assembly. The testing information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the testing of the R-102 system must be trained and hold a current ANSUL® certificate in an R-102 training program.

Note: AUTOMAN release must be in the cocked position before testing manual pull station. Make certain to remove lock pin before performing pull station testing.

TESTING MANUAL PULL STATION

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

1. With the expellant gas cartridge removed, remove lock pin from regulated release assembly cable lever.
2. On the pull station, remove the break rod from the pull station by inserting a small screwdriver into slot at bottom of pull knob to facilitate turning the pull knob. Push slightly on the screwdriver and turn pull the knob clockwise, then the pull knob can be removed without breaking the glass rod.

NOTICE

Take care in removing the break rod from the pull station side shields while rotating the break rod/pull knob assembly.

3. Pull the ring handle on pull station. If the regulated release assembly is tripped easily, the remote manual pull station is properly installed. If the regulated release assembly does not trip, remove the pulley tee, if provided, and each pulley elbow cover to make certain the wire rope is resting on the pulley sheave. If this does not correct the problem, there is too much slack in the line and it must be retightened.
4. Recock regulated release assembly using cocking lever (Part No. 441042 or 441041) and reinstall lock pin (Part No. 438031).
5. On the pull station, insert the break rod into the two holes toward the top of the pull knob. Rotate the pull knob counterclockwise.

NOTICE

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

NOTICE

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

TESTING MECHANICAL GAS VALVES

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

1. **⚠ WARNING**

To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

Turn gas line on.

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

Note: Run a functional pressure test from the maintenance section with pressurized gas (see page 8-2).

3. Test gas line for leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear and repeat test again to make certain no other gas leaks exist.
4. If no gas leak is found, pull air cylinder rod to fully extended position.
5. Recock mechanical gas valve.
6. Check burners for gaseous odor.

CAUTION

If gaseous odor exists, manually push the air cylinder rod to the fully retracted position immediately. This causes the mechanical gas valve to shut the gas line off.

Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.

7. If no gaseous odor exists, pilot light may be ignited at this time.
8. Reinstall the side covers to gas valve housing. Make certain roll pin is positioned within both sides of the valve housing slot. Connect lead wire seals (Part No. 197) on ANSUL® type valves. See Figure 6-1.
9. Make certain the regulated release mechanism is cocked with lock pin in place.

NOTICE

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

TESTING MECHANICAL GAS VALVES (Continued)

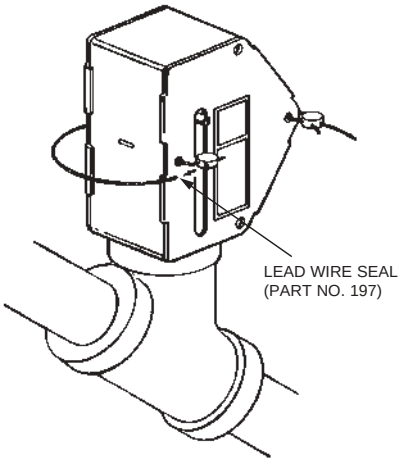


FIGURE 6-1
000359

TESTING ELECTRICAL GAS VALVES

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

1. **⚠ WARNING**

   To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

   Turn gas line on.
2. Make certain electric or snap-action switch is properly wired.
3. Make certain all other devices connected to the manual reset relay are properly wired. See typical wiring diagrams in Figure 5-122 through to Figure 5-125 in *Installation Instructions* section, pages 5-43 to 5-46.
4. Test for gas leaks by painting connections with a soap solution. Bubbles indicate a gas leak. Tighten connections where leaks appear. Repeat test again to make certain no other gas leaks exist.
5. If no gas leaks are found, turn power source on and depress the reset button on the manual reset relay (red light on) to energize or open electric gas valve.
6. Remove lock pin from regulated release mechanism.

   CAUTION

   Do not install the cartridge at this time or the system may be actuated.
7. Manually actuate the system by operating the remote pull station. It may be necessary to remove the glass break rod prior to operating pull station. Manual reset relay (**red light out**) de-energizes (**Close**) the electric gas valve, thus shutting off the gas line. If this does not happen, turn power source off. Then re-examine all wiring connections for proper hookup. See Figure 5-122 through to Figure 5-125 in *Installation Instructions* section for typical wiring diagrams.
8. If the test is successful, recock the regulated release mechanism using the cocking lever (Part No. 441042 or 441041) and reinstall the lock pin (Part No. 438301). Depress the reset button on the manual reset relay. The red light switches on (**red light on**).
9. Check burners for gaseous odor.

   CAUTION

   If gaseous odor exists, turn off power source immediately. This causes the electric gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
10. If no gaseous odor exists, the pilot light may be ignited at this time.

    NOTICE

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

TESTING ELECTRIC SWITCH

The procedure for testing a field installed electric or snap-action switch is as follows:

NOTICE

If an electrical gas shut-off valve is attached to system, perform the proper test procedure for the gas valve first, before completing the following steps.

1. Turn the power source on and if installed, depress the reset button on the manual reset relay (**red light on**).All electrical devices should be operating at this time.
2. Remove the lock pin.

   CAUTION

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

TESTING ELECTRIC SWITCH (Continued)

3. Manually actuate the system by operating the remote pull station. It may be necessary to remove the glass break rod prior to operating pull station. If installed, the manual reset relay de-energizes the electric gas valve, thus shutting off the gas line. All electrically-operated devices predetermined to shut off or turn on should do so. If this does not occur, turn power source off and make sure all wiring is properly connected and retest. See Figure 5-122 through to Figure 5-125 in *Installation Instructions* section for typical wiring diagrams.
4. If the test is successful, recock the regulated release mechanism using the cocking lever (Part No. 441042 or 441041) and reinstall the lock pin (Part No. 438031). If a manual reset relay is installed, depress the reset button (red light on). It is necessary to re-light any pilot lights on the cooking appliances.

NOTICE

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

TESTING DETECTION SYSTEM

1. Test detection system by completing the following steps:
   a. Raise the regulated release mechanism tension lever to the **Up** position.
   b. Remove the fusible link from the terminal detector and install a test link (Part No. 24916). See Figure 6-2.

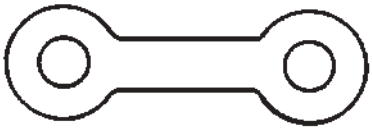


FIGURE 6-2
000363

   c. Locate the detector linkage:

      For clip on style linkage, locate the linkage in the bracket slightly toward termination end of the detection run.

      For scissor style linkage, locate the linkage in the bracket all the way toward termination end of the detection run.

   d. Lower regulated release mechanism tension lever to **Down** position and **remove lock pin.**
   e. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
   f. If the system actuates successfully, go to Step 4.
2. If the regulated release mechanism does not actuate, check the following components and remedy any disorder as follows:
   a. Check the detector linkage for correct positioning.
   b. Check the wire rope for knotting or jamming.
   c. Check pulley elbows to see that wire rope is free and centered in pulley sheaves. If any evidence of pulley elbow deformation is found, replace the pulley elbow.
   d. Make certain that lock pin is removed.
   e. Make certain that regulated release mechanism is cocked.
   f. Make certain that tension lever is in **Down** position.
3. Re-test the system by completing the following steps:
   a. Make certain regulated release is cocked and lock pin is inserted.
   b. Raise the regulated release mechanism tension lever to the **Up** position.
   c. Install a new test link (Part No. 24916) on the terminal detector.
   d. Lower the regulated release mechanism tension lever to the **Down** position.
   e. Check for 1/4 in. (6.4 mm) minimum 3/8 in. (9.5 mm) maximum clearance between the trip hammer assembly and the cable lever assembly.
   f. Remove the lock pin.
   g. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.
4. Upon successful actuation of the system, complete the following steps:
   a. Raise tension lever to **Up** position and install a properly-rated fusible link in the terminal detector.
   b. Cock the regulated release mechanism using the cocking lever (Part No. 441042 or 441041) and insert the lock pin (Part No. 438031).
   c. Lower tension lever to **Down** position.
   d. For scissor-style linkage, locate linkage in bracket all the way toward termination end of detection run.
   e. Make certain the 1/4 in. (6.4 mm) minimum to 3/8 in. (9.5 mm) maximum clearance was maintained between the base of the trip hammer assembly and the cable lever assembly.

NOTICE

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

TESTING DETECTION SYSTEM (Continued)

Step 4 (Continued)

f. Remove the shipping cap and weigh each cartridge. Replace if weight is 1/2 oz (14.2 g), or more, below weight stamped on nitrogen cartridge. CO_2 cartridges which weigh more than 1/2 oz (14.2 g) over stamped weight should also be replaced.

g. Install the cartridge into the regulated release mechanism receiver and each regulated actuator receiver. Hand tighten firmly.

h. Remove the lock pin.

i. Install the cover on the regulated release assembly and each regulated actuator assembly and secure with appropriate fasteners or lead wire seal. Insert the seal (Part No. 197) in each upper and lower cover hole, if applicable. If the system is installed in an OEM enclosure, attach the enclosure cover and secure with appropriate hardware or procedure.

CAUTION

Before installing the cover, make certain the detection tension lever is secured in the **Down** position to enable automatic detection and operation of the AUTOMAN regulated release.

j. Record installation date on the tag attached to unit and in a permanent file.

The recharge information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the recharge of the R-102 system must be trained and hold a current ANSUL® certificate in an R-102 training program.

► ***NOTICE***

For continued fire protection, the R-102 restaurant fire suppression system must be recharged immediately after use.

Recharge procedures for single, double, and multiple-tank systems are as follows.

CLEANUP PROCEDURES

Although there is no unusual cleanup procedure of ANSULEX low pH agent, due to the alkaline nature of these agents, clean kitchen surfaces within 24 hours after system discharge. The reaction from the wet chemical agent on cooking grease or oil produces a foamy bi-product that can be wiped up with a cloth or sponge. The following procedures should be followed:

⚠ CAUTION

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

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

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

1. The agent is non-toxic; however, food product and cooking grease/oil that has come in contact with the agent is no longer suitable for human consumption and should be discarded.
2. Soak up as much of the agent as possible using sponges or clean rags. Dispose of these sponges or rags in a local sanitary land fill site in accordance to local authorities.

⚠ CAUTION

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

3. Using hot, soapy water and either a clean cloth or sponge, wipe away all foamy residue and thoroughly scrub all surfaces that have come in contact with the agent.
4. After thoroughly cleaning all affected surfaces, adequately rinse and allow to completely dry before re-energizing the equipment.

RECHARGE

NOTICE

Determine the cause of the system discharge and correct immediately before performing system recharge.

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. From the tank in regulated release enclosure: Disconnect the expellant gas hose from each tank adaptor assembly.

   From the tank in the mounting bracket or mounting enclosure: Disconnect the expellant gas piping union at each of the tank adaptor inlet lines.
3. Disconnect the distribution piping union at each tank adaptor outlet lines.
4. From the tank in enclosure: Remove the tank.

   From the tank in bracket assembly: Loosen the wingnut, disengage the bracket band, and remove each tank.
5. Remove each tank adaptor/tube assembly and complete the following:
   a. Remove the o-ring and inspect for damage.
   b. Clean and coat the o-ring with a good grade of extreme temperature grease and reinstall into adaptor groove. See Figure 7-1.
   c. Remove the 1/4 in. vent plug.
   d. Clean and inspect for free movement and corrosion. If necessary, replace the vent plug (Part No. 68800).
   e. Reinstall the vent plug into adaptor body.

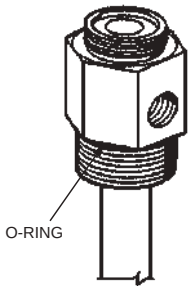


FIGURE 7-1
000364

RECHARGE (Continued)

6. **CAUTION**

   Do not flush pipe with only water or other non-approved material, as this could cause internal corrosion, leading to possible improper discharge.

   Piping system must be flushed to remove any wet chemical residue. To prepare the system for flushing:

   a. Pour the complete contents of one 32-oz. bottle of ANSUL® Flushing Concentrate (Part No. 79656) into an empty R-102 agent tank. One complete bottle is used for either size tank, the 1.5 gallon or the 3 gallon.

   b. Fill the tank approximately half full with warm, clean water. Agitate the tank for a few seconds and then add more warm water to bring the fill level to within approximately 1 in. (25 mm) from the bottom of the fill opening.

   c. Install adaptor/tube assembly and tighten.

7. To perform the flushing procedure, either secure heavy-duty plastic bags to each nozzle (See Figure 7-2) or remove each nozzle tip and strainer and attach plastic tubing. See Figure 7-3.

   If using plastic bags, secure bags and proceed to Step 9.

   If using plastic tubing, proceed to Step 8.

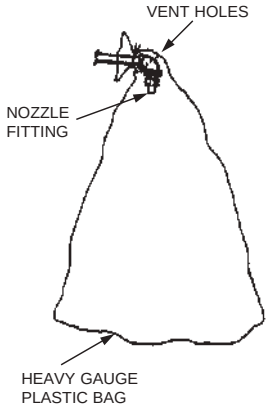


FIGURE 7-2
001739

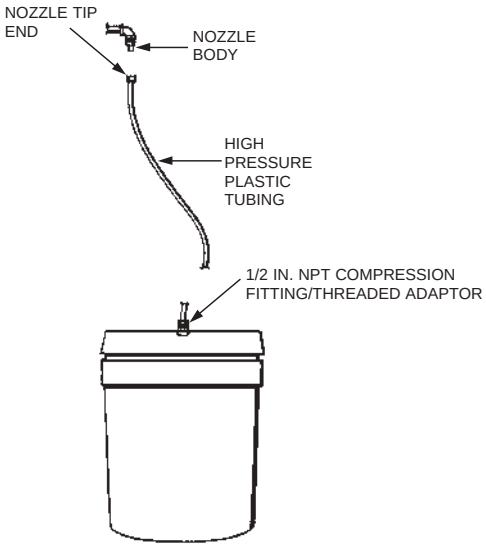


FIGURE 7-3
001740

8. If using the plastic tubing option, utilize the 1/2 in. (13 mm) OD plastic tubing with wall thickness not to exceed 1/16 in. (1.5 mm), and make certain it can withstand the pressures of at least 90 psi (6.2 bar) expelled during the flushing and blowdown procedures.

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

   To prepare the plastic tubing:

   a. Cut as many tubing lengths as required, making them long enough to reach the container from each nozzle outlet.

   b. Using the nozzle tip end, slide a length of 1/2 in. (13 mm) plastic tubing over the rib on the nozzle tip and secure with a 1/2 in. (13 mm) adjustable hose clamp. See Figure 7-4.

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

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

RECHARGE (Continued)

Step 8. d. (Continued)

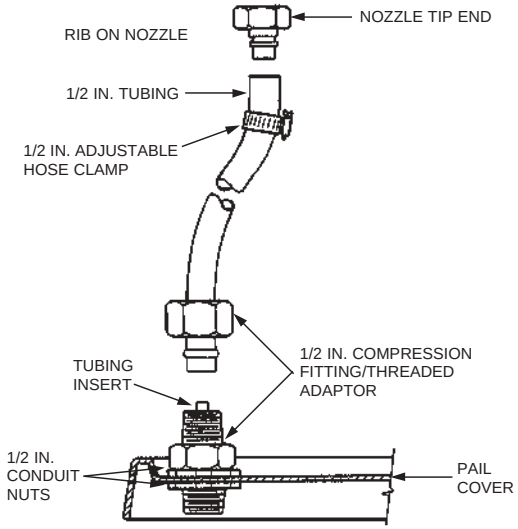


FIGURE 7-4
000367

e. Attach the tubing ends to the compression fittings. Tubing inserts are required. See Figure 7-4.

f. Install the nozzle/tubing ends to the nozzle bodies in the discharge piping.

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

9. Complete the following steps in the flushing procedure:

a. Connect the discharge piping and expellant gas line to the agent tank adaptor.

b. Cock the AUTOMAN release mechanism and insert the lock pin. See the *Components* Section of this manual for detailed part numbers.

c. Install the cartridge and tighten by hand.

d. Remove the lock pin.

e. If the regulated actuators are included in the system, also install the cartridges in the actuators.

f. Actuate the system via the pull station.

g. Wash out all of the system nozzles and strainers in warm soapy water, rinse and return all of the nozzles and strainers to their appropriate locations in the discharge piping.

h. Verify that all nozzle types are correct. Utilizing the nozzle aiming device, ensure that all nozzles are correctly aimed at the appropriate location on the appliance.

The current nozzle design incorporates an o-ring to seal the nozzle and help retain the metal nozzle cap. To help ensure the nozzle orifice remains clean and clear of the cooking grease or oil accumulation, the nozzle o-ring must be replaced at intervals not to exceed one year, or sooner if conditions warrant replacement. If o-ring deterioration or damage is present, replace the o-ring immediately.

Some applications still require the use of grease across the nozzle orifice, for example rubber blow-off caps, clip-on style metal blow-off caps, and CB style metal blow-off caps. For these instances use Dow Corning MOLYKOTE HP-300 lubricant (HP-300 Grease, Part No. 445051). **Do not use** Silicone Grease such as, but not limited to, Dow Corning #4 and MOLYKOTE 111 on any existing system.

Note: Be sure all distribution pipe is clean of thread cutting oil.

Use the lubricant (HP-300 Grease) in applications requiring the use of grease across the nozzle orifice, for example rubber blow-off caps, clip-on style metal blow-off caps, and CB style metal blow-off caps.

Note: Silicone grease should not be applied to the nozzle orifice.

i. Optional: Apply a small amount of HP-300 grease across the opening of the nozzle tip. Install the blow-off caps onto nozzles.

j. Remove the empty tank.

k. Drain agent distribution hose if used.

10. Fill each tank with 1.5 gal (5.7 L) or 3.0 gal (11.4 L) of ANSULEX low pH liquid fire suppressant. See Figure 7-5.

Note: Use a funnel with a screen to stop any foreign material from entering the tank. **See page 5-3, Figure 5-6, for additional detailed filling instructions.**

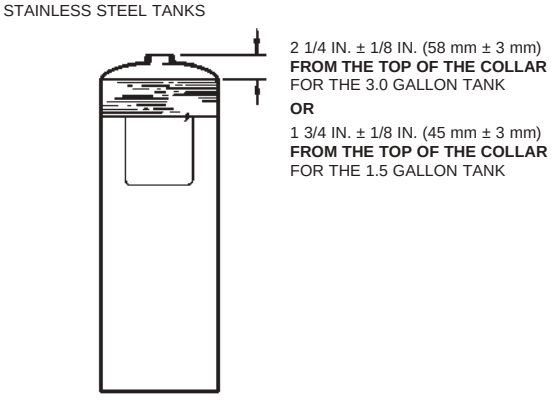


FIGURE 7-5
000292

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **Do not fill with cold agent. Do not overfill.** Overfilling may result in agent entering gas hose and regulator potentially causing system malfunction. See page 5-3.

RECHARGE (Continued)

11. Replace the bursting disc (Part No. 416974) in the adaptor assembly. Make certain the silver side of disc is away from the tank.
12. Replace the adaptor/tube assembly and tighten into place. Return and secure each tank in the regulated release assembly and mounting bracket/enclosure. Reconnect the expellant gas and distribution piping and/or as required.
13. Raise the tension lever to **Up** position.
14. Cock the regulated release mechanism using cocking lever (Part No. 441042 or 441041) and install the lock pin (Part No. 438031).
15. Remove the empty cartridge from the regulated release assembly and each regulated actuator assembly as required.

CAUTION

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

16. Install the properly-rated fusible links in all of the detectors except the terminal detector.

NOTICE

If actuation was caused by a fire situation, all fusible links must be replaced.

17. Install the test link (Part No. 24916) in terminal detector.
18. Lower the tension lever to the **Down** position.
19. Remove the lock pin.
20. Using a wire cutter, cut the test link at the terminal detector to simulate automatic actuation.

NOTICE

If the regulated release mechanism does not actuate, see Steps 2 and 3 of the Testing Detection System portion of the *Testing and Placing In Service* section, page 6-3, of this manual.

21. After successful actuation, raise the tension lever to the **Up** position
22. Install the properly-rated, ANSUL® approved, fusible link in the terminal detector.
23. Cock the regulated release mechanism and install the lock pin (Part No. 438031).
24. Locate the detector linkage and correctly position in each bracket.
25. Lower tension lever to the **Down** position.
26. Inspect the base of the wire rope clamping device to make certain there is a minimum of 1/4 in. (6.4 mm) to a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer assembly and the cable lever assembly.

NOTICE

If clearance is not 1/4 in. (6.4 mm) minimum to a maximum of 3/8 in. (9.5 mm), raise tension lever to the **Up** position, raise trip hammer 3/8 in. to 1/2 in. (9.6 mm to 12.7 mm), tighten the set screws, and repeat Steps 25 and 26.

27. Remove the lock pin.
28. Manually test the regulated release mechanism by operating the remote manual pull station.
29. Recock the regulated release mechanism and insert the lock pin.
30. Reset all of the devices which were affected by the system actuation. See the following *Resetting* section.

RESETTING

Resetting Remote Manual Pull Station

METAL STAMPED STYLE (PART NO. 4835 AND 54011)

Reset each of the remote manual pull stations by completing the following steps:

1. If necessary, remove the set screw that is retaining the break glass rod.
2. Press and position the ring handle in the proper location against the cover and slide the replacement break rod (Part No. 4834) through the stud and handle.
3. Tighten the set screw into the stud.
4. If no other resetting is required, see *Replacement Cartridge* page 7-6, and complete steps 1 through 5.

RESETTING (Continued)

Resetting Remote Manual Pull Station (Continued)

MOLDED COMPOSITE STYLE WITH SIDE SHIELDS (PART NO. 434618 AND 435960)

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

NOTICE

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

3. Hold the pull knob assembly against the faceplate. Rotate the pull knob assembly counterclockwise until the break rod and pull knob snap in place.
4. If no other resetting is required, see *Replacement Cartridge*, page 7-6, and complete steps 1 through 5.

Resetting Mechanical Gas Shut-Off Valve

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

⚠ WARNING

To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

1. Remove the side cover from the gas valve housing.
2. Extend the air cylinder rod to fully extended position. Air cylinder is located inside the regulated release assembly enclosure.
3. Recock gas valve by pulling valve stem up so pin in stem engages in cocking lever.
4. Check burners for gaseous odor. **If gaseous odor exists, manually push the air cylinder rod to the fully retracted position immediately.** This causes the mechanical gas valve to shut the gas line off.

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

Resetting Electrical Switch

Reset the electrical switch by completing the following steps:

1. Make certain the power source is on.
2. The electric switch is reset automatically when the regulated release mechanism is recocked.
3. If no other resetting is required, see *Replacement Cartridge* and complete steps 1 through 5.

Resetting Electrical Gas Shut-Off Valve

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

⚠ WARNING

To reduce the risk of explosion due to leaking gas, before the gas line is turned on, make certain to extinguish any open flames and turn off all burners and any electrical or mechanical devices that are capable of igniting gas. Failure to comply may result in serious personal injury or death.

1. Make certain the power source is on.
2. Depress reset button on manual reset relay (red light on). Gas valve resumes its normal operating or open position.
3. Check burners for gaseous odor. **If gaseous odor exists, turn off power source immediately.** This causes the electric gas valve to shut the gas line off.

   Open any doors and/or windows to clear the area of gaseous fumes, then correct the gas leak before proceeding any further.
4. If no gaseous odor exists, the pilot light may be ignited at this time.
5. If no other resetting is required, see *Replacement Cartridge*, next page, and complete steps 1 through 5.

Resetting Pressure Switch

Reset the pressure switch by completing the following:

1. Depress the reset buttons on the pressure switch cover. The pressure switch assemblyies is located on the right side of the regulated release enclosure. An audible click is heard to verify the pressure switch has resumed its normal or non-actuated condition.
2. If no other resetting is required, see *Replacement Cartridge* and complete steps 1 through 5.

REPLACEMENT CARTRIDGE

To complete the recharge and resetting procedures:

1. Remove the shipping cap and weigh the replacement cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on cartridge. CO_2 cartridges that weigh more than 1/2 oz (14.2 g) over stamped weight should also be replaced.
2. Make certain that the regulated release mechanism is cocked and the lock pin is installed. Then, install the replacement cartridge into the regulated release assembly and each regulated actuator receiver and hand tighten.
3. Remove the lock pin.
4. Snap cover on the regulated release and each regulated actuator assembly, insert the lead wire seal (Part No. 197) in the upper and lower cover hole and secure.

CAUTION

Before installing cover, make certain that the detection tension lever is secured in the **Down** position to enable automatic detection and operation of the AUTOMAN regulated release.

5. Record the recharge date on tag attached to the unit and in a permanent file.

The maintenance information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the maintenance of the R-102 system must be trained and hold a current ANSUL® certificate in an R-102 training program.

Maintenance is required semi-annually. At the 12 year interval, along with the normal maintenance exam, the tanks and hoses must be hydro-tested and the regulators must be flow tested.

Prior to performing the required maintenance steps, verify that the R-102 system protection is designed and installed correctly for the existing appliance and ventilation system configuration. If not, make corrections as required.

SEMI-ANNUAL MAINTENANCE EXAMINATION

Semi-annual maintenance procedures for single, double, and multiple-tank systems are as follows.

NOTICE

Under certain circumstances hood and duct cleaning operations may render the fire suppression system ineffective due to a coating of cleaning chemical left on the detection equipment or mishandling of the system by cleaning service personnel. **Therefore, it is strongly recommended that the R-102 system be completely inspected and serviced by an Authorized ANSUL® Distributor immediately following any such cleaning operations.**

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) or lock pin (Part No. 438031) on the cocked regulated release mechanism. See Figure 8-1 or Figure 8-2.

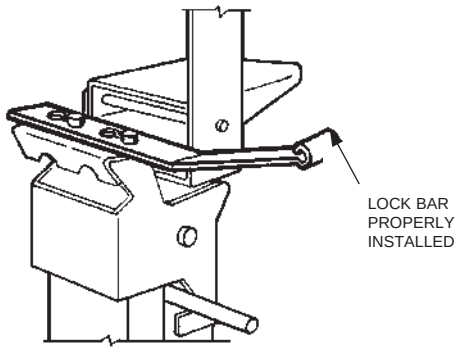


FIGURE 8-1
000321a

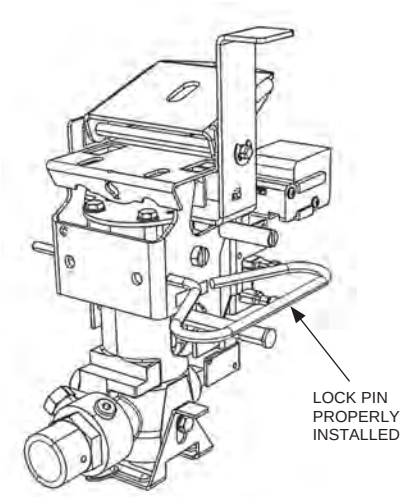


FIGURE 8-2
009462

3. Remove cartridge from regulated release assembly and each regulated actuator assembly, install safety shipping cap, and set aside in a safe location.
4. Check to make certain the actuation line used to connect the regulated actuator assemblies to the AUTOMAN regulated release assembly is connected to the high pressure side (right side) of the cartridge receiver in the AUTOMAN releasing device and that it is intact, with all fittings securely tightened. This includes any 1/8 in. copper tubing and fittings used to connect to the air cylinder for the ANSUL® mechanical gas valve.

CAUTION

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

5. From tank in regulated release assembly: Disconnect the expellant gas hose from each tank adaptor assembly.

   From tank in bracket/enclosure assembly: Disconnect the expellant gas piping union at each tank adaptor inlet line.
6. Disconnect distribution piping union at each tank adaptor outlet line.
7. From tank in enclosure: Remove tank. Keep in upright position to avoid spilling the agent.

   From tank in bracket assembly: Loosen wingnut, disengage bracket band, and remove each tank. Keep tank in upright position to avoid spilling the agent.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

8. To check for leaks in the actuation line, a hand held or electric vacuum pump may be used:
   a. Disconnect the actuation line from the AUTOMAN regulated release cartridge receiver and connect the pump to the line.
   b. The pump pulls a vacuum to 20 in. (678 mbar) of mercury, as shown on the gauge. Leaks do not exceed 5 in. (169 mbar) of mercury loss within a 30 second time frame.
   c. If the gauge indicates a leak in the line, examine for loose connections or damage. Repair or replace as needed.
   d. If leakage is not due to piping, disassemble the pneumatic actuator assemblies in the regulated actuators and inspect the actuator and the o-ring in the actuator. Repair or replace as needed.

      Note: Vacuum pumps can be obtained from automotive parts/supply stores.

   ALTERNATE TEST METHOD FOR STEP 8:

   The actuation line can also be pressurized with either CO_2 or N_2 from a cartridge or with dry air, CO_2, or N_2 from a larger cylinder.

   a. Cock the AUTOMAN regulated release assembly and carefully insert lock bar (Part No. 14985) or lock pin (Part No. 438031). See Figure 8-1 or Figure 8-2.
   b. Make certain expellant gas line hose and/or pipe from the regulator in the AUTOMAN regulated release is disconnected from agent storage tanks.
   c. Connect regulator test kit (Part No. 56972) to one of the expellant gas line hoses and securely cap the remaining hose or pipe. See Figure 8-13.
   d. Verify that no cartridges are installed in the AUTOMAN releasing device or the regulated actuator assemblies.
   e. To verify operation of the regulated actuator assemblies, pressure adaptor (Part No. 427560) can be used to connect to a pressurized CO_2 or N_2 cylinder, instead of using a CO_2 or N_2 cartridge.

      Note: The pressure adaptor assembly comes with a 1/4 in. NPT pipe plug that is required to be installed in the side of the adaptor.

   f. Install a suitable 1/4 in. air pressure quick connect fitting (supplied by others) to the bottom of the adaptor.
   g. Install and hand tighten the adaptor to the cartridge receiver and securely attach the corresponding connector from the gas cylinder hose assembly.
   h. With the valve on the regulator test kit closed, remove the lock bar or lock pin and operate the remote cable operated pull station to operate the regulated release.
   i. Open the pressure cylinder valve to verify that the regulated actuator assemblies has operated properly and the air cylinder has unlatched the ANSUL® mechanical gas valve, if used.
   j. Once regulated actuator and gas valve operation is verified, close the valve on the pressurized cylinder, if used, and open the valve on the regulator test kit to relieve any residual pressure.

      Note: Although only required at 12 year intervals, the regulator in the AUTOMAN regulated release can also be verified. See *Maintenance* steps on page 8-7.

   k. Re-cock the AUTOMAN regulated release and remove the spent cartridge or pressure adaptor from the cartridge receiver.
   l. If there were leaks in the actuation line or in the 1/8 in. copper gas tubing for the air cylinders, re-tighten the fittings or replace damaged components.
   m. If the cartridge puncture pin in the regulated actuators did not fully extend, dismantle the actuator and inspect components of the actuator assembly.
      - Once the pneumatic actuator is disassembled, remove the actuator piston assembly and check the interior walls of the actuator body for signs of damage or corrosion.
      - Check the o-ring for elasticity or cuts. Replace, if necessary. Clean and coat o-ring with HP-300 Grease and reinstall.
      - Re-assemble the actuator assemblies, and reconnect all actuation and all expellant piping or hose.
9. Remove gasket from cartridge receiver in regulated release mechanism and each regulated actuator. Check gasket for elasticity or cuts and replace gasket (Part No. 181) if necessary. Clean and coat gasket lightly with a good grade of extreme temperature grease. Reinstall gasket into cartridge receivers.
10. Remove tank adaptor/tube assembly from each tank. If evidence of corrosion, replace assembly. See Figure 8-3.

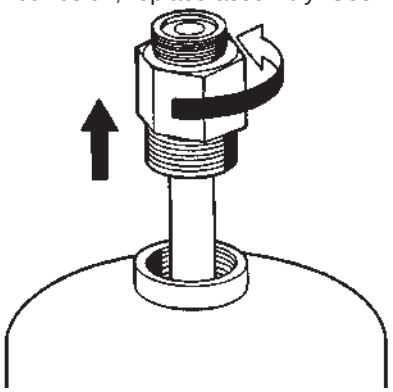


FIGURE 8-3
000291

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

11. Make certain that each tank is filled with 1.5 gal (5.7 L) or 3.0 gal (11.4 L) of only ANSULEX low pH liquid fire suppressant. See Figure 8-4.

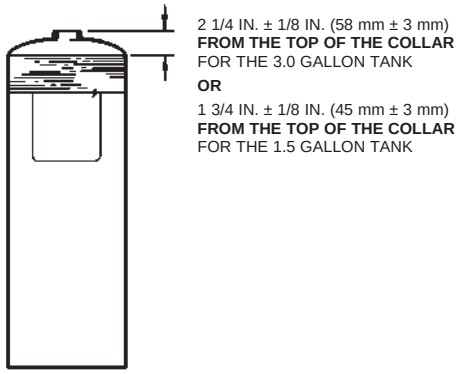


FIGURE 8-4
000292

12. Check each tank adaptor by completing the following:
    a. Examine threads on each tank adaptor and tank collar for nicks, burrs, or cross-threading.
    b. Clean and coat o-ring with a good grade of extreme temperature grease. See Figure 8-5.
    c. Remove 1/4 in. vent plug and clean and inspect for free movement and corrosion, if necessary, replace vent plug (Part No. 68800).
    d. Apply thread tape and reinstall vent plug.
    e. Make certain bursting disc is in place and silver side is away from tank.
    f. Clean seating surface and return adaptor/tube assembly to each tank.
    g. Tighten securely.

Note: If six gallon manifolded system, check in-line burst disc assembly. Verify tank adaptors do not have a burst disc. (Should have plastic gaskets.)

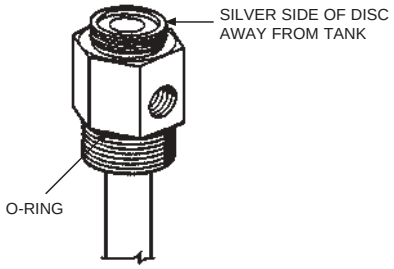


FIGURE 8-5
000364

13. Place fully charged tanks in enclosures and/or brackets and secure.
14. Carefully assemble and wrench tighten all expellant gas hoses and agent distribution piping. Apply thread tape to all gas pipe connections.
15. Remove blow-off caps from nozzles. Inspect each blow-off cap and o-ring replace if deteriorated. On metal blow-off caps with spring clips, make certain spring clip rotates freely on cap. If there are signs of deterioration, replace caps and/or o-rings as needed. Replace o-rings annually.

NOTICE

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

Some applications still require the use of grease across the nozzle orifice, for example rubber blow-off caps, clip-on style metal blow-off caps, and CB style metal blow-off caps. For these instances use Dow Corning MOLYKOTE HP-300 lubricant (HP-300 Grease, Part No. 445051). Do not use silicone grease such as, but not limited to, Dow Corning #4 and MOLYKOTE 111 on any existing system.

NOTICE

When using old style metal blow-off cap with spring clips, make certain the spring clip rotates freely on the metal cap and coat the outside of the cap, including the clip, with HP-300 Grease.

16. Verify all nozzle types are correct. Check all nozzles to ensure each is free of cooking grease build-up. Optional: Add a thin coating of clean HP-300 grease across the orifice.

    Note: Do not allow grease to enter nozzle orifice.

    Note: If there is any evidence of cooking grease or other residue in the nozzles or distribution piping or agent or agent residue in the distribution piping, the entire piping network must be inspected and thoroughly cleaned. Portions of piping that cannot be thoroughly cleaned must be replaced.

    Use the nozzle aiming device (Part No. 431992 or Part No. 439877) to help ensure that all nozzles are correctly aimed at the appropriate location on the appliance. Reinstall blow-off caps.
17. Remove the lock bar or lock pin and manually test the regulated release assembly by operating the remote manual pull station. Check metal pull station cover for damage or wear. Replace cover if cable has worn a groove in the cover as deep as the diameter of the cable. If flexible conduit is used in installation, check conduit for damage, cuts and sharp bends.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

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

▸ Before proceeding with Step 18, test electric switches:

▸ a. With the AUTOMAN releasing device in the cocked or ready position, press the lever of each switch up. If the switch is working properly, there should be an audible click.

▸ b. With the AUTOMAN releasing device in the fired position, press the lever of each switch up, there should be no audible click.

c. If an audible click is heard in the fired position several adjustments can be made. The trip lever extension pin can be rotated so the peak of one of the hex points is pointed up against the switch levers. Tighten it in that position. If this doesn't resolve the problem, loosen the screws holding the switches, apply a small counter-clockwise torque on the switches and retighten the screws. If necessary, a final adjustment can be made ▸ by removing the electric switch and bending the lever slightly.

d. After adjustments, repeat Steps a. and b. Then, recock ▸ AUTOMAN releasing device and insert lock bar or lock pin.

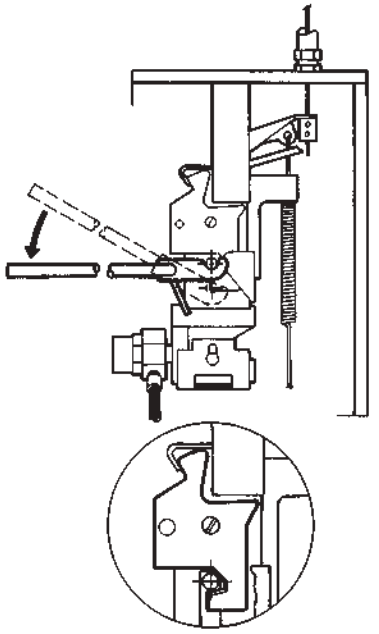


FIGURE 8-6
009468

19. Raise tension lever to **Up** position. See Figure 8-7.

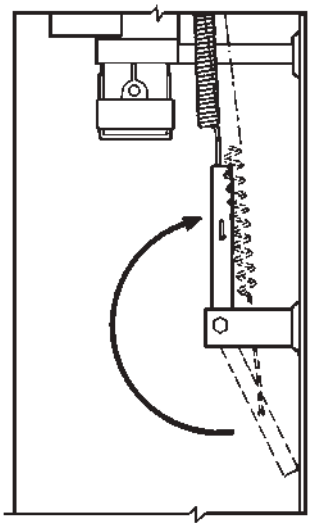


FIGURE 8-7
000322

20. Install test link in terminal detector.
21. Lower tension lever to **Down** position. See Figure 8-8.

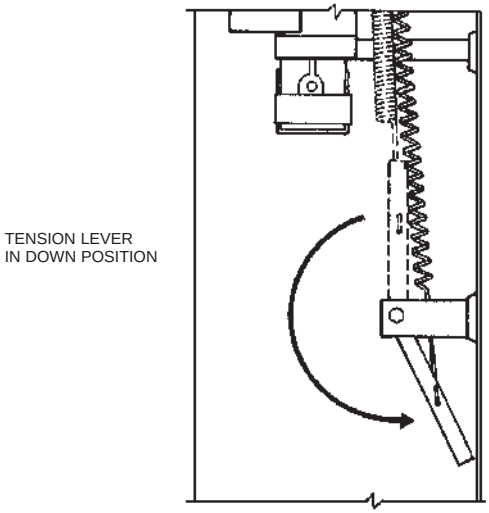


FIGURE 8-8
001096

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

NOTICE

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

23. After successful actuation, raise the tension lever to **Up** position.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

24. Remove and destroy all existing fusible links from the terminal and series detector brackets and replace with properly-rated ANSUL® approved, fusible links in accordance with NFPA 17A.
25. Inspect wire rope at all detector locations, pulley elbows, pulley tee and at AUTOMAN release. If wire rope shows signs of wear or fraying, replace entire length.
26. Lower the tension lever to **Down** position.
27. Recock the regulated release mechanism and insert the lock bar or lock pin.
28. Inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 8-9.

▸ **Note:** If needed, use Part No. 078942 to replace the loocking clamp.

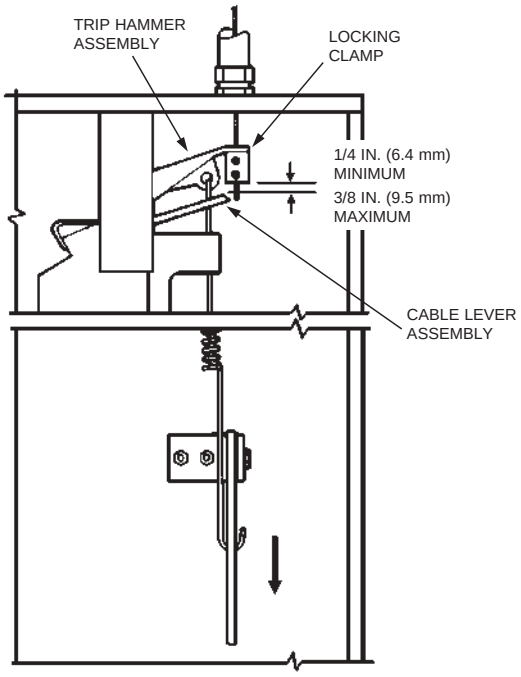


FIGURE 8-9
000329

NOTICE

If clearance is not between 1/4 in. (6.4 mm) or 3/8 in. (9.5 mm), raise tension lever to **Up** position, raise trip hammer 3/8 in. to 1/2 in. (9.5 mm to 12.7 mm), tighten set screws, and repeat Steps 24 and 26.

29. For scissor-style linkage, locate linkage and properly position in each bracket all the way toward termination end of detection run.
30. ▸ If a mechanical gas valve is installed, remove both side covers.
31. At the regulated release, push the air cylinder rod fully retracted.
32. The gas valve should operate.
33. Pull the air cylinder rod to its fully extended position.
34. Re-cock the gas valve by pulling the valve stem up until the pin in the stem engages the cocking lever.
35. Reinstall the side covers on the gas valve and connect ▸ the lead wire seal.
36. Test the electric switches and the electric gas valves by completing the steps on Page 6-2 in Section 6, *Testing and Placing In Service.*
37. Before reinstalling the cartridge, reset all additional equipment by referring to appropriate section of *Recharge and Resetting Procedures*, Section 7.
38. Remove the shipping cap and weigh each cartridge. Replace if weight is 1/2 oz (14.2 g), or more, below weight ▸ stamped on cartridge. Replace CO_2 cartridges which ▸ weigh more than 1/2 oz (14.2 g) over stamped weight.
39. Make certain the regulated release mechanism is cocked and the lock bar or lock pin is installed, then screw the replacement cartridge into the regulated release mechanism and each regulated actuator receivers and hand tighten.
40. Remove the lock bar or the lock pin.

CAUTION

Make certain tension lever is in the **Down** position after completing all tests. Failure to put the tension lever in the **Down** position will cause the system to not operate automatically.

41. ▸ Secure the cover on regulated release and each ▸ regulated actuator, insert lead wire seal (Part No. 197) through holes in the cover and box, and secure.

SEMI-ANNUAL MAINTENANCE EXAMINATION (Continued)

42. If the system contains an agent distribution hose and restraining cable assembly, also perform the following steps:
    a. Carefully pull or push out the appliance and verify that the restraining cable limits the travel of the appliance and prevents the application of any pull force or bending stress on the agent distribution hose or hose-to-pipe connections.
    b. Check the restraining cable to verify it is not frayed and is securely fastened to the appliance and the wall or restraining location.
    c. Check the hose and hose fittings and verify that the hose remains in a vertical natural loop with no noticeable fatigue at hose end couplings, no hose twists, no hose kinking or sharp bends.
    d. Check the outer hose covering for signs of damage, checking, tears, or wear. If any of these signs are observed, replace the hose.
    e. Return the appliance to its normal operating position. Again, check the hose and hose fittings to verify that the hose does not have sharp bends, and is not kinked, twisted, or caught on anything behind the appliance. If any of these conditions exist, the hose and/or hose connections will require installation modifications.
    f. With the appliance in its normal operating position, check the hose bend to make certain the bend is not less than a 3 in. (77 mm) bend the radius (6 in. (153 mm) diameter). If less, replace the hose.
    g. Verify that the appliance is returned to its original desired location. Failure to do so may result in undue stress and fatigue of the hose and hose connections.

43. Disconnect the agent discharge piping from the storage tank outlets and verify that the agent distribution piping is not obstructed.

    Use dry air or nitrogen and blow through the agent distribution piping with the nozzle blow-off caps removed, verifying that dry air or nitrogen is discharging at each nozzle location.

    CAUTION

    If nozzles show signs of cooking grease migration into the orifice of the nozzle, or if there is evidence of agent residue in the nozzles or the inlet to the agent distribution piping, some or all of the piping may require dismantling to verify that the piping is not obstructed.

    Replace all rubber nozzle blow-off caps annually.

    Replace O-rings on newer nozzles annually.

    Note: Annual replacement is not necessary for metal blow-off caps.

44. Record semi-annual maintenance date on tag attached to unit and/or in a permanent file.

12-YEAR MAINTENANCE EXAMINATION

In addition to performing all of the steps necessary for semi-annual and annual maintenance, the following twelve-year maintenance procedures for single, double, and multiple-tank systems must be performed. All hose assemblies must be hydrostatically tested at 12 year intervals.

NOTICE

Under certain circumstances hood and duct cleaning operations may render your fire suppression system ineffective due to a coating of cleaning chemical left on the detection equipment or mishandling of the system by cleaning service personnel.

Therefore, it is strongly recommended that the R-102 system be completely inspected and serviced by an Authorized ANSUL® Distributor immediately following any such cleaning operations.

At twelve-year intervals, the liquid agent tanks must be hydrostatically tested and refilled with a fresh charge of ANSULEX low pH liquid fire suppressant. The date of manufacture is stamped on the bottom of the agent tank or on the tank label.

1. Remove the enclosure cover from the AUTOMAN regulated release assembly and each regulated actuator assembly.
2. Insert the lock bar (Part No. 14985) or lock pin (Part No. 438031) on the cocked regulated release mechanism. See Figure 8-10 or Figure 8-11.

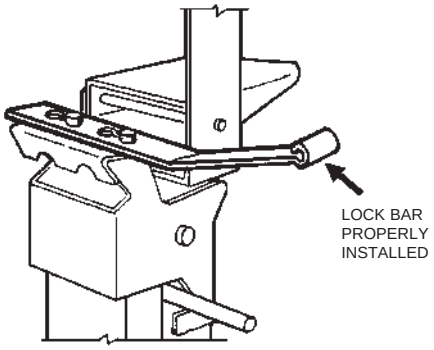


FIGURE 8-10
000321

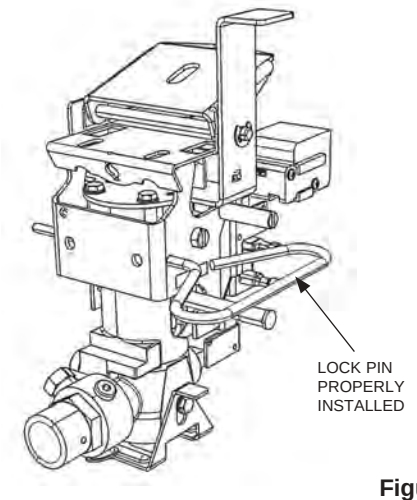


Figure 8-11
009462

3. Remove the cartridge from regulated release assembly and each regulated actuator assembly, install the safety shipping cap, and set aside in a safe location.

CAUTION

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

4. Remove the gasket from the cartridge receiver in the regulated release mechanism and each regulated actuator. Check the gasket for elasticity or cuts and replace the gasket (Part No. 181) if necessary. Clean and coat gasket lightly with a HP-300 Grease. Reinstall the gasket into cartridge receivers.
5. From the tank in enclosure: Disconnect the expellant gas piping or hose from each tank adaptor assembly.

   From the tank in bracket assembly: Disconnect expellant gas piping union at each tank adaptor inlet line.
6. Disconnect the distribution piping union at each tank adaptor outlet line.
7. From the tank in enclosure: Remove tank.

   From the tank in bracket assembly: Loosen the wingnut, disengage the bracket band, and remove each tank. Keep the tank in upright position to avoid spilling the agent.
8. Loosen the tank adaptor/tube assembly and remove.

12-YEAR MAINTENANCE EXAMINATION (Continued)

9. **⚠ CAUTION**

   Wear safety glasses during transfer operations of ANSULEX low pH liquid fire suppressant. Avoid contact with skin or eyes. In case of contact, flush immediately with water for 15 minutes. If irritation persists, contact a physician. Do not take internally. If taken internally do not induce vomiting. Dilute with water or milk and contact a physician.

   Pour the liquid agent from the tank into a clean, plastic container, and flush tank with clear water.

10. At this point, each liquid agent tank, including the 1/4 in. expellant gas hose assembly must be **hydrostatically tested** tested to 330 psi (22.75 bar) and stainless steel actuation hose must be hydrostatically tested to 1,000 psi (68.95 bar). Refer to *Hydrostatic Test Instructions* (Form No. F-7602) for test adaptors and instructions.

    NOTICE

    Do not hydrostatically test a red painted mild steel agent storage tank. Instead, replace the tank with a new stainless steel tank shipping assembly, 3 Gallon (Part No. 429862) or 1.5 Gallon (Part No. 429864).

11. Verify date stamped on the cartridge. The cartridge must also be hydrotested at intervals not greater than 12 years. European cartridges are not refillable, therefore cannot be hydrotested and refilled. They must be discarded.

12. If the cartridge date indicates the need for hydro-testing, the cartridge must be bled down through normal AUTOMAN release operation, returned to Johnson Controls for credit or hydrotested by properly trained personnel at authorized cartridge refilling stations, and replaced with a charged, replacement cartridge.

    NOTICE

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

13. If the system contains an agent distribution hose and a restraining cable assembly, a hydrostatic test is required at 220 psi (15.2 bar) for hose assembly.

14. The regulator must be flow tested at 12 year intervals. Check the date code stamped on the regulator body to determine if the regulators requires the 12 year testing (see Date Code Table). If the regulator does not require testing, proceed to Step 15. Flow test the regulators per the following table:

TABLE 8-1: DATE CODE TABLE

UL 541L

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

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

* STAMPED MONTH 1ST, YEAR 2ND

UL 74FF

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

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

* STAMPED YEAR 1ST, MONTH 2ND

** STAMPED I FOR SEPTEMBER

UL 74FF

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

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

* STAMPED MONTH 1ST, YEAR 2ND

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 14 (Continued)

a. Regulated Release Mechanism

For First Tank: Disconnect the expellant gas pipe or hose from the tank. Connect the regulator test kit (Part No. 56972) to the hose. See Figure 8-12.

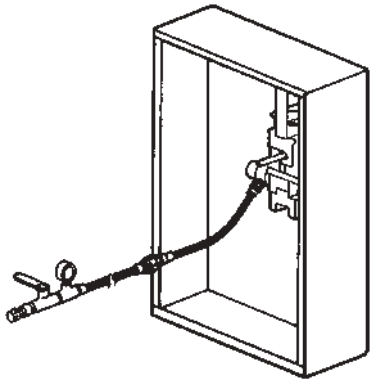


FIGURE 8-12
000369

For Second Tank: Disconnect the expellant gas piping at union. Remove the union from expellant gas piping and install the pipe cap to prevent the cartridge pressure from escaping during the test. See Figure 8-13.

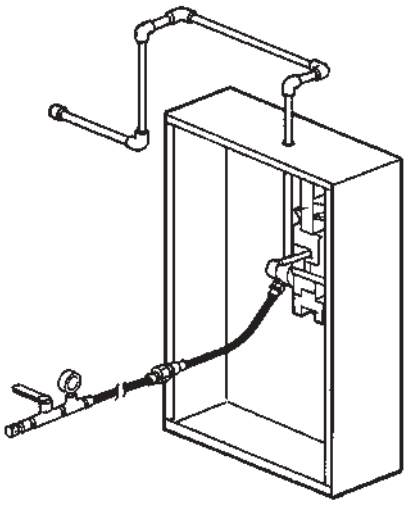


FIGURE 8-13
000370

NOTICE

For multiple-tank systems, one test kit (Part No. 56972) is required for each regulator in the system.

b. Regulated Actuator

For First Tank: Disconnect the expellant gas hose from the tank. Connect the regulator test kit (Part No. 56972) to the hose. See Figure 8-14.

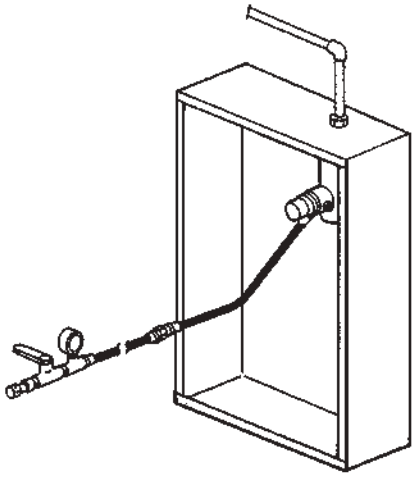


FIGURE 8-14
000371

For Second Tank: Disconnect the expellant gas piping at the union. Remove the union from the expellant gas piping and install the pipe cap to prevent the cartridge pressure from escaping during the test. See Figure 8-15.

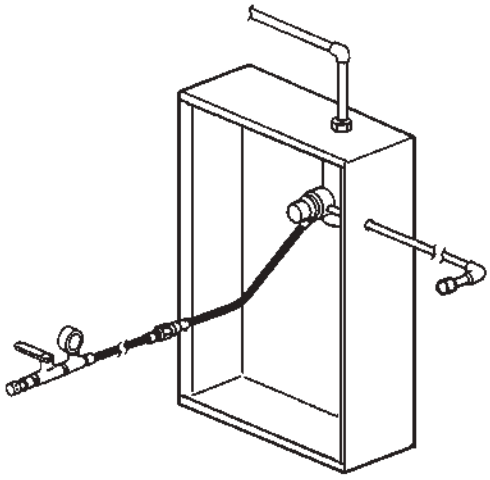


FIGURE 8-15
000372

NOTICE

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

12-YEAR MAINTENANCE EXAMINATION (Continued)

Step 14 (Continued)

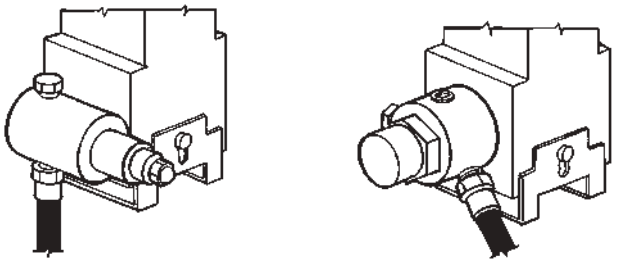
c. Install either a nitrogen or CO_2 cartridge into release mechanism and each regulated actuator provided with the system. Cartridge should be conditioned to approximately 70 °F (21 °C) before test.

NOTICE

Before continuing with Step d, make certain valve on test kit is closed.

d. Remove the lock bar or lock pin and operate the remote manual pull station to actuate the regulated release and supply pressure to each test kit.

Two styles of regulators are used with the R-102 release mechanisms. The diaphragm style (see Figure 8-16) was used in R-102 systems up to approximately 1988. The piston style (see Figure 8-16) has been used since 1988. Each style requires a different flow test procedure. Use the appropriate flow test procedure as stated in Step e.



DIAPHRAGM STYLE (USED UNTIL 1988)

PISTON STYLE (USED AFTER 1988)

FIGURE 8-16
002301

e. Flow test each regulator by completing the following steps:

Diaphragm Style – The correct pressure is between 90 psi to 110 psi (6.2 bar to 7.6 bar) with the valve on the test kit closed and 80 psi (5.5 bar) with the valve on the test kit opened. Keep the valve opened to completely empty the pressure cartridge after pressure test has been verified.

Piston Style – Open the valve on the regulator test kit. The correct pressure is between 95 psi to 125 psi (6.6 bar to 8.6 bar). Keep the valve open to completely empty the pressure cartridge.

If necessary, continue to flow test at each additional regulated actuator. Test each regulated actuator by repeating Step e.

f. Cock the release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041) and insert lock bar (Part No. 14985) or lock pin (Part No. 438031).

g. Remove empty nitrogen cartridges from release mechanism and each regulated actuator.

h. Remove test kits from release mechanism and each regulated actuator.

i. If regulator test was not successful, replace regulator.

j. Reconnect all expellant gas lines.

k. Reset all additional equipment that was operated by release mechanism.

15. Examine threads on each adaptor and tank collar for nicks, burrs, or cross-threading. Clean and coat o-ring with a good grade of extreme temperature grease. Make certain bursting disc is in place and silver side is away from tank. See Figure 8-17.

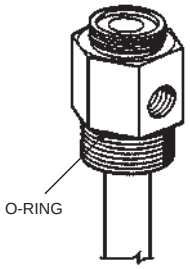


FIGURE 8-17
000364

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

17. Refill each tank with 1.5 gal (5.7 L) or 3.0 gal (11.4 L) of only new ANSULEX low pH liquid fire suppressant.

Note: Use a funnel with a screen to stop any foreign material from entering the tank.

CAUTION

During filling, the agent temperature should be 60 °F to 80 °F (16 °C to 27 °C). **Do not fill with cold agent.** See the *Installation* section, Page 5-3 for maximum fill heights for ANSULEX low pH agent storage tanks. **Do not overfill.** Overfilling may result in agent entering gas hose and regulator, potentially causing system malfunction.

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

NOTICE

Do not reinstall any tank at this time.

12-YEAR MAINTENANCE EXAMINATION (Continued)

19. Remove the blow-off caps from nozzles. Inspect each blow-off cap and replace if deteriorated. On older style metal blow-off caps with spring clips, make certain the spring clip rotates freely on the cap. On newer metal blow-off caps, make certain the integral o-ring is intact and undamaged. If there are signs of deterioration, replace caps.

> ***NOTICE***
>
> Rubber blow-off caps and nozzle o-rings that have been installed in the system for one year or more must be replaced.

20. Check all the nozzles to ensure that they are free of cooking grease build-up and have a covering of clean grease on the orifice. Reinstall the blow-off caps.
21. Remove the lock bar or lock pin and manually test the regulated release assembly by operating the remote manual pull station.
22. Cock the regulated release mechanism using cocking lever (Part No. 14995 or 435603/Part No. 441042 or 441041). See Figure 8-18.

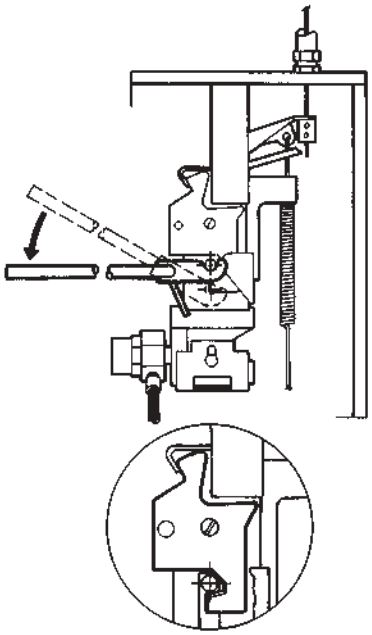


FIGURE 8-18
009468

23. Raise the tension lever to **Up** position. See Figure 8-19.

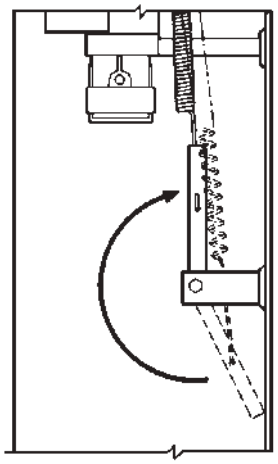


FIGURE 8-19
000362

24. Install the test link (Part No. 24916) in terminal detector.
25. Lower the tension lever to **Down** position. See Figure 8-20.

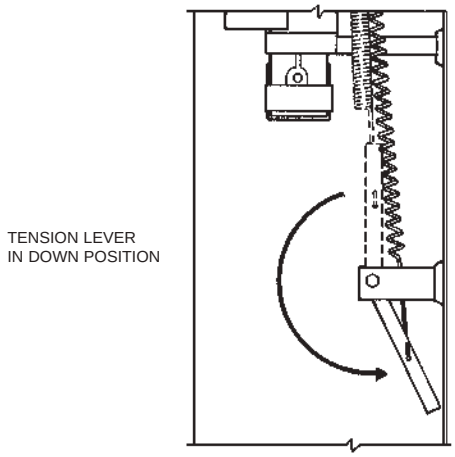


FIGURE 8-20
001096

26. Using a wire cutter, cut the test link at terminal detector to simulate automatic actuation.

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

27. After successful actuation, raise the tension lever to **Up** position.
28. Remove and destroy all the existing fusible links from the terminal and series detector brackets and replace with properly-rated ANSUL® approved, fusible links in accordance with NFPA 17A.
29. Lower the tension lever to **Down** position.
30. Recock the regulated release mechanism and insert the lock bar or lock pin.

12-YEAR MAINTENANCE EXAMINATION (Continued)

31. Inspect the base of the wire rope locking clamp to make certain that there is a minimum of 1/4 in. (6.4 mm) and a maximum of 3/8 in. (9.5 mm) clearance between the base of the trip hammer locking clamp assembly and the cable lever assembly. See Figure 8-21.

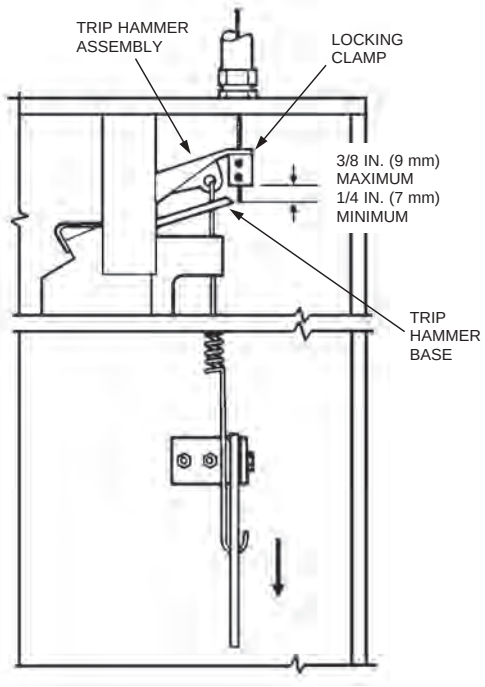


FIGURE 8-21
000329a

NOTICE

If clearance is not between 1/4 in. (7 mm) or 3/8 in. (9 mm), raise tension lever to **Up** position, re-adjust trip hammer 3/8 in. to 1/2 in. (10 mm to 12 mm), tighten set screws, and repeat Steps 29 and 31.

32. Locate the detector linkage and properly position in each bracket.
33. Make certain the additional devices have operated as intended.
34. Before reinstalling the cartridge, reset all additional equipment by referring to appropriate section of *Recharge and Resetting Procedures*, Section 7.
35. Place each fully charged tank in enclosure and/or bracket and secure.
36. Reconnect all of the distribution piping and expellant gas piping unions as required. Wrench tighten.
37. Check each gas cartridge by removing the shipping cap and weighing the cartridge. Replace if weight is 1/2 ounce (14.2 g), or more, below weight stamped on the cartridge. CO_2 cartridges which weigh more than 1/2 oz (14.2 g) over stamped weight should also be replaced.
38. Make certain the regulated release mechanism is cocked and the lock bar or lock pin is installed, then screw the replacement cartridge into regulated release mechanism and each regulated actuator receivers and hand tighten.
39. Remove the lock bar or lock pin.
40. Install the cover on regulated release assembly and each regulated actuator assembly and secure with the appropriate fasteners or lead wire seal. Insert the seal (Part No. 197) in each upper and lower cover hole, if applicable. If the system is installed in an OEM enclosure, attach the enclosure cover and secure with the appropriate hardware or procedure.

CAUTION

Before installing the cover, make certain the tension lever is in the **Down** position after completing all tests. Failure to put the tension lever in the **Down** position will cause the system to not operate automatically.

41. Record the date of 12 year maintenance examination on tag attached to enclosure and/or in a permanent file.

SYSTEM SELECTION GUIDE

Note: System options do not cover all conceivable/acceptable variations. They are listed here as a general guideline to show the most common type arrangement for multiple systems. Based on certain system designs utilizing manifolding, non-manifolding, 3-tank systems, etc., other tank/cartridge combinations can be designed. The combinations below are based on 11 flow, 3 gallon tanks and 5 flow, 1.5 gallon tanks. More competitive designs may be available by utilizing 12 flow and 6 flow systems when appropriate. Options are available up to a maximum of 15 tanks. Contact Technical Services Department for detailed information.

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
1-5	1	Single	1.5 Gal Reg. Release	101-10 (423439)	LT-20-R (423429)
6-11	1	Single	3 Gal Reg. Release	101-20 (423441)	LT-30-R (423435)
12-16	2	Double	1.5 Gal Reg. Release	101-30 (423443)	Double (423493)
			3 Gal Additional Tank		
17-22	2	Double	3 Gal Reg. Release	101-30 (423443)**	Double (423493)
			3 Gal Additional Tank		
17-22	2	Manifold	3 Gal Reg. Release	N/A	Double (423493)
			3 Gal Additional Tank		
23-27	3	Multiple	1.5 Gal Reg. Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
23-33	3	Multiple	3 Gal Reg. Release	101-20 (423441)	LT-30-R (423435)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
23-33 (Optional)	3	Multiple	3 Gal Reg. Release	N/A	Double (423493)
			(2) 3 Gal Additional Tanks		
34-38	4	Multiple	1.5 Gal Reg. Release	101-10 (423439)	LT-20-R (423435)
			3 Gal Reg. Actuator	N/A	LT-A-101-30 (423491)
			Double 3 Gal Tank Box		
34-38 (Optional)	4	Multiple	1.5 Gal Reg. Release	101-30 (423443)	Double (423493)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
39-44	4	Multiple	3 Gal Reg. Release	101-20 (423441)	LT-30-R (423435)
			3 Gal Reg. Actuator	N/A	LT-A-101-30 (423491)
			Double 3 Gal Tank Box		
39-44 (Optional)	4	Multiple	3 Gal Reg. Release	101-30 (423443)**	Double (423493)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
45-49	5	Multiple	1.5 Gal Reg. Release	101-30 (423443)	Double (423493)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	N/A	LT-A-101-30 (423491)
			Double 3 Gal Tank Box		
45-49 (Optional)	5	Multiple	1.5 Gal Reg. Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
50-55	5	Multiple	3 Gal Reg. Release	101-30 (423443)	Double (423493)
			3 Gal Additional Tank		
			3 Reg. Actuator	N/A	LT-A-101-30 (423491)
			Double 3 Gal Tank Box		

► **Note:** Double Tank Cartridge can also be used in regulated actuators in place of LT-A-101-30 cartridge.

* Based on 5 flow numbers for a 1.5 gal system and 11 flow numbers for a 3 gal system.

** If tanks are manifolded, only a double tank nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
50-55 (Optional)	5	Multiple	3 Gal Reg. Release	101-20 (423441)	LT-30-R (423435)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
56-60	6	Multiple	1.5 Gal Reg. Release	101-30 (423443)	Double (423493)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
61-66	6	Multiple	3 Gal Reg. Release	101-30 (423443)**	Double (423493)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
67-71	7	Multiple	1.5 Gal Reg. Release	101-10 (423439)	LT-20-R (423429)
			(2) 3 Gal Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal Tank Box		
67-71 (Optional)	7	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)	LT-A-101-30 (423491)
			1.5 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-20 (423441)***	LT-30-R (423435)
72-77	7	Multiple	3 Gal Reg. Release	101-20 (423441)	LT-30-R (423435)
			(2) 3 Gal Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal Tank Box		
72-77 (Optional)	7	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-20 (423441)	LT-30-R (423435)
78-82	8	Multiple	1.5 Gal Reg. Release	101-30 (423443)	LT-30-R (423435)
			3 Gal Additional Tank		
			(2) 3 Gal Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal Tank Box		

Note: Double Tank Cartridge can also be used in regulated actuators in place of LT-A-101-30 cartridge.
* Based on 5 flow numbers for a 1.5 gal system and 11 flow numbers for a 3 gal system.
** If tanks are manifolded, only a double tank nitrogen cartridge (Part No. 423493) can be used.
*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
78-82 (Optional)	8	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)	LT-A-101-30 (423491)
			1.5 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
83-88	8	Multiple	3 Gal Reg. Release	101-30 (423443)	LT-30-R (423435)
			3 Gal Additional Tank		
			(2) 3 Gal Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal Tank Box		
83-88 (Optional)	8	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
89-99	9	Multiple	Remote Mechanical Release	101-10 (423439)	N/A
			(3) 3 Gal Reg. Actuator	N/A	(3) LT-A-101-30 (423491)
			(3) Double 3 Gal Tank Box		
89-93 (Optional)	9	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
89-93 (Optional) (Continued)	9	Multiple	3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			1.5 Gal Additional Tank		
			3 Gal Reg. Actuator	101-20 (423441)	LT-30-R (423435)
94-99 (Optional)	9	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		

Note: Double Tank Cartridge can also be used in regulated actuators in place of LT-A-101-30 cartridge.

* Based on 5 flow numbers for a 1.5 gal system and 11 flow numbers for a 3 gal system.

** If tanks are manifolded, only a double tank nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM SELECTION GUIDE (Continued)

Total Flow No.*	Tank Quantity	Type of System	Type of Hardware	Carbon Dioxide Cartridge Required	Nitrogen Cartridge Required
94-99 (Optional) (Continued)	9	Multiple	3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-20 (423441)	LT-30-R (423435)
100-110	10	Multiple	Remote Mechanical Release	101-10 (423439)	N/A
			(3) 3 Gal Reg. Actuator	N/A	(3) LT-A-101-30 (423491)
			(3) Double 3 Gal Tank Box		
			3 Gal Reg. Actuator	101-20 (423441)	LT-30-R (423435)
100-104 (Optional)	10	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)	LT-A-101-30 (423491)
			1.5 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
100-104 (Optional)	10	Multiple	Remote Mechanical Release	101-10 (423439)	N/A
			(2) 3 Gal Reg. Actuator	N/A	(2) LT-A-101-30 (423491)
			(2) Double 3 Gal Tank Box		
			(2) 3 Gal Reg. Actuator	(2) 101-30 (423443)	(2) LT-A-101-30 (423491)
			3 Gal Additional Tank		
			1.5 Gal Additional Tank		
105-110 (Optional)	10	Multiple	Remote Mechanical Release	101-10 (423439)	LT-20-R (423429)
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		
			3 Gal Reg. Actuator	101-30 (423443)***	LT-A-101-30 (423491)
			3 Gal Additional Tank		

Note: Double Tank Cartridge can also be used in regulated actuators in place of LT-A-101-30 cartridge.

* Based on 5 flow numbers for a 1.5 gal system and 11 flow numbers for a 3 gal system.

** If tanks are manifolded, only a double tank nitrogen cartridge (Part No. 423493) can be used.

*** If tanks are manifolded, either an LT-A-101-30 nitrogen cartridge (Part No. 423491) or a double tank cartridge (Part No. 423493) can be used.

SYSTEM COMPONENT INDEX

Part No.	Description
429853	Mechanical AUTOMAN Regulated Release Shipping Assembly Includes: Regulated Release Mechanism in Stainless Steel Mounting Enclosure
429856	Electric AUTOMAN Regulated Release Shipping Assembly (120VAC) Includes: Regulated Release Mechanism with Solenoid and Switch in Stainless Steel Mounting Enclosure
429850	Regulated Actuator Shipping Assembly Includes: Actuator and Regulator in Stainless Steel Mounting Enclosure
429870	Stainless Steel Mounting Box Shipping Assembly Includes: Stainless Steel Mounting Box
429872	Double Tank Enclosure Shipping Assembly Includes: Two Expellant Gas Hoses Two Grommets Stainless Steel Mounting Box
429859	24 VDC Regulated Release Shipping Assembly Includes: 24 VDC AUTOMAN II-C Release Mechanism in Stainless Steel Mounting Box
► 418054	OEM Regulated Electric Release Shipping Assembly (120VAC) Includes: Regulated Release Mechanism with Solenoid and Switch 1/4 in. Hose and Mounting Bracket
79493	OEM Regulated Mechanical Release Shipping Assembly Includes: Regulated Release Mechanism 1/4 in. Hose and Mounting Bracket
418691	OEM Regulated Actuator Shipping Assembly Includes: Actuator and Regulator Hose Bracket
429878	3 Gallon Bracket Assembly (Bracket Only)
433485	Remote Release Assembly
439946	OEM Remote Release Assembly
418522	OEM Regulated Actuator Shipping Assembly Includes: Actuator and Regulator Hose
429862	3 Gallon Tank Shipping Assembly
429864	1.5 Gallon Tank Shipping Assembly
56972	Regulator Test Kit Includes: Gauge, Hose and Valve Assembly
79694	1.5 Gal (5.8 L) Container of ANSULEX Low pH Liquid Fire Suppressant
79372	3.0 Gal (11.6 L) Container of ANSULEX Low pH Liquid Fire Suppressant

Part No.	Description
► 442952	R-102 Mechanical Release (CCF approval)
442953	R-102 3 Gallon Agent Tank (CCF approval)
446286	R-102 Regulated Actuator (CCF approval)
446287	R-102 OEM Mechanical Release (CCF approval)
► 078942	Locking Clamp
423429	Cartridge Shipping Assembly (LT-20-R) (TC/DOT)
423435	Cartridge Shipping Assembly (LT-30-R) (TC/DOT)
423493	Cartridge Shipping Assembly (R-102 Double-Tank) (TC/DOT)
423491	Cartridge Shipping Assembly (LT-A-101-30) (TC/DOT)
423439	Cartridge Shipping Assembly (101-10) (TC/DOT)
15850	Cartridge Shipping Assembly (101-10) (DOT)
423441	Cartridge Shipping Assembly (101-20) (TC/DOT)
423443	Cartridge Shipping Assembly (101-30) (TC/DOT)
428440	Cartridge Shipping Assembly (LT-20-R) (European)
428441	Cartridge Shipping Assembly (LT-30-R) (European)
428446	Cartridge Shipping Assembly (R-102 Double Tank) (European)
428442	Cartridge Shipping Assembly (LT-A-101-30) (European)
428443	Cartridge Shipping Assembly (101-10) (European)
428445	Cartridge Shipping Assembly (101-20) (European)
428444	Cartridge Shipping Assembly (101-30) (European)
428948	Cartridge Shipping Assembly (LT-20-R) (Australian)
426553	Cartridge Shipping Assembly (LT-30-R) (Australian)
426563	Cartridge Shipping Assembly (R-102 Double Tank) (Australian)
426555	Cartridge Shipping Assembly (LT-A-101-30) (Australian)
► 443323	Nozzle Shipping Assembly (1W) Includes: 10 1W Nozzles 10 Blow-Off Caps
443321	Nozzle Shipping Assembly (1/2N) Includes: 10 1/2N Nozzles 10 Blow-Off Caps
443317	Nozzle Shipping Assembly (1N) Includes: 10 1N Nozzles 10 Blow-Off Caps

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
443327	Nozzle Shipping Assembly (3N) Includes: 10 3N Nozzles 10 Blow-Off Caps
443325	Nozzle Shipping Assembly (2W) Includes: 10 2W Nozzles 10 Blow-Off Caps
443329	Nozzle Shipping Assembly (230) Includes: 10 230 Nozzles 10 Blow-Off Caps
443331	Nozzle Shipping Assembly (245) Includes: 10 245 Nozzles 10 Blow-Off Caps
443333	Nozzle Shipping Assembly (260) Includes: 10 260 Nozzles 10 Blow-Off Caps
443335	Nozzle Shipping Assembly (290) Includes: 10 290 Nozzles 10 Blow-Off Caps
443337	Nozzle Shipping Assembly (2120) Includes: 10 2120 Nozzles 10 Blow-Off Caps
443319	Nozzle Shipping Assembly (1F) Includes: 10 1F Nozzles 10 Blow-Off Caps
439865	Stainless Steel Nozzle Shipping Assembly (1N) Includes: 1 Blow-Off Cap
439864	Stainless Steel Nozzle Shipping Assembly (1W) Includes: 1 Blow-Off Cap
419385	Swivel Adaptor Shipping Assembly Includes: 9 Swivel Adaptors
423572	Swivel Adaptor Shipping Assembly Includes: 25 Swivel Adaptors
77695	Blow-Off Cap Shipping Assembly (Spare) Includes: 50 Blow-Off Caps
77411	Blow-Off Cap Shipping Assembly Includes: 12 Blow-Off Caps
433208	CB Metal Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps
439861	Metal Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps
434707	CB Stainless Steel Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps
439866	Stainless Steel Blow-Off Cap Shipping Assembly Includes: 10 Blow-Off Caps

Part No.	Description
439848	Metal Blow-Off Cap O-Ring Shipping Assembly Includes: 25 O-Rings
416970	In-Line Burst Disc Union Assembly
417911	In-Line Burst Disc Shipping Assembly Includes: 10 Burst Discs
25627	1/4 in. Check Valve
551265	Nozzle Aiming Device (without Adaptor)
439877	Nozzle Aiming Device with Adaptor
439876	Aiming Device Adaptor
435547	Series Detector Shipping Assembly (Scissor)
435548	Series Detector, Pack of 25 (Scissor)
435546	Terminal Detector Shipping Assembly (Scissor) Includes: Test Link
435545	Detector Hook Assembly (Scissor)
439515	Detector Hook Assembly (Scissor) Includes: 10 Detectors
415671	Pulley Elbows Shipping Assembly (Socket End) to 700 °F (371 °C) Includes: 50 Elbows
423251	Pulley Elbows Shipping Assembly (Compression End) to 700 °F (371 °C) Includes: 50 Elbows
427929	Pulley Tee
15821	Wire Rope (50 ft (15.2 m))
79653	Wire Rope (500 ft (152.4 m))
24919	Stop Sleeve Package Includes: 10 Stop Sleeves
550122	Oval Sleeve Package Includes: 100 Oval Sleeves
436063	Conduit Offset Shipping Assembly Includes: 6 Conduit Offsets
78196	1/4 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seal” Adaptors
77285	3/8 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seal” Adaptors
77287	1/2 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seal” Adaptors
77289	3/4 in. “Quik-Seal” Adaptor Package Includes: 24 “Quik-Seal” Adaptors
79149	1/4 in. Compression-Seal Pipe Adaptor Package Includes: 24 Compression-Seals
79151	3/8 in. Compression-Seal Pipe Adaptor Package Includes: 24 Compression-Seals

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
79147	1/2 in. Compression-Seal Pipe Adaptor Package Includes: 24 Compression-Seals
79153	1/2 in. Compression-Seal EMT Conduit Adaptor Package Includes: 24 Compression-Seals
423253	Hood Seal Adaptor Shipping Assembly Includes: 6 Hood Seals
436228	Reducing Coupling
441042	Short Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN release)
441041	Long Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN release)
26310	Cocking Lever (AUTOMAN II-C release)
416018	Cocking Lever (Mechanical Gas Valve)
438031	Lock Pin
13707	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 3/4 in.
13708	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 in.
550360	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 1/4 in.
13709	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Solenoid Valve – 1 1/2 in.
13710	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 2 in.
550363	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 2 1/2 in.
17643	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Fluid Power Gas Valve – 3 in.
426151	Gas Shut-off Equipment (Electrical 110 VAC, 60 Hz) Includes: Relay – Manual Reset
423878	One Electric Switch (Field Mounted) Kit Includes: Electric Switch (SPDT) Mounting Hardware
423879	Two Electric Switch (Field Mounted) Kit Includes: 2 Electric Switches (SPDT) Mounting Hardware
423880	Three Electric Switch (Field Mounted) Kit Includes: 3 Electric Switches (SPDT) Mounting Hardware
423881	Four Electric Switch (Field Mounted) Kit Includes: 4 Electric Switches (SPDT) Mounting Hardware
428311	Alarm Initiating Switch Kit
55598	ANSUL® Gas Shut-off Equipment Mechanical Includes: Mechanical Gas Valve – 3/4 in.

Part No.	Description
55601	ANSUL® Gas Shut-off Equipment Mechanical Includes: Mechanical Gas Valve – 1 in.
55604	ANSUL® Gas Shut-off Equipment Mechanical Includes: Mechanical Gas Valve – 1 1/4 in.
55607	ANSUL® Gas Shut-off Equipment Mechanical Includes: Mechanical Gas Valve – 1 1/2 in.
55610	ANSUL® Gas Shut-off Equipment Mechanical Includes: Mechanical Gas Valve – 2 in.
25937	Gas Shut-off Equipment Mechanical (ASCO) Includes: Mechanical Gas Valve – 2 1/2 in.
25938	Gas Shut-off Equipment Mechanical (ASCO) Includes: Mechanical Gas Valve – 3 in.
15733	Gas Shut-off Equipment Includes: Air Cylinder and Tube Assembly
434618	Remote Manual Pull Station Assembly
435960	Remote Manual Pull Station Assembly Includes: 50 ft (15.2 m) of Wire Rope
434618	Remote Pull Station, English
436349	Remote Pull Station, French
436353	Remote Pull Station, German
436361	Remote Pull Station, Spanish
436369	Remote Pull Station, Russian
436373	Remote Pull Station, Turkish
437156	Remote Pull Station, Polish
437375	Remote Pull Station, Hungarian
438233	Remote Pull Station, Portuguese
436357	Remote Pull Station, English/Italian
436365	Remote Pull Station, English/Dutch
440679	Remote Pull Station, English/Arabic
443692	Remote Pull Station, English/Swedish
24915	Break Rod Package Includes: 10 Glass Break Rods (Part No. 4834) (Replacement)
427074	Trim Rings (Pack of 10)
434525	Flexible Conduit – 500 ft (152.4 m)
435959	Flexible Conduit – 500 ft (152.4 m) Includes: 500 ft (152.4 m) of Wire Rope
435979	Flexible Conduit Strain Relief Includes: 50 Strain Reliefs
434347	Flexible Conduit Inserts Includes: 50 Inserts
439104	Pre-Fed Flexible Conduit – 50 ft (15.2 m)
436150	P-Clip Shipping Assembly Includes: 50 P-Clips

SYSTEM COMPONENT INDEX (Continued)

Part No.	Description
31809	16 in. (406 mm) Stainless Steel Actuation Hose
32335	20 in. (508 mm) Stainless Steel Actuation Hose
32336	24 in. (610 mm) Stainless Steel Actuation Hose
430815	42 in. (1067 mm) Stainless Steel Actuation Hose
435982	Agent Distribution Hose and Restraining Cable Kit
434455	Henny Penny Fryer Nozzle Kit
24916	Test Link Shipping Assembly Includes: 10 Test Links
439085	SL Style Fusible Link – 165 °F (74 °C) Includes: 25 Links
439086	SL Style Fusible Link – 212 °F (100 °C) Includes: 25 Links
439087	SL Style Fusible Link – 280 °F (138 °C) Includes: 25 Links
439088	SL Style Fusible Link – 360 °F (182 °C) Includes: 25 Links
439089	SL Style Fusible Link – 450 °F (232 °C) Includes: 25 Links

Part No.	Description
439227	A-PC Style Fusible Link – 165 °F (74 °C) Includes: 10 Links
439228	A-PC Style Fusible Link – 212 °F (100 °C) Includes: 10 Links
439229	A-PC Style Fusible Link – 280 °F (138 °C) Includes: 10 Links
439230	A-PC Style Fusible Link – 360 °F (182 °C) Includes: 10 Links
439231	A-PC Style Fusible Link – 450 °F (232 °C) Includes: 10 Links
439232	A-PC Style Fusible Link – 500 °F (260 °C) Includes: 25 Links
439517	Trip Hammer Set Screw Includes: 25 Screws
15240	Maximum Registering Thermometer
197	Lead Wire Seal
25940	Tamper Seal
181	Cartridge Receiver Gasket
74274	Vent Plug Assembly
418087	R-102 System Manual

VIEGA PROPRESS COMPONENT INDEX

Fitting Description	Viega Part No.	Material	Product Type
90° Elbow 1/2 in.	85402	304 SS	ProPress Stainless 304
45° Elbow 1/2 in.	85447	304 SS	ProPress Stainless 304
Tee 1/2 in.	85582	304 SS	ProPress Stainless 304
Adapter 1/2 in. Press to 1/2 in. Male NPT Thread	85012	304 SS	ProPress Stainless 304
Adapter 1/2 in. Press to 1/2 in. Female NPT Thread	85082	304 SS	ProPress Stainless 304
Cap 1/2 in.	85357	304 SS	ProPress Stainless 304
Union 1/2 in. Press x 1/2 in. Press	86007	304 SS	ProPress Stainless 304
Coupling 1/2 in.	85267	304 SS	ProPress Stainless 304
Standard Pipe 1/2 in. x 20 ft	87000	304 SS	ProPress Stainless 304

The use of ProPress Stainless (304) pipe and fittings (1/2 in.) must comply with the agent distribution piping requirements as specified in this manual. The use of ProPress Stainless (304) pipe and fittings (1/2 in.) must also comply with specifications in Viega ProPress Stainless Installation Manual (Viega Part No. 599834).

Note: 5/8 in. tubing is used with 1/2 in. Viega ProPress fittings.

Acceptable tools to make connections can be found at https://www.viega.us/en/homepage.html

PARTS LISTS

AUTOMAN Regulated Release Assembly

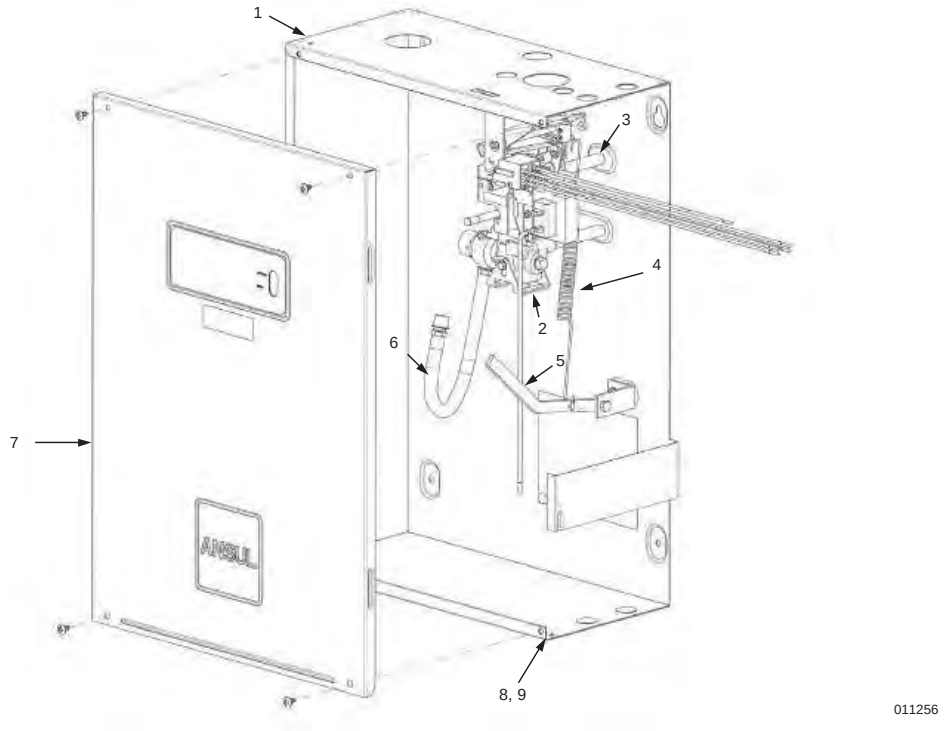


Figure No.	Description	Mechanical Part No.	Electrical Part No.
–	Regulated Release Shipping Assembly	429853	429856
1	Mounting Box	419293	419293
2	Basic Release w/Regulator	438662	–
	Basic Release w/Solenoid, Switch, and Regulator	–	438649
3	Spacer	76555	76555
4	Tension Spring	79094	79094
5	Lever and Bracket Assembly	79300	79300
6	Hose Assembly	79007	79007
7	Enclosure Cover (Includes Label)	423744	423744
8	Cover Screw	15362	15362
9	Speed Nut	423479	423479

PARTS LISTS (Continued)

Regulated Actuator Assembly

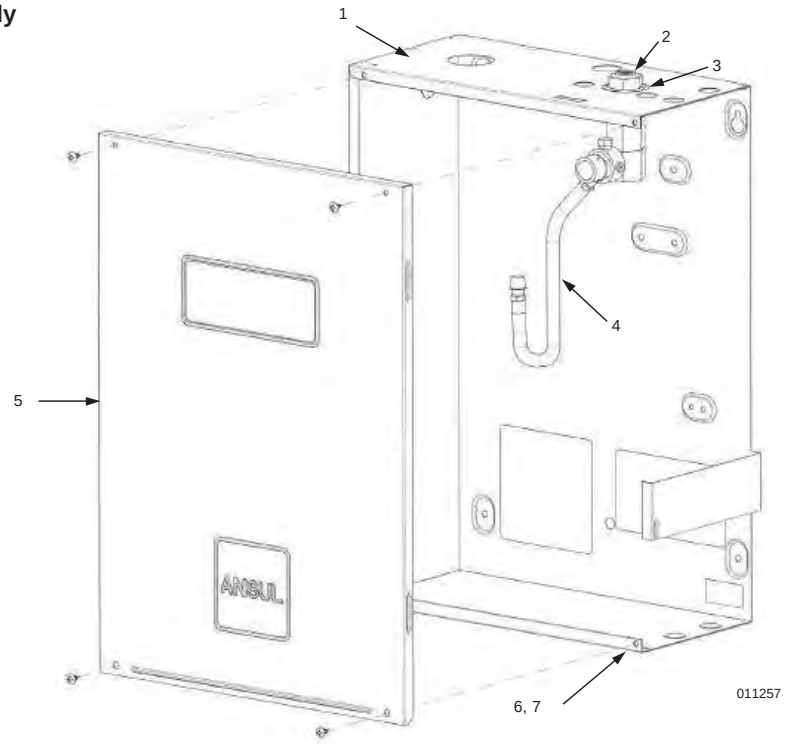


Figure No.	Description	Part No.
–	Regulated Actuator Assembly	429850
1	Mounting Box	419293
2	Hex Jam Nut	67990
3	Hole Adaptor (2)	423277
4	Hose Assembly	79007
5	Enclosure Cover (Without Labels)	419294
6	Cover Screw	15362
7	Speed Nut	423479

PARTS LISTS (Continued)

Enclosure Assembly

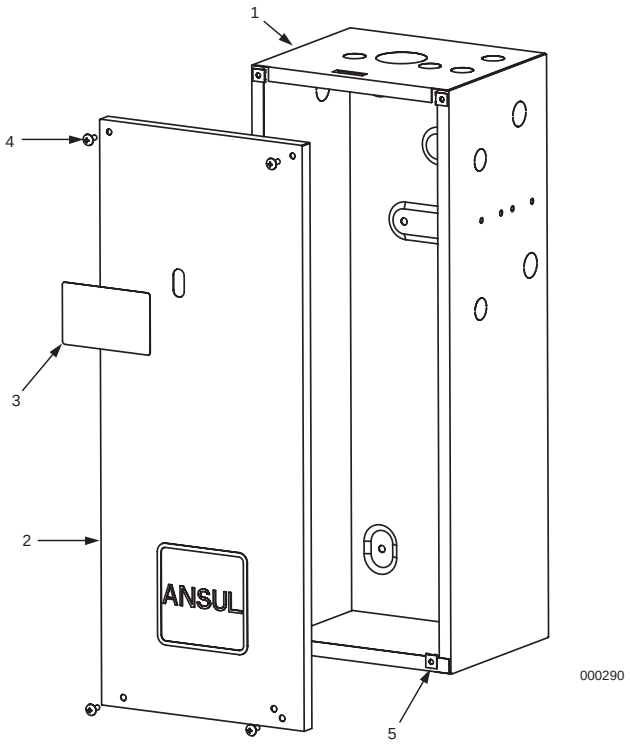


Figure No.	Description	Part No.
–	Enclosure Shipping Assembly	429870
1	Enclosure	419295
2	Cover	419296
3	Nameplate	429871
4	Screw	15362
5	Speed Nut	423479

PARTS LISTS (Continued)

Bracket Assembly

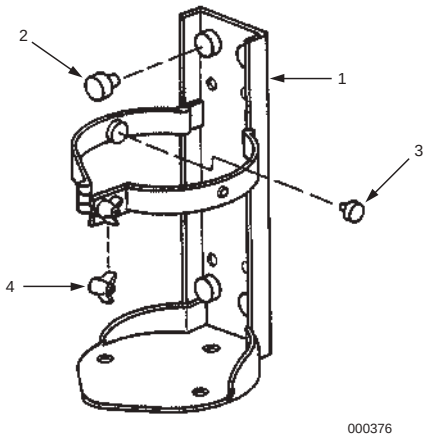


Figure No.	Description	3 Gallon Part No.
–	Bracket Shipping Assembly	429878
1	Bracket Assembly	–
2	Grommet	14089
3	Grommet	8688
4	Wing Nut	12065

PARTS LISTS (Continued)

Tank Assembly

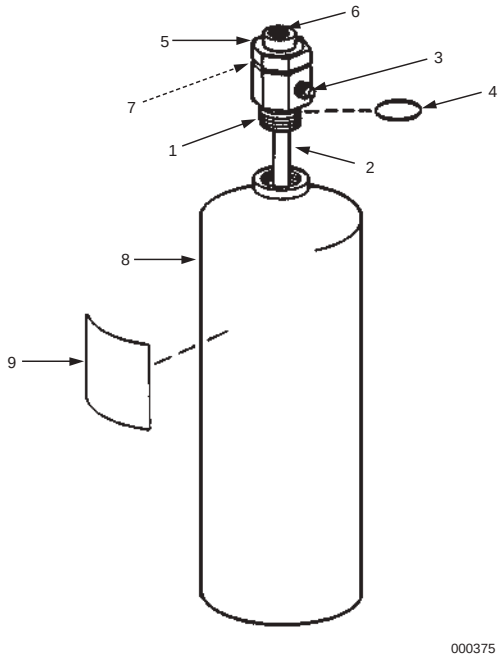


Figure No.	Description	1.5 Gallon Part No.	3 Gallon Part No.
–	Tank Assembly	429864	429862
1	Tank Adaptor Shipping Assembly	430103	79522
2	Pickup Tube Assembly	429883	417700
3	Vent Plug Assembly	68800	68800
4	O-Ring	56909	56909
5	Union Nut	417705	417705
6	Union Tail Piece	417706	417706
7	Burst Disc	416974	416974
8	Shell	429861	429860
9	Nameplate	N/A	N/A

PARTS LISTS (Continued)

Remote Release

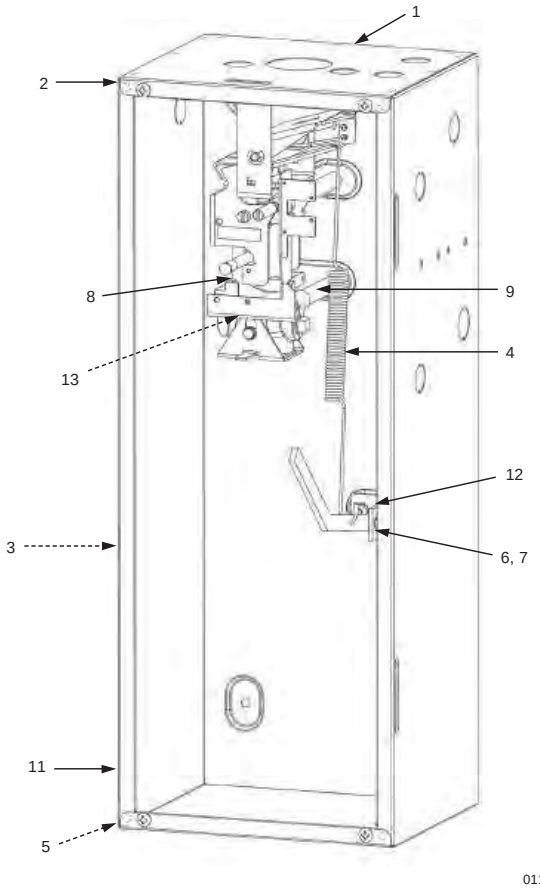


Figure No.	Description	Part No.
—	Remote Release	433485
1	Mounting Box	419295
2	Cover	419296
3	Maintenance Label	17351
4	Spring	79094
5	Speed Nut	423479
6	Machine Screw	14973
7	Hex Nut	551220
8	101 Release	438662
9	Spacer	76555
10	Screw	71342
11	Cover Screw	15362
12	Tension Lever and Bracket Assembly	79300
13	Gasket	181
14	101-10 CO^2 Cartridge (Order Separately) (Not Shown)	423439 (TC/DOT)
		15850 (DOT)
15	LT-20-R Cartridge (Order Separately) (Not Shown)	428440 (European)
		428948 (Australian)
		423429 (TC/DOT)

MULTIPLE NOZZLE FRYER PROTECTION CALCULATION EXAMPLES

Example No. 1 – Donut Fryer Without Dripboard. This fryer has a frypot that measures 26 in. depth x 28 in. length (660 mm x 711 mm). Because the frypot exceeds the maximum dimensions for one nozzle, multiple nozzles will be required. This will divide (modularize) the fryer to protect each section.

Procedure:

Find the area of the fryer by multiplying the 26 in. depth x the 28 in. length (660 mm x 711 mm) which equals 728 in.^{2} (0.469 m^2). Using the 3N nozzle (approved for fryers with the longest side of 25 3/8 in. (644 mm) and a maximum of 370 1/2 in.^{2} (0.239 m^2) in area), divide the total area of 728 in.^{2} (0.469 m^2) by 370 1/2 in.^{2} (0.239 m^2) to find the number of nozzles needed. 728 in.^{2} (0.469 m^2) divided by 370 1/2 in.^{2} (0.239 m^2) per nozzle = 2 nozzles required. Then, verify the maximum longest side dimension of 25 3/8 in. (644 mm). Doing this will require doubling the 3N nozzles to **= a total of 4 nozzles,** if we are to protect the 26 in. (660 mm) depth and the 28 in. (711 mm) length of the fryer with this 3N nozzle option. See Figure 9-1.

Using the same process, but utilizing the 3N nozzle approved for fryer protection with the longest side of 27 5/8 in. (702 mm) and the maximum of 324 in.^{2} (0.209 m^2) in area, the calculation will change to 728 in.^{2} (0.469 m^2) divided by 324 in.^{2} (0.209 m^2) per nozzle **= 3 nozzles.** Because this 3N nozzle option will protect 27 5/8 in. (701 mm) on the longest side, it will protect the 26 in. (660 mm) side in this example, thus eliminating the need for extra nozzles. Utilizing this option, in this example, will require a total of 9 flows, but allows less nozzles and less nozzle drops*. See Figure 9-1.

***Note:** 2-flow appliance nozzles can also be used. This option requires a total of 4 nozzles (728 in.^{2} (0.469 m^2) divided by 210 in.^{2} (0.135 m^2) per nozzle = 4 nozzles, or 8 total flows). Using this option requires that the nozzles be placed over each quadrant of frypot area protected and aimed to the center of the modules. This option may be desirable if minimizing total system flows is important.

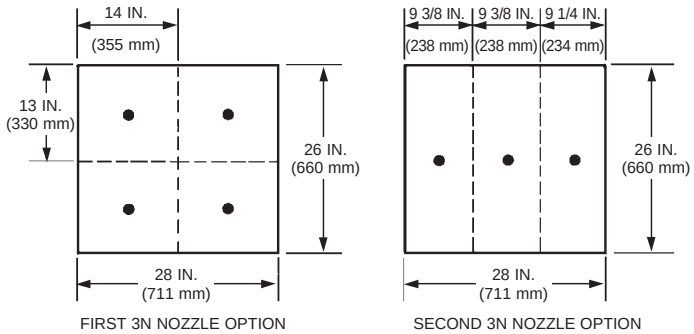


FIGURE 9-1
002466

Example No. 2 – Fryer With Dripboard. This fryer has an overall fry vat, including a dripboard, that measures 24 in. (609 mm) in depth x 20 in. (508 mm) in length. The actual frypot measures 20 in. x 20 in. (508 mm x 508 mm). Because both the frypot and the overall fry vat including the dripboard exceed the maximum dimensions for one nozzle, multiple nozzles will be required.

Procedure:

Divide the fryer cooking area from left to right or from front to back into modules that do not exceed single nozzle area limitations and longest side limitations as described in the table for *Fryer Multiple Nozzle Protection* located in the *System Design* section.

The example fryer can either be divided from left to right into two modules, each measuring 10 in. x 24 in. (254 mm x 609 mm), or it can be divided from front to back. See Figure 9-2.

If the fryer is divided from front to back, two 2-flow nozzles may be adequate. To determine this, first protect as much of the rear portion of the vat (the frypot area) that is allowed with 2-flow appliance nozzles using the maximum area of 210 in.^{2} (0.135 m^2) per nozzle with the maximum longest side of 21 in. (533 mm) for multiple nozzles. See Figure 9-2.

In the example, the frypot is 20 in. (508 mm) from side to side. Use the maximum area of 210 in.^{2} (0.135 m^2) allowed for one nozzle and divide it by 20 in. (508 mm), a total of 10 1/2 in. (266 mm) of the frypot can be protected with one 2-flow nozzle (210 in.^{2} divided by 20 in. = 10 1/2 in.). See Figure 9-2.

This leaves the remainder of 9 1/2 in. (241 mm) of frypot and the entire dripboard yet to protect. One 2-flow appliance nozzle will protect up to 10 1/2 in. (266 mm) of frypot, therefore, there is no need to verify the remaining 9 1/2 in. (241 mm). There is only the overall of 9 1/2 in. (241 mm) remaining plus the dripboard to verify.

The dripboard measures 4 in. x 20 in. (101 mm x 508 mm), with an overall remainder of frypot + dripboard area size of 13 1/2 in. x 20 in. (342 mm x 508 mm) = 270 in.^{2} (0.174 m^2). Reviewing the *Multiple Nozzle Fryer Table*, a 2-flow appliance nozzle can protect an area, including dripboard, of 294 in.^{2} (0.189 m^2) with a longest side of 21 in. (533 mm). Because the area is less than the maximum of 294 in.^{2} (0.189 m^2) and the longest side is less than the maximum of 21 in. (533 mm), a 2-flow nozzle will be sufficient. See Figure 9-2.

MULTIPLE NOZZLE FRYER PROTECTION CALCULATION EXAMPLES (Continued)

Example No. 2 – Fryer With Dripboard (Continued)

Adding the protection required for the back of the frypot to the front protection requires two **2-flow appliance nozzles as a minimum.** See Figure 9-2.

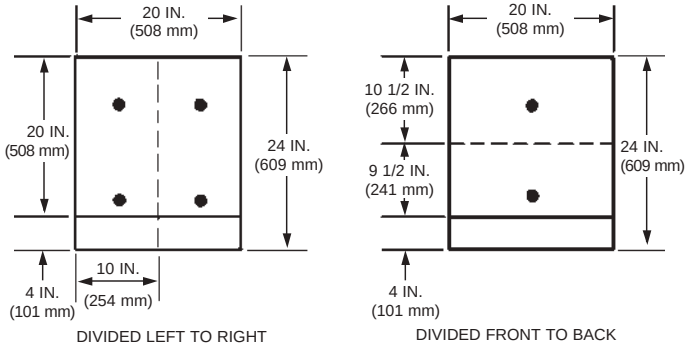


FIGURE 9-2
002467

WIRING DIAGRAM

NFPA standards require simultaneous operation for fire suppression systems when two or more hazards can be simultaneously involved in fire by reason of their proximity. To accomplish simultaneous operation, the 120 VAC electric AUTOMAN regulated release assembly can be used. This release can be activated independently by fusible line operation exactly like the mechanical version and can also be triggered electrically using a snap action switch from another 120 VAC electric AUTOMAN regulated release assembly or a mechanical AUTOMAN regulated release assembly. The electrical wiring used to connect from one AUTOMAN regulated release assembly to another will not be supervised. However, NFPA 96 allows an exception for electrically operated systems which include automatic mechanical detection (fusible link) and actuation as a backup detection system.

In the case of multiple hoods sharing a common exhaust duct, NFPA 17A requires one of two forms of simultaneous operation. The following wiring diagrams (See Figure 9-3 and Figure 9-4) identify two principle uses for the 120 VAC electric AUTOMAN regulated release assembly. See Section 3 - *System Components*, Page 3-2, Figure 3-4.

1. Simultaneous operation of all independent hood, duct, and appliance protection systems. See Figure 9-3.
2. Simultaneous operation of any hood, duct, and appliance protection system and the systems protecting the entire common exhaust duct. See Figure 9-4.

Simultaneous Actuation of Multiple 120 VAC Electric AUTOMAN Regulated Release Assemblies

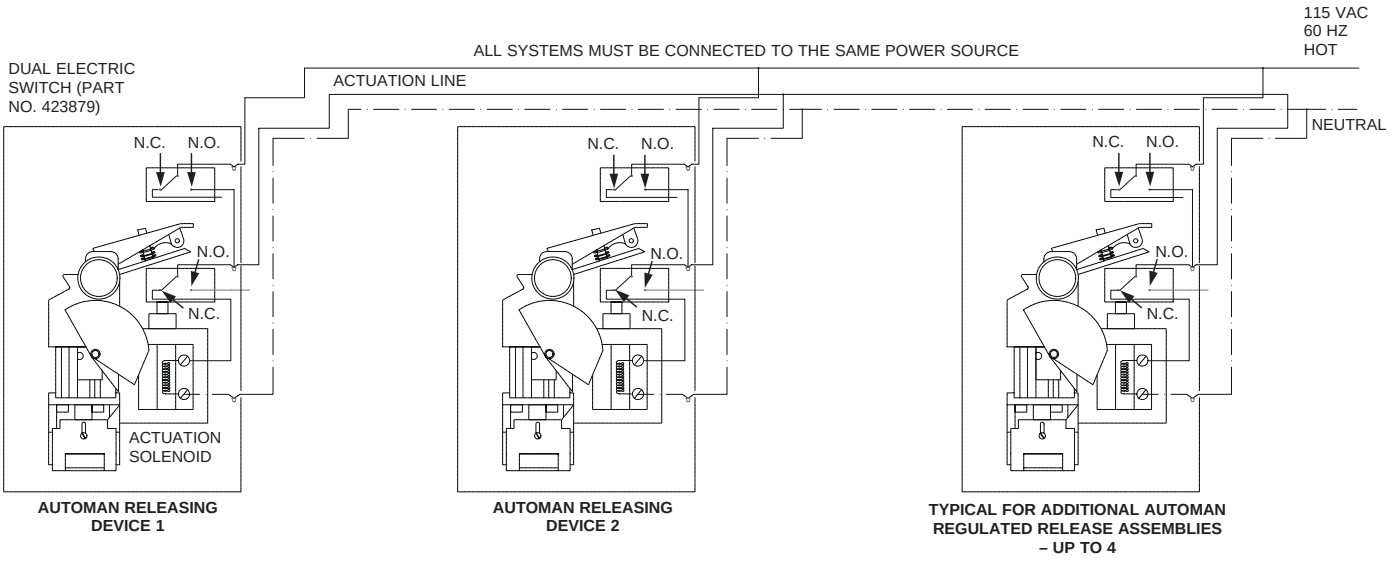


FIGURE 9-3
008405

WIRING DIAGRAM (Continued)

Simultaneous Actuation of One or More 120 VAC Electric AUTOMAN Releasing Device Assemblies from Multiple Mechanical AUTOMAN Releasing Device Assemblies

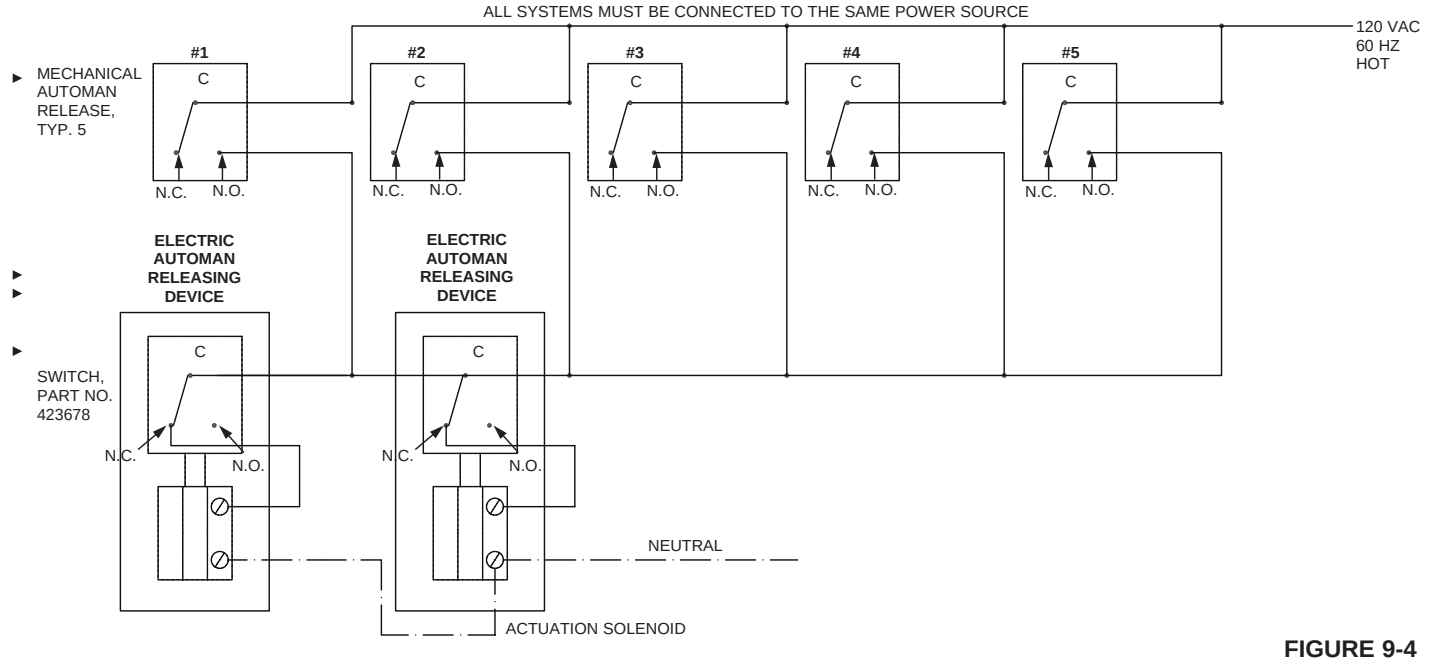


FIGURE 9-4
008406

Note 1: For fusible link detection only.

Note 2: Use AUTOMAN assemblies with solenoid and electric switch. Replace Single Electric Switch (Part No. 423878) with Dual Switch Kit (Part No. 423879).

Note 3: See Installation section of this manual for power capacity of solenoid and switches.

Note 4: This method does not provide supervision for battery or system wiring. The Authority Having Jurisdiction (AHJ) may waive this requirement.

Note 5: When any one of the Mechanical AUTOMAN assemblies is activated, the microswitch will transfer to the N.O. position, completing the circuit to the N.C. switch in the Electrical AUTOMAN assembly. This will activate the AUTOMAN assembly. When the AUTOMAN assembly fires, the N.C. switch transfers to the N.O. position, opening the circuit to the solenoid.

NOTES: