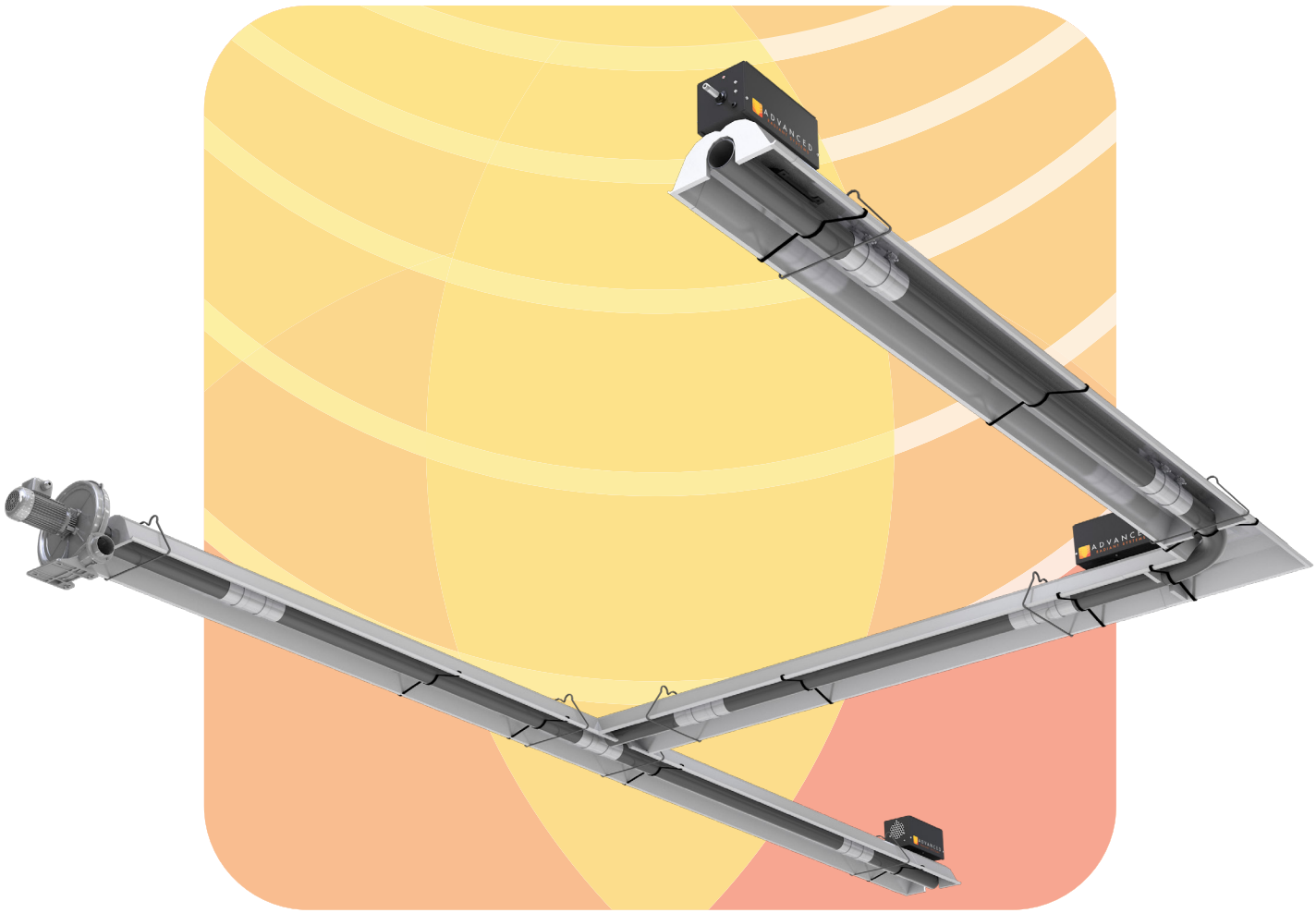
ADVANCED
RADIANT SYSTEMS

Installation, Operation and Service Instructions



SLV RANGE

SIRIUS VARIABLE OUTPUT CONDENSING CONTINUOUS

DESIGN CERTIFIED®

CSA US

U.S. GREEN BUILDING COUNCIL MEMBER

INFRARED HEATING 25 1991-2016 INDUSTRY LEADERS

WARNINGS

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. If you smell gas:

1. Open windows
2. Don't touch electrical switches
3. Extinguish any open flame
4. Immediately call your gas supplier

OWNER

Retain this Manual & ensure available for service. Improper installation, adjustment, alteration, service or maintenance can cause injury, death or property damage.

Read the installation, operation and service instructions thoroughly before installing or servicing this equipment.

INSTALLER

Provide Manual to Owner upon completion of installation!

Read and thoroughly understand these Instructions before attempting any installation

CAUTION: FIRE OR EXPLOSION HAZARD

Maintain clearance to combustible constructions as further specified in this manual. Failure to do so could result in a serious fire hazard. Heaters should not be located in hazardous atmospheres containing flammable vapors or combustible dusts. Signs should be provided in storage areas specifying maximum safe stacking height.

CAUTION: MECHANCIAL HAZARD

This equipment expands and contracts with each operating cycle. The gas connection, suspension hardware and the installation itself must safely allow this movement. Failure to do so could result in serious fire or explosion hazard.

CAUTION: FIRE OR EXPLOSION HAZARD

This heater is equipped with an automatic ignition device. Do not attempt to light the burner by hand. Failure to comply could result in a serious fire and personal injury hazard.

CAUTION: MECHANCIAL HAZARD

Do not use high pressure (above 1/2 psi) to test the gas supply system with the burners connected, doing so could result in damage to the burner and its control components requiring replacement.

CAUTION: SERVICE LIFE RISK

Do not install equipment in atmospheres containing halogenated hydrocarbons or other corrosive chemicals, doing so may lead to premature equipment failure and invalidation of the warranty. Additionally, it is recommended that the equipment be installed with a slope downward and away from the burner of ¼" (6mm) in 10' (3m) to allow start-up condensate drainage.

Due to continuous product innovations, we reserve the right to change product specifications without due notice.

CONTENTS

INTRODUCTION 1
- Operating Principle 1
- Installation Codes 1

EQUIPMENT SPECIFICATIONS 2
- System Layout Types 2
- Major Components 4
- General Burner Specifications 5
- Details of All Burner Labels/Stickers 7
- Vacuum Pump Specifications 10

CLEARANCE TO COMBUSTIBLES 12

INSTALLATION 14
- Preparation 14
- Layout Limits 14
  - ◊ Radiant Tube System Layout Limits 14
  - ◊ Tailpipe Lengths Required for Various Branch Layouts 15
- Assembly Overview Notes 16
- Radiant Line System 17
  - ◊ Radiant Line Tubes 17
  - ◊ Tailpipe Tubes 22
  - ◊ Burners 23
  - ◊ Reflectors 27
  - ◊ Optional Shield Equipment 31
  - ◊ Decorative Grille Option 35
- Vacuum Pump & Venting 36
  - ◊ Vacuum Pump Mounting 37
  - ◊ Venting Connections 41
  - ◊ Additional Pump Connections & Equipment 42
- Optional Combustion Air Supply 43
  - ◊ Combustion Air Supply Duct Connections 43
- Gas Supply System 44
  - ◊ Flexible Gas Connector Line 45
- Electrical Connections 46
  - ◊ Burners 47
  - ◊ Fresh Air Blower Interlock 47
  - ◊ System Wiring Connections 48

COMMISSIONING 56
- Installation Checklist 56
- Initial System Power Test 57
- Cold Balancing the System Vacuum 57
- Burner Time Delay Setting 59
- Burner Adjustment 60
- Final Balancing the System Vacuum 61

OPERATION 62
- Manual Set-Up 62
- Automatic Operating Sequence 62

MAINTENANCE 63
- General Safety Reminders 63
- Annual Maintenance Recommendations 63

TROUBLESHOOTING 65
- Vacuum Pump 65
- Burners 65

PARTS 66

WARRANTY 70

INTRODUCTION

Advanced Radiant Systems' continuous linear SIRIUS Variable Output, SLV Range, incorporates flexibility to match any facilities diverse application requirements. Unlike standard, unitary based systems, the SIRIUS Range achieves superior performance by utilizing a series of in-line burners that match the input requirements with the precise coverage demands. The option of a multi branch control on a single vacuum fan gives these systems the flexibility and precision required for unsurpassed performance.

IMPORTANT

These instructions, the layout drawing, local codes and ordinances, and applicable standards such as apply to gas piping and electrical wiring comprise the basic information needed to complete the installation, and must be thoroughly understood along with general building codes before proceeding.

Only personnel who have been trained and understand all applicable codes should undertake the installation. Representatives that are Factory Certified in the service and application of this equipment and can be called on for helpful suggestions about installation.

Operating Principle

The SLV System operates on the following basic principles:

- The Burner Unit can provide Rates from 60,000 to 250,000 BTU/hr.
- Burner models are specially engineered & built for the individual 'positions' they are installed in along each Branch.
- Burner Rate (BTU/hr) is determined by the Vacuum Setting of the Branch. Rates can be adjusted by changing the Vacuum Settings at the Branch End Vent:
- Modulating Rate: The use of motorized dampers allows the system to modulate overall heat output during operation to meet building demand. Burner output rates may be decreased from ideal rate by up to 40%.

Installation Codes

Installations must comply with local building codes, or in their absence, the latest edition of the national regulations and procedures as listed below.

GENERAL INSTALLATION AND GAS CODES

Heaters must be installed only for use with the type of gas appearing on the rating plate, and the installation must conform to the National Fuel Gas Code, ANSI Z223.1/NFPA 54 in the US and CSA B149.1 and B149.2 Installation Codes in Canada. This heater may be approved for either indoor or outdoor installation. Not for use in residential dwellings, refer to Rating plate.

AIRCRAFT HANGAR INSTALLATION

Installation in aircraft hangars must conform to the Standard for Aircraft Hangars, ANSI/NFPA 409 in the US and CSA B149.1 and B149.2 Installation Codes in Canada.

PUBLIC GARAGE INSTALLATION

Installation in public garages must conform to the Standard for Parking Structures, NFPA-88A or Standard for Repair Garages, NFPA 88B, in the US and CSA B149.1 and B149.2 Installation Codes in Canada.

PARKING STRUCTURES

Technical requirements are outlined in ANSI/NFPA 88B (USA)

GAS SUPPLY LINES

Gas supply pipe sizing must be in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 in the US and CSA B149.1 and B149.2 Installation Codes in Canada.
A ⅛ in NPT plugged tap must be installed in the gas line connection immediately upstream of the burner farthest from the gas supply meter to allow checking of system gas pressure.

ELECTRICAL

All heaters must be electrically grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

VENTING

Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CSA B149.1 and B149.2 Installation Codes in Canada, as well as all local requirements for general venting guidance.

EQUIPMENT SPECIFICATIONS

System Layout Types

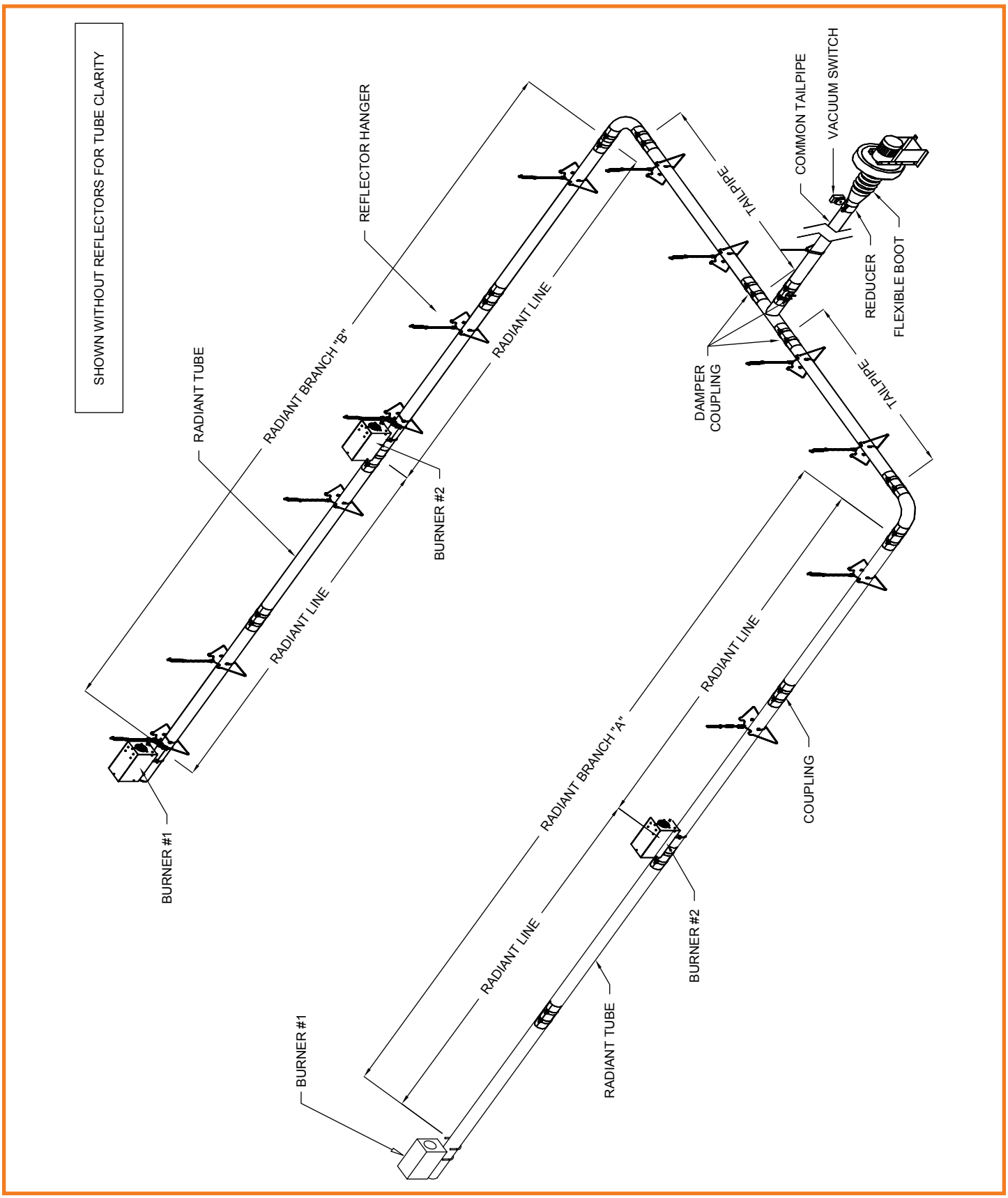


Figure 1: Symmetric System Overview

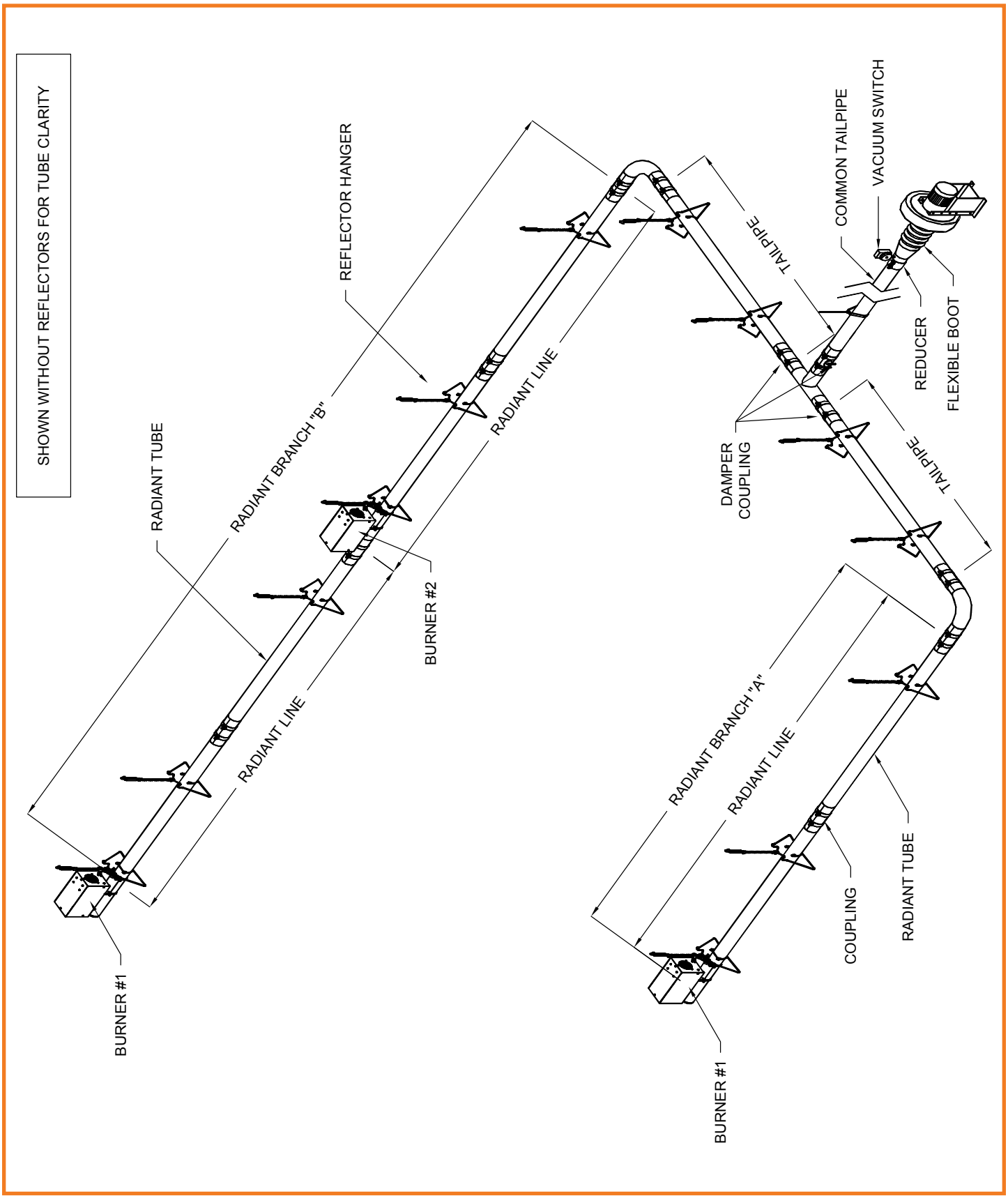
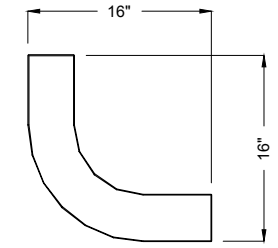


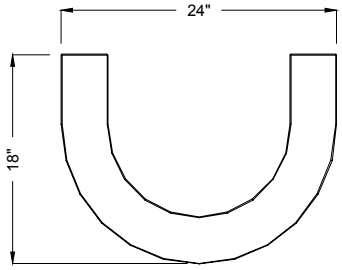
Figure 2: Non-symmetrical System Overview

EQUIPMENT SPECIFICATIONS

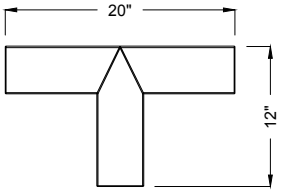
Major Components



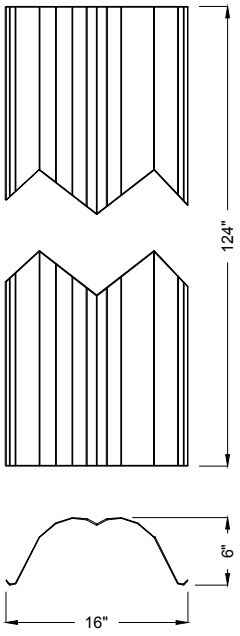
TUBE ELBOW, 4"Ø



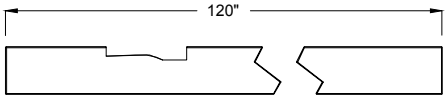
TUBE U BEND, 4"Ø



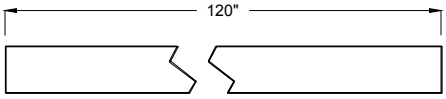
TUBE TEE, 4"Ø



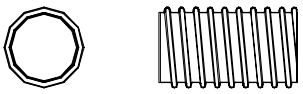
STANDARD REFLECTOR



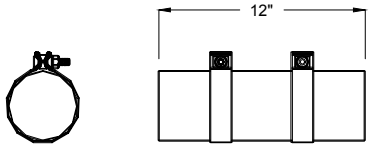
COMBUSTION TUBES, 4"Ø



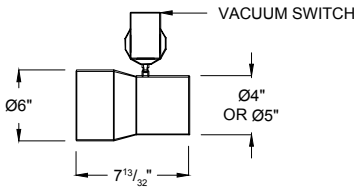
TUBES, 4"Ø & 5"Ø



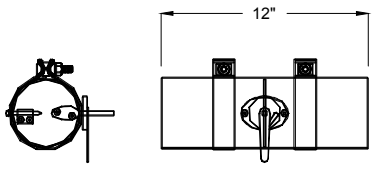
FLEXIBLE BOOT
4"Ø OR 6"Ø



TUBE COUPLING
4"Ø OR 5"Ø



REDUCER W/VACUUM SWITCH



DAMPER COUPLING
4"Ø OR 5"Ø

Figure 3: Common Component Dimensions

General Burner Specifications

Gas Supply

Inlet Pressure

Natural Gas:	Minimum	5.0" W.C.	Propane Gas:	Minimum	11.0" W.C.
	Maximum	14.0" W.C.		Maximum	14.0" W.C.

Manifold Pressure 0" W.C.

Inlet Connection 1/2" NPT female

Electric Supply

120 VAC, 60 HZ, 0.2 Amp: 36" (0.9 m) cord with grounded 3 prong plug

Flue and Outside Air Connection

4" type C duct for flue adapter and outside air (optional) provided at the heater

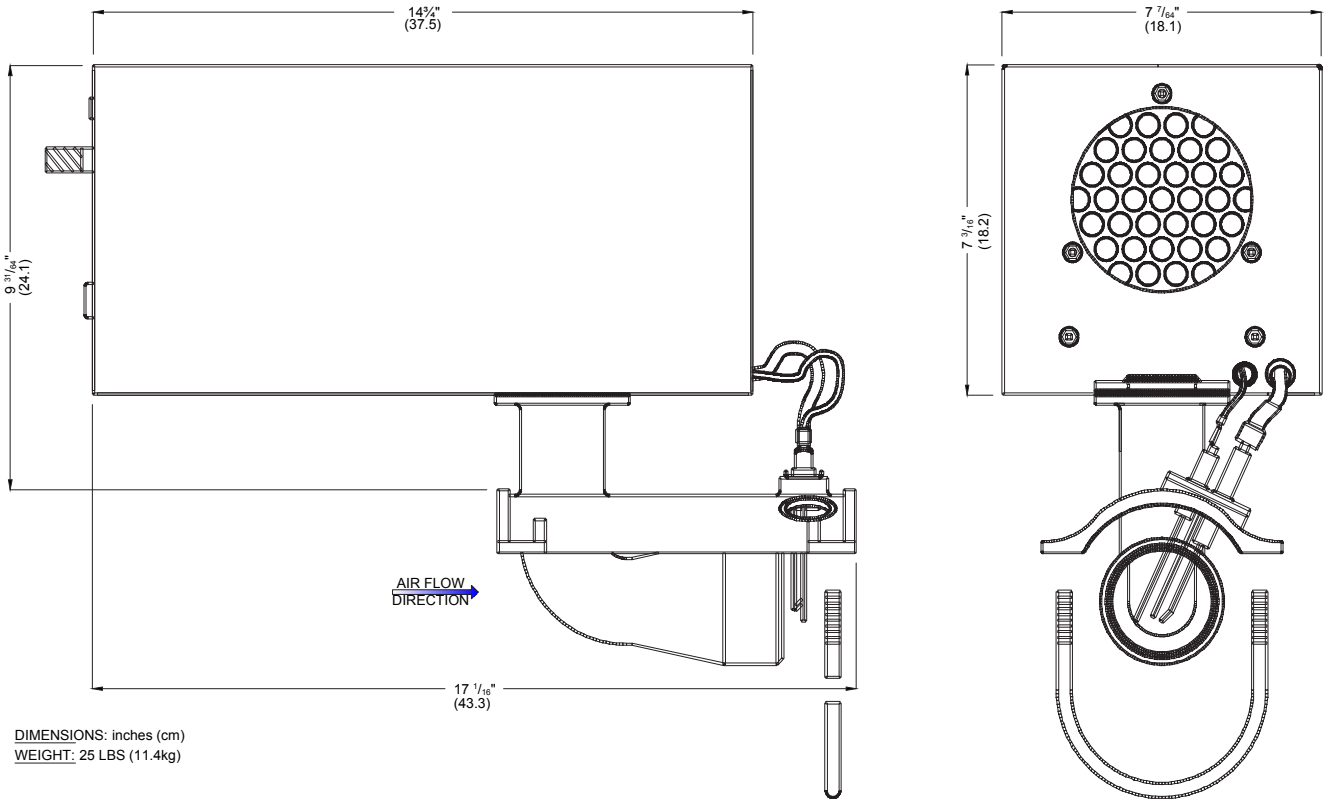


Figure 4: Burner Dimensions

EQUIPMENT SPECIFICATIONS

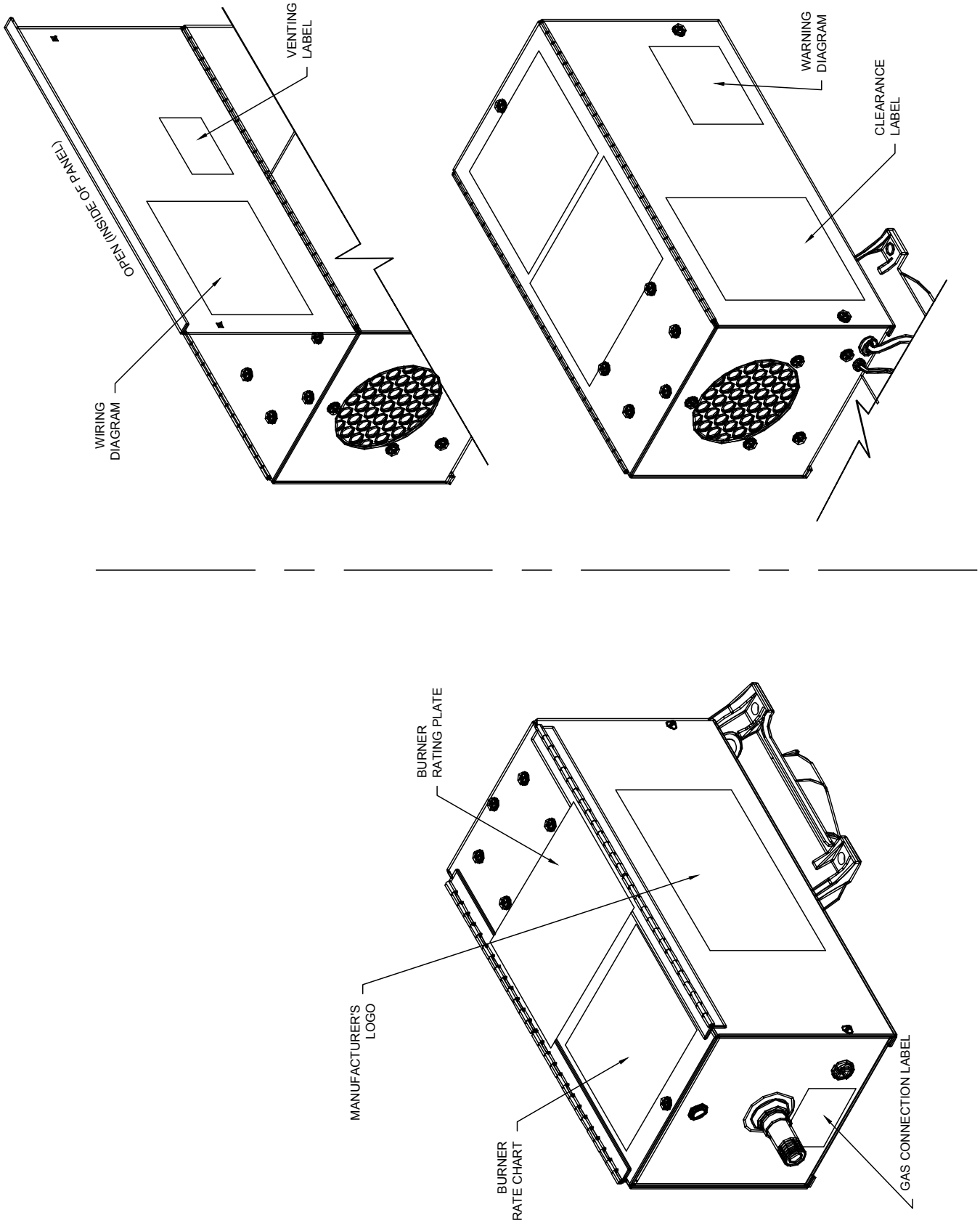
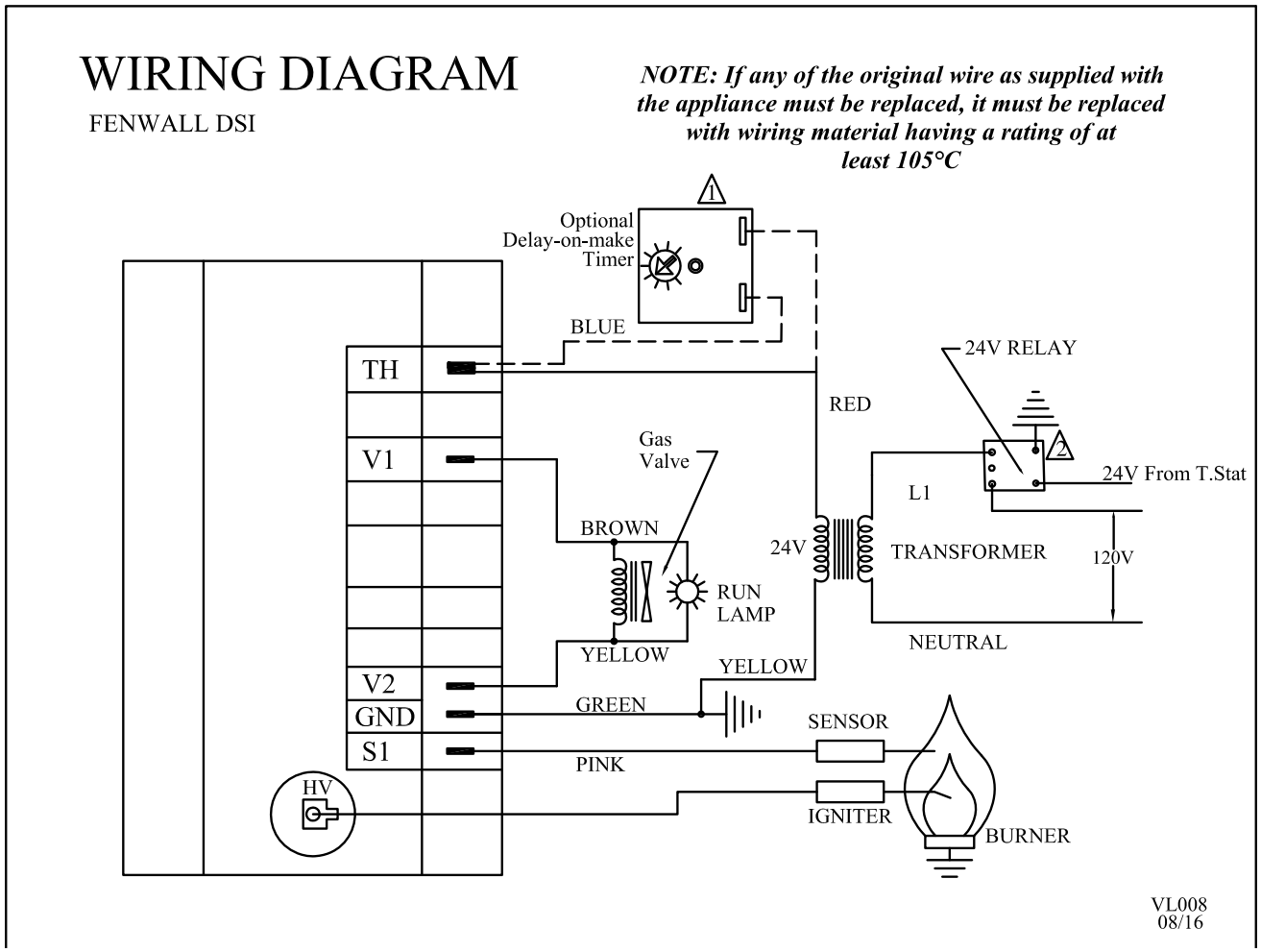


Figure 5: Locations of Burner Labels/Stickers

Details of All Burner Labels/Stickers

Wiring Diagram



Venting Label

1. Part # for venting materials

- wall thimble (4")	V-CS006
- wall thimble (6")	V-CS033
- vent terminal (4")	V-0700
- vent terminal (6")	V-0800
- C vent / aluminized tube (4")	T-CT001
- C vent / galvanized tube (6")	T-CT059
- Vibration Boot Package (4")	P-7531.3
- Vibration Boot Package (6")	P-7532.2

2. Vent length from vacuum pump
   - minimum 2 ft.
   - maximum 50 ft.

VL005H

Warning Diagram

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

Read the Installation, Operating and Maintenance Instructions thoroughly before installing or servicing this equipment.

AVERTISSEMENT

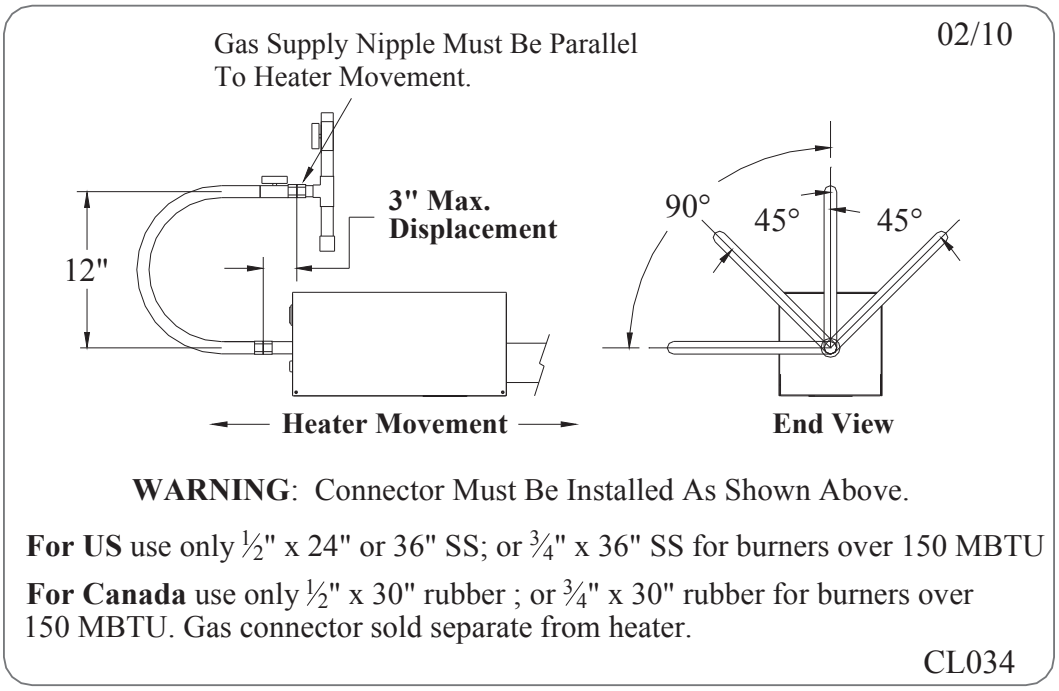
For use with natural gas or propane. A conversion kit as supplied by the manufacture, shall be used to convert this heater to the alternate fuel. Installation shall be by qualified personnel only.

Pour utilization avec gaz naturel ou propane. Pour changer d un combustible à l autre, vous été requisz de prendre une trousse fournie par le fabricant. Linstallation doit etre fait par des personnes qualifiees seulement.

UL007

EQUIPMENT SPECIFICATIONS

Gas Connection Label



(on a YELLOW Background)

***For more gas connection details refer to Gas Supply System on page 45.**

Burner Rate Chart

Chart of Burner Rates

Important: *This burner is a variable input appliance. See chart below to determine appliance burn rate.*

Natural Gas requires a No. ***S*** *drill size orifice. LP Gas requires No.* ***K*** *drill size orifice.*

A conversion kit as supplied by the manufacturer shall be used to covert to the alternate fuel.

A flow plate appropriate to the position of the burner in the system MUST be installed (see Manufacturer's Instructions).

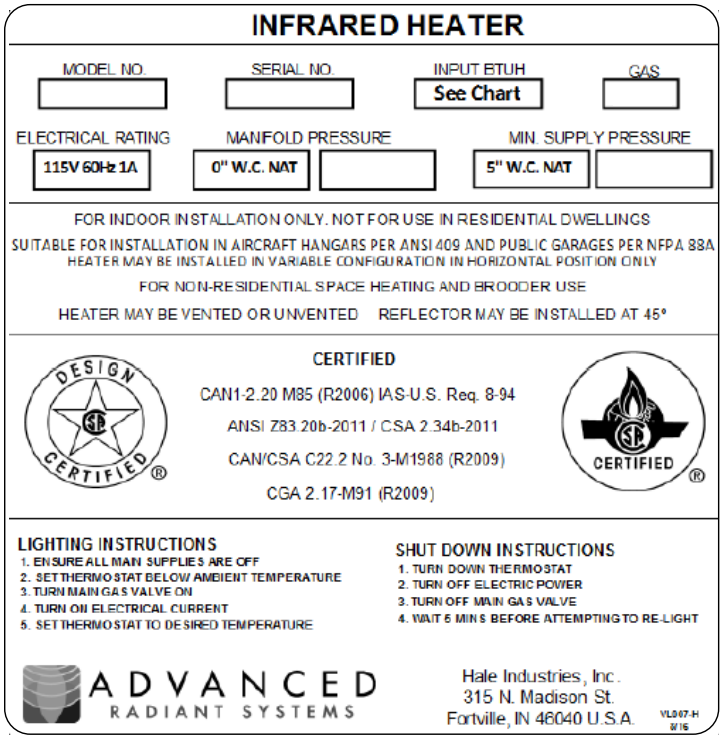
Positions are identified in ascending order from the start end of the system.

Note: *An end vent vacuum intermediate to those shown will result in rates intermediate and proportional to those indicated.*

End Vent Vacuum (in. wc)	Burner Position 1 Flow Plate No. 1 Rate (BTUH)	Burner Position 2 Flow Plate No. 2 Rate (BTUH)	Burner Position 3 Flow Plate No. 3 Rate (BTUH)	Burner Position 4 Flow Plate No. 4 Rate (BTUH)	Burner Position 5 Flow Plate No. 5 Rate (BTUH)
4.5	250,000				
3.6	225,000				
3.0	200,000	165,000			
2.0	175,000	130,000	130,000		
1.7	150,000	120,000	120,000	120,000	120,000
1.3	120,000	100,000	100,000	100,000	100,000
1.0	100,000	80,000	80,000	80,000	80,000
0.75	80,000	60,000	60,000	60,000	60,000

VL001
08/16

Burner Rating Plate



Clearance to Combustibles Label

MINIMUM CLEARANCE TO COMBUSTIBLE MATERIALS
for space heating applications (inches)

		BURNER RATE 1,000 BTUH								
	DIM.	60	80	100	120	150	175	200	225	250
FIG. 1	A	2	2	2	4	4	4	6	6	6
	B	17	23	28	30	36	40	44	46	50
	C	50	53	58	60	73	75	80	83	85
	D	17	23	28	30	36	40	44	46	50
FIG. 2	A	4	4	4	4	6	6	6	6	6
	B	4	4	4	4	4	4	4	4	4
	C	48	52	60	66	71	74	78	81	83
	D	42	46	50	59	64	67	72	75	77
FIG. 3	A	2	2	2	4	4	6	6	6	6
	B	4	4	4	4	4	6	6	6	6
	C	56	65	70	73	77	80	84	87	89
	D	34	38	43	49	52	54	56	58	60
FIG. 4	A	2	2	4	4	4	6	6	6	6
	B	14	16	18	21	23	26	29	32	34
	C	56	64	71	74	79	82	86	89	92
	D	14	16	18	21	23	26	29	32	34

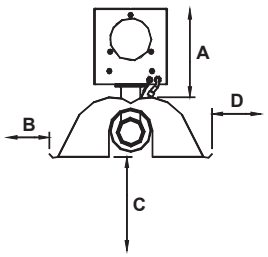


FIG. 1

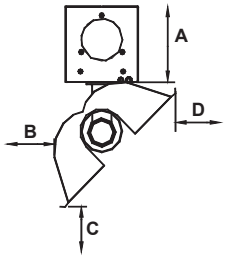


FIG. 2

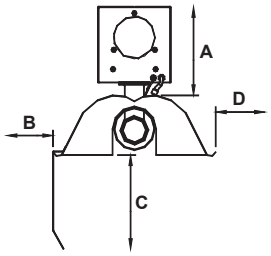


FIG. 3

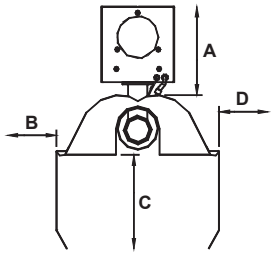


FIG. 4

NOTES: Fig. 1 clearances also apply with use of approved decorative grille.
Use of approved bottom shield reduces C by up to 25% EXCEPT BURNER RATE 250,000 BTUH.
Downstream 25 ft. from burner: B, C, D can be reduced by 50% for burner rates up to 150,000 BTUH and by 40% for burner rates 150,000 to 250,000 BTUH.
(See Manual for Complete Details).

VL002
08/09

EQUIPMENT SPECIFICATIONS

Vacuum Pump Specifications

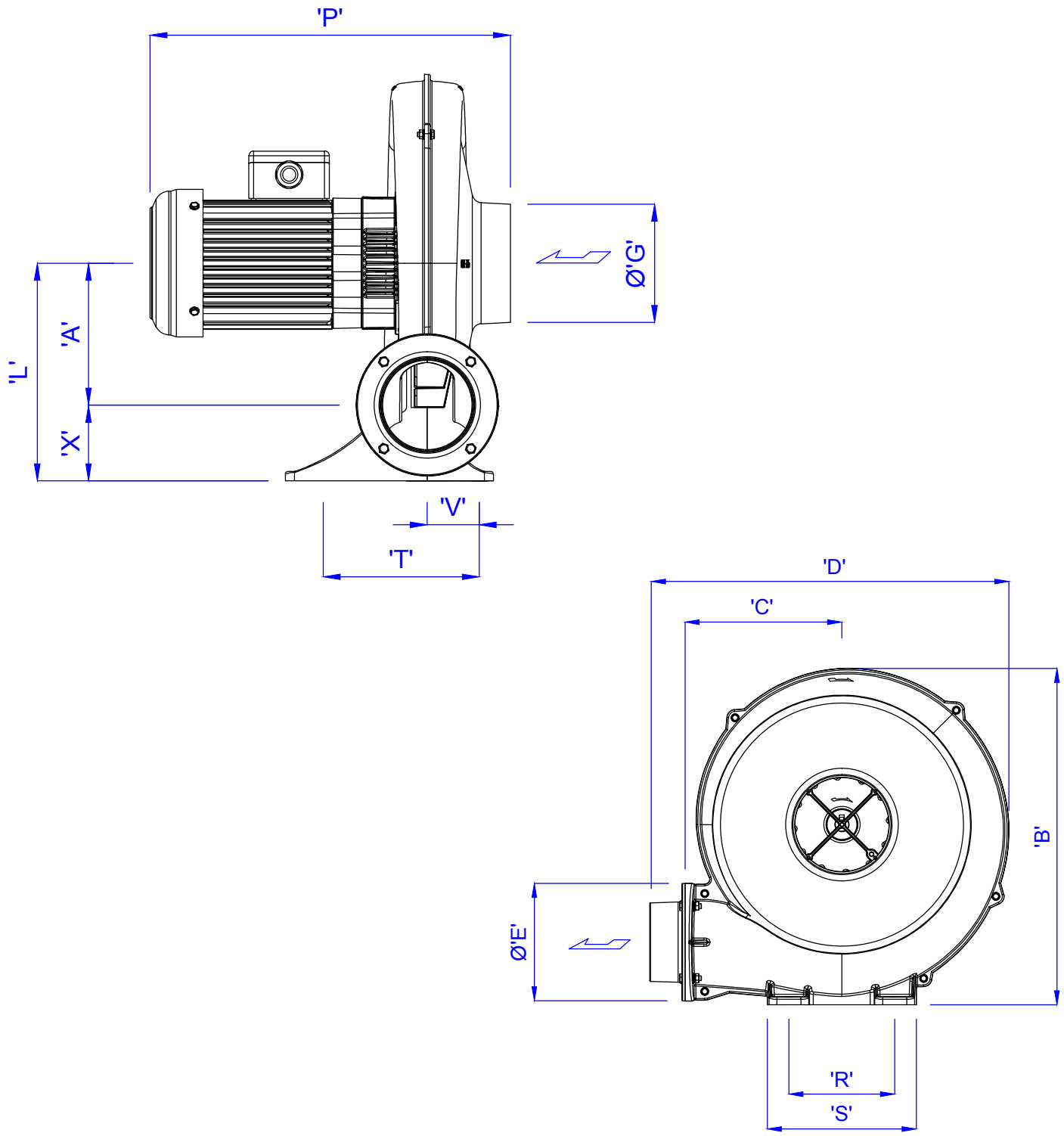


Figure 6: Vacuum Pump Dimensional Diagram

EQUIPMENT SPECIFICATIONS

REFERENCE	VACUUM FAN DIMENSIONS (in)		
	F100NA	F200NA	F300NA
A	5 1/8	5 7/8	7 5/16
B	14 9/16	16 15/16	20
C	6 1/2	7 7/8	8 1/4
D	15	18	19 3/4
E (Ø)	4 5/16	5 7/8	5 7/8
G (Ø)	5	5	6
L	7 11/16	9 1/16	11
P	13 3/8	15	17 5/8
R (crs)	5 5/16	5 5/16	5 1/2
S (crs)	7 1/2	7 1/2	10 1/4
T	5 5/16	6 1/2	7
V	1 3/4	2 3/16	3 1/16
X	2 9/16	3 1/8	3 3/4

Table 1: Vacuum Pump Dimensional Information

DETAIL	FAN DETAILS		
	F100NA	F200NA	F300NA
Fan ref	202074	202073	202072
Motor ref	F100NA	F200NA	F300NA
Power (kW/hp)	0.4/0.5	0.75/1.0	1.5/2.0
Supply to Fan (V/Hz/P)	115/230~60/1	115/230~60/1	230/460~60/3
Run Current (A)	4.5/2.7	9.0/4.5	5.5/3.5
Speed (RPM)	3500	3500	3500
Wired	Δ	Δ	Δ
Maximum Air Flow (cfm)	280	630	805
Noise Data (db)	56	64	74
Pressure (in w.c.)	6.3	10.6	12.6
Max Operating Temperature (°F)	392	392	392
Weight (lbs)	22	52	60
Inlet (in Ø)	4	5	6
Outlet (in Ø)	4	4	6

Table 2: Vacuum Pump Details

CLEARANCE TO COMBUSTIBLES

A general clearance of 18 in (.5 m) in every direction is recommended for servicing around each burner, vacuum pump, and vent cap air supply (at the far end of each radiant branch) also to ensure adequate air flow in and around the heating system.

In addition to this it is very important to observe the minimum clearance to combustibles at all times to avoid any possibility of property damage or personal injury.

WARNING

- **Clearances as marked on the heater body must be maintained from vehicles parked beneath. Signs should be posted identifying any possible violation of the clearance distances from the heater in all vehicle areas.**

- **Maximum allowable stacking height in storage areas should be identified with signs or appropriate markings adjacent to the thermostat or in a conspicuous location.**

Table 3 lists the minimum clearance to combustible materials for various installation configurations. Note that standard clearances also apply to installation above T-bar ceilings and above decorative grills. Additional clearance may be required for glass, painted surfaces and other materials which maybe damaged by radiant or convective heat.

***Combustible materials** are considered to be wood, compressed paper, plant fibers, plastics, Plexiglas or other materials capable of being ignited and burned. Such materials shall be considered combustible even though flameproofed, fire-retardant treated or plastered.*

Adequate clearance to sprinkler heads must be maintained (NFPA 13: Standard for the Installation of Sprinkler Systems).

The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building materials with low heat tolerance (i.e. plastics, vinyl siding, canvas, triply, etc.) may be subject to degradation at lower temperatures.

It is the installer's responsibility to ensure that adjacent materials are protected from deterioration.

- **Note 1: Bottom Shields are approved for all burner sizes. The "below" clearance (dimension C in Table 3) may be reduced by 25% when an approved Bottom Shield is used.**

- **Note 2: Reduced clearances downstream from the burner are approved for all configurations. Dimensions "B", "C", and "D" in Table 3 can be reduced for locations 25ft (7.6 m) or more downstream from a burner, before the next burner, maximum reduction is 50%**

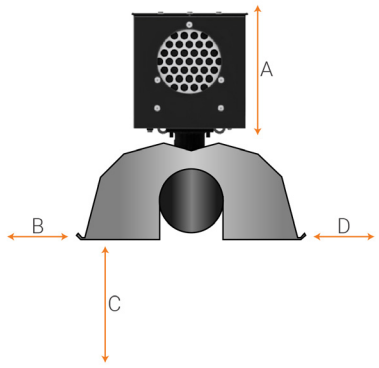
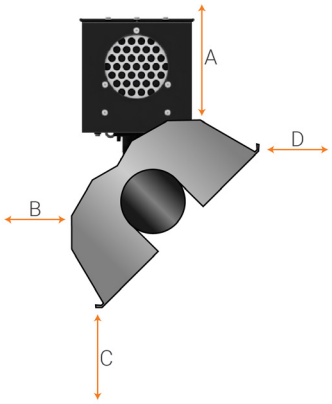
REFLECTOR CONFIGURATIONS	MODEL NUMBER	CLEARANCE TO COMBUSTIBLES in (cm)*			
HORIZONTAL		A	B	C	D
	SLV-60	2 (5.1)	17 (43.2)	50 (127)	17 (43.2)
	SLV-80	2 (5.1)	23 (58.4)	53 (135)	23 (58.4)
	SLV-100	2 (5.1)	28 (71.1)	58 (148)	28 (71.1)
	SLV-120	4 (10.2)	30 (76.2)	60 (153)	30 (76.2)
	SLV-150	4 (10.2)	36 (91.4)	73 (186)	36 (91.4)
	SLV-175	4 (10.2)	40 (102)	75 (191)	40 (102)
	SLV-200	6 (15.3)	44 (112)	80 (204)	44 (112)
	SLV-225	6 (15.3)	46 (117)	83 (211)	46 (117)
	SLV-250	6 (15.3)	50 (127)	85 (216)	50 (127)

Table 3: Minimum Required Clearance to Combustibles

CLEARANCE TO COMBUSTIBLES

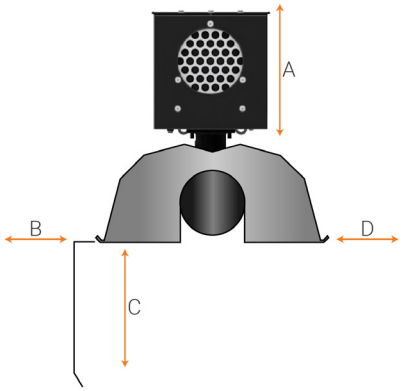
REFLECTOR CONFIGURATIONS

45° REFLECTOR TILT



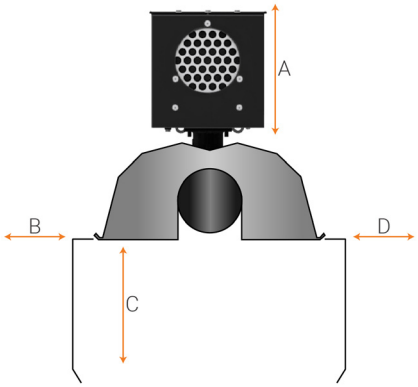
MODEL NUMBER	CLEARANCE TO COMBUSTIBLES in (cm)*			
	A	B	C	D
SLV-60	4 (10.2)	4 (10.2)	48 (122)	42 (107)
SLV-80	4 (10.2)	4 (10.2)	52 (132)	46 (117)
SLV-100	4 (10.2)	4 (10.2)	60 (153)	50 (127)
SLV-120	4 (10.2)	4 (10.2)	66 (168)	59 (150)
SLV-150	6 (15.3)	4 (10.2)	71 (181)	64 (163)
SLV-175	6 (15.3)	4 (10.2)	74 (188)	67 (170)
SLV-200	6 (15.3)	4 (10.2)	78 (199)	72 (183)
SLV-225	6 (15.3)	4 (10.2)	81 (206)	75 (191)
SLV-250	6 (15.3)	4 (10.2)	83 (211)	77 (196)

ONE SIDE EXTENSION



MODEL NO.	A	B	C	D
SLV-60	2 (5.1)	4 (10.2)	56 (143)	34 (86.4)
SLV-80	2 (5.1)	4 (10.2)	65 (166)	38 (96.5)
SLV-100	2 (5.1)	4 (10.2)	70 (178)	43 (110)
SLV-120	4 (10.2)	4 (10.2)	73 (186)	49 (125)
SLV-150	4 (10.2)	4 (10.2)	77 (196)	52 (132)
SLV-175	4 (10.2)	6 (15.3)	80 (204)	54 (138)
SLV-200	6 (15.3)	6 (15.3)	84 (214)	56 (143)
SLV-225	6 (15.3)	6 (15.3)	87 (221)	58 (148)
SLV-250	6 (15.3)	6 (15.3)	89 (226)	60 (153)

ONE SIDE EXTENSION



MODEL NO.	A	B	C	D
SLV-60	2 (5.1)	14 (35.6)	56 (143)	14 (35.6)
SLV-80	2 (5.1)	16 (40.6)	64 (163)	16 (40.6)
SLV-100	4 (10.2)	18 (45.7)	71 (181)	18 (45.7)
SLV-120	4 (10.2)	21 (53.3)	74 (188)	21 (53.3)
SLV-150	4 (10.2)	23 (58.4)	79 (201)	23 (58.4)
SLV-175	6 (15.3)	26 (66)	82 (209)	26 (66)
SLV-200	6 (15.3)	29 (73)	86 (219)	29 (73)
SLV-225	6 (15.3)	32 (81.3)	89 (226)	32 (81.3)
SLV-250	6 (15.3)	34 (86.4)	92 (234)	34 (86.4)

Table 3: Minimum Required Clearance to Combustibles

***Clearance to combustibles for non-reflectored fittings is 18" (0.5m).**

INSTALLATION

Preparation

Most vacuum system designs are laid out on a clean blank sheet of paper. Unfortunately, typical construction does not permit this unimpeded access and therefore some planning and preparation early in the project will save much time and effort later on.

Start by reviewing the installation procedure. Examine where the equipment will be installed and how it will be supported. Please pay special attention to any objects that might be in the way or in close proximity to the heating system. Refer to Table 3 (Clearance to Combustibles) to ensure a safe distance between the heating system and any combustible materials.

Acquaint yourself with the standard components referred to in this manual. Many of these components are shown in detail in Figure 3 & Figure 4. They are also shown in general assembly form in Figure 1 and Figure 2 to illustrate where the components fit in a typical Symmetrical System and a Non-Symmetrical System. (These Figures are found in the 'Equipment Specifications' section.)

If possible, lay the entire system out on the floor prior to installation. This will help identify any potential problems with the installation as well as any discrepancy in component quantity. Ensure that all burners are those specified by the System Design Layout in input, gas type and position number.

***DO NOT TRIM / CUT ANY Combustion Tube, adjust the system to fit around the Combustion Tubes.**

Layout Limits

◊ Radiant Tube System Layout Limits

Ensure that the System Layout meets the limits required in Table 3 and Table 4.

Avg. Burner Rating btu/hr	Radiant Tube Lengths/ Distance Between Burners ft (m)*			Minimum Distance to Elbow ft (m)	
	MINIMUM	RECOMMENDED	MAXIMUM	BEFORE BURNER	AFTER BURNER
60,000	20 (6.1)	30 (9.2)	40 (12.2)	3 (0.9)	10 (3)
80,000	25 (7.7)	30 (9.2)	40 (12.2)	3 (0.9)	10 (3)
100,000	30 (9.2)	40 (12.2)	45 (13.7)	3 (0.9)	15 (4.6)
120,000	30 (9.2)	40 (12.2)	45 (13.7)	3 (0.9)	15 (4.6)
130,000	35 (10.7)	40 (12.2)	55 (16.8)	3 (0.9)	20 (6.1)
150,000	40 (12.2)	50 (15.3)	60 (18.3)	3 (0.9)	20 (6.1)
165,000	45 (13.7)	50 (15.3)	65 (19.8)	3 (0.9)	20 (6.1)
175,000	45 (13.7)	50 (15.3)	65 (19.8)	3 (0.9)	20 (6.1)
200,000	50 (15.3)	60 (18.3)	70 (21.4)	3 (0.9)	25 (7.7)
225,000	50 (15.3)	60 (18.3)	70 (21.4)	3 (0.9)	25 (7.7)
250,000	55 (16.8)	70 (21.4)	75 (22.9)	3 (0.9)	25 (7.7)

Table 4: Radiant Tube System Layout Limits

***When minimum radiant tube lengths are used, minimum tailpipe length must be increased by 50%**

◊ Tailpipe Lengths Required for Various Branch Layouts

TOTAL BURNERS PER BRANCH	BURNER INPUT RATE AT EACH POSITION Mbtu/hr					TOTAL OUTPUT PER BRANCH btu/hr	MINIMUM TAILPIPE PER BRANCH ft (m)
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5		
1	80	-	-	-	-	80,000	20 (6.1)
2	80	60	-	-	-	140,000	20 (6.1)
3	80	60	60	-	-	200,000	20 (6.1)
4	80	60	60	60	-	260,000	20 (6.1)
5	80	60	60	60	60	320,000	30 (9.2)
1	100	-	-	-	-	100,000	20 (6.1)
2	100	80	-	-	-	180,000	20 (6.1)
3	100	80	80	-	-	260,000	20 (6.1)
4	100	80	80	80	-	340,000	30 (9.2)
5	100	80	80	80	80	420,000	30 (9.2)
1	120	-	-	-	-	120,000	20 (6.1)
2	120	100	-	-	-	220,000	20 (6.1)
3	120	100	100	-	-	320,000	30 (9.2)
4	120	100	100	100	-	420,000	30 (9.2)
5	120	100	100	100	100	520,000	40 (12.2)
1	150	-	-	-	-	150,000	20 (6.1)
2	150	120	-	-	-	270,000	30 (9.2)
3	150	120	120	-	-	390,000	30 (9.2)
4	150	120	120	120	-	510,000	40 (12.2)
1	175	-	-	-	-	175,000	20 (6.1)
2	175	130	-	-	-	305,000	30 (9.2)
3	175	130	130	-	-	435,000	30 (9.2)
1	200	-	-	-	-	200,000	20 (6.1)
2	200	165	-	-	-	365,000	30 (9.2)
1	225	-	-	-	-	225,000	20 (6.1)
1	250	-	-	-	-	250,000	20 (6.1)

Table 5: Tailpipe Lengths Required for Various Branch Layouts

Exceptions:

- When minimum radiant tube lengths are used, minimum tailpipe length must be increased by 50%
- If using common tailpipe refer to the following to determine the minimum common tailpipe length required:
  - Add up usual recommended lengths of tailpipe using data from Table 5.
  - Subtract the length of any tailpipe that will NOT be common.
  - IF result is > 40' remaining - multiply by 0.60 for minimum common tailpipe length OR,
    IF result is ≤ 40' remaining - multiply by 0.75 for minimum common tailpipe length
- When using 5" Ø tailpipe, the required tailpipe lengths may be reduced by 25%.

INSTALLATION

Assembly Overview Notes

Generally there is no unique sequence for installation of the SLV Series. A review of the job site will often indicate a logical installation order. However, it is typical to start at the end of the branch with the furthest burner location and continue that branch downstream towards the Vacuum Pump, then begin again with the next branch. Generally, 10 ft (3 m) increments of Tube and Reflector can be used until one reaches the Common Tailpipe areas or Vacuum Pump connections. The general order of material in this manual is recommended for low-hassle installation purposes.

The installation of the entire system potentially consists of 5 individual parts, one part for each major component/ system;

1. Radiant Line System, (Heat Exchangers)
2. Vacuum Pumps & Ventilation Systems,
3. Optional Combustion Air Supply System,
4. Gas Supply System, and
5. Electrical System(s)

Directions for the installation of each component / system are therefore found in the respective sections along with general information and additional safety notes as required.

Radiant Line System

For the purpose of this section the term “Radiant Line System” will refer only to the main heat exchanging components: Tubes, Burners, Reflectors, Tailpipes and attached Optional pieces. These must be hung from ceiling supports and form the main Radiant Lines & Branches of the Heat Exchanger System.

Installation of the Radiant Line System has been divided into 6 main parts as follows:

- **Radiant Line Tubes**
- **Tailpipe Tubes**
- **Burners**
- **Reflectors**
- **Optional Shield Equipment**
- **Decorative Grille Option**

The order they are listed in is recommended for ease of installation and allows for adjustments to be made easily if required. Other orders of installation are possible; please note that there are certain components which, once installed, will make it more difficult to install others. Thoroughly read through the following installation directions for details on individual components.

Figure 7 illustrates the relationship of many of the various components of the Radiant Line System and will be a useful reference at many times during the installation.

- **The SIRIUS Variable Output, SLV, does not typically require the use of baffles. If baffles are desired please consult with the manufacturer prior to installation.**

All Combustion Tubes are heat-treated aluminized steel tubes. On Burners that are to be fired at 150,000 BTU/hr. or more, the next 10 ft. (3 m) Tube section is to be heat-treated aluminized as well. The remaining Radiant Tube length can be either hot rolled or heat-treated aluminized depending on the system design.

◊ Radiant Line Tubes

1. Locate hanging chain at predetermined points in the structure using methods as shown in Figure 8.
   - The first 2 hanging points are approximately 7 ½ ft (2.3 m) apart to fully support each end of the first tube. Thereafter spacing of 10 ft (3 m) is acceptable, i.e. one hanging point per tube.
   - Ensure that reflector hangers located on a combustion tube will be within 8. (20 cm) of the Burner.
   - Ensure that the mounting height allows a downward slope of ¼ in. per 10 ft (7 mm per 3 m) towards the vacuum pump location.
2. Welded link chain with a working load limit of at least 500 lbs. (230 kg) is recommended.
   - The suspension mechanism must allow for lateral expansion of the tubing.
   - A minimum length of 12 in. (30 cm) of hanging chain is recommended.
   - Using turnbuckles between the chain and the Reflector Hanger allows for easy height adjustment later.

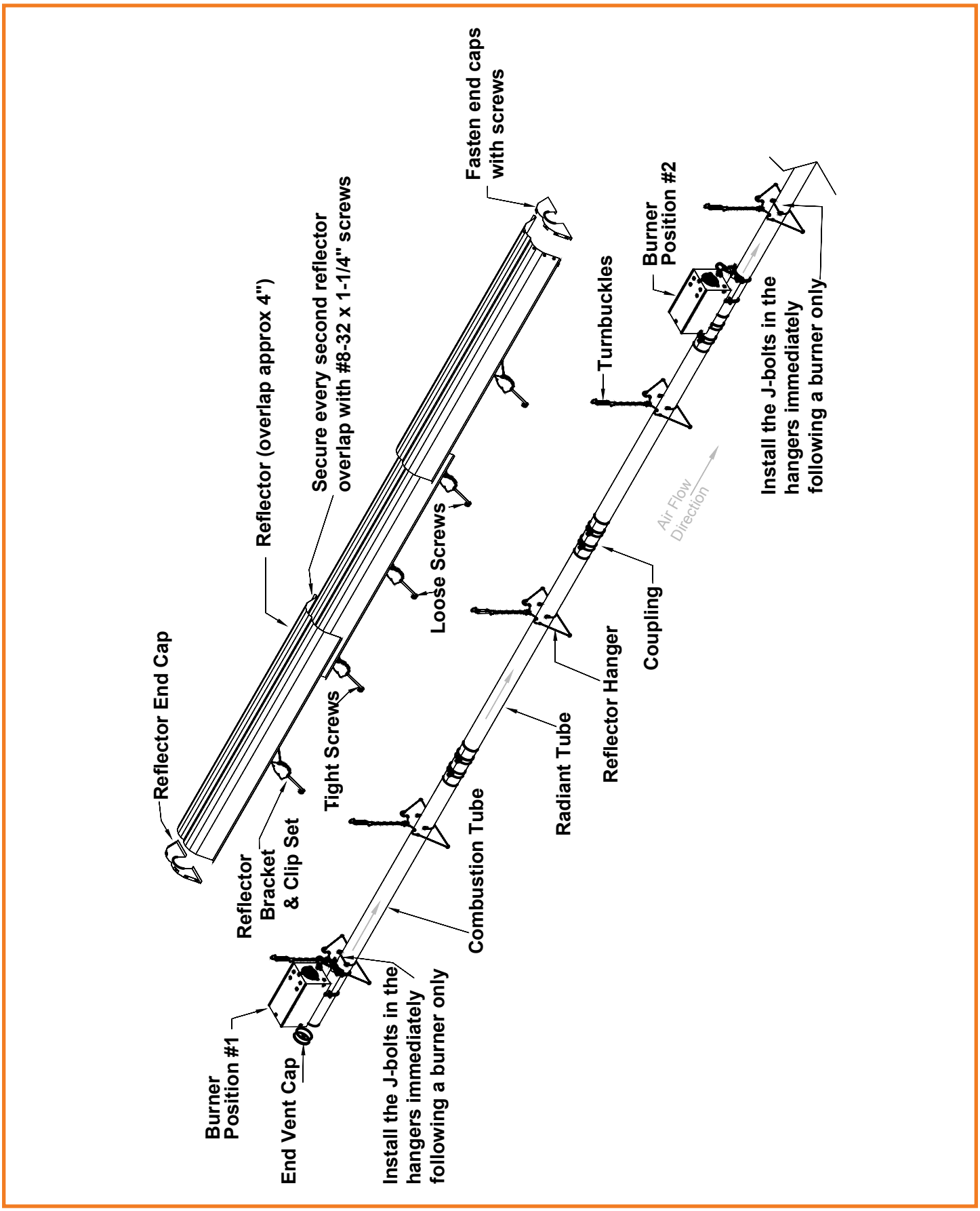


Figure 7: Radiant Line System - Component Relationships

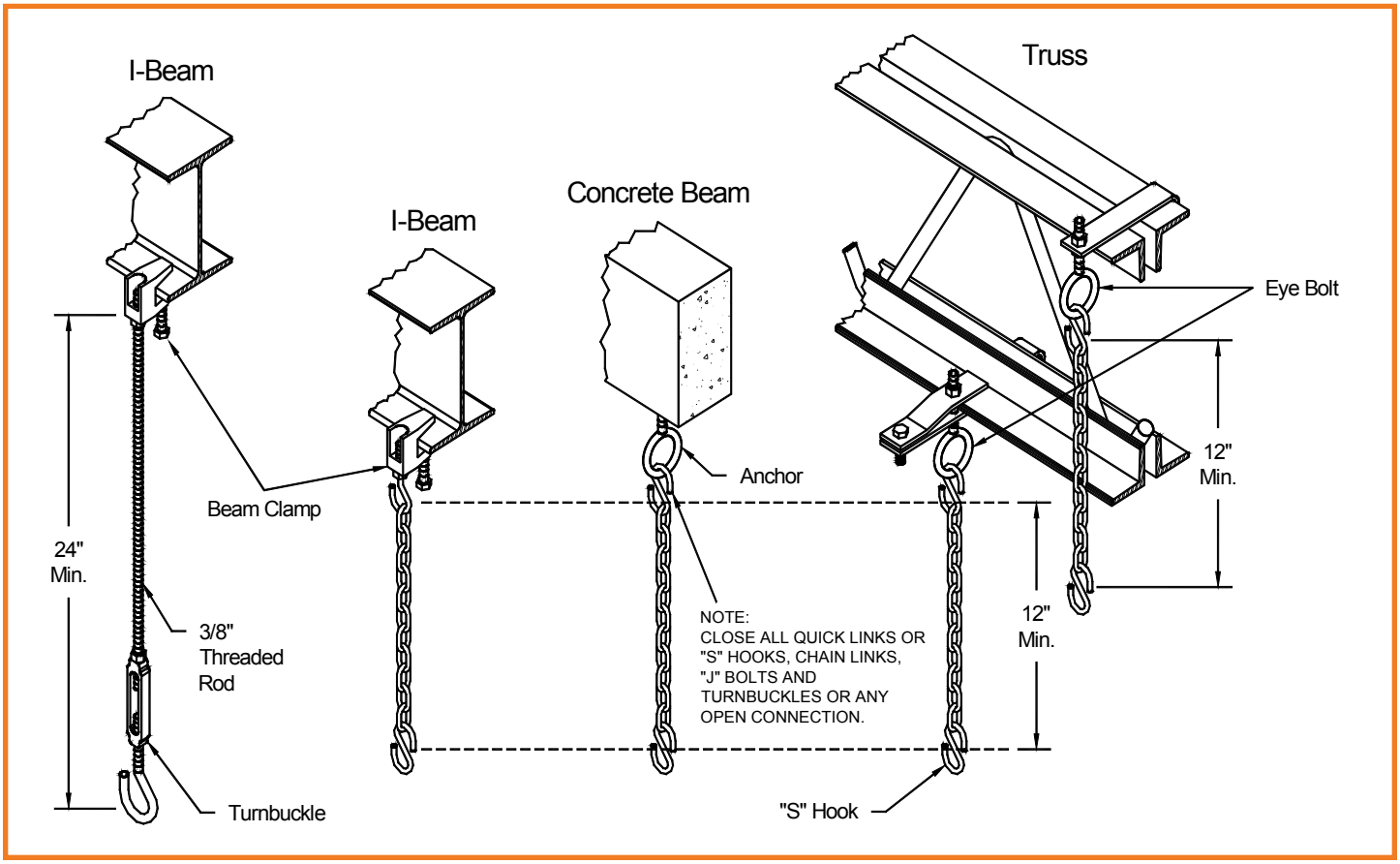


Figure 8: Ceiling Mounting / Hanging Options

3. Install an End Vent Cap at the beginning of each Branch (open end of the first Combustion Tube) and fasten it with a #8 x ⅜ in. screw as shown in Figure 9 below.

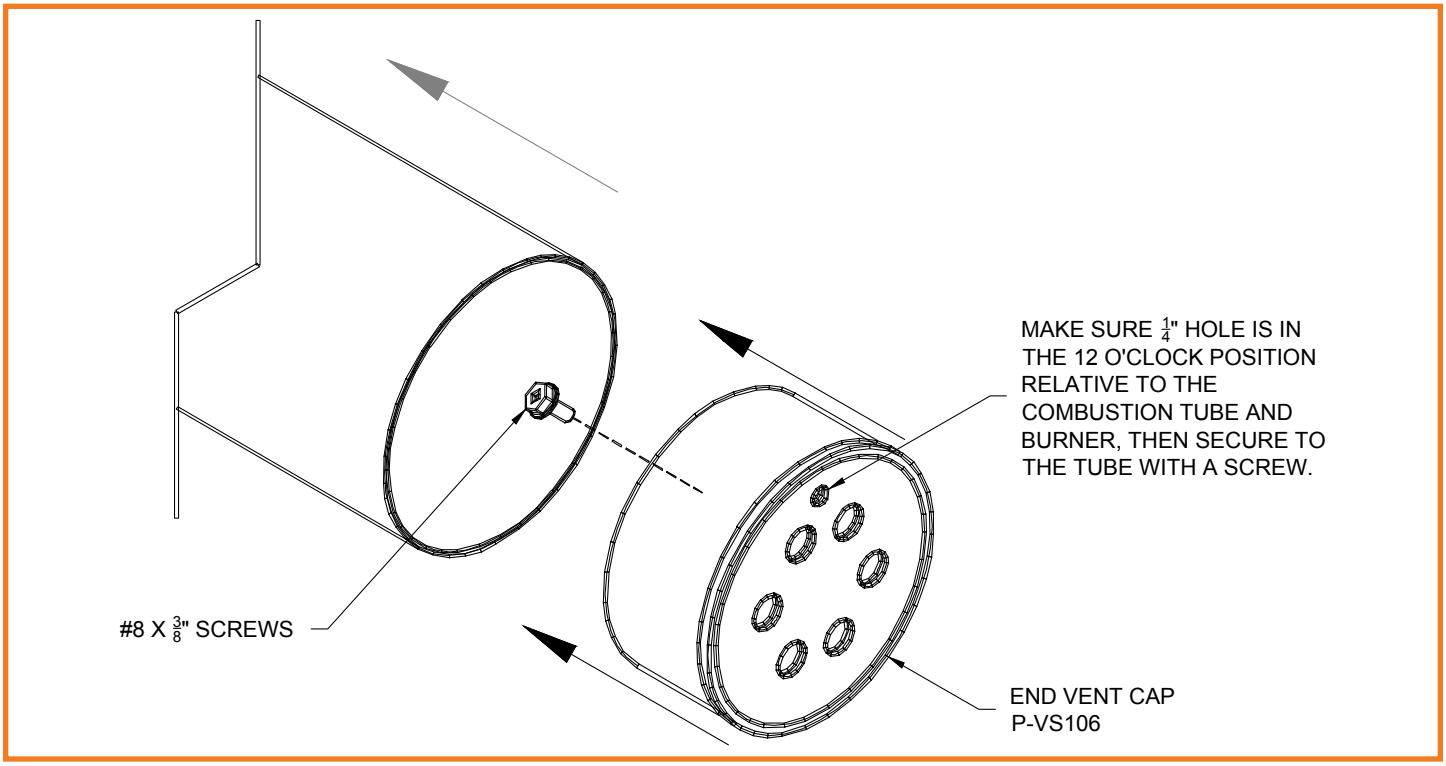


Figure 9: Ceiling Mounting / Hanging Options

4. Fasten the Reflector Hanger to the end of the hanging chain and place the tube in the hanger. Ensure that Combustion Tubes have the burner mounting hole positioned at 12 o'clock and facing downstream. (Refer to Figure 10)

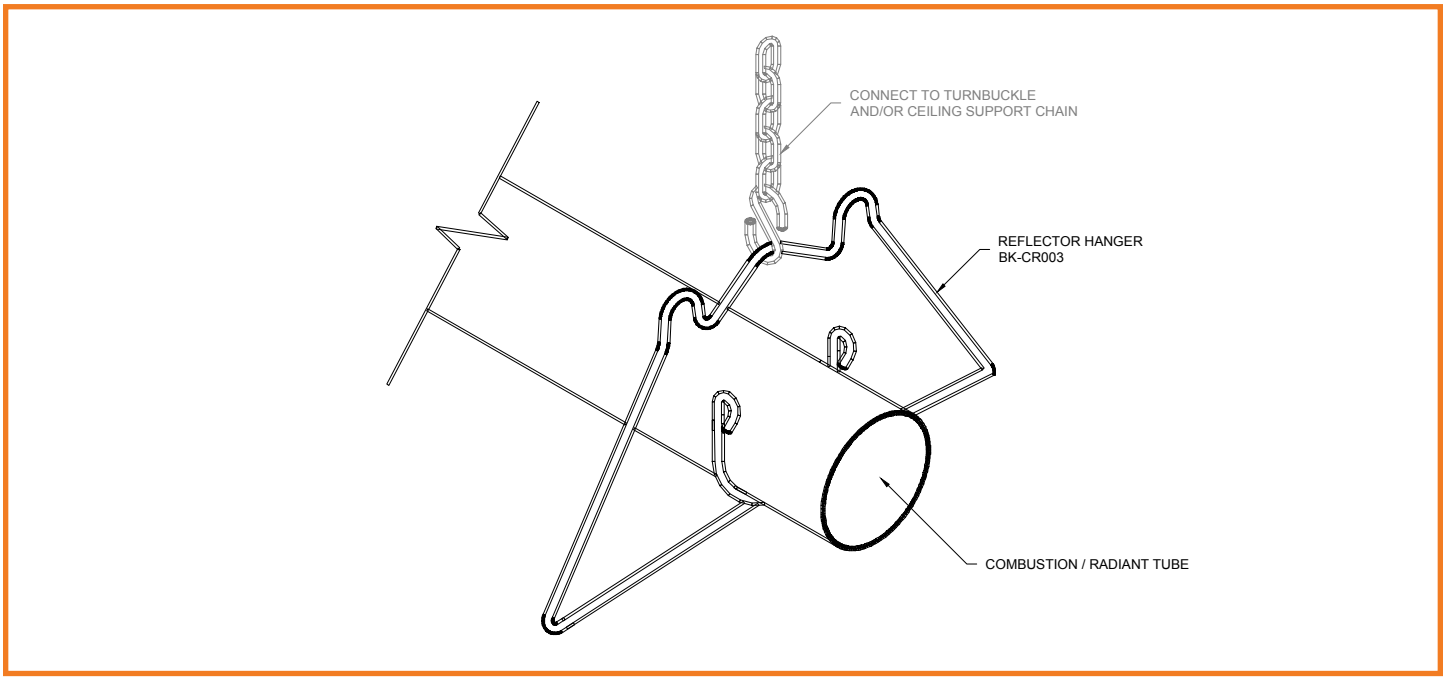


Figure 10: Tube & Reflector Hanger Detail

5. Join consecutive pieces of tube using Couplings. Insert one end of both tubes fully into the Coupling. (Refer to Figure 11). These should be tightened as the tubing is put in place, as it is more difficult to do so once the Reflector is installed. Tighten band clamps alternately to prevent buckling of the sleeve, set to Torque shown. Ensure that the weld seams on ALL Tubes are facing down.

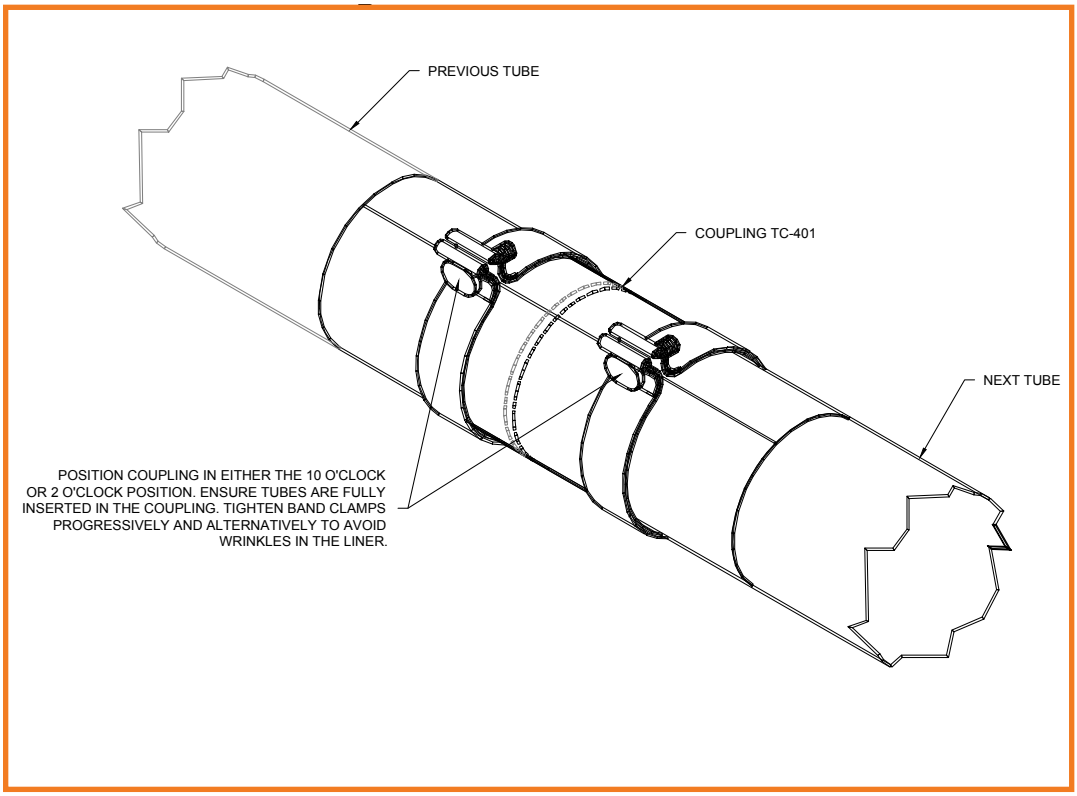


Figure 11: Tube Coupling Installation

Recommended Static Torque for Couplings*

STAINLESS STEEL	
Nm	55 ± 8
Lb ft	40.6 ± 6

ALUMINIZED	
Nm	70 ± 10
Lb ft	51.6 ± 7

* Static (Audit) Torque is defined as the amount of torque required to rotate the nut approximately ⅛ turn in the tightening direction immediately after rundown.

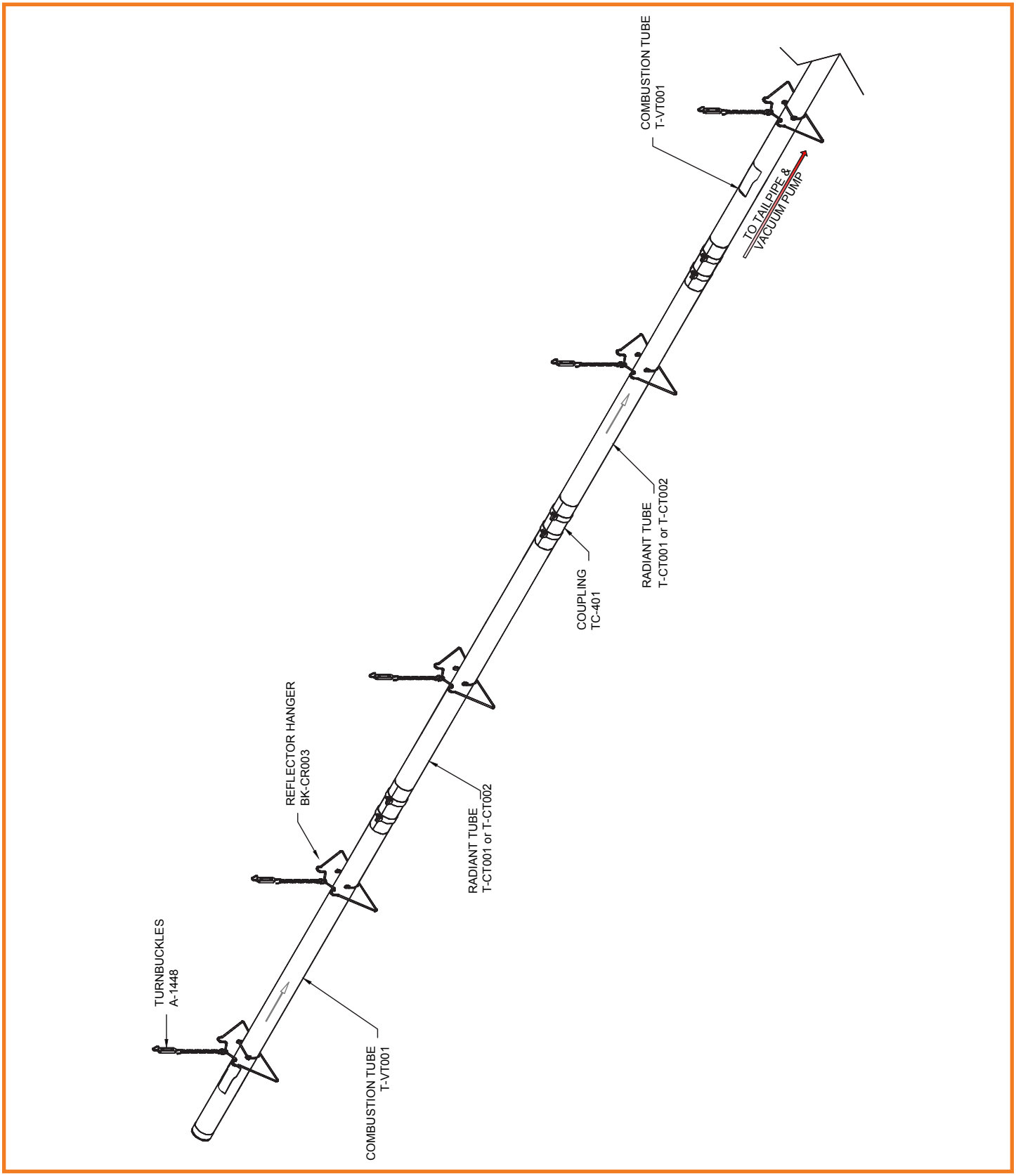


Figure 12: View of System after Installation of Radiant Line Tubes

System is now ready for Tailpipe installation(s).

System is now ready for Burner installation(s).

INSTALLATION

◊ Tailpipe Tubes

1. Continue to install Hangers*, Tubes and Couplings as per Installation Part 1-A: Steps 1 to 4. Ensure that the mounting height allows a downward slope of ¼ in. per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.

   ***On tubes that will NOT have reflectors, e.g.. tailpipe, the use of hanger straps instead of reflector hangers is approved.**

2. BEFORE installing the Tee Section between the Branch Tailpipes and the Common Tailpipe determine where the Damper Couplings need to be installed.

3. Check which type of System is being installed, Symmetric (S) or Non-Symmetric (N) as per Figure 1 and Figure 2. Dampers are positioned to allow the Vacuum Setting at the Branch End Vent to be adjusted individually for each branch. Symmetric / identical branches require the same vacuum setting so one damper coupling is located before the tailpipe splits into separate branches. Non-symmetric branches require a separate Damper Coupling for each Branch. For Modulating Rate Systems ensure that Motorized Damper Couplings are used.

   Damper Couplings are ONLY installed in the locations on the System where the respective letter reference “S”, OR “N” is located in Figure 13. On all other connections use normal Couplings. Dampers and Couplings are installed using the same method. (See previous section.)

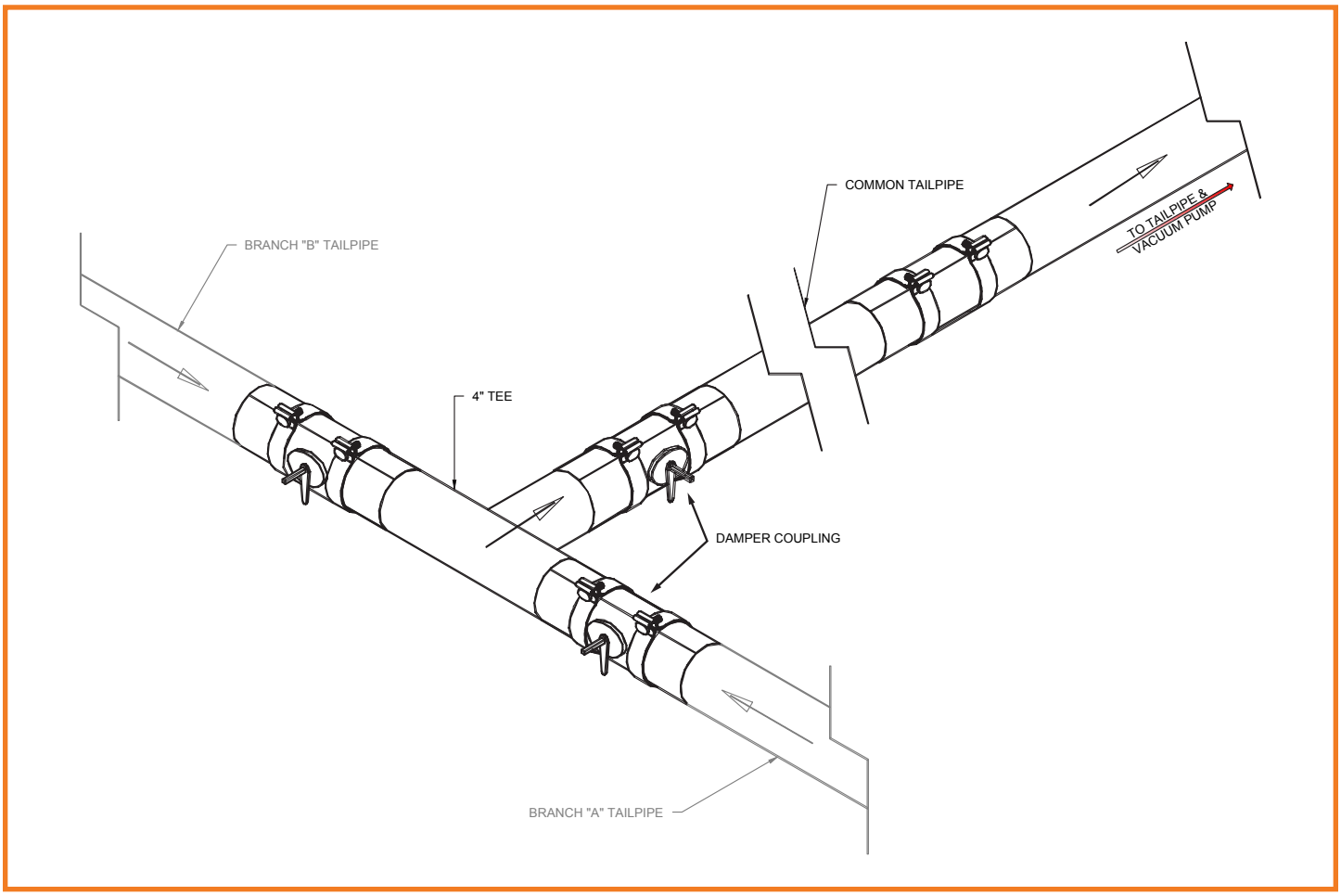


Figure 13: Typical Tailpipe Connections

4. Continue to install the Common Tailpipe in the same manner as all other Tubing. Ensure that the mounting height allows a downward slope of ¼ in. per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.

System is now ready for Vacuum Pump and Ventilation connection(s).

◊ Burners

- Each burner in the SIRIUS SLV Branch must be placed in its appropriate position and have the appropriate air plate installed.
- Burner Position No.1 is at the furthest end of the branch from the vacuum pump and the burner number increases as the branch runs towards the vacuum pump.

(As shown in Figure 16 & referred to in your System Design Layout)

- Each Burner is shipped with a Burner Rating Plate & As-Built Burner Position Label affixed, with the corresponding Air Plate installed. If the System Design Layout changes and the Burner must be placed in a position other than the As-Built Burner Position then the Air Plate will need to be replaced with the appropriate one for the required new Position.

(See figure below for details.)

Verify that the burners are correct for the fuel being burned.

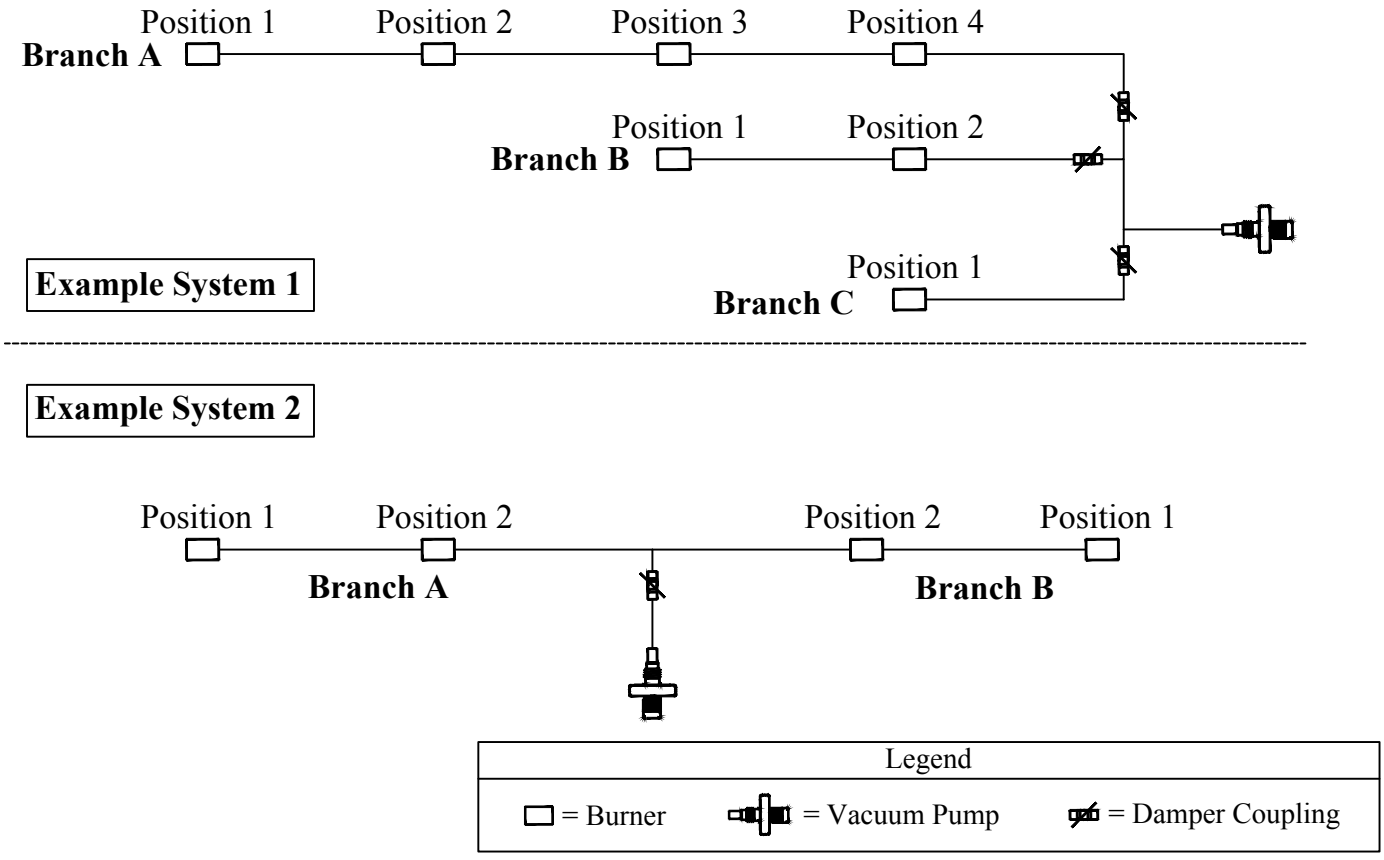


Figure 14: Burner Position Reference Diagram

INSTALLATION

1. Use the J-bolt (included with the Burner packaging) to clamp the Tube snugly at the first Reflector Hanger after a Burner mounting hole location. This prevents the Tube from twisting / rotating once the Burner is installed. (Refer to Figure 7 and Figure 15)
2. J-bolts must be installed before the reflectors are inserted.

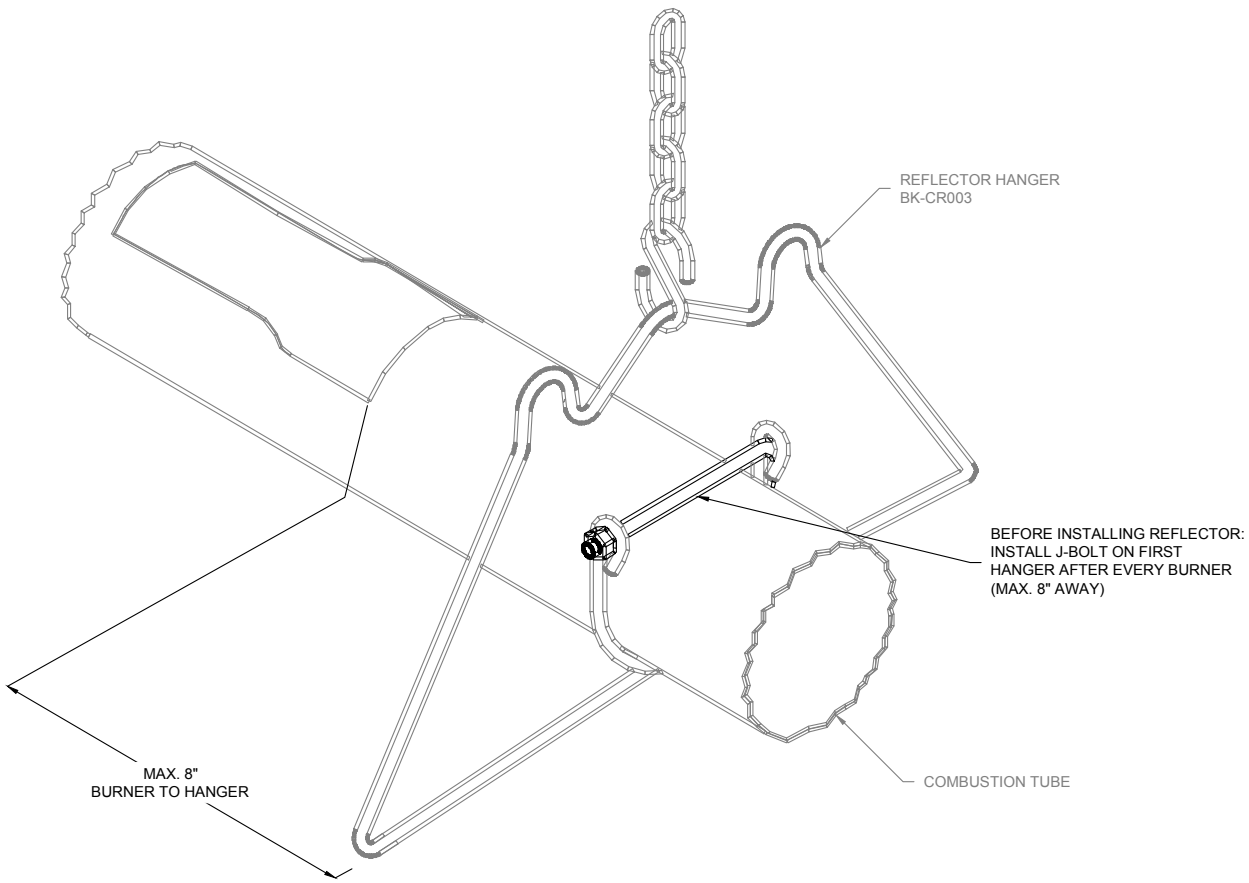


Figure 15: J-Bolt Installation Detail

3. Install each Burner. Ensure the gasket is properly in place, a small amount of contact cement will hold the gasket. **Position the Burner completely to the back of the installation slot** as shown in Figure 16. Ensure that little or no Tube is in view through the Viewing Glass/ Window.
4. Fasten the U-bolts but do **NOT** over-tighten as it will damage the combustion tube.

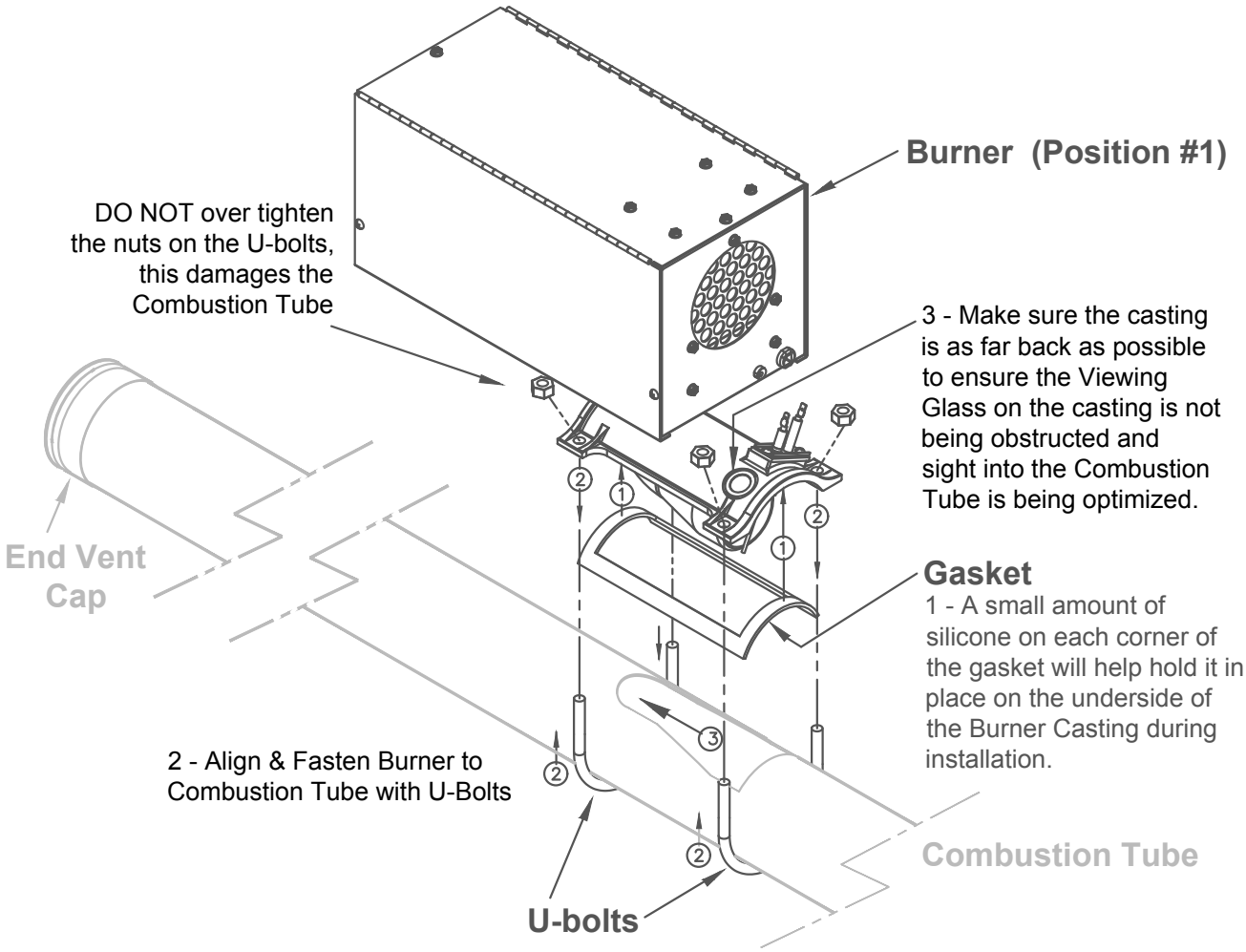


Figure 16: Burner Installation

Burners are now ready for Optional Combustion Air Supply connection(s) as necessary.
Burners are now ready for Electrical System connection(s).
Burners are now ready for Gas Supply System connection(s).

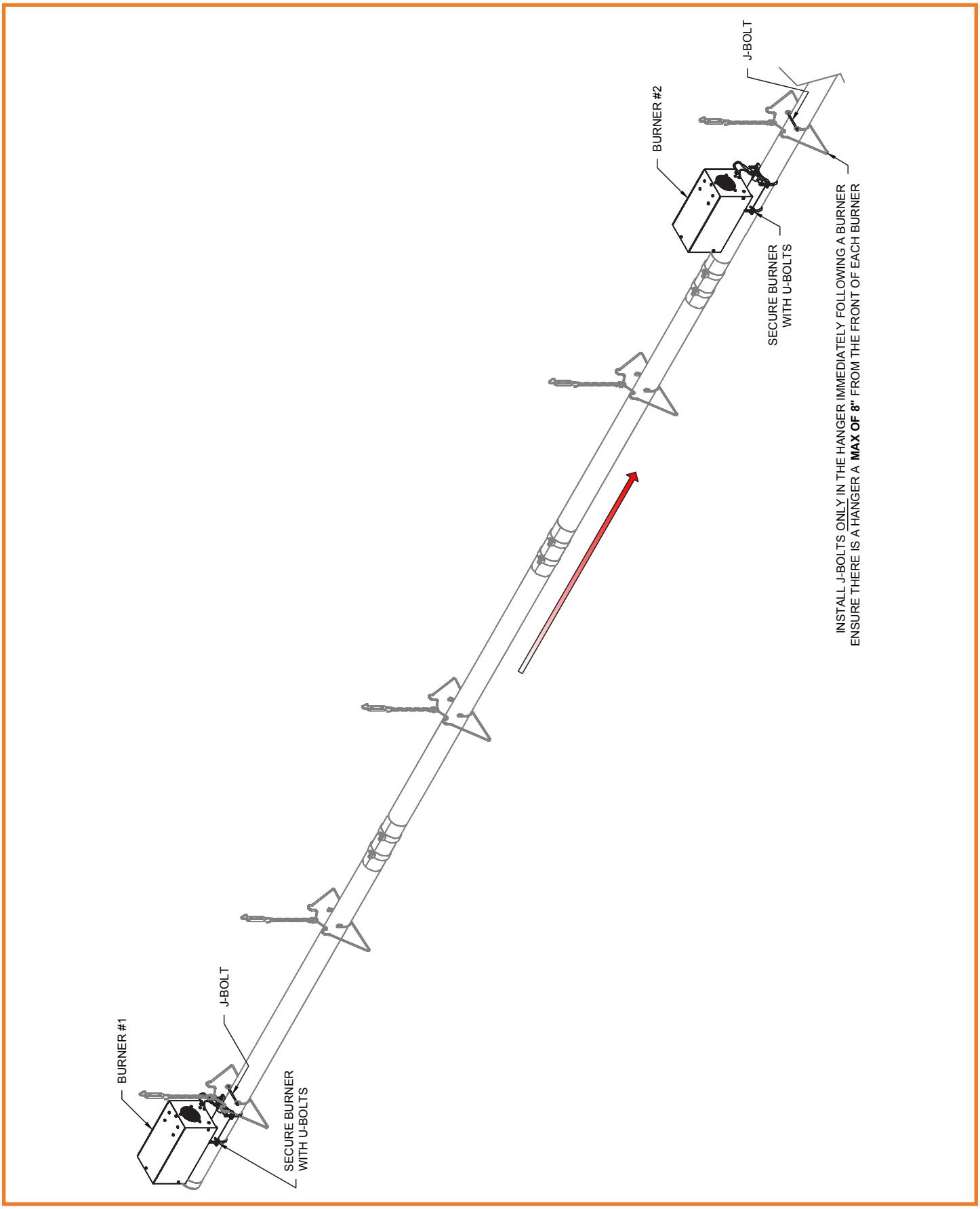


Figure 17 : View of System After Installation of Burners

◊ Reflectors

1. Install Reflectors after any Tube Couplings and J-bolts they cover have been installed. (For ease of installation it is suggested to install Burners before the Reflectors; however it is possible to do the reverse.)

   ***If the System Plan includes Bottom Shields these MUST be put on before the Reflectors as there will be limited access afterwards. For details see Section E - Optional Shield Equipment.**

2. Begin the first Reflector after a Burner with an End Cap about 3 in. (7.6 cm) downstream of the Burner as shown in Figure 18 & Figure 19. Install the End Cap using #8 x$^{3}/_{8}$. screws. Leaving space in the Reflector run allows unimpeded installation and servicing of the Burner.

3. Install Reflector Brackets. Place one at each Reflector overlap position and one in the middle of each 10 ft (3 m) Reflector length. Secure the Brackets loosely with #8 x $^{3}/_{8}$ in. screws. Tighten only the screws for Brackets in the center of alternating Reflectors & at every second overlap location. The remaining Reflector Bracket screws are left loose to accommodate system movement / expansion. Refer to Figure 20 below and to Figure 7 for a visual of which screws to tighten and which to leave loose.

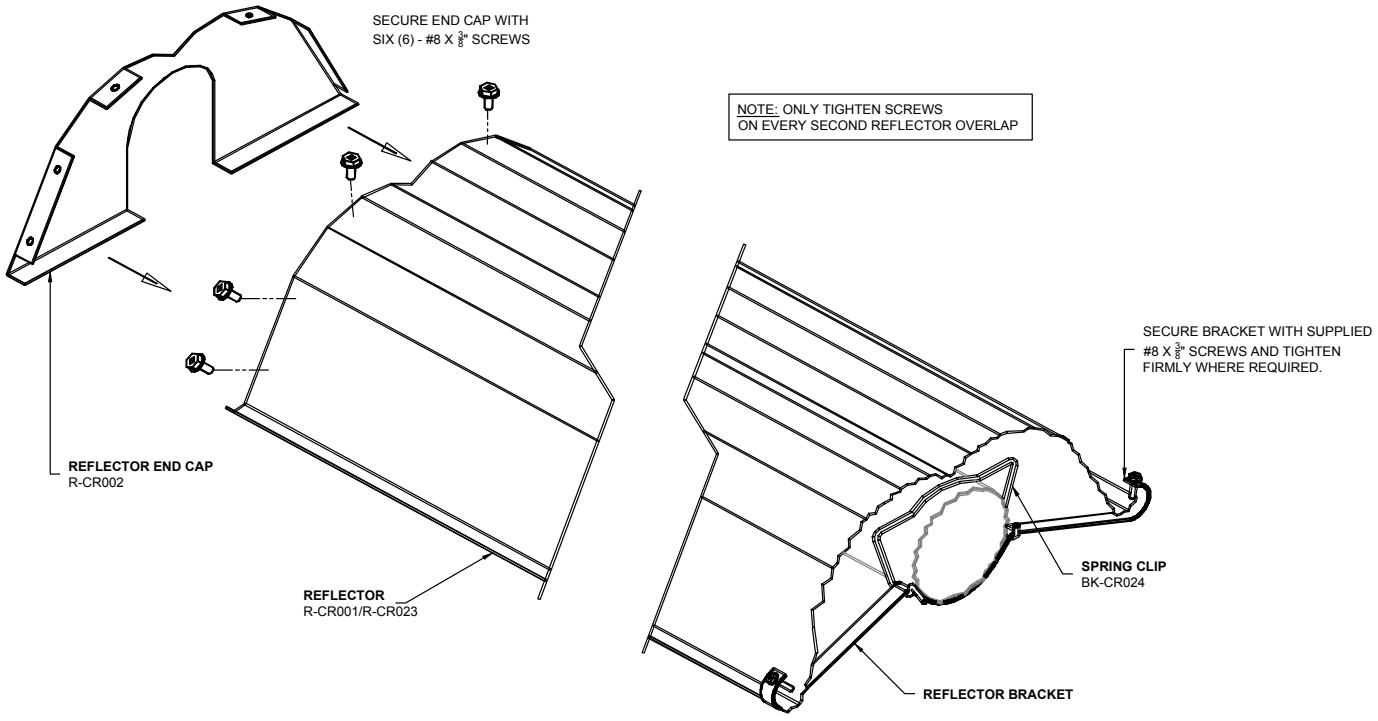


Figure 18: Reflector End Cap & Bracket Detail

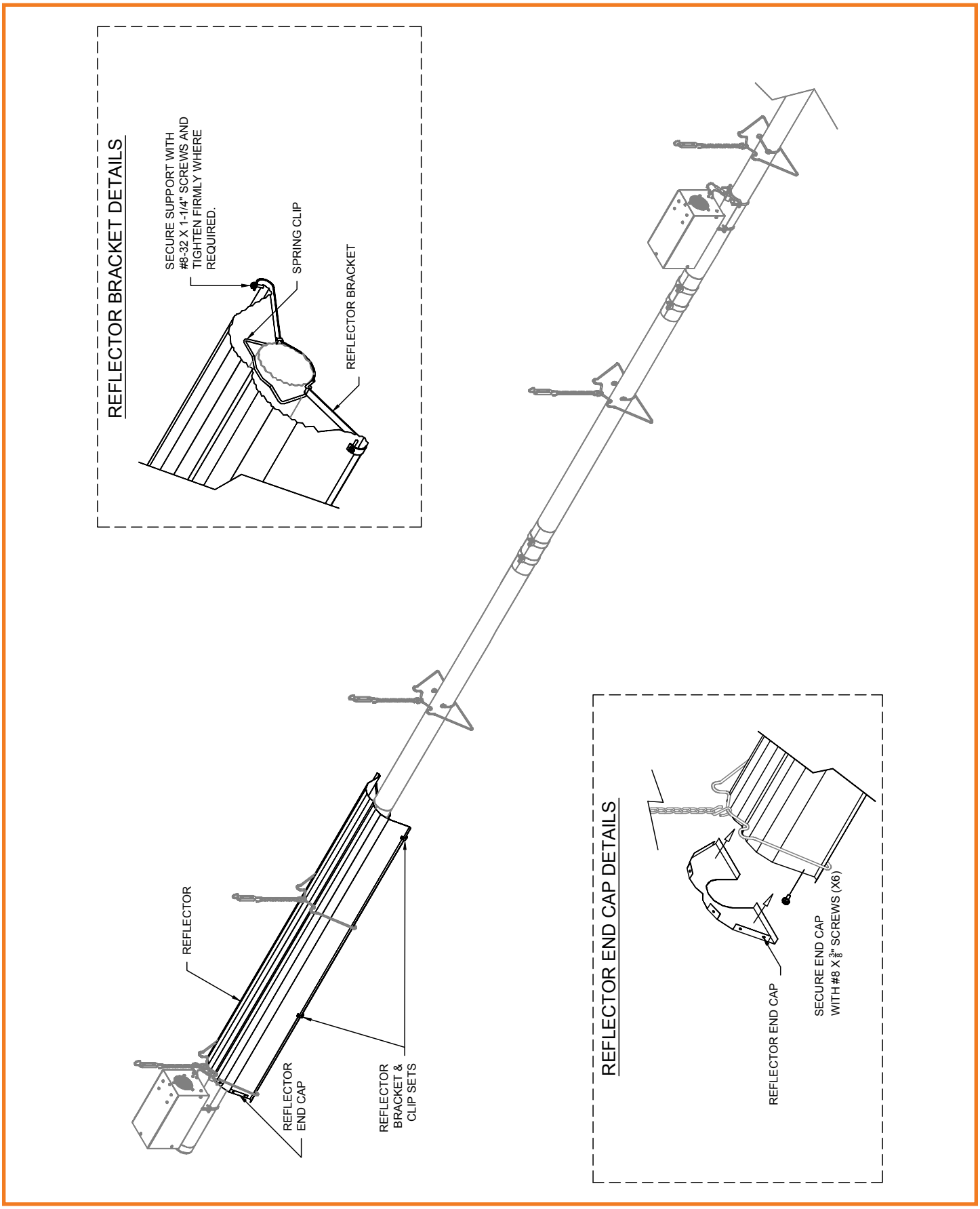


Figure 19 : View of System After Installation of First Reflector

4. Continue to slide the Reflectors into place within the Tube/Reflector Hanger up to the next Burner position. Overlap the Reflectors as shown in Figure 9 and Figure 23.

   DO NOT install Reflectors like roofing shingles, by overlapping the same end of the reflector every time. This will cause damage once the system heats up and components start to expand.

5. When approaching successive Burner locations, ensure the Reflector is as far under the Burner (close to the Burner mounting hole) as possible, as shown in Figure 22. *Install an End Cap using #8 x ⅜ in. screws on the open end of the Reflector which will be under the Burner at the end of the Reflector run.

   ***Burner Reflectors** are for use **instead of End Caps.** If Burner Reflectors, for Continuous Reflector runs, are required by the System Plan please refer to Section E - Optional Shield Equipment for alternate Reflector installation details.

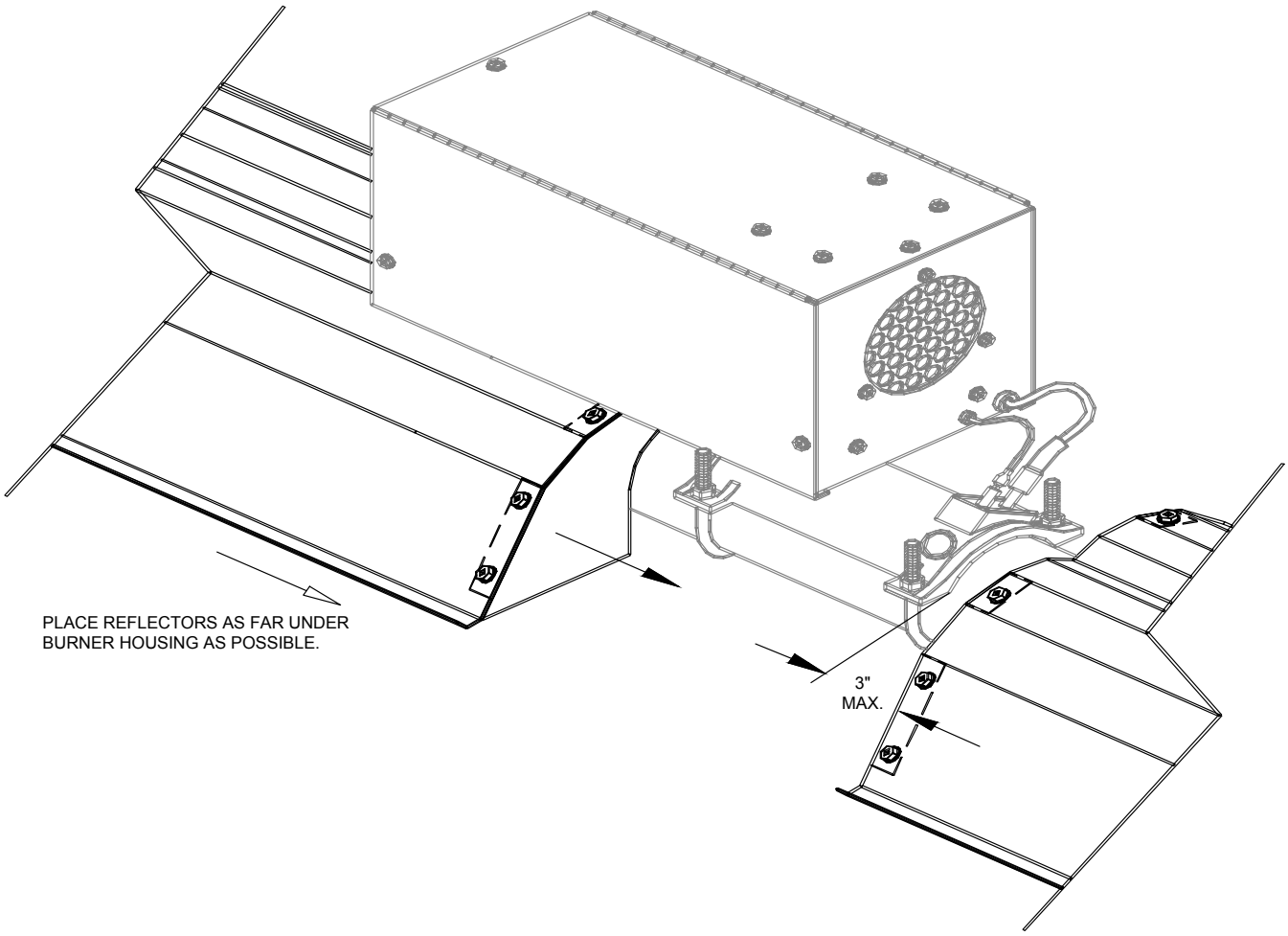


Figure 20: Standard Reflector & Burner Relative Positioning

6. Stop the Reflector run as per plan or when reaching an Elbow or Tee and install an End Cap at the end of the Reflector run using #8 x ⅜ in. screws.

   *When using the optional **Corner / Mitered Reflectors** refer to Figure 22 - Optional Shield Equipment, for details on how to assemble Reflectors sections instead of installing End Caps.

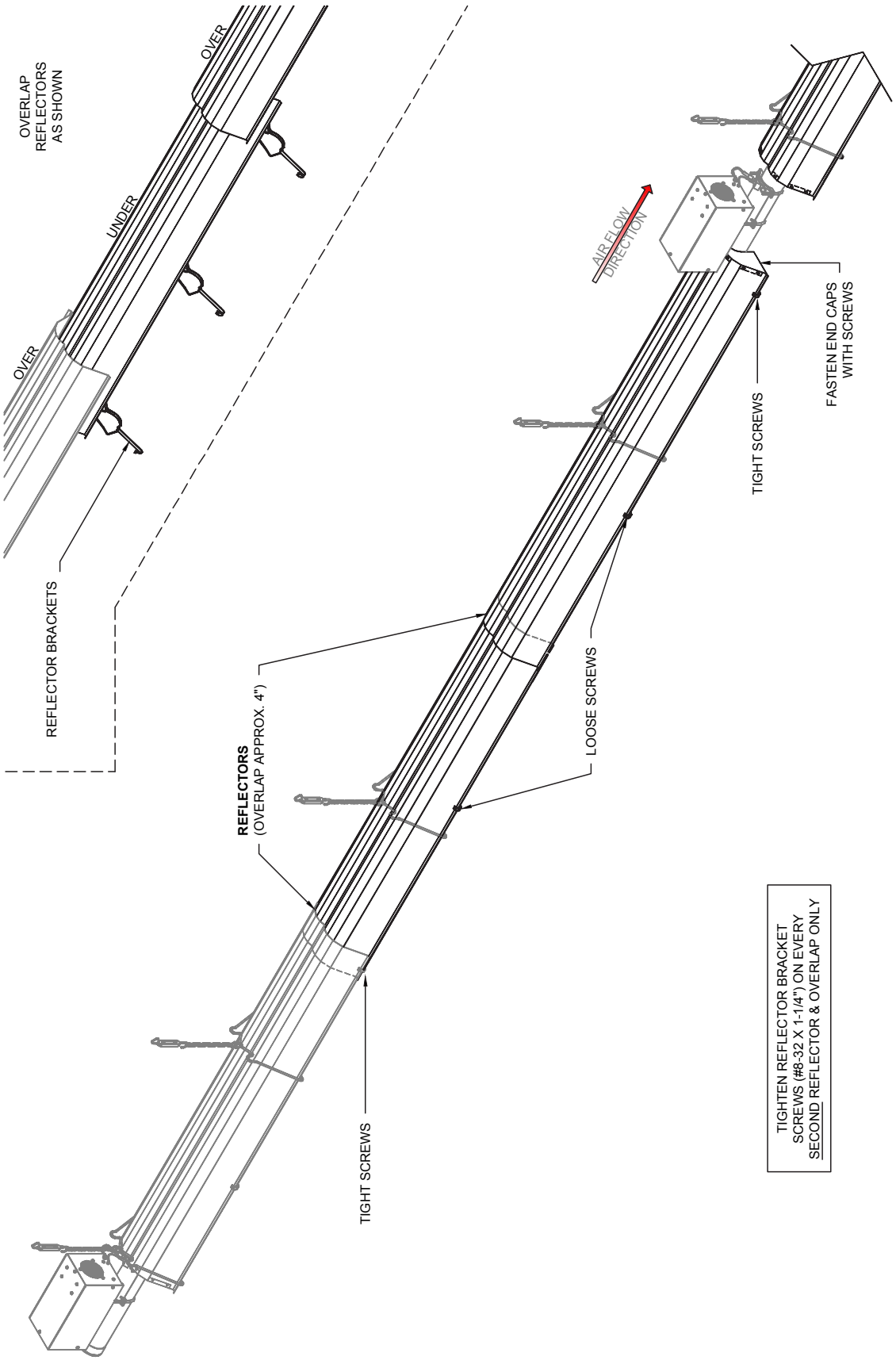


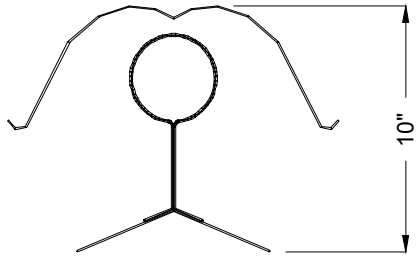
Figure 21 : View of System after Installation all Reflectors

◊ Optional Shield Equipment

Bottom Shields

Bottom Shields do not need to overlap. Each 5 ft (1.5 m) section is held with two Support Brackets. Secure each of the Support Brackets around the Tube and attach to bottom shields with two #8 x ⅜ in. screws.

Refer to Figure 22 below for reference.



BOTTOM SHIELD

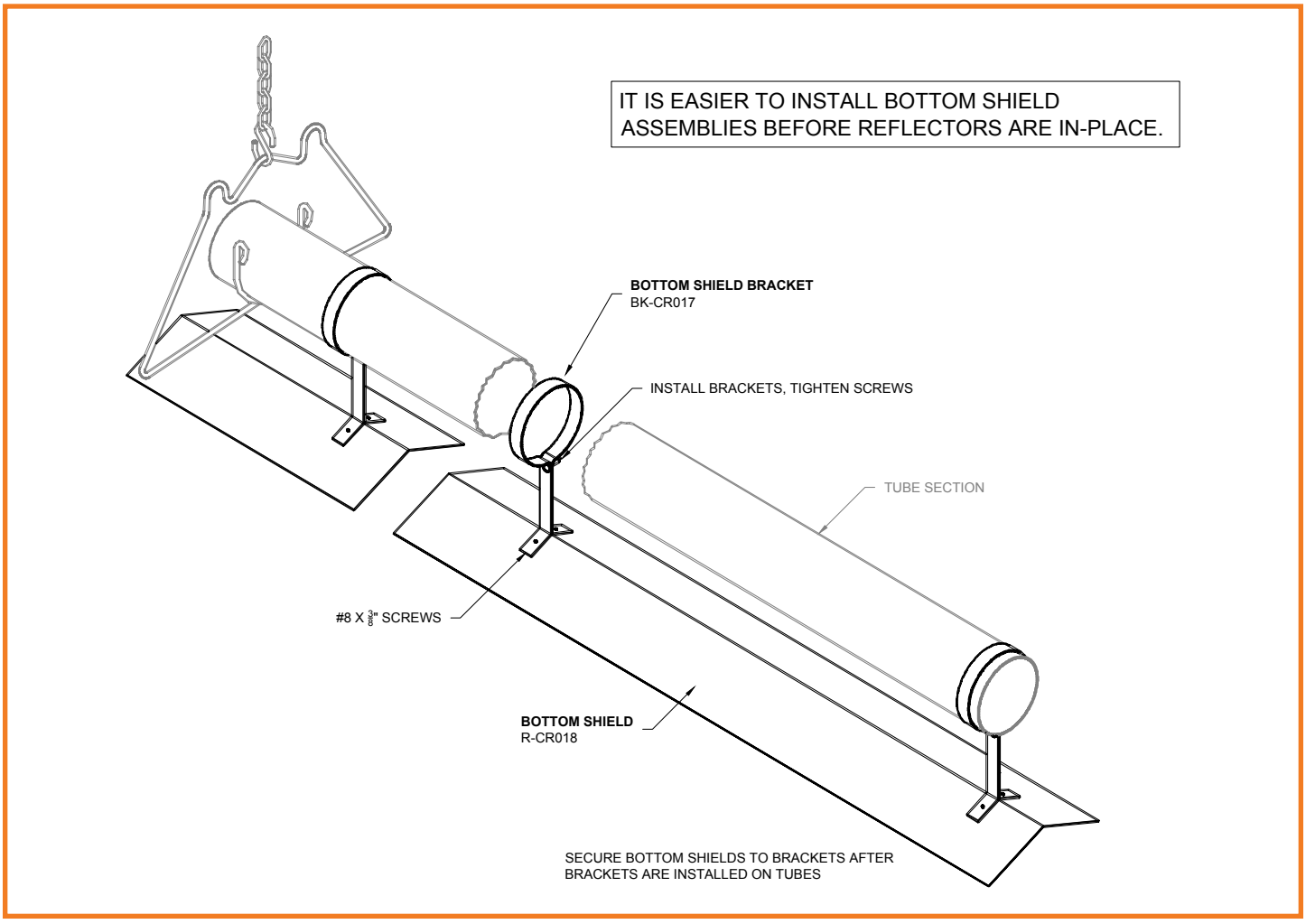


Figure 22: Bottom Shield Installation Detail

Burner Reflectors

Burner reflectors are used to maintain a continuous reflector surface along the length of the heat exchanger instead of ending & restarting reflector runs with End Caps at each burner location.

Burner reflectors are installed after Burner installation, and before / during assembly of the main Reflector run. All pieces are connected using #8 x ⅜ in. screws. The Side pieces and End Sections are installed first to create a base to secure the Burner Reflector sections to. Overlap the Burner Reflectors with Standard Reflectors; secure the Reflectors together with Support Brackets. Refer to the sequence of images in Figure 23 for more detail.

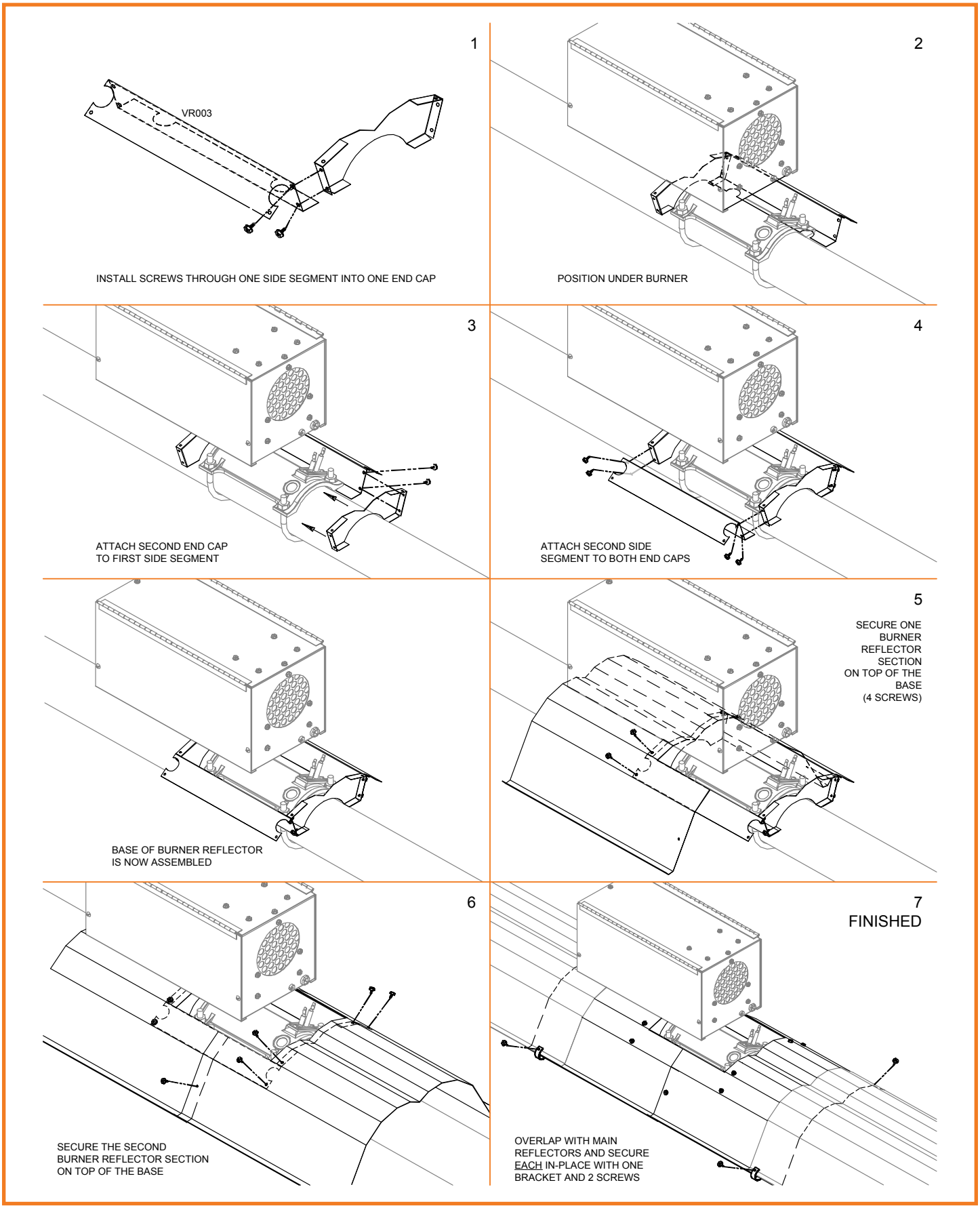


Figure 23: Burner Reflector Installation Sequence Details

Corner / Mitered Reflector

Corner / Mitered Reflector Kits are used above elbow locations instead of stopping and restarting a Reflector run to accommodate the elbow. Secure the Mitered Reflectors together using the Two (2) Corner Brackets as shown in Figure 24. Also insert #8 x ³/₈ in. screws at each 'tab' location along the top of the Reflectors.

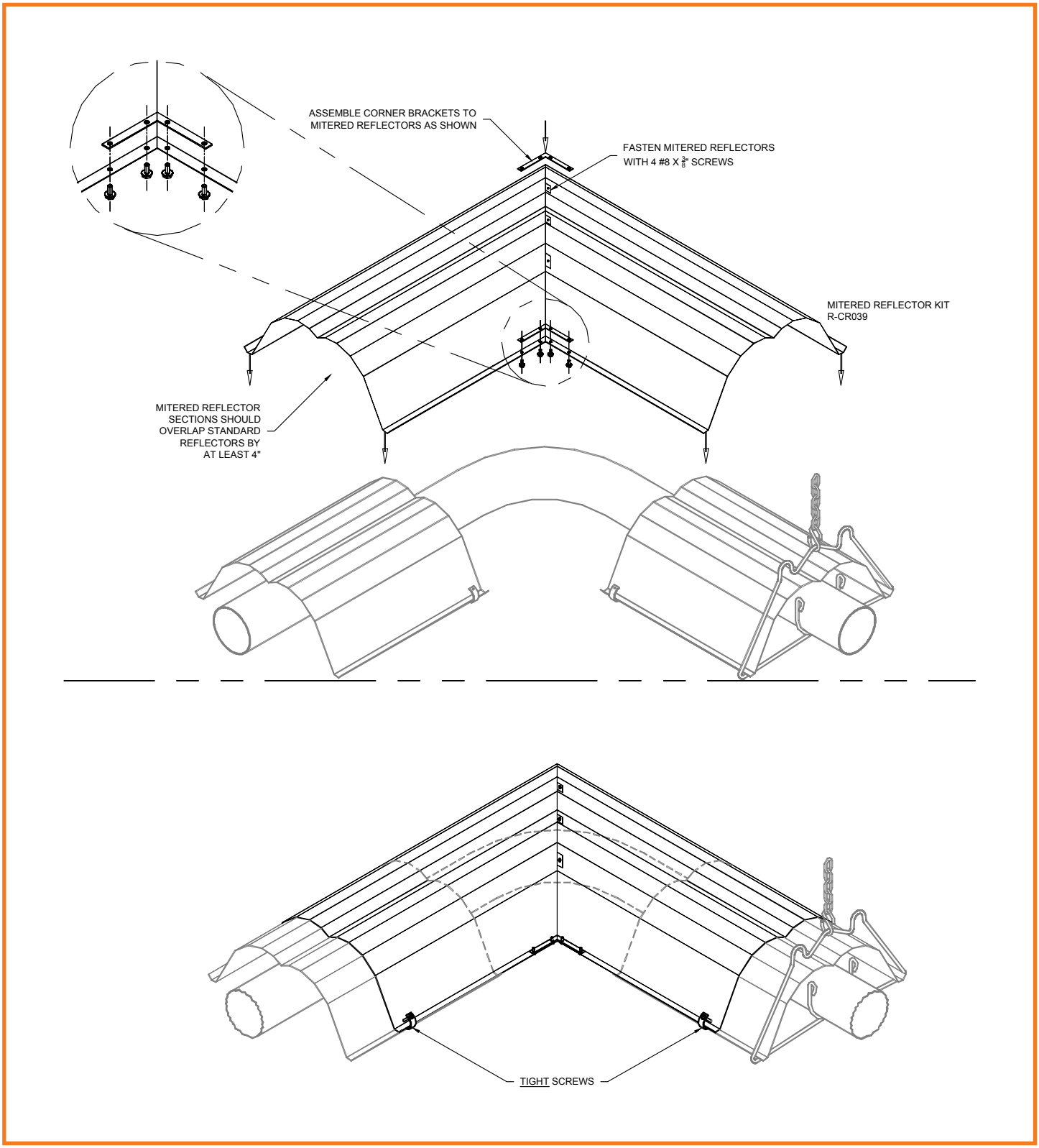


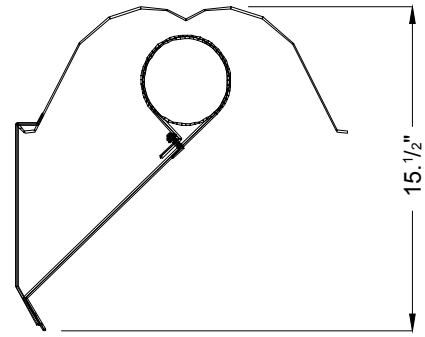
Figure 24: Optional - Corner (Mitered) Reflectors

Side Reflectors

Side Reflectors are 124 in. (3.15 m) long. Fasten one Side Reflector per main Reflector tightly with #8 x ⅜ in. screws spaced about 18 in. (0.5 m) apart. Install three (3) Side Reflector Brackets per Side Reflector, spaced about 48 in. (1.2 m) apart, using #8 x ⅜ in. screws. DO NOT tighten screws where Reflectors overlap. Refer to Figure 27 on the following page for details.

Install Side Reflector Retainer Clips when connecting / overlapping Side Reflectors.

Side Reflectors should be independent of each other. They should overlap approximately 2-4 in. (5-10 cm) but with no physical connection between them. This will allow for movement with thermal expansion of the Tube & main Reflector.



SIDE REFLECTOR

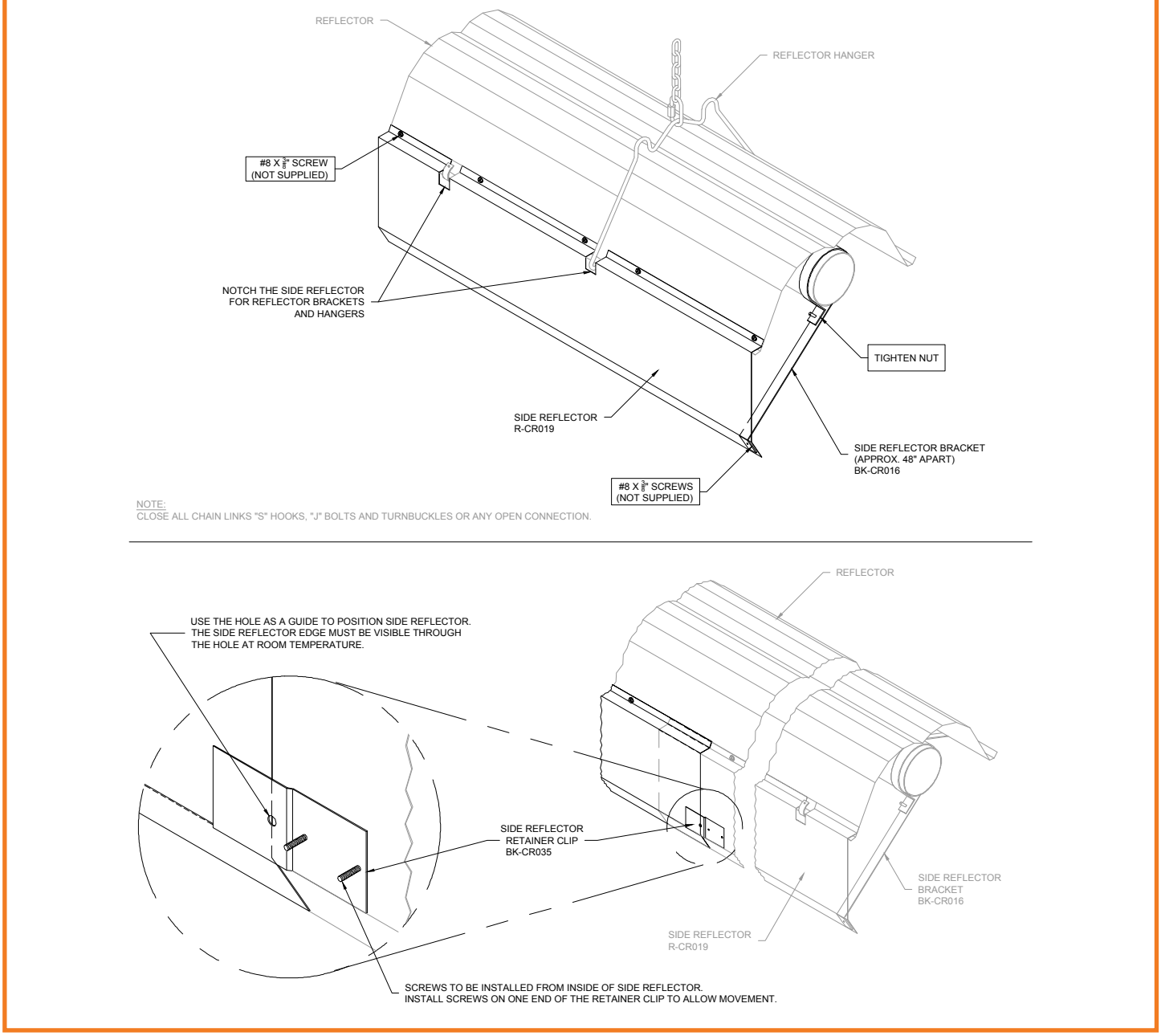


Figure 25: Side Reflector Installation Detail

◊ Decorative Grille Option

The SIRIUS SLV Range heaters are approved for the addition of a Decorative Grille [Deco-Grille] either directly to the Reflector or as part of a T-bar installation where the Heater System is above the ceiling structure. Refer to Figure 26 and Figure 27 for their respective details.

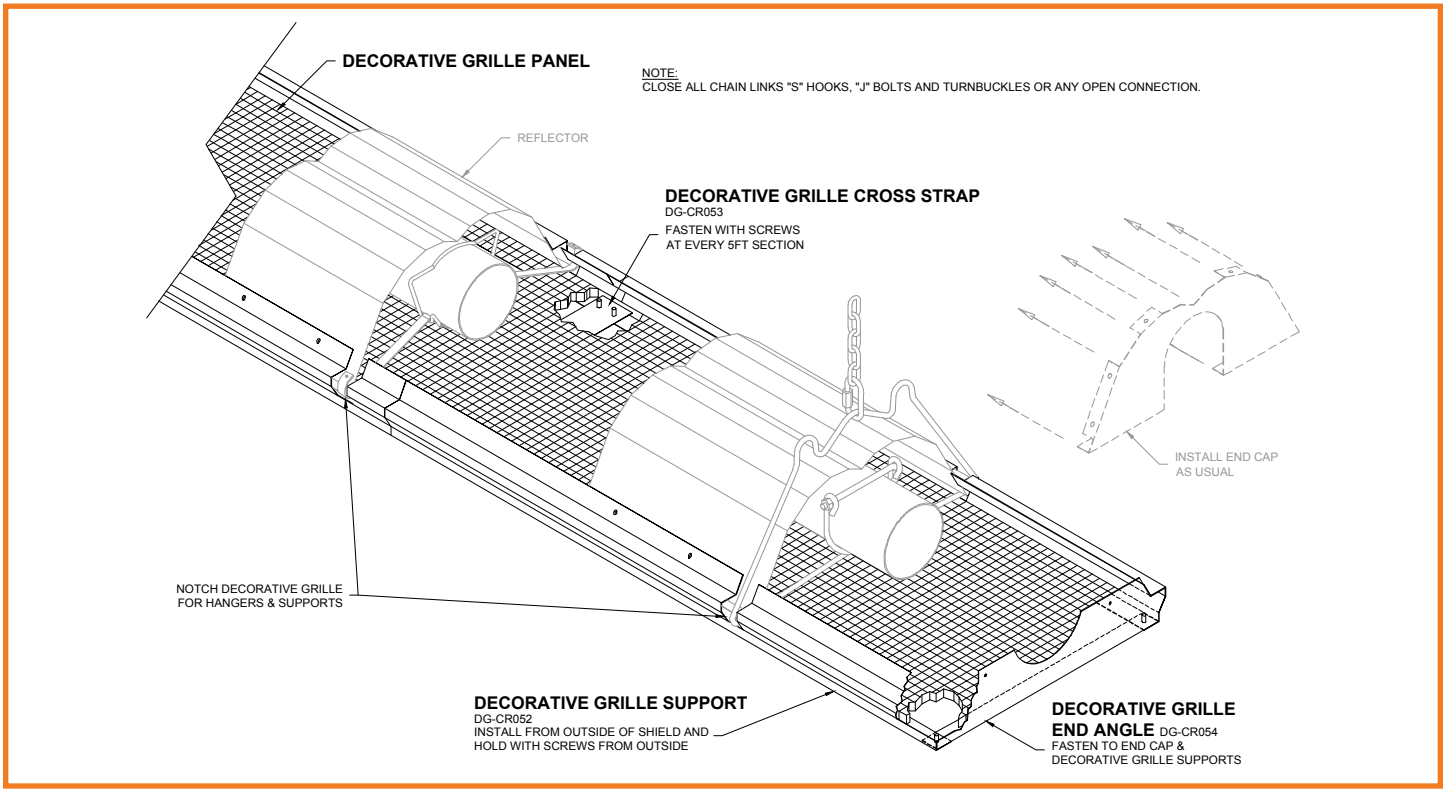


Figure 26: Decorative Grille – Mounted Directly to Heater

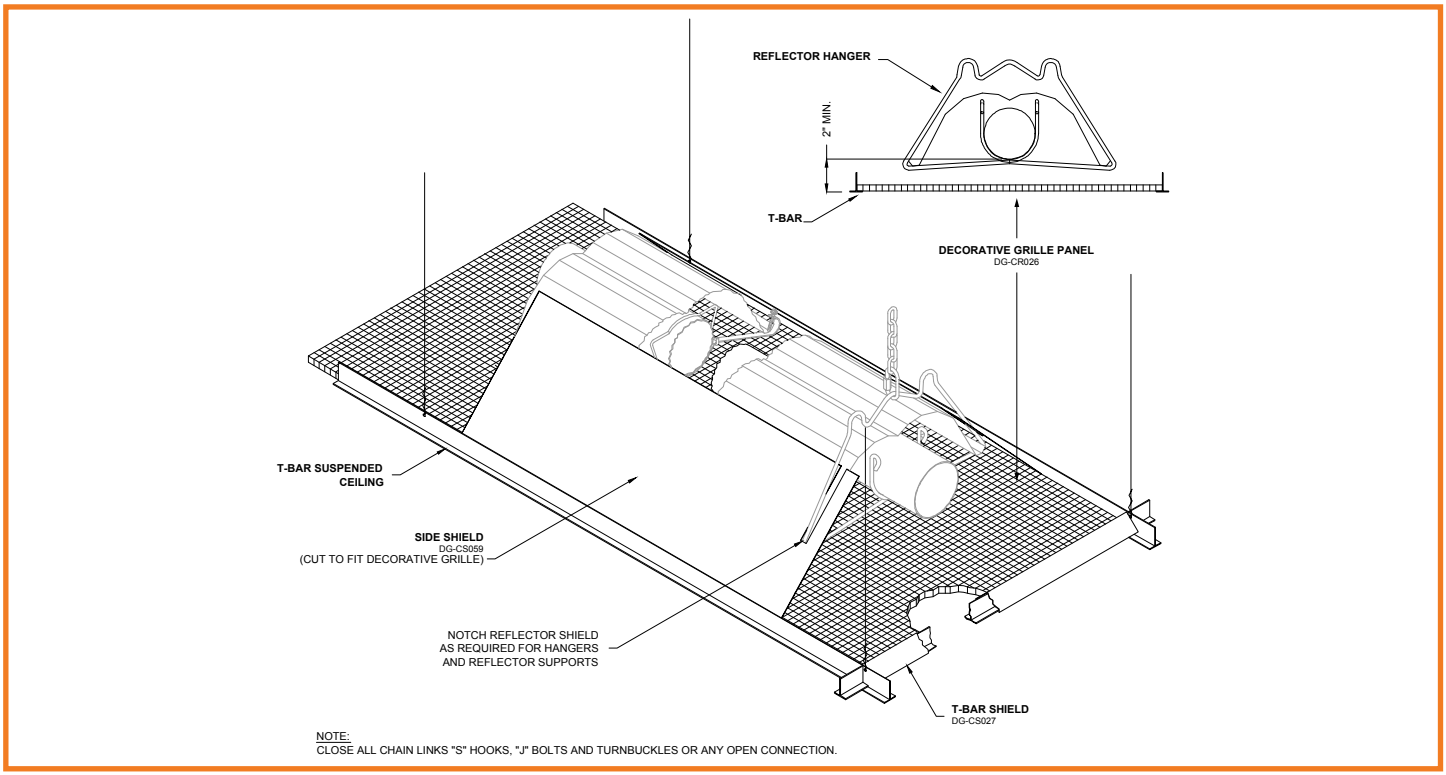


Figure 27: Decorative Grille – Mounted With T-Bar

INSTALLATION

Vacuum Pump & Venting

Vacuum Pump General Requirements

The Vacuum Pump (with permanently mounted motor affixed) is generally located at the height of the system, bolted to a platform or support structure that is either suspended from the ceiling members or is bolted to a column or building sidewall. The Vacuum Pump scroll is orientated for the preferred horizontal discharge, but can be rotated 90 degrees in the field for vertical discharge.

(Refer to Figure 28, Figure 29 and Figure 30 for visuals of Vacuum Pump mounting options.)

*If a lengthy heater run has a 90 degree elbow with a short run to the Vacuum Pump, consider placing the Pump somewhat off (past) the centerline of the connecting Tailpipe so that as the system grows the Flexible Boot Connection in fact improves performance.

Vacuum Pump Safety Warnings

Confirm that the Vacuum Pump's impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse rotation, see instructions on the motor.

WARNING

DO NOT OPERATE THE VACUUM PUMP WHEN NOT INSTALLED

- Unguarded openings can entangle clothing and severe injury can result
- Unrestricted air flow into Vacuum Pump can cause the motor to overload

To ensure maximum safety, a vacuum proving switch is mounted near the inlet of the vacuum pump and electrically interlocked to the burner power circuit. No fuel gas can flow or ignition begin before the vacuum proving switch has established the presence of a blower induced vacuum.

See the "Electrical Connections" section for details on wiring the switch.

Installation of the Vacuum Pump and Venting has been divided into 3 main parts as follows:

- **Vacuum Pump Mounting**
- **Venting Connections**
- **Additional Pump Connections & Equipment**

◊ Vacuum Pump Mounting

1. Install Vacuum Pump as per designed system mounting location and position.
2. Ensure that mounting supports are sufficient to withstand the weight and vibration of the Vacuum Pump and Ventilation System. Welded link chain with a working load limit of at least 200 lbs. (91 kg) is recommended for mounting vacuum pumps only.
3. Install using the Vacuum Pump Mounting Kit if purchased. (Chain & threaded rods for ceiling mounting are NOT included in package.)
4. Ensure elevation of Inlet will allow for the alignment of the Tubing with a downward slope of ¼ in. per 10 ft (7 mm per 3 m) towards the Vacuum Pump.
5. Ensure that the isolators are placed between the Pump housing and the mounting supports to reduce vibration transfer to the structure.

See Figure 28 Figure 29 or Figure 30 respectively for mounting type details

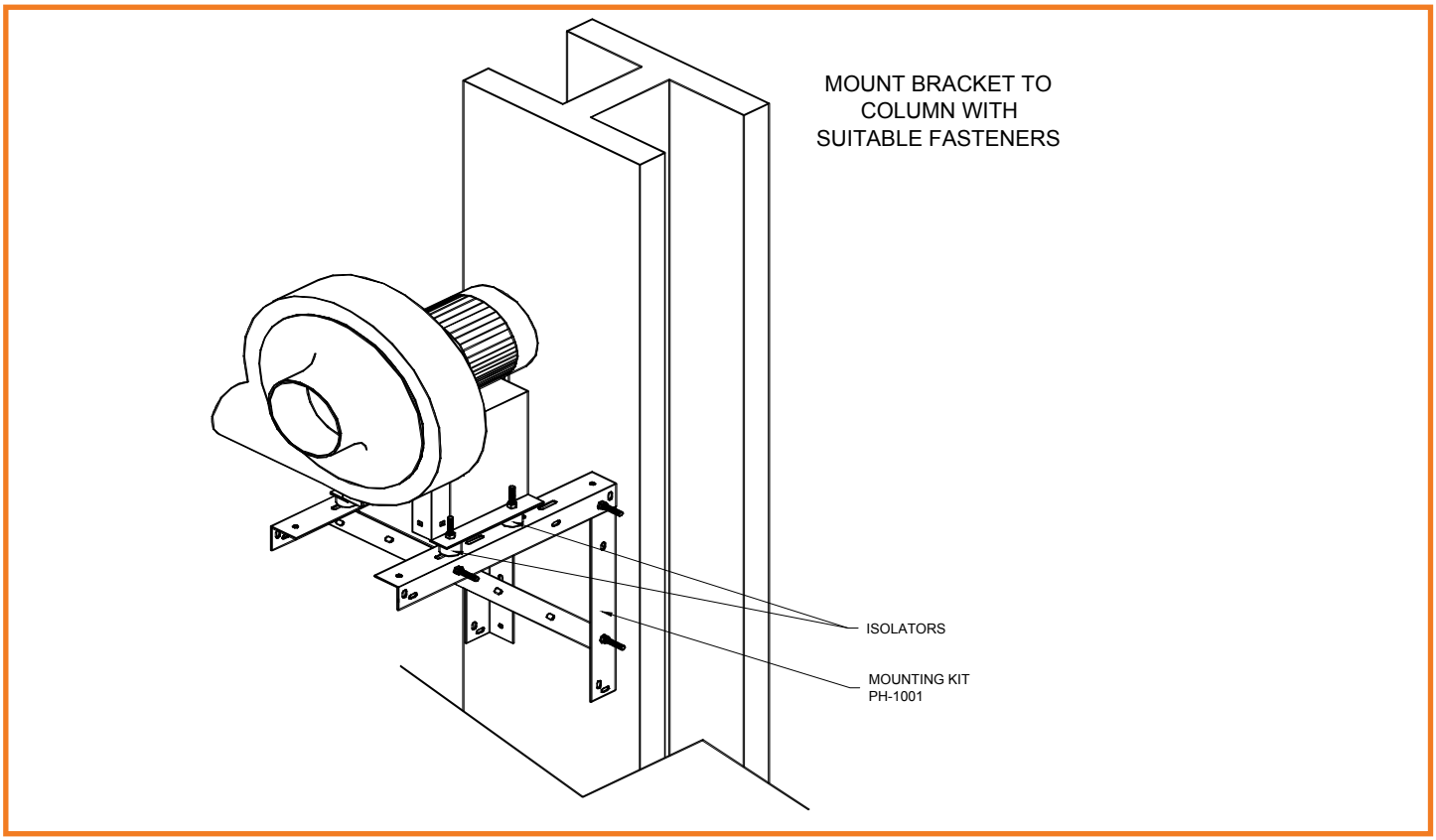


Figure 28: Column Mounting – Recommended Pump Suspension

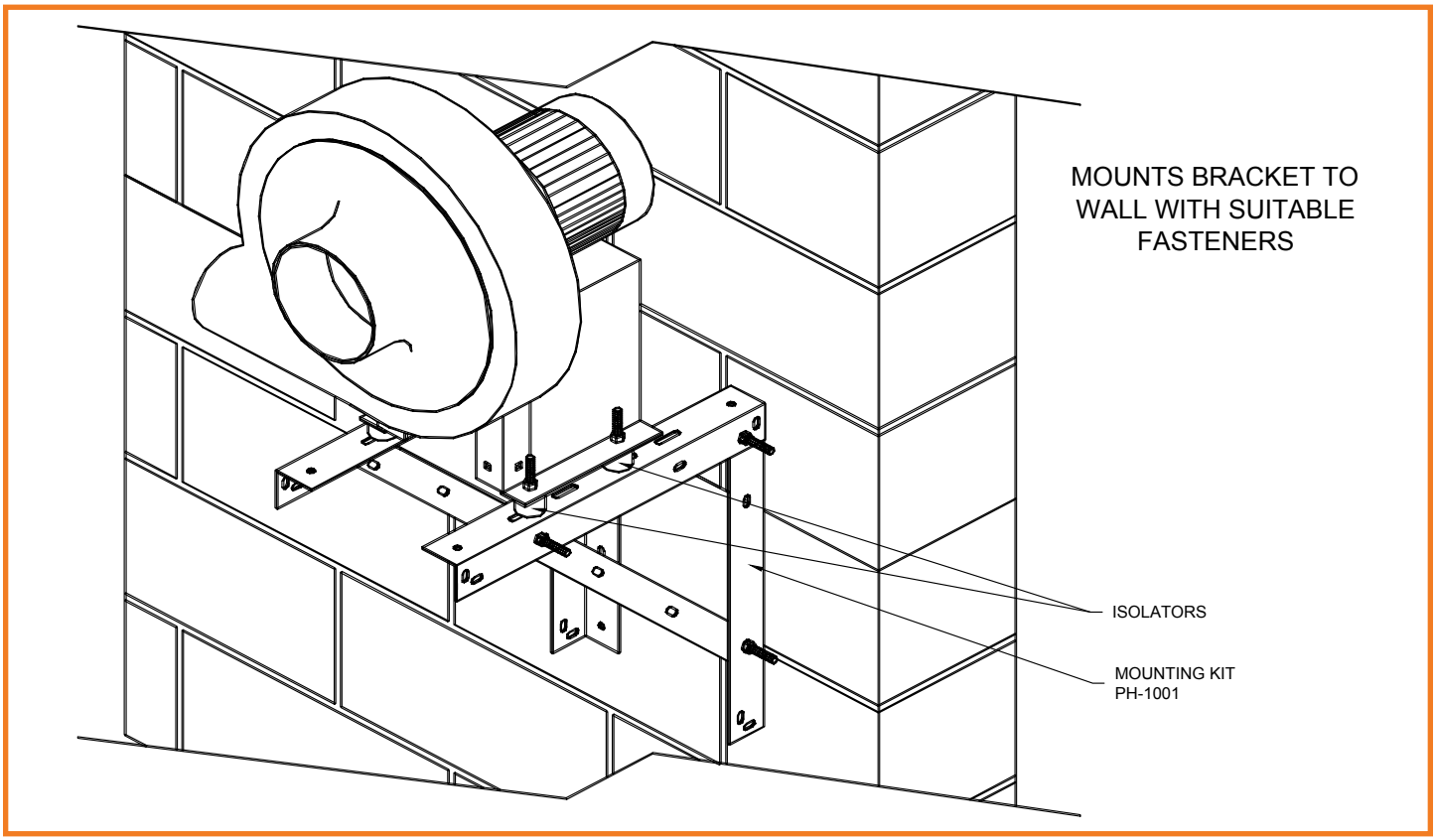


Figure 29: Side Wall Mounting - Recommended Pump Suspension

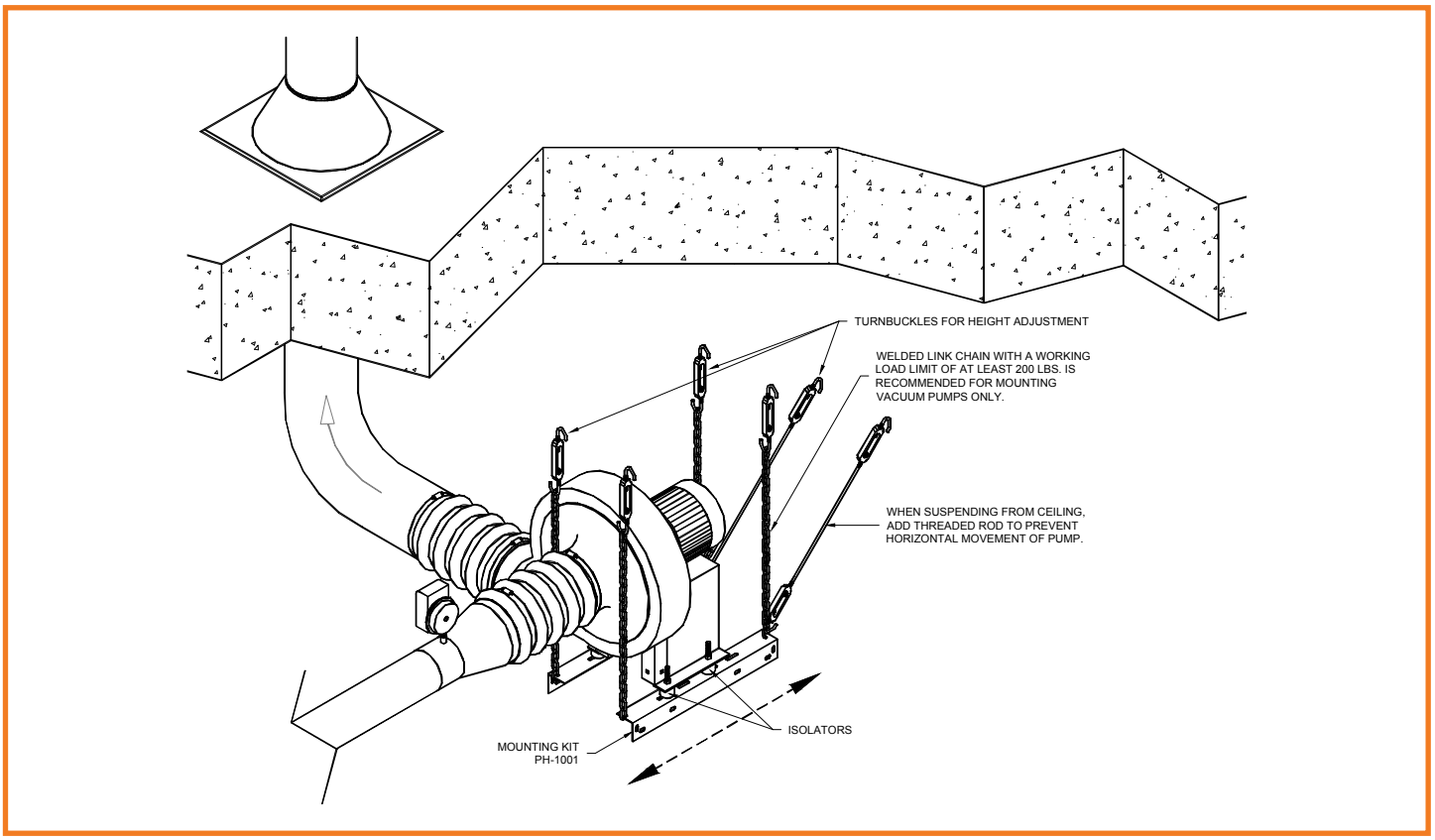


Figure 30: Ceiling Mount - Recommended Pump Suspension

Venting General Requirements

The SIRIUS SLV Range is approved for both Sidewall (Horizontal) and Roof (Vertical) Venting.

(Refer to Figure 31 and Figure 32)

Venting must comply with the *National Fuel Gas Code*, ANSI Z223.1/ NFPA-54 in the USA and CAN/CGA B149.1/ B149.2 Installation Code in Canada.

Note: ANSI Z223.1 specifies a minimum 4 ft (1.22 m) horizontal vent terminal clearance from gas and electric meters, regulators and relief equipment (see clause ¹⁄₃₁/3-m4).

ITEMS COMMON TO BOTH CODES

(Always check for changes to Code – list is for example only)

- **Horizontal discharge must be not less than a specified distance above grade**
- **Vent must not terminate within a specified distance below, horizontally from, or above any window, door or gravity opening to a building.**
- **Discharge must be at least a specified distance from any opening through which vent gases can enter a building.**
- **Venting must terminate beyond any combustible overhead and at a height sufficient to prevent blockage by snow.**
- **Venting through a combustible wall requires an approved thimble.**
- **Vent should extend beyond wall surfaces to avoid splash-back condensation.**
- **Corrosion resistant materials should be employed for venting.**

Venting General Installation Notes

- Never connect venting to a chimney flue serving a separate solid-fuel burning appliance.
- Rigid, spiral wrap, corrosion resistant ducting is recommended to facilitate leak-proofing the system. Venting runs over 25 ft (7.6 m) in length may need to be insulated.
- Always install venting with a down-slope of at least ¼ in. per 10 ft (7 mm per 3 m) towards the Vacuum Pump location.
- Ensure that ducting is well suspended to avoid low spots where condensate can gather.
- Seal ALL joints using higher temperature Silicone Sealant. (RTV Silicone)

INSTALLATION

Venting System Requirements

HORIZONTAL VENTING REQUIREMENTS

Material: Minimum 24 gauge, GALV, single wall pipe
Size: 4 in. or 6 in. Diameter as per Vacuum Pump Outlet
Sealant: RTV Silicone
Fasteners: Minimum of Two (2) sheet metal screws #8 x ¾ in. per joint.

F100NA		F200NA & F300NA		VENT LENGTH ft (m)	
VENT DIAMETER	# OF ELBOWS	VENT DIAMETER	# OF ELBOWS	MAXIMUM	MINIMUM
4"	Up to 3	6"	Up to 2	10 (3.0)	2 (0.6)
6"	Up to 3	6"	Up to 2	50 (7.7)	2 (0.6)

Table 6: Size Conditions for Horizontal Exhaust Venting

For specific part numbers of wall vent connection pieces see Figure the listing in the PARTS section of this manual.

VERTICAL VENTING REQUIREMENTS

For Vertical Venting refer to ANSI Z223.1 and CAN/CGA B149.1 for Fan Assisted Appliances.

◊ Venting Connections

1. Install Ventilation system pipes, etc. as per design / conformance with required Codes and connect with Vacuum Pump Outlet. Ensure that there is a minimum of 2 in. (5 cm) between the Vacuum Pump outlet and the first rigid section of the Ventilation piping to avoid mechanical contact between the two. Use the Silicone Connector Boot to connect the Vent Pipe to the Vacuum Pump Outlet. Refer to Figure 31 or Figure 32 respectively for mounting type details.

)

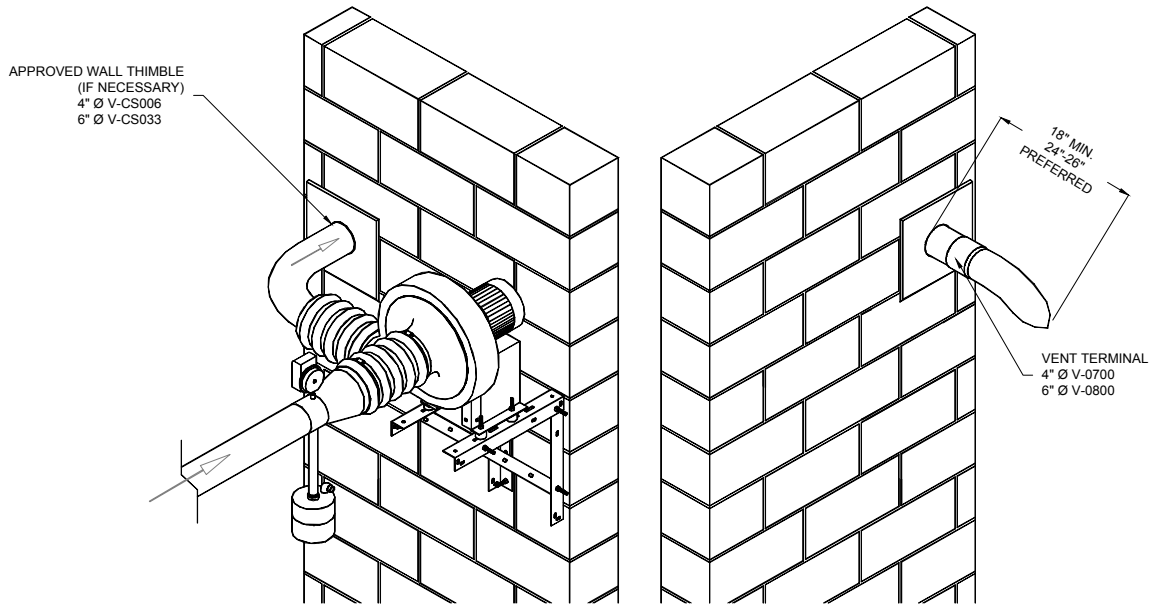


Figure 31: Side Wall Mounting - Recommended Venting (Horizontal)

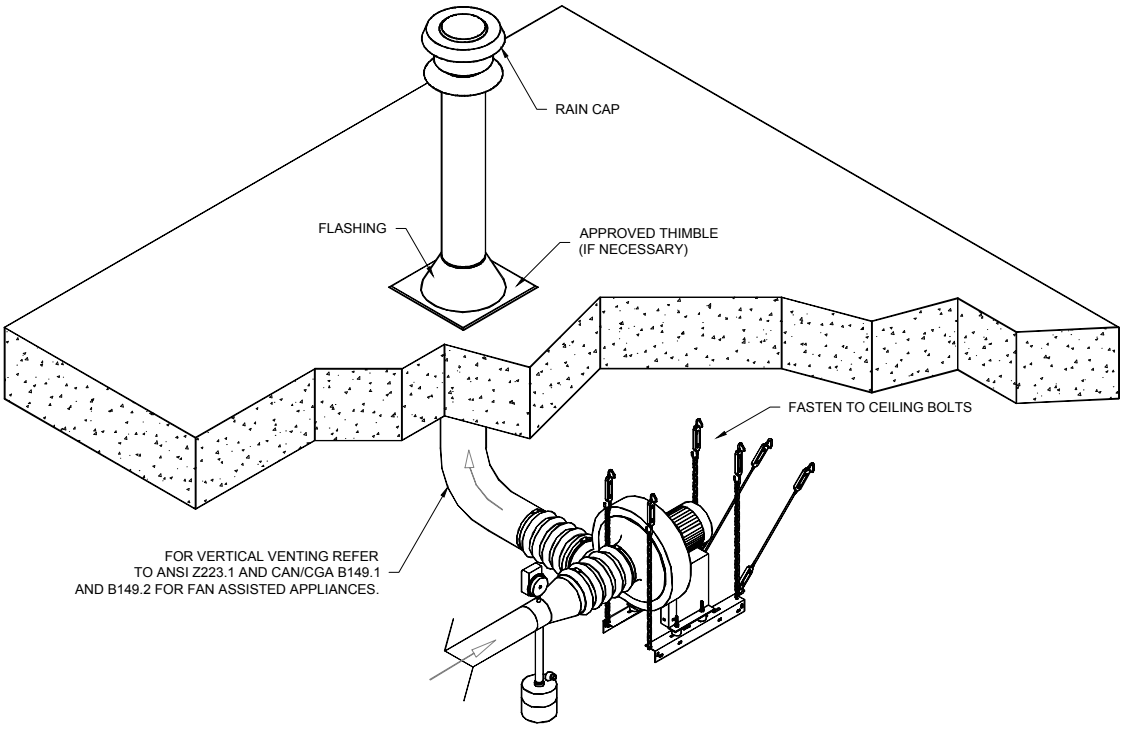


Figure 32: Ceiling Mounting - Recommended Venting (Vertical)

INSTALLATION

◊ Additional Pump Connections & Equipment

1. Connect the Reducer to the end of the Common Tailpipe using a 4 in. Butt Joint Clamp. Ensure a minimum of 2 in. (5 cm) clearance between the Reducer and the Pump Inlet.
2. Install the Flexible Boot Connector between the Reducer and Pump Inlet, to reduce vibration and noise transmission, using a gear clamp at either end, as shown in Figure 33.

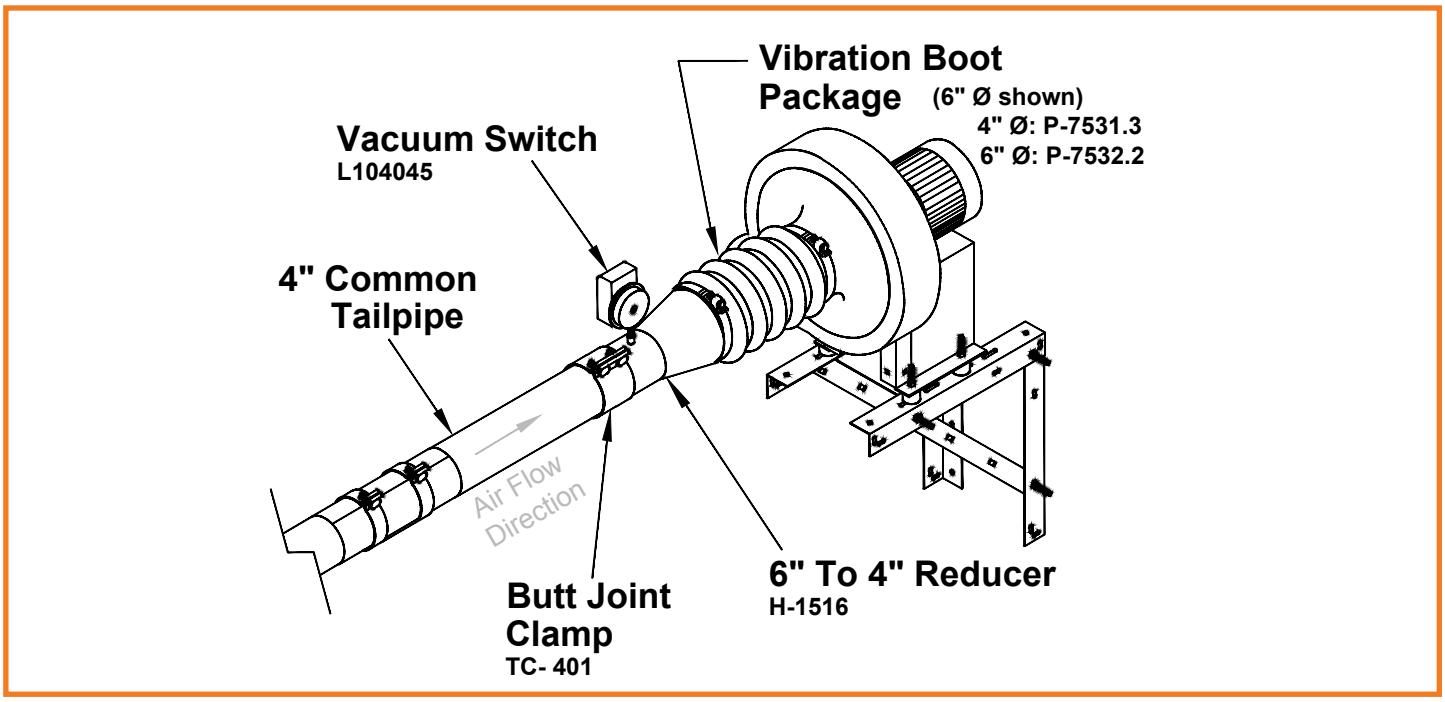


Figure 33: Tailpipe to Vacuum Pump Connections

3. Seal all joints and seams using high temperature Silicone Sealant (RTV Silicone).
4. Where Condensing System designs are specified, a Condensate Drain may be installed as shown in Figure 34. Ensure the connection to the Drain Pipe is flexible to allow for system movement / expansion during operation, and that an appropriate Neutralization Device is installed as required.

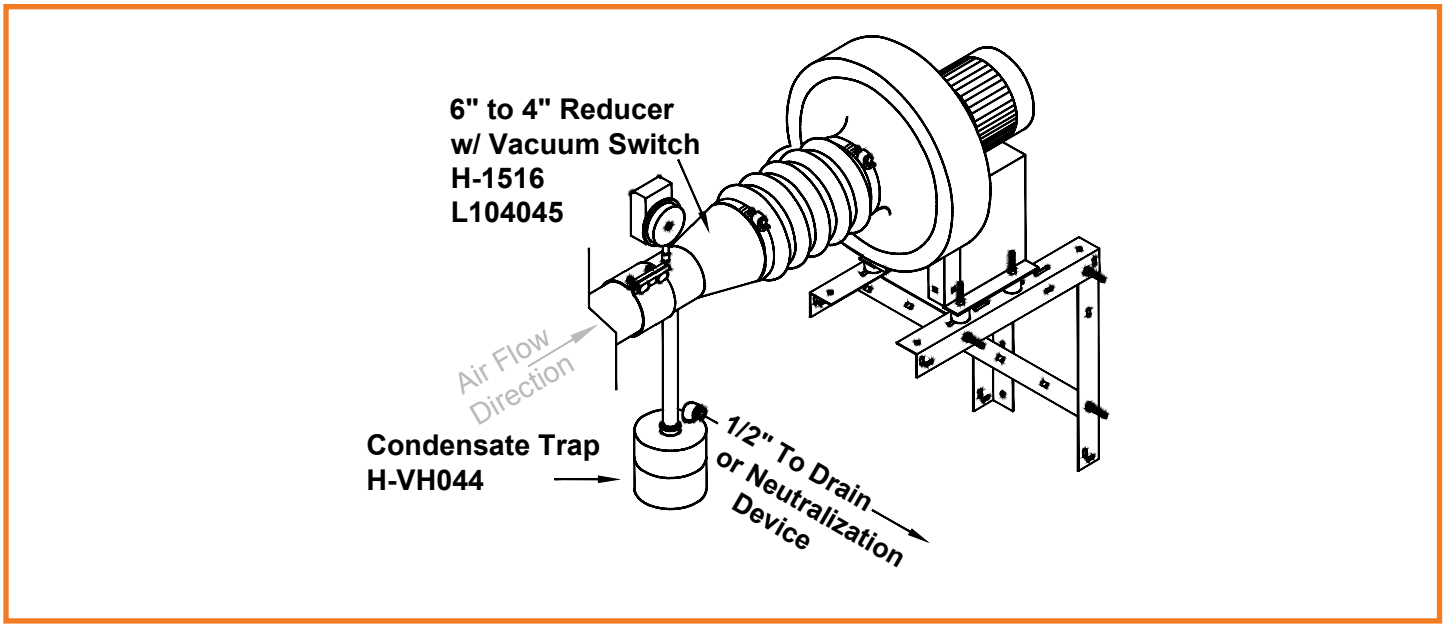


Figure 34: Condensate Drain Detail - Optional

Optional Combustion Air Supply

An air supply at atmospheric pressure of 40 CFM per 100,000 BTU/hr to each Burner and the end of each Radiant Branch (at the End Vent Cap) is usually sufficient.

Under certain circumstances of very dirty or wet environments, or extremely negative building pressure, a Combustion Air Supply System that is connected to the fresh air outside the building may be recommended. The Combustion Air Supply System must be designed with accepted HVAC design methods to ensure adequate supply of air to each Burner and Radiant Branch. This Combustion Air can be supplied using a Blower. Supply at the Burner must be at atmospheric pressure therefore it may be necessary for the Installer to insert Damper Couplings to allow adjustment of pressure just before the connection to each Burner and at the end of each Branch. **The Blower must be electrically interlocked with the Vacuum Pump, details can be found in "Electrical Connections".**

◊ Combustion Air Supply Duct Connections

1. Install Blower if required.
2. Install Combustion Air Supply ductwork and Damper Couplings as required.
3. Each Burner can be fitted with a 4 in. dia. fitting to accept 4 in. dia. Type C-Duct or 4 in. PVC pipe. Provision for thermal expansion of the System must be made when considering Combustion Air Supply Ducting. Ensure that the System movement / expansion does not restrict the supply of fresh air to the Burners or the Radiant Branches. (Refer to Figure 35 for clearance requirements)

As required, connect the Supply Ductwork in the same manner as for the Burner. (Refer to Figure 35 for details), **DO NOT** remove the End Vent Cap from the Radiant Branch to make this connection.

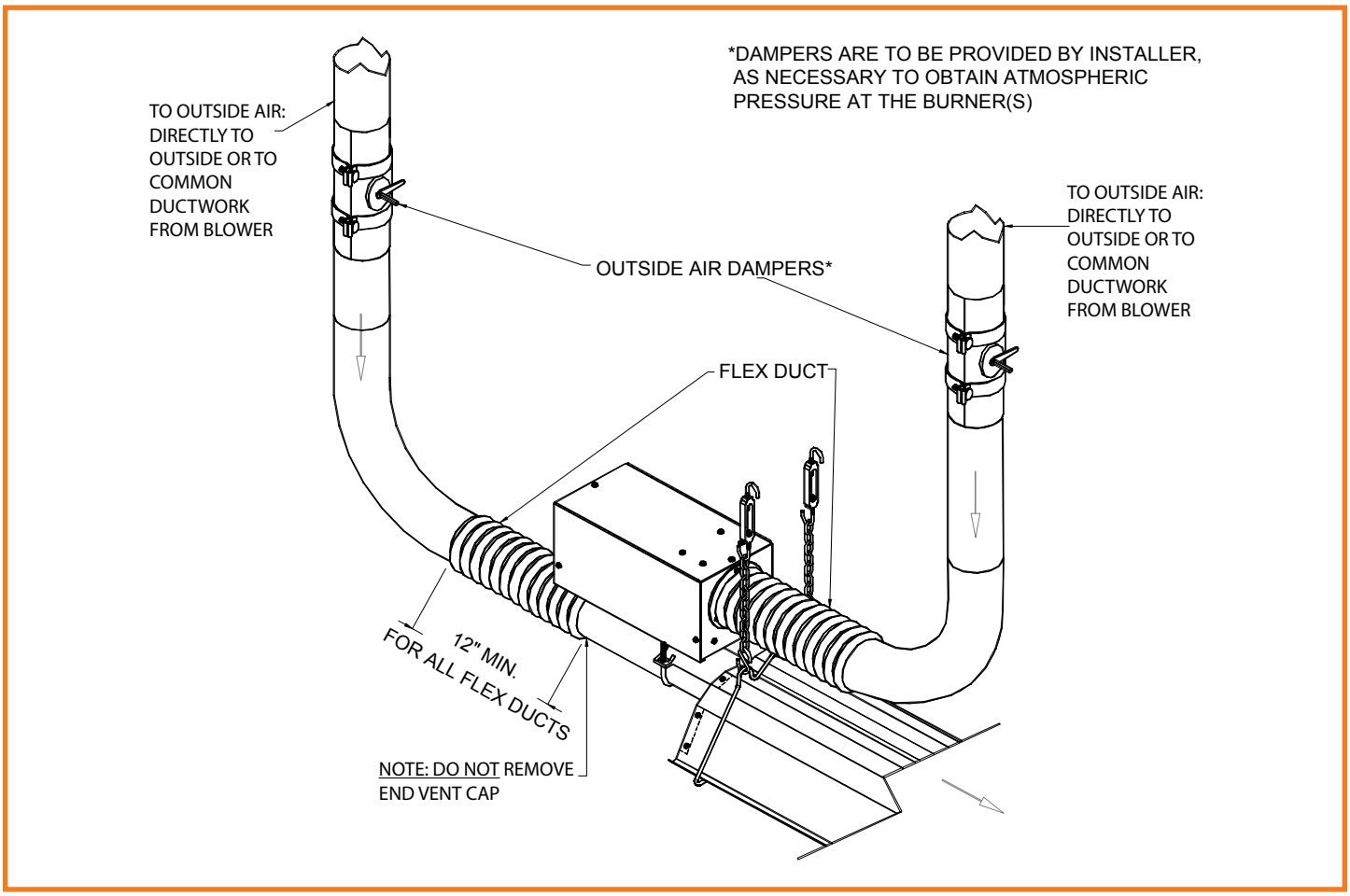


Figure 35: Outside Combustion Air Detail

INSTALLATION

Gas Supply System

General Requirements

SUPPLY LINES

The Gas Supply Meter and the Supply Service must be sufficiently large to supply gas to the total building gas load including the heating equipment. Additionally, the gas distribution piping must be designed according to local and national ordinances. Generally, systems designed with a maximum .5 in. W.C. total pressure drop (low pressure) meet this requirement.

Gas supply pipe sizing must be in accordance with the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the US and CAN/CGA B149.1 and B149.2 Installation Codes in Canada.

A ⅛ in. NPT plugged tap must be installed in the Gas Line connection immediately upstream of the Burner farthest from the Gas Supply Meter to allow checking of system gas pressure.

A Gas Shut-off Valve must be installed parallel to EACH Burner's Gas Inlet connection.

Before connecting Burners to the Gas Supply System, verify that high pressure testing of the Gas System has been completed. Burners must be isolated from any pressure testing in excess of ½ psi (3.5 k Pa). Failure to comply may expose the Burner components to damaging high pressure, requiring replacement of key components.

FLEXIBLE GAS CONNECTOR LINES

Gas Flex Line Connector sizes for Burners with firing rates: (1 MBH = 1 000 BTU/hr)

- Below 150 MBH, requires ½ in. diameter x 36 in. (90 cm) long
- At 150 MBH or higher, requires ¾ in. diameter x 36 in. (90 cm) long

In the United States: The Flexible Metallic Connector Hose must be certified for use on a Radiant Tube type Infrared Heater per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10.

In Canada: Only use Type I Hose Connector that is (a) certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1; and (b) of a length of 36in. ± 6in. (90 ± 15 cm).

Failure to install the Gas Connection in the approved manner will result in a hazardous and potentially deadly situation due to the movement of the Heat Exchanger System and the Burners in the normal course of operation.

Gas Flex Line Connector must be ½ in. or ¾ in. diameter x 36 in. (90 cm) long

Installation or repair of this heater should only be done by personnel qualified for the installation of gas powered appliances.

(Certified by the local or national regulating body)

◊ Flexible Gas Connector Line

A Flexible Gas Connector of approved type & size must be installed as shown in Figure 36 and Figure 37, in one plane, and without sharp bends, kinks or twists. A smooth loop of approximately 12 in. (30 cm) in diameter is best. Refer to Figure 36 for examples of correct and incorrect positioning.

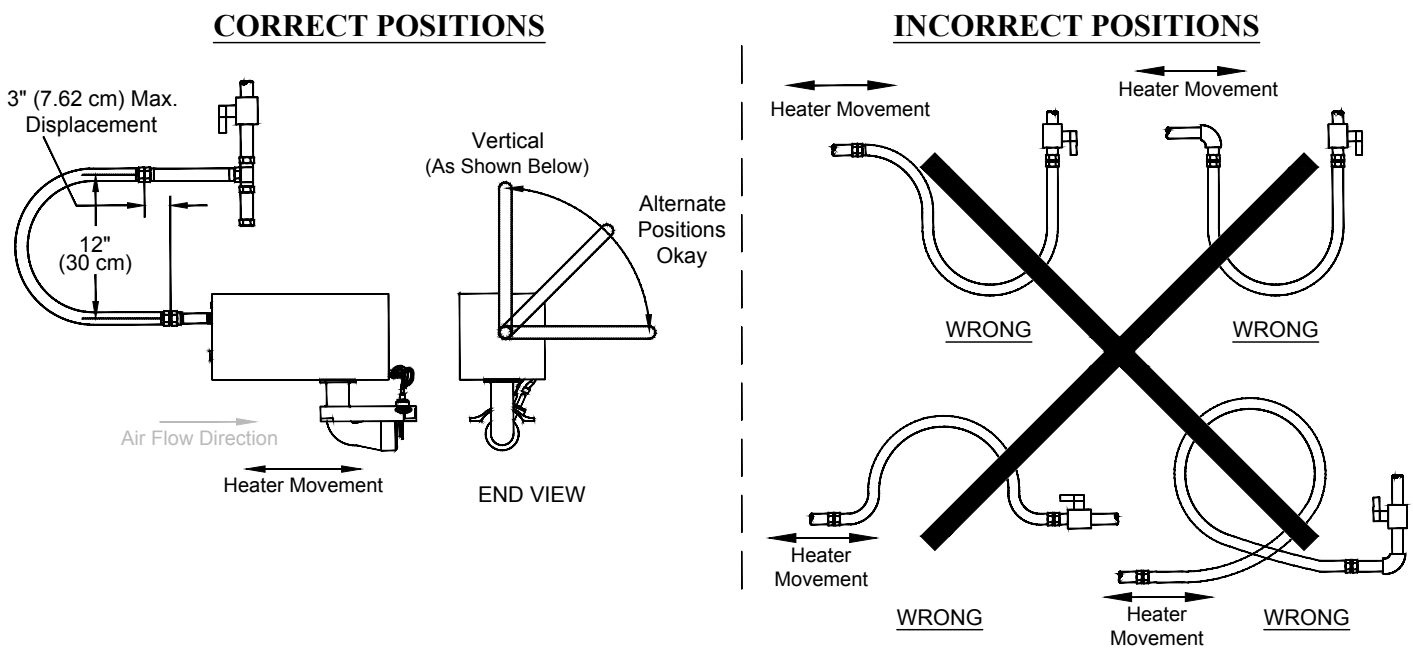
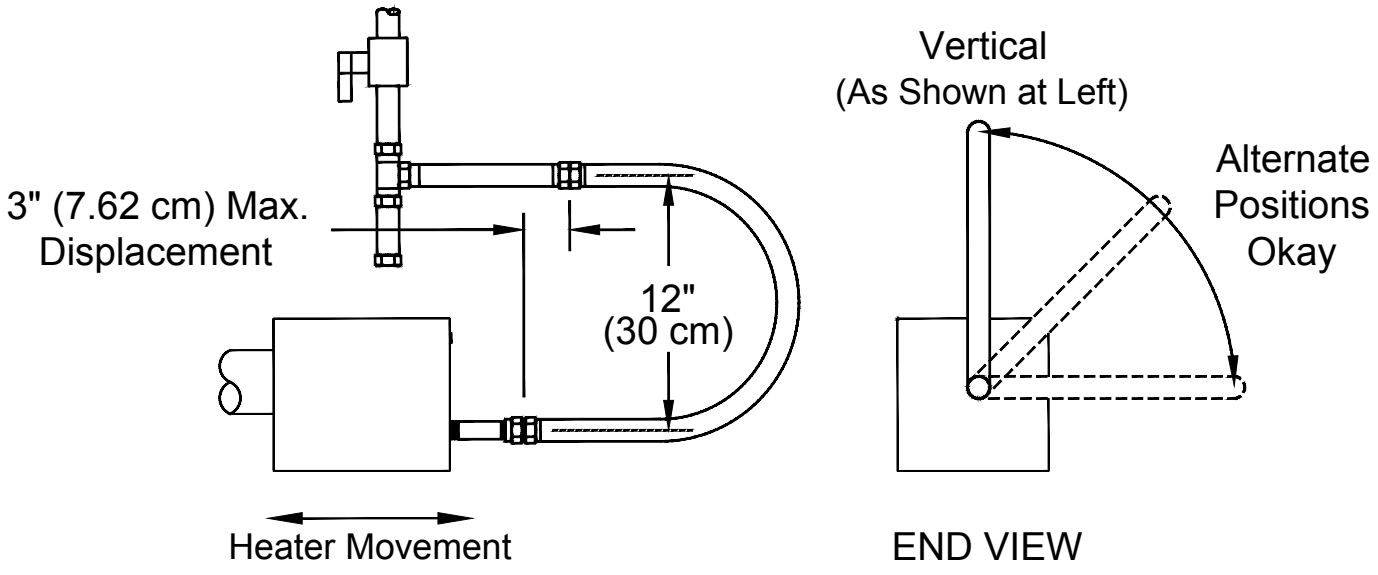


Figure 36: Connector Installation Details



WARNING: CONNECTOR MUST BE INSTALLED IN "⊃" CONFIGURATION. USE ONLY THE 36" (90 cm) LONG CONNECTION OF ½" OR ¾" (12.7 OR 19 mm) NOMINAL ID THAT WAS FURNISHED WITH THIS HEATER.

Figure 37: Installation Position Instructions

INSTALLATION

Electrical Connections

General Requirements

If electronic components are to be installed in an area that is subject to water (drips, spray, rain etc.) then sufficient means shall be provided by the Installer to protect the components from water ingress.

Ensure that all Electricity to the Supply locations involved has been 'disconnected' and 'locked out' as per local and national safety requirements before proceeding with any part of the Electrical installation.

GENERAL WIRING

All field wiring and connections must be in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

All heaters must be connected and electrically grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the US, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements.

THERMOSTATS

Preference is to have each Branch as a separate Heating Zone with a separate Thermostat for better control of heat levels and fuel usage.

Thermostats must be located/ mounted within the operating heat envelope of the Radiant Line Branch being controlled. Thermostats must be protected / shielded from direct 'line of sight" with the Radiant Tubing & Reflectors.

CONTROL METHODS & DEVICES*

Single Thermostat: Entire system operates as one Heating Zone, ON or OFF using **one Relay** to control the Vacuum Pump, Vacuum Switch and Burner Power.

Multiple Thermostats: System Branches operate as multiple individual Heating Zones which can be separately controlled ON or OFF. Burners are controlled ON / OFF by the Thermostat they are wired / connected to using one of the following control devices:

- **Relays (Two)** - *2 Thermostats* - Hardwired control of Vacuum Pump & Burner Power depending on individual Thermostat status change.
- **Premier Control Panel** - *up to 4 Thermostats* - Local Panel control of Burner Power & Vacuum Pump with options for response to Thermostat status change.

***Refer to their respective OEM Manual when electrically wiring ALL Control Devices**

Installation of the Electrical Connections has been divided into 3 main parts as follows:

- **Burners**
- **Fresh Air Blower Interlock**
- **System Wiring Connections**

◊ Burners

Maximum current draw is 0.2 A per burner. Burners internally operate on 24 VAC with a 120 VAC 60 Hz Power Cord and transformer provided. The Power Cord uses a standard single phase North American three-pronged plug (grounded) that is 3 ft. (90 cm) long and extends from the back of the Burner. Burner wiring between the transformer, gas valve, transformer etc. has been completed by the manufacturer as shown in the Wiring label located on the Burner service door. (The Wiring label can also be found on page 7 of this manual).

Any repair / replacement of the manufacturer's wiring must have a minimum temperature rating of at least 105°C and supply circuit wiring shall have a minimum size of 18 AWG.

◊ Fresh Air Blower Interlock

If a Blower is installed to achieve the 40 CFM per 100,000 BTU/hr of Fresh (Combustion) Air Supply requirement then an 'interlock' connection must be made between the Blower and Vacuum Switch (and therefore the Vacuum Pump).

Mount the Vacuum Switch and make the connections to the Blower as required. (See Figure 38 below for details)

Ensure that field wiring maintains the required clearances when being routed near equipment.

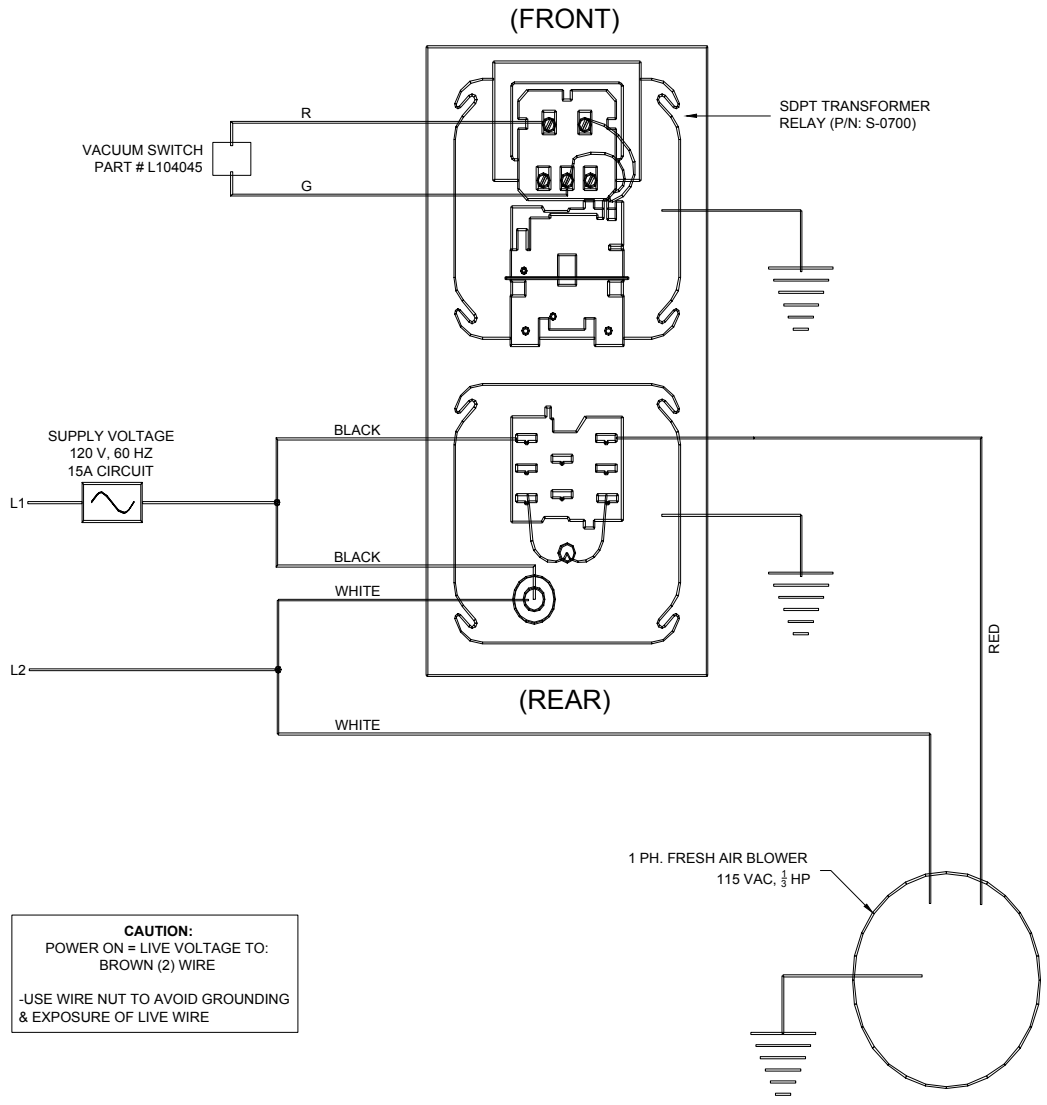


Figure 38: Fresh Air Blower Connection Diagram

INSTALLATION

◊ System Wiring Connections

1. Ensure that field wiring maintains the required clearances when being routed near equipment
2. Mount ALL Electrical components as required by Code(s) and system layout / plan.

   Reminder: Ensure that all Electricity to the supply locations involved has been 'disconnected' and 'locked out' as per local and national safety requirements before proceeding with any part of the electrical installation.
3. Mount the Electrical Power Outlets (120 VAC, 60 Hz, 0.2 A) for each Burner. Outlets are required to be within reach of the Burner Power Cord while maintaining the minimum clearances around the equipment.
4. Mount the Thermostat(s) as per plan & as described beginning on Page 46. Wire the Thermostats into the system Control Panel. Sample Control Panel diagrams are shown in the following pages.
5. Wire the Electrical Power Outlets to the Relay(s) / Control Panel according to the device OEM Manual: as required for the Heating Zone system Plan/Layout.
6. Mount / position the Vacuum Switch onto the Radiant System as shown in Figure 33. Connect the Vacuum Switch to the Vacuum Pump and the Relay(s) / Control Panel as shown in the sample control panel diagrams on the following pages and according to the device OEM Manual.
7. Connect the Electrical Power Supply to the Relay(s) / Control Panel and all other equipment as shown in the sample Control Panel diagrams in the following pages and according to the device OEM Manual.
8. Test all connections / wires as necessary.

   DO NOT energize Relay(s) / Control Panel with Electrical Power until it is time to complete the COMMISSIONING of the System.
9. Confirm that the Vacuum Pump's impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse rotation, see instructions on the motor.

WARNING

DO NOT OPERATE THE VACUUM PUMP WHEN NOT INSTALLED

- Unguarded openings can entangle clothing and severe injury can result
- Unrestricted air flow into Vacuum Pump can cause the motor to overload

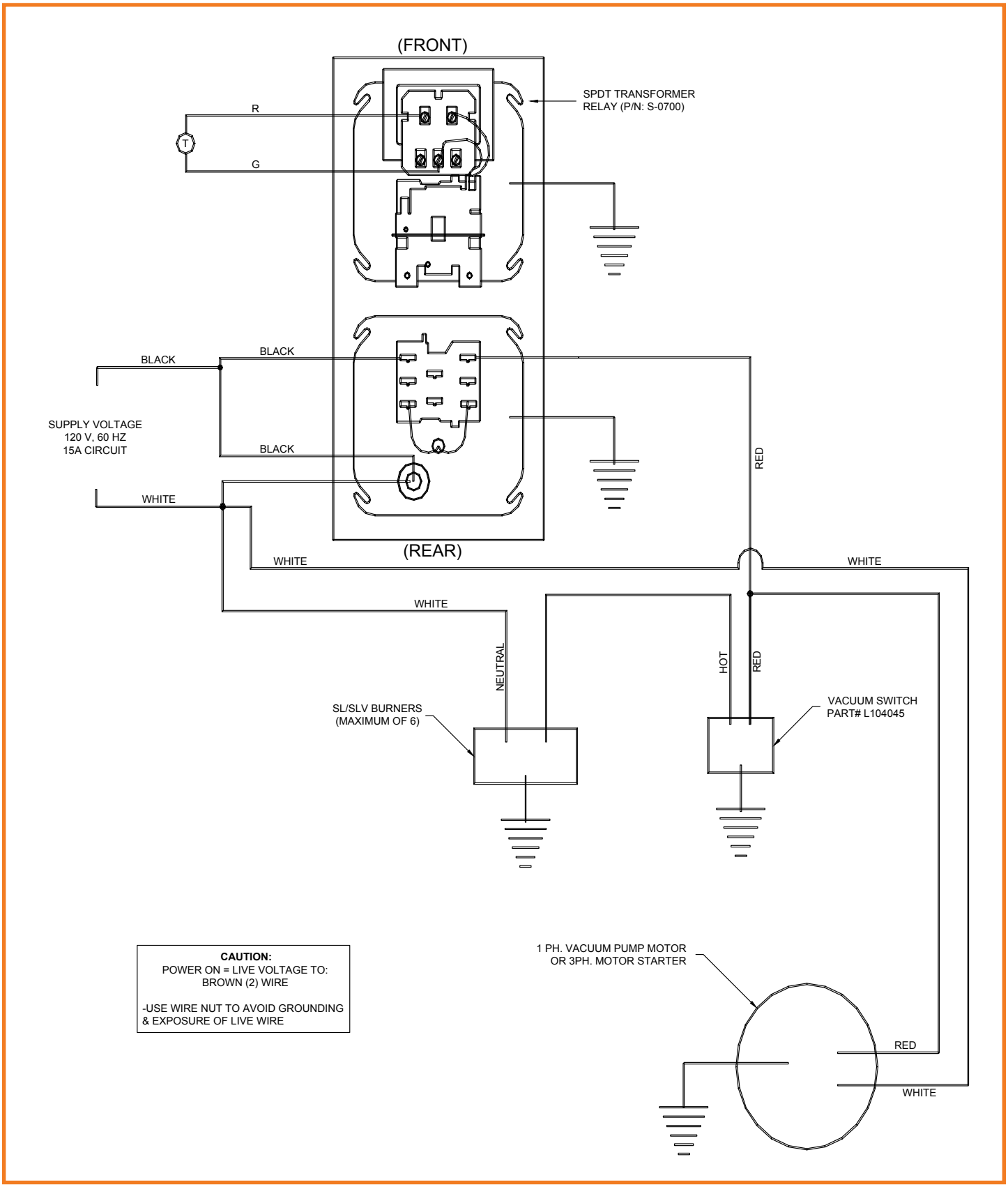


Figure 39: Control Panel Wiring Diagram (Optional) Single Heating Zone, 120VAC Supplied to Burners

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

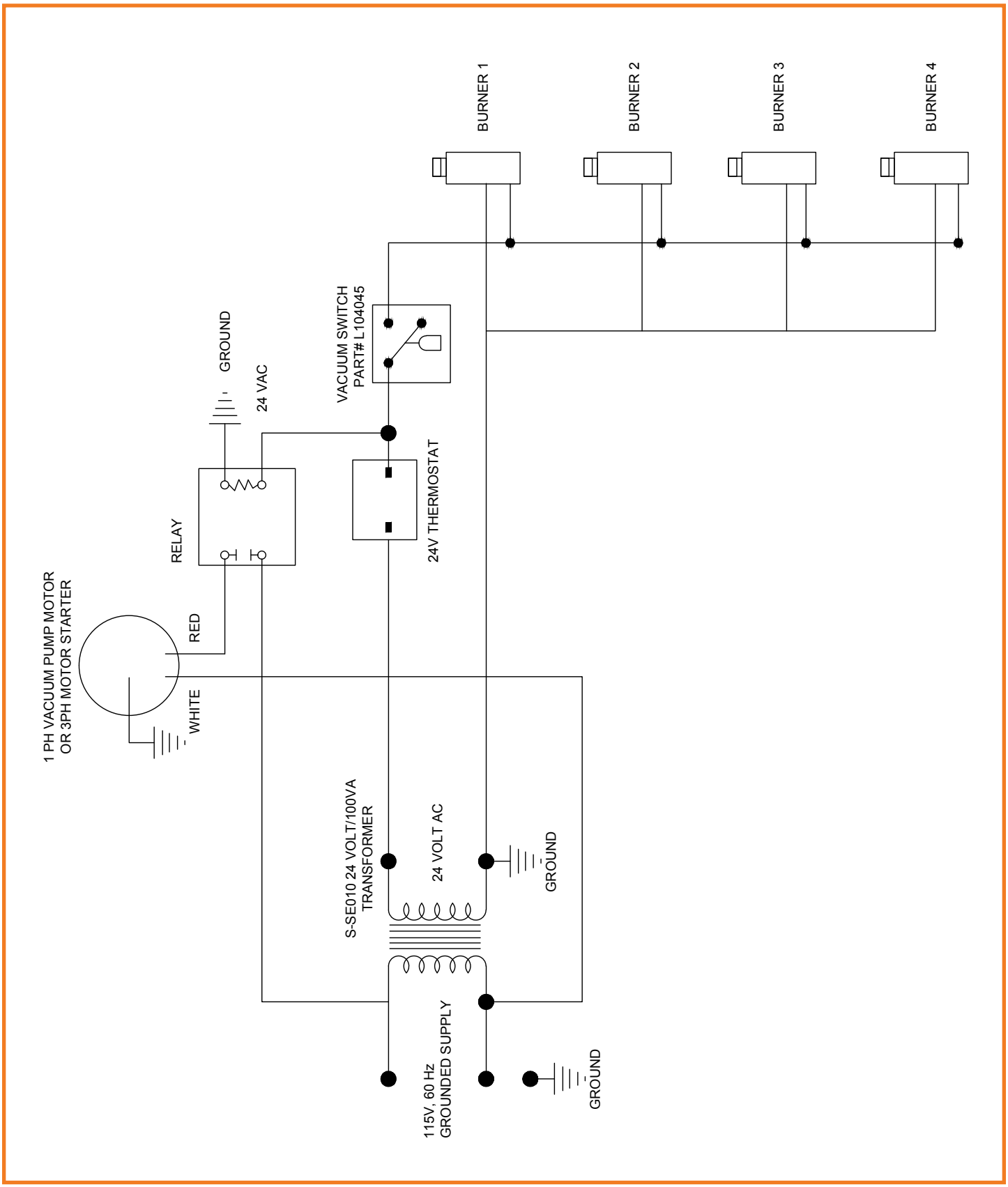


Figure 40: Control Panel Wiring Diagram (Optional) Single Heating Zone, 24VAC Supplied to Burners

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

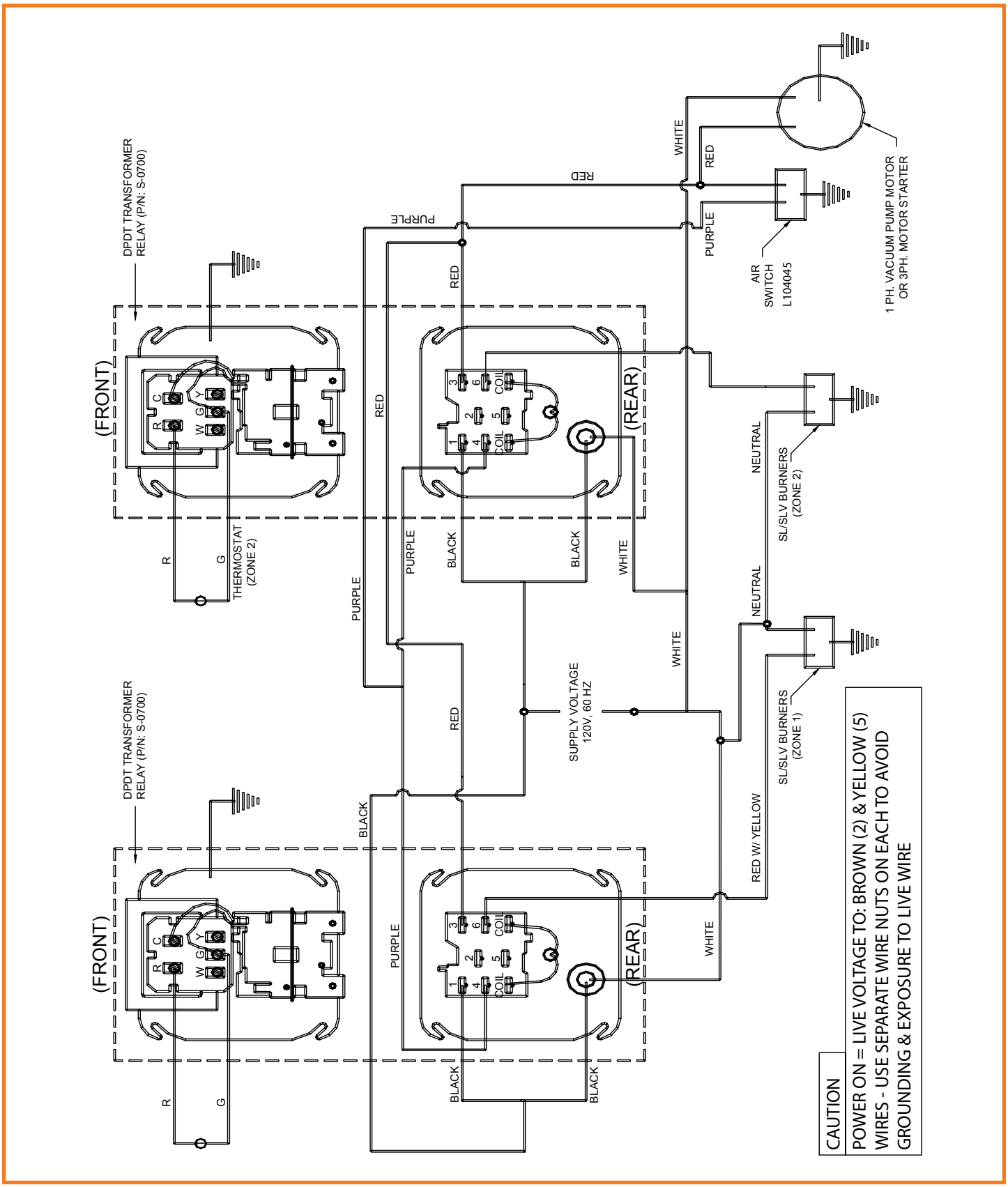


Figure 41: Control Panel Wiring Diagram (Optional) Two Heating Zones, 120VAC Supplied to Burners

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

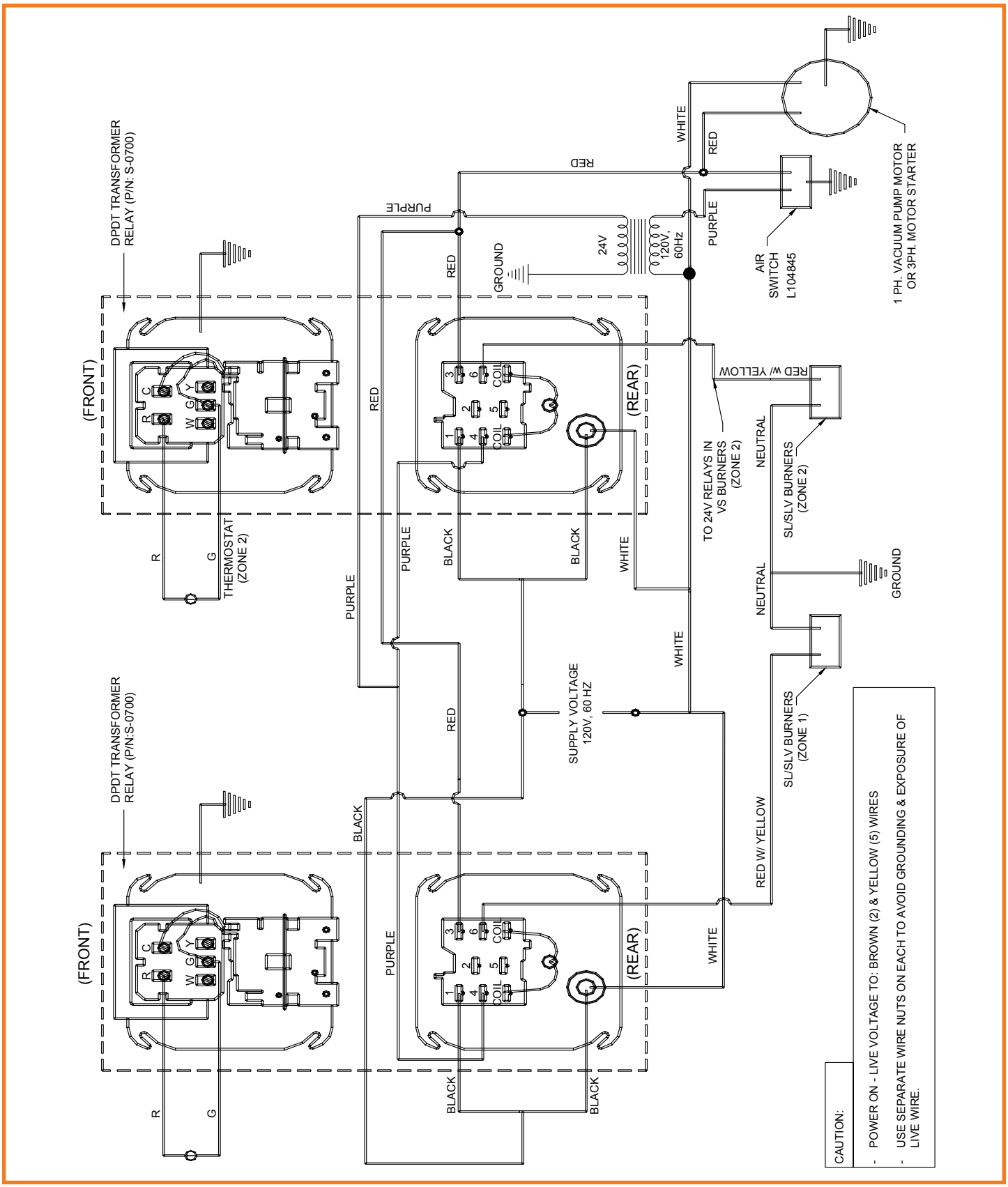


Figure 42: Control Panel Wiring Diagram (Optional) Two Heating Zones, 24VAC Supplied to Burners

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

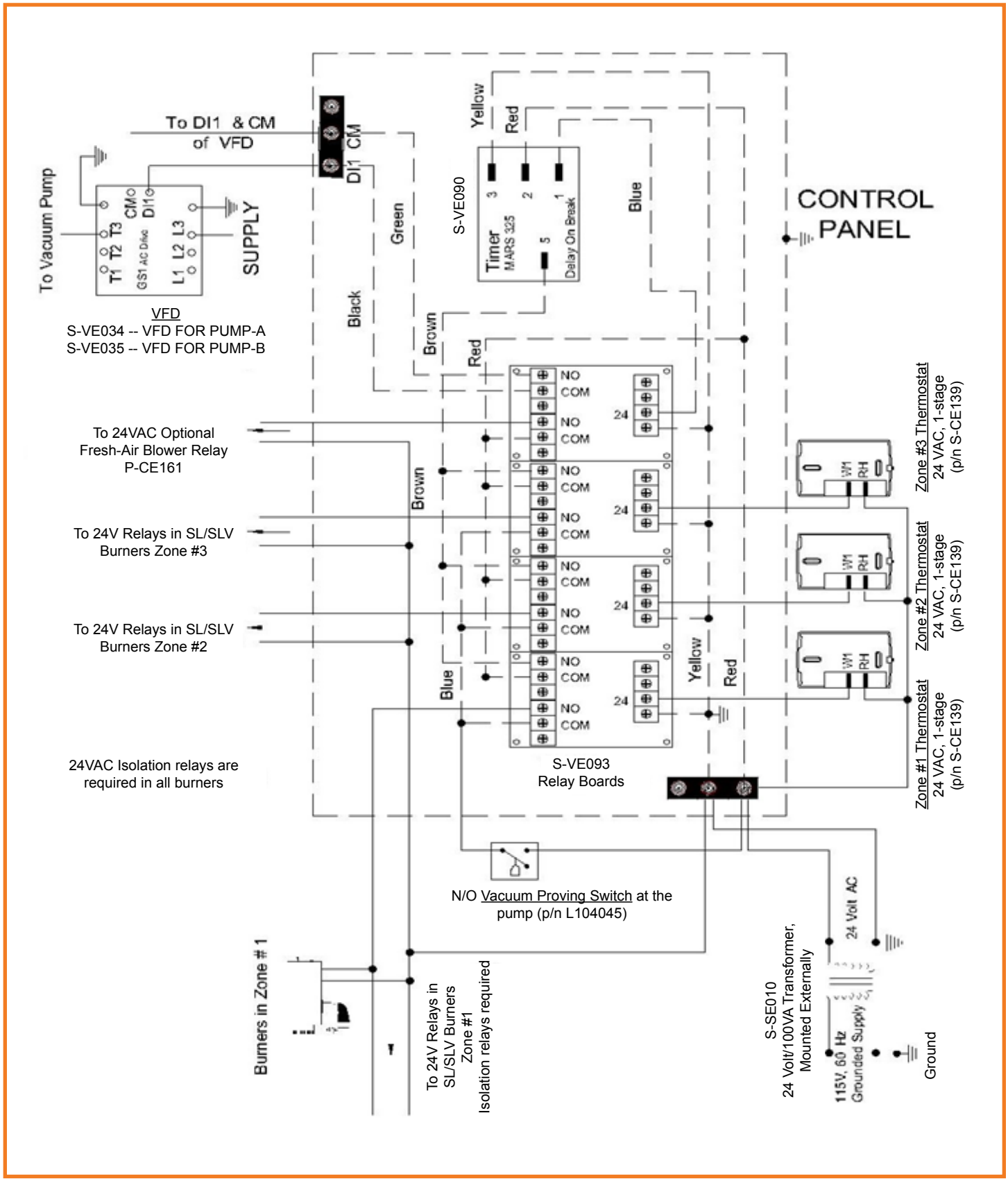


Figure 43: Control Panel Wiring Diagram (Optional) Three Heating Zones, 24VAC Supplied to Burners, Single-Stage Fire Mode Fresh-Air Blower Relay Interlock, VFD for Pump & Post-Purge Timer for Pump

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

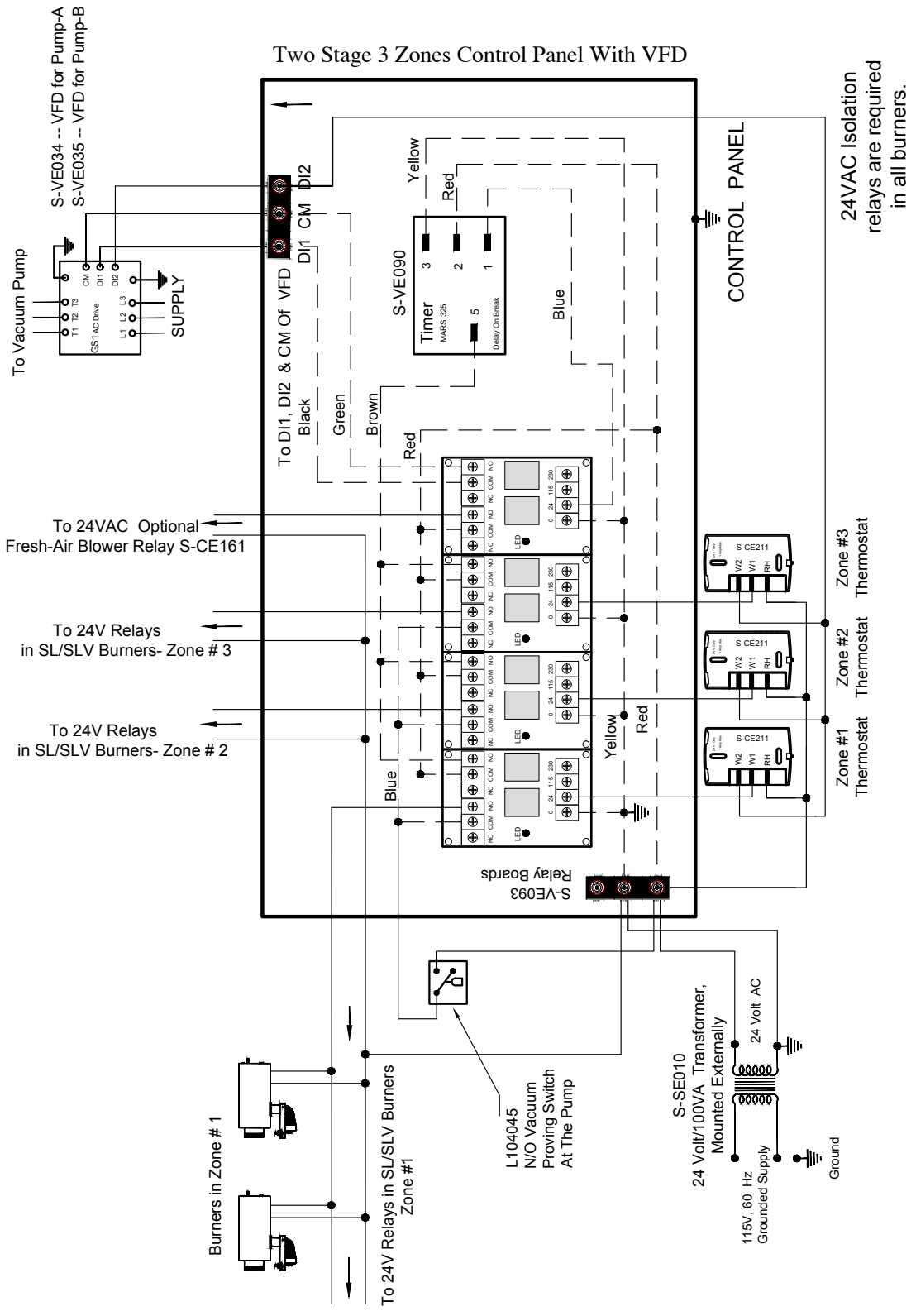


Figure 44: Control Panel Wiring Diagram (Optional) Three Heating Zones, 24VAC Supplied to Burners, Two-Stage Fire Mode Fresh-Air lower Relay Interlock, VFD for Pump & Post-Purge Timer for Pump

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

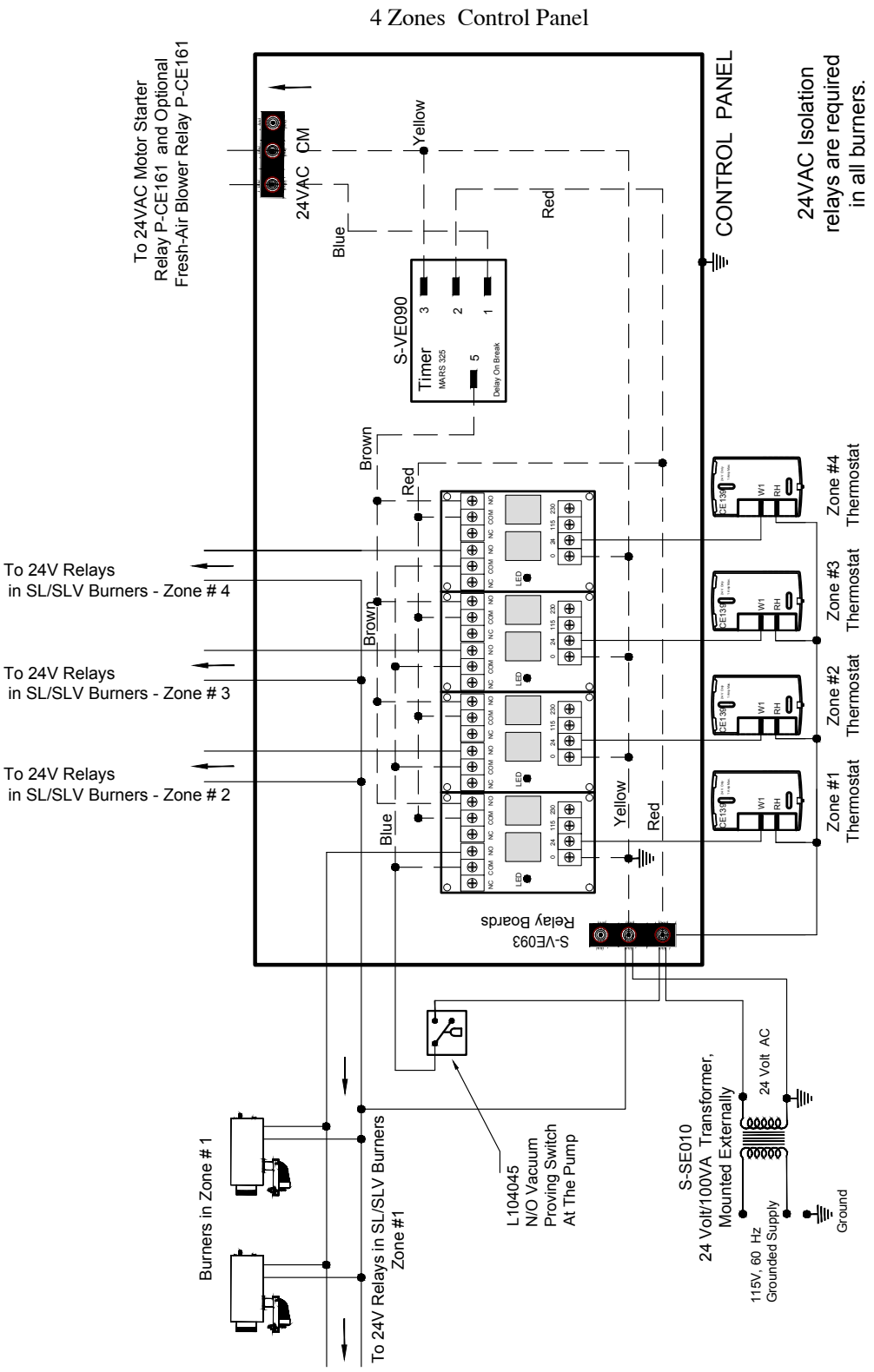


Figure 45: Control Panel Wiring Diagram (4 Zones)

This is ONE possible set-up for the Control Panel, other set-ups are available, see OEM Instructions and / or your Representative for more details.

COMMISSIONING

Installation Checklist

Before proceeding with the start-up of the system, review the list of items below to ensure proper operation.

- ☐ Close all Quick links and turnbuckles to avoid unlocking chain with inadvertent contact
- ☐ Verify that the Burners are correct for the fuel being burned. The rating plate listing this information is located on the Burner housing, check this against your site plans.
- ☐ Burners are position dependent. For proper operation, ensure that the Burner labeled as '*No. 1*' on the housing is located at the end of each Radiant Branch. Subsequent Burners in each Branch must be positioned sequentially.
- ☐ Burners should be mounted with the Burner casting as far back in the Tube opening as possible. Ensure that little or no Tube is in view through the viewing window.
- ☐ Ensure that the End Vent Cap is oriented with the ¼ in. test hole at the 12 o'clock position and that it has been secured to the end of each Branch with a #8 x ⅜ in. screw.
- ☐ If you have both hot rolled Tube (black & shiny) and heat-treated aluminized steel Tube (matte gray), ensure that the heat-treated aluminized Tube is used in the Tailpipe section of the system, and used in the 10ft (3 m) following all Burners with a rating of 150,000 Btu/hr. or higher.
- ☐ Ensure that Tubes are fully inserted in the Couplings and tightened with band clamp hardware at the 10 or 2 o'clock position. Tighten band clamps alternately to prevent buckling of the Coupling sleeve.
- ☐ Ensure that each Branch has a Damper Coupling at the end of the Radiant length, as well as one at the Vacuum Pump. If the system is symmetrical, one Damper along the Common Tailpipe may be used. Single Rate Systems will use standard Manual Dampers while Modulating Rate Systems will use Motorized Dampers.
- ☐ Ensure that Reflectors are properly overlapped and that every second overlap joint is screwed together, as shown in Figure 7. The remaining joints are left loose. This will allow the Reflectors to 'telescope' with the thermal expansion of the System.
- ☐ Visually confirm that the Vacuum Pump's impeller rotates in the same direction indicated by the arrow on the pump scroll. To reverse the rotation, see instructions on the motor.
- ☐ Ensure that EACH Flexible Gas Connector is of sufficient size for the desired Burner rate and is installed in a smooth arc with no kinks. For Burners firing at 150,000 Btu/hr. and higher ¾ in. diameter x 36 in. Gas Flex Connector is required.
- ☐ Purge Gas Lines according to installation codes
- ☐ Verify the Wiring & that the Electrical Power Supply is connected but remains turned OFF.

Refer to Figure 7 for Radiant Line System –Component Relationships

After all actions on the checklist are checked / completed - proceed with start up.

Initial System Power Test

With the individual gas valves to each burner 'Shut off' perform the following:

1. Ensure Gas Supply is turned OFF. (Open main gas valve and ensure that no gas is flowing through the gas meter [dial test].)
2. Verify that lock-up gas pressure is not above 14 in. W.C.
3. Set all thermostats below room temperature and turn ON main power – no part of the System should be energized.
4. Check each Radiant Branch in each Zone in sequence by turning up the appropriate Thermostat. In each case the Vacuum Pump should turn on and after the pre-purge time, the Burners in that Zone should attempt to light.
5. Troubleshoot as necessary to get the System operational. (See the Trouble-Shooting section of this manual for more detailed information & helpful notes.)

Cold Balancing the System Vacuum

NOTE: The SLV burner is a variable rate appliance. Vacuum Pump setting must be accurately adjusted to ensure Burners are operating at the specified design input.

1. Turn ON the Electrical Supply but NOT the Gas Supply (remains turned OFF). You may also disconnect the air switch to allow for system cold balancing. This will let you start the vacuum pump without energizing any burners.
2. Allow the system to run without Burners operating.
3. With a manometer check the vacuum at the End Vent Cap of the longest Branch. (Refer to Figure 2 for manometer positioning details.)
4. Adjust the Damper that is installed in the Tailpipe of the same Branch to obtain the vacuum readings according to Table 5. (In Systems that are "Symmetrical" there will be only one Damper along the Common Tailpipe.) A cold vacuum will always be higher than a hot vacuum, so compensation should be factored in for cold balancing as follows – add 0.40 in. W.C. for each burner in a zone. If your desired end result hot setting is 1.50 in. W.C. and you have two burners in a row in that zone, set your cold vacuum to 1.5 in. + 0.40 in. + 0.40 in. = 2.30 in. W.C. Mark the Damper positions for future reference.
5. Proceed similarly until each individual branch in the system is balanced / adjusted.
6. Shut down the System.

Note: Vacuum Settings apply regardless of the number of Burners being used in the System Branch.

Refer to table 7: Vacuum System Settings for Relative Burner Rates

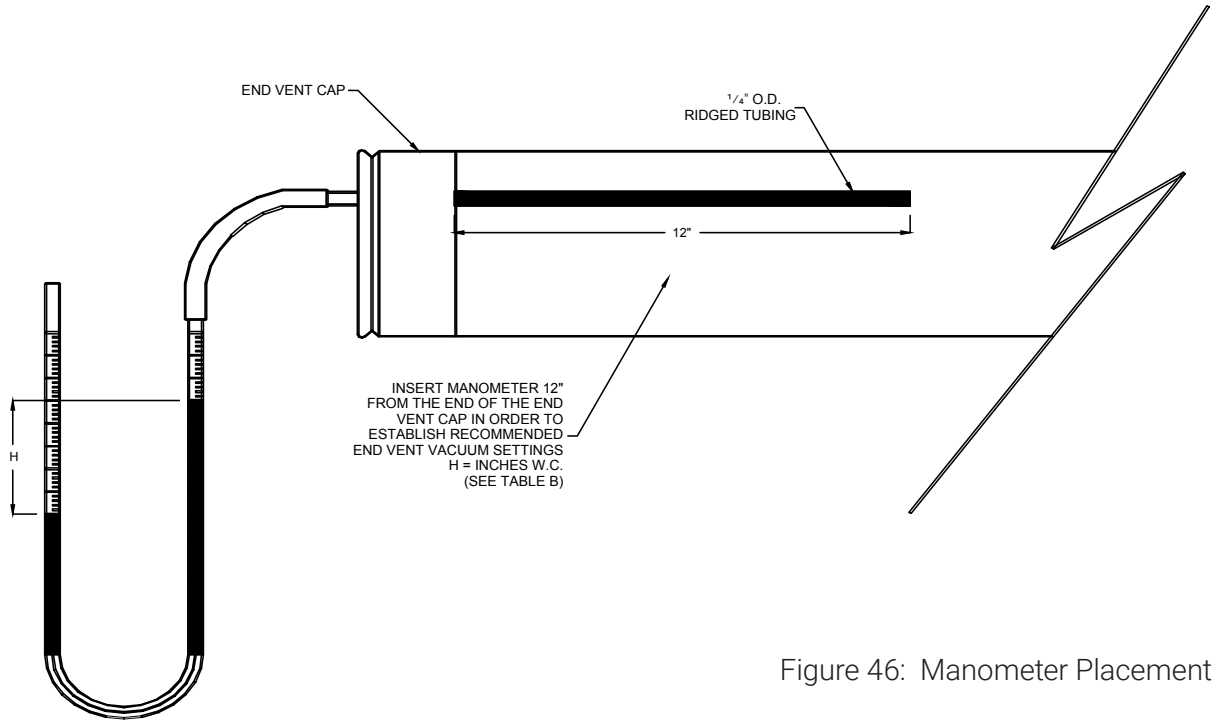


Figure 46: Manometer Placement Diagram

Radiant Branch End Vent Vacuum in. W.C.	Burner Position (Flow Rate) No. 1 Rate btu/hr	Burner Position (Flow Rate) No. 2 Rate btu/hr	Burner Position (Flow Rate) No. 3 Rate btu/hr	Burner Position (Flow Rate) No. 4 Rate btu/hr	Burner Position (Flow Rate) No. 5 Rate btu/hr
0.75	80,000	60,000	60,000	60,000	60,000
1.0	100,000	80,000	80,000	80,000	80,000
1.3	120,000	100,000	100,000	100,000	100,000
1.7	150,000	120,000	120,000	120,000	
2.0	175,000	130,000	130,000		
3.0	200,000	165,000			
3.6	225,000				
4.5	250,000				

Table 7: Vacuum System Settings for Relative Burner Rates

Burner Time Delay Setting

1. Once you have acquired the proper cold start End Vent Vacuum, go to the burner closest to the vacuum pump on that branch.

NOTE: In most applications we would like to see the burner closest to the pump to start up first. If you have a system with only one burner in a branch, all you need to do is set the End Vent Vacuum and plug in the heater. No burner adjustment should be needed.

NOTE: Each module in each burner has 3 dip switches as seen in Figure 46 below.

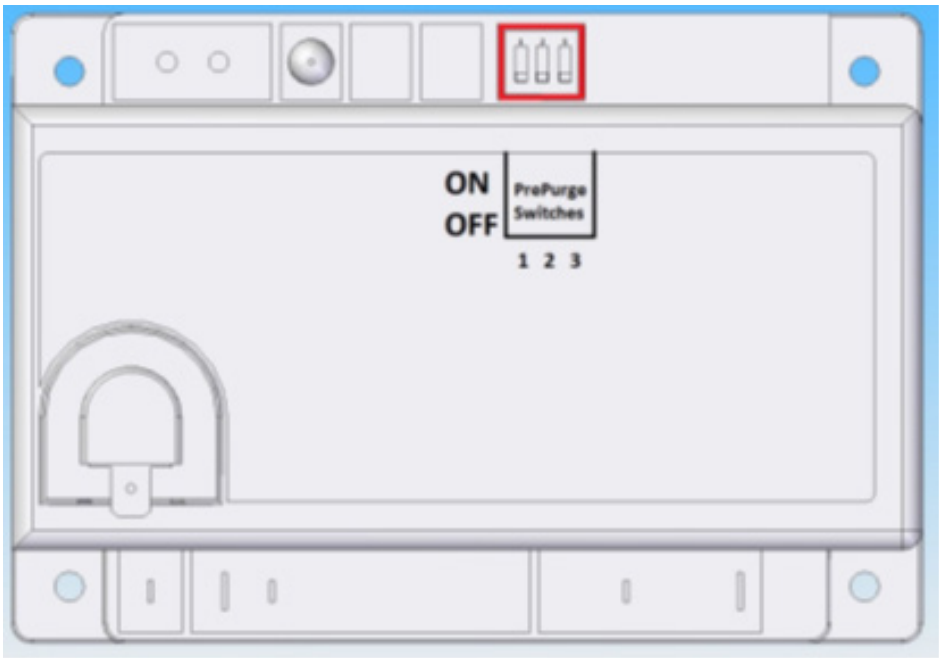


Figure 47: Burner Module showing 3 dip switches:

2. Set the dip switch settings of all burners to ensure at least 60 seconds delay between the consecutive burners. The modules all come set for 30 seconds, so the burner closest to the pump will not need to be changed, (for a 3 burner branch, set Burner #3 for 30 seconds, Burner #2 for 90 seconds, and Burner #1 for 150 seconds). Refer to Table 8 for dip switch settings and timing.

NUMBER OF SECONDS	SWITCH 1	SWITCH 2	SWITCH 3
30	OFF	OFF	OFF
60	OFF	ON	OFF
90	ON	ON	OFF
120	OFF	OFF	ON
150	ON	OFF	ON
180	OFF	ON	ON
240	ON	ON	ON

Table 8: Dip Switch Settings and Timing

COMMISSIONING

Burner Adjustment

1. Now we are ready to start up the burner. Before plugging in the burner, take the cap off the Maxitrol Zero Regulator. Refer to Figure 48 below to locate Zero Regulator.

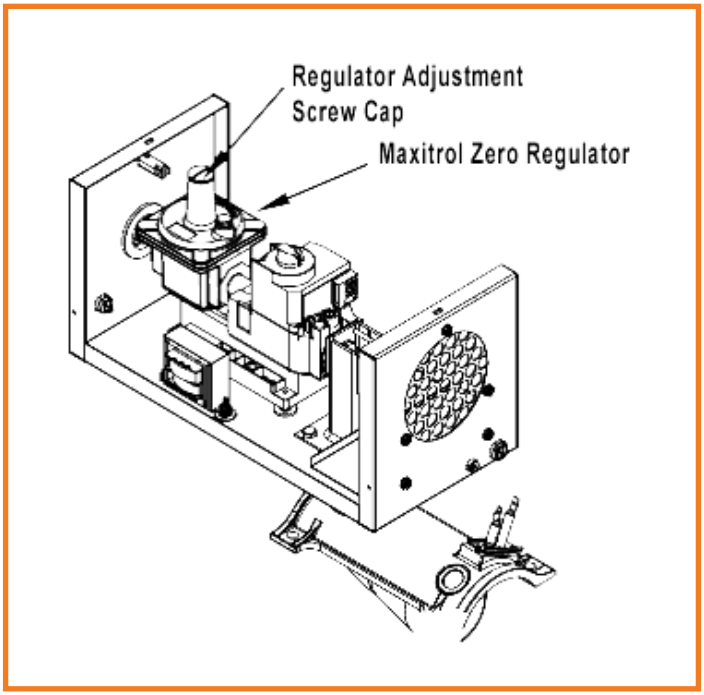


Figure 48: Locate Zero Regulator

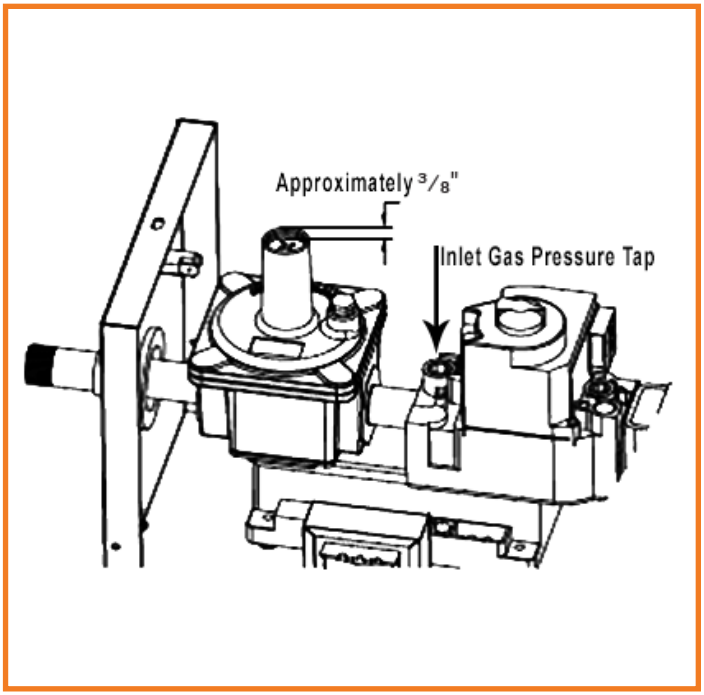


Figure 49: Zero Regulators Factory Set

NOTE: The Maxitrol Zero Regulator takes the incoming gas pressure and reduces it down to zero. The gas valve is set to a specific setting so that it acts mostly just like a gate valve, open and closed. The gas pressure is knocked down to zero, the gas valve opens and the vacuum sucks in the amount of fuel it needs. You never want to adjust the gas valve. We make all fuel adjustments with the Zero Regulator **ONLY.**

NOTE: These burners are at their optimum performance when they are **burning their leanest** (least amount of fuel possible but still lit). When they are running rich they can make high pitch harmonic noises.

2. The zero regulators come factory set as shown above in Figure 49. Make sure the one you are working on has not been tampered or set incorrectly.

3. Make sure the gas supply line has been purged then plug in the burner to the main 115V supply.

NOTE: Once plugged in, the burner will wait the 30 seconds that is set from the dip switch and then try to light. In some conditions the burner will light, some may not light, and some may light intermittently.

4. If your burner will not stay lit or will intermittently light you may need to adjust the Zero Regulator. Refer to Figure 50 and the following sequence.

NOTE: The Honeywell gas valve is screwed into a square mixing chamber as seen in Figure 6. On the opposite side of the mixing chamber our air plate is screwed on.

   a. Take a firm object (cardboard or metal strip) and when it starts to spark, carefully slide the object over the opening slowly reducing the air being drafted in.

   b. When the flame stabilizes keep the opening restricted that amount. If the adjustment screw was at the correct starting position you should not have to restrict a big amount of the opening.

   c. Adjust the Zero Regulator adjustment screw. Clockwise increases the amount of fuel being supplied to the burner and counterclockwise will reduce fuel supply.

   d. Turn the adjustment screw a ¼ - ½ turn clockwise. Wait 2 – 5 seconds to allow the diaphragm in the regulator to adjust. The flame should get stronger.

e. Now slowly slide your object back to allow more air in. Just when the flame starts to get unstable again (flutter and intermittent sparking due to loss of flame signal) turn the adjustment screw another ¼ – ½ turn clockwise.

f. Repeat these steps until you are able to completely remove your object and allow full air draw and a nice stable flame is present. We need to make sure this is as lean as possible.

g. Now that the burner is up and running, turn the adjustment screw a ¼ turn counterclockwise. After every ¼ turn wait 5 seconds to allow it to settle. Keep turning it a ¼ turn at a time with the pauses in between until the flame once again becomes unstable.

h. Now once it starts fluttering and sparking, turn the screw a ½ turn clockwise. This will stabilize the flame. Now we are sure it is a strong stable flame operating at its leanest.

i. Just to make sure it is operating properly, the flame sensor should be glowing red. Leave this burner running.

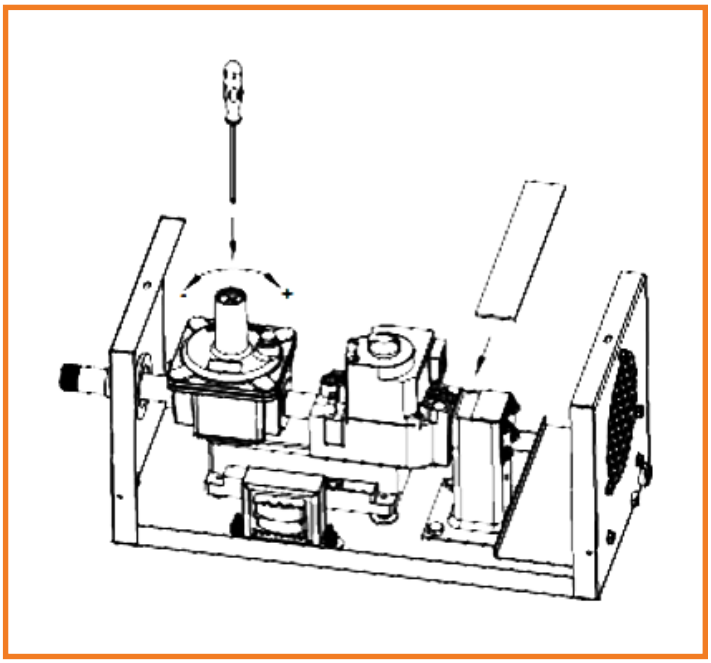


Figure 50: Adjusting Regulators

5. Now go to the next burner in line moving away from the burner and repeat all steps. Make sure you adjust the dip switch settings so this one will not light at the same time as the others.

NOTE: All burners need adjustment **EXCEPT** burner #1. Those are the burners furthest away from the vacuum pump and closest to the End Vent Cap. Burner #1 uses fresh air for secondary combustion so it is very forgiving. The flame characteristics on this burner are also different from the rest. The igniter and flame sensor will NOT glow red and the flame will look like it is lifting from the burner casting. You will still have to set the dip switch setting on the burner.

Now your burners are running, wait half an hour with the system heating.

Now we can adjust the End Vent Vacuum to get the proper vacuum designed for your system.

Final Balancing the System Vacuum

1. Turn ON the Gas Supply.
2. Turn up the Thermostat(s) to start the system and let it run (with Burners operating) for at least 30 minutes.
3. With a manometer check the vacuum at the End Vent Cap of the longest Branch. (Refer to Figure 46 for manometer positioning details.)
4. Adjust the Dampers again (Caution: dampers are now hot adjust with caution) as required to obtain the vacuum readings within +0.1 to -0.2 in. W.C. of the settings in Table 7. The Burners in this Branch should now be firing at the appropriate rate.
5. Proceed similarly until each individual Branch in the System is balanced / re-adjusted.
6. Mark the Damper position and lock in place when the System has been balanced. (Lock in place by putting a screw through the handle to hold it against the Sleeve / Tube.)
7. Turn the Thermostat(s) down again to shut off the System.

NOTE: An End Vent Vacuum which is intermediate to (between) those shown will result in rates intermediate and proportional to those which are listed.

NOTE: Vacuum settings and rates apply regardless of the number of Burners being used in the system branch to the maximum allowable number of burners as per Table 5.

OPERATION

Manual Set-Up

1. Set the ambient temperature to be maintained at / by each Thermostat.
2. Ensure Electrical Power and Gas Supply are turned “ON”

Automatic Operating Sequence

Start-up

1. Thermostat calls for heat and energizes the transformer relay.
2. Transformer relay contacts close and the Vacuum Pump motor is energized.
3. If the Vacuum Switch finds no fault, power is supplied to all the Burners in the Zone(s) in which the Thermostat(s) are calling for heat.
4. At the Burner, the control module waits for the pre-purge period and then opens the fuel valve and the spark igniter is energized. Time delay in the control module causes the Burners to light sequentially.
5. When the flame is established, the flame sensor signal returns to the control module and the ignition spark ceases.
6. If the flame is not established, the control module will re-try the ignition cycle again in 30 seconds.
7. Should ignition continue to fail, the control module will make 3 ignition attempts every hour.
8. If it does not, or if it continues to “not establish a flame”, Trouble-Shoot to find the cause.
9. System operates until Thermostat(s) temperature setting is reached.

Shut-down

1. When the Thermostat has supplied sufficient heat, its contacts open and de-energize the transformer relay.
2. The contacts of the transformer relay open and Electrical Power to the Burners and Vacuum Pump is disconnected.
3. A post purge cycle can be provided when a Control Panel is supplied.
4. System remains ‘OFF’ until ambient temperature falls below the Thermostat(s) setting.
5. System cycles through Steps 1 to 10 on a continuous basis until Power is turned OFF.

General Safety Reminders

- Ensure Gas Supply and Electrical Power are shut OFF before commencing maintenance work. Exception: Checking igniter flames will require the system to be operational.
- Keep area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
- **Caution:** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.
- Verify proper operation and set-up (as listed in the Commissioning section) after servicing.

Annual Maintenance Recommendations

Annual maintenance, prior to the heating season (Fall / Winter) is recommended.

The System

1. Inspect the Common Tailpipe and Vent Pipe for soot or dirt, clean as required to avoid obstructions.
2. Check that Flexible Boot Connectors are without cracks, kinks or leaking connections. Change the connectors every three to four years.
3. Ensure that the Vacuum Pump and motor mounting bolts are tight.
4. Make a visual inspection (without dismounting) of the Vacuum Pump impeller.
5. Inspect the Vacuum Switch connections.
6. Clean the Condensate Trap and ensure that all piping to / from the Condensate Trap allows free flow of fluid.
7. There should be no sound of leaking air around any of the various gaskets or connections.
8. Make spot checks of the interior of the Radiant Line Tubes for soot or obstructions, clean as required.

Each Burner

1. Remove Burner and inspect burner face for soot or cracks. Burner feet should be back flushed with air every year, to clean the internal ceramic burner.
2. Visually inspect electrode. Replace if there is excessive oxidation, erosion or cracks in the ceramic insulators. Set spark gap at 0.125 in. (3.2 mm) and clean the electrodes.
3. Verify that flame observation glass is clean, free of cracks and airtight.
4. Inspect air filter. Change as necessary – frequency is dependent on the environment
   - For SLV Air Filter includes frame (Bulk Qty. 20) use part No. VH001B
   - For SLV Filter Media Kits (Bulk Qty 24) use part No. VH053B.

Note: Dirty air filters will restrict combustion air flow into the burner housing, creating a slight negative pressure environment for the zero governor (and other controls). Consequently, while flame characteristics and balance will not change appreciably, overall burner rate will decline. Very dirty filters will cause the flame to become more rich (yellow and soft). Filters can be cleaned once with reverse air pressure, but it is generally more cost effective to merely replace them.

MAINTENANCE

Adjust the System

1. Turn on gas and electric power.
2. Start system and allow to run for 30 minutes.
3. Verify end plate vacuum settings against Installation/Operation Manual, to establish correct burner rates. With a manometer check the vacuum at the End Vent Cap of the longest Branch. (Refer to Figure 46 for manometer positioning details.)
   - If the Vacuum is too low, inspect the Flexible Boot Connectors on the Inlet and Outlet of the Vacuum Pump for tight connections, leaks, damage, kinks, etc.
   - To adjust the vacuum on a single leg manipulate the damper coupling at the end of that leg.
   - To adjust the vacuum on the entire system manipulate the damper coupling at the vacuum pump.
4. There should be no sound of leaking air around any of the various gaskets or connections.

Burner Adjustment

1. Observe each flame through the flame sight glass.
   - Flame may flutter once or twice at ignition but should settle promptly.
   - Flame should extend straight out from igniter
   - Sense rod (and igniter) will glow bright red-orange on all except No.1 Burners.
2. End burners (No. 1, or the furthest upstream from vacuum pump) do not need to be adjusted. The flame in a No. 1 burner, appears soft and fluffy, it is solid blue in color.
3. All downstream burners (Nos. 2 - 4) may require adjustment of the Maxitrol regulator located inside each SLV burner; refer to Burner Adjustment under Commissioning section.
4. SLV Range systems with multiple in-series burners can occasionally produce a high pitched noise that can be best be described as a whistle, or howl. Usually the howl is produced by a rich no. 2 burner. De-tune the burner by slowly reducing the gas pressure at the internal Maxitrol regulator in the burner. You may also have to de-tune the no. 3 burner. Tum down the pressure till the noise disappears. Reducing it too much may cause ignition problems later.

Vacuum Pump

Vacuum Pump Fails To Run

1. Check that a Thermostat is calling for heat.
2. Check the main Electrical Power Supply, fuses or breakers.
3. Check for power to the Control Panel or Relay.

Vacuum Pump Runs, But Little to No Vacuum

1. Check the direction of the impeller rotation.
2. Are the End Vent Caps installed in all of the Branches?

Vacuum Pump Runs, But No Power to Burners

1. Check the Vacuum Switch.
2. Check voltage to Burner terminals.
3. Check Relay.
4. Check individual Burner control.

Burners

No Power to Burner

1. Check if correct Thermostat is calling for heat.
2. Check for 120VAC supply at Burner.

No Gas Supply

1. Ensure manual supply valve to the System is turned ON.
2. Ensure gas valve knob on Burner gas control is ON.
3. Check for 24V across valve terminals during ignition trial time.

Burner Does Not Light

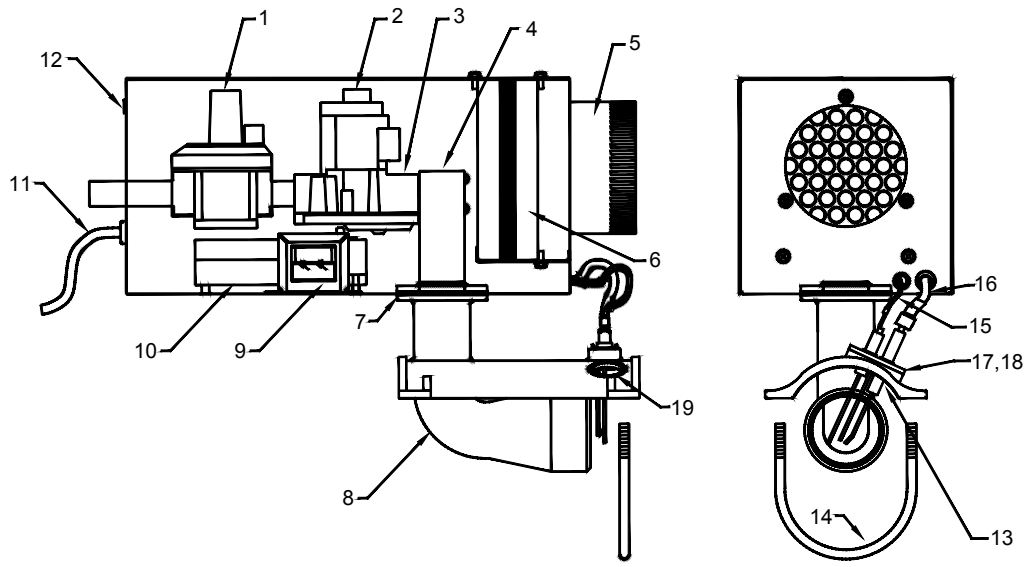
1. Ensure spark is present during ignition trial.
2. If no spark is present during ignition trial, check control module & check for cracked igniter insulation.
3. Ensure there is gas flow during ignition trial.
4. Purge gas lines.
5. Ensure Filter is not obstructed.

Burner Does Not Stay Lit

1. Check sensor wire for continuity.
2. Measure flame signal current, it should be above 5 µA - DC.
3. Regulator adjustment may be necessary.
4. Ensure Filter is not obstructed.

PARTS

Burner Replacement Parts



REFERENCE	PART NUMBER	DESCRIPTION
1	P-VG010	ZERO GOVERNOR, MAXITROL R-500Z
2	P-VG009	GAS VALVE, HONEYWELL 8205M
3	P-VH002	VALVE GASKET
4	P-VG001	MIXING CHAMBER
5	P-VS022	COMBUSTION AIR ADAPTOR AND GASKET (AIR)
6	P-VH001	COMBUSTION AIR FILTER
7	P-CH007	VALVE TRAIN GASKET/BURNER MOUNT
8	P-VG016	BURNER CASTING ASSY SLV 150-250,000 (ELECTRODE INCL.)
8	P-VG026	BURNER CASTING ASSY SLV UNDER 150000
9	P-CE008	TRANSFORMER
10	P-CE056	CONTROL MODULE, FENWAL
11	P-CE010	POWER CORD
12	P-CE057	OPERATOR INDICATOR LIGHT (ROUND)
13	P-VH003	BURNER MOUNTING GASKET
14	P-VH004	MOUNTING U-BOLTS
15	P-CE036	SENSE WIRE
16	P-CE006	IGNITION WIRE (12 INCH)
17	P-VE002	ELECTRODE ASSEMBLY
18	P-VH005	ELECTRODE ASSEMBLY GASKET
19	P-CH011	FLAME SIGHT WINDOW
20	P-CE173	RELAY G2R-1-S-AC24(S)

Vacuum Pumps - Main Part Numbers

PART NUMBER	DESCRIPTION
PH-1001	PUMP MOUNTING KIT
F100 Pump Kit 4"	F100 PUMP KIT 4" OUTLET
F100 NA	MOTOR - 120V 60HZ .5HP SINGLE PHASE
F200 Pump Kit 4"	F200 PUMP KIT 4" OUTLET
F200 Pump Kit 6"	F200 PUMP KIT 6" OUTLET
F200 Pump Kit NA	MOTOR - 120V 60HZ 1HP SINGLE PHASE
F300 Pump Kit 6"	F300 PUMP KIT 6" IN
F300 NA	F300 NA VACUUM PUMP (AVAILABLE IN SINGLE PHASE OR THREE PHASE)

Gas Connection Replacement Part Numbers

PART NUMBER	DESCRIPTION
A-1428	GAS FLEX CONNECTOR - 24" X 1/2" DIA.
A-1429	GAS FLEX CONNECTOR - 36" X 3/4" DIA.
A-1427	SHUT OFF VALVE - FOR GAS FLEX (1/2")
A-1423	SHUT OFF VALVE - FOR GAS FLEX (3/4")

Optional Wall Vent Terminal Part Numbers

PART NUMBER	DESCRIPTION
P-1074-4000	VENT TERMINAL 4" GALVANIZED BIRD SCREEN
V-0700	VENT TERMINAL 4” EXTERIOR WALL FLUE (PUMP A)
V-0800	VENT TERMINAL 6” EXTERIOR WALL FLUE (PUMP B)
V-CS006	WALL THIMBLE 4" (PUMP A)
V-CS033	WALL THIMBLE 6" (PUMP B)

PARTS

Burner Part Numbers

PART NO.	DESCRIPTION
SLVN1	SLV BURNER #1 NAT
SLVN2	SLV BURNER #2 NAT
SLVN3	SLV BURNER #3 NAT
SLVN4	SLV BURNER #4 NAT
SLVN5	SLV BURNER #5 NAT
SLVP1	SLV BURNER #1 LPG
SLVP2	SLV BURNER #2 LPG
SLVP3	SLV BURNER #3 LPG
SLVP4	SLV BURNER #4 LPG
SLVP5	SLV BURNER #5 LPG
PARTS BELOW 150,000 BTU	
SLVN1L	SLV BURNER #1 NAT
SLVN2L	SLV BURNER #2 NAT
SLVN3L	SLV BURNER #3 NAT
SLVN4L	SLV BURNER #4 NAT
SLVN5L	SLV BURNER #5 NAT
SLVP1L	SLV BURNER #1 LPG
SLVP2L	SLV BURNER #2 LPG
SLVP3L	SLV BURNER #3 LPG
SLVP4L	SLV BURNER #4 LPG
SLVP5L	SLV BURNER #5 LPG

Main System Component Parts List

PART NO.	DESCRIPTION
COMMON COMPONENTS	
T-VT001	SLV COMBUSTION TUBE, 4" OD
T-CT001	TUBE, 4" OD, HEAT TREATED ALUM.
T-CT010	ELBOW, 90 DEG, 4" OD
TU-CT020	U-TUBE, 4"OD ON 10" RADIUS (ROUND)
T-CT022	CROSS, 4" O.D. ALUMINIZED
TC-401	COUPLING ASSY 4" ALUMINIZED
P-VS106	END VENT CAP
A-1448	TURNBUCKLE
BK-CR003	HANGER, TUBE & REFLECTOR
BK-CR024	REFLECTOR BRACKET & CLIP SET
R-CR001	REFLECTOR 124"
R-CR002	END CAP
V-CS005	4" AIR INLET HOOD
DA-CR015	DAMPER COUPLING, 4" - MANUAL
A-1430	HANGER STRAP, 4" OD TAILPIPE
H-VH044	CONDENSATE TRAP ASSEMBLY
OPTIONAL SHIELD EQUIPMENT	
R-CR039	REFLECTOR KIT - MITERED 90 DEGREE
R-VR003	BURNER REFLECTOR KIT
SIDE REFLECTOR COMPONENTS	
R-CR019	SIDE REFLECTOR
BK-CR016	BRACKET ASSY (FOR SIDE SHIELD)
BK-CR035	RETAINER CLIP-SIDE SHIELD
BOTTOM SHIELD COMPONENTS	
R-CR018	BOTTOM REFLECTOR/SHIELD
BK-CR017	SUPPORT ASSY (FOR BOTTOM SHIELD)
DECORATIVE GRILLE COMPONENTS (SUSPENDED FROM HEATER)	
DG-CR051	DECORATIVE GRILLE 15" X 60" X .5"
DG-CR052	DECORATIVE GRILLE SUPPORT 60"
DG-CR053	DECORATIVE GRILLE CROSS STRAP 15"
DG-CR054	DECORATIVE GRILLE END ANGLE 15"
DECORATIVE GRILLE COMPONENTS (SUSPENDED CEILING)	
DG-CR026	DECORATIVE GRILLE PANEL 24" X 48"
DG-CS059	DECORATIVE GRILLE SIDE SHIELD
DG-CR053	DECORATIVE GRILLE CROSS STRAP 15"
DG-CR054	DECORATIVE GRILLE END ANGLE 15"
DG-CS027	T-BAR SHIELD

PART NO.	DESCRIPTION
SPECIALTY TUBE COMPONENTS	
H-1502	4" X 20. ALUMINUM TAILPIPE
H-1542	4" ELBOW, 45° ANGLE
H-1519	4" EQUAL TEE
H-1512	4" ELBOW, 90° ANGLE
H-1507	4" ALUMINUM COUPLER
6" TAILPIPE	
H-1503	6" X 20. ALUMINUM TAILPIPE
H-1513	6"ELBOW, 90° ANGLE
H-1520	6" EQUAL TEE
H-1516	4" - 6" TRANSITION
H-1508	6" ALUMINUM COUPLER
STAINLESS STEEL (S/S)	
T-VT003	S/S COMBUSTION TUBE VS
T-4102	S/S RADIANT TUBE
TC-402	S/S COUPLING LINED
DA-CR047	S/S DAMPER COUPLING - MANUAL
R-CR032	S/S REFLECTOR
R-CR033	S/S SIDE REFLECTOR
COATED TUBES & FITTINGS	
H-1552	TUBE, COATED INSIDE & OUT
T-VT005	COMBUSTION TUBE COATED IN/OUT
H-1553	ELBOW 90 DEGREE,COATED IN/OUT
H-1554	TEE, 4" SQUARE COATED IN/OUT
MODULATING SYSTEM COMPONENTS	
DA-VT013	MOTORIZED DAMPER 4" DIA.
DA-T014	MOTORIZED DAMPER 5" DIA.

WARRANTY

THE SIRIUS SLV RANGE WARRANTY

The manufacturer warrants to the original owner that the product will be free of defects in material and workmanship as described below.

SLV VACUUM SYSTEM COMPONENTS	WARRANTY PERIOD (Years)				
	1	3	5	7	10
CONTROL PANEL					
VACUUM PUMP					
BURNER ELECTRICAL COMPONENTS					
CAST IRON BURNER HEAD					
HOT ROLLED HEAT EXCHANGER					
ALUMINIZED HEAT EXCHANGER					
HOT ROLLED HEAT EXCHANGER WITH CONTROL PANEL					
ALUMINIZED HEAT EXCHANGER WITH CONTROL PANEL					
TAILPIPE - ALUMINIZED / COATED (PER MINIMUM DESIGN LENGTH)					

The Manufacturer's obligation under this warranty is limited to repair or replacement, F.O.B. its facility, of the defective part. In the case of replacement parts, the warranty period shall be the longer of the original warranty or a period of 12 months from date of purchase. In no event shall the manufacturer be liable for incidental expense or consequential damages of any kind.

This warranty does not cover any shipping, installation or other labor costs incurred in the repair or replacement of the product. No materials will be accepted for return without authorization.

This warranty will not apply, if in the judgment of the Manufacturer, the equipment has been improperly installed, unreasonably used, damaged, or modified.

This warranty will not apply to damage to the product when used in corrosive atmospheres and in particular atmospheres containing halogenated hydrocarbons. No person is authorized to assume for the Manufacturer any other warranty, obligation or liability.

THE REMEDIES PROVIDED FOR IN THE ABOVE EXPRESS WARRANTIES ARE THE SOLE AND EXCLUSIVE REMEDIES. NO OTHER EXPRESS OR IMPLIED WARRANTIES ARE MADE INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.

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