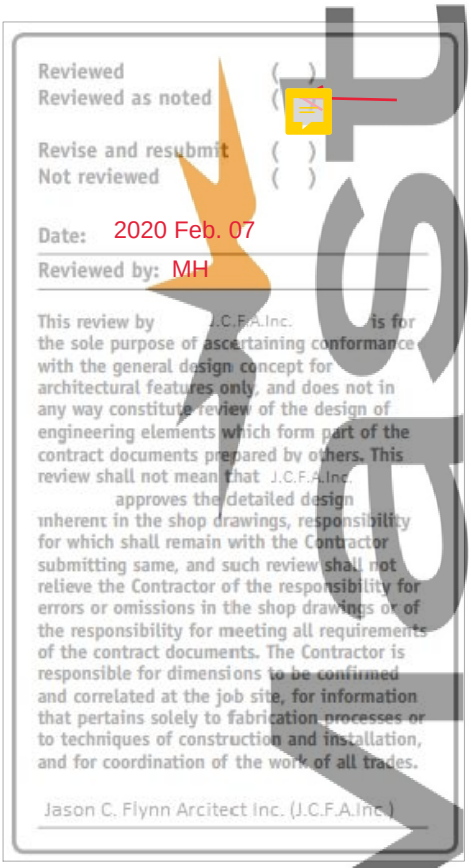
REVIEWED
By Pat Newton at 12:21 pm, Feb 07, 2020

Master REFRIGERATION | HEATING | AIR CONDITIONING



Project: **4012522 – 225 Huntmar**

Client: **CORCANN HEATING & COOL. INC**

DRAWING FOR APPROVAL

Date: **5 Feb 2020**

Revision Number: **00**

Quote # **4101650-2**

Prepared By: Paul Brown
Inside Sales Representative

Telephone: **(613) 829-2816**
Email: **pnbrown@master.ca**

■ For Approval ☐ As-Built ☐ Revision

Master
REFRIGERATION | HEATING | AIR CONDITIONING

☑ NO COMMENT ☐ COMMENT AS NOTED
☐ REJECTED ☐ REVISE AND RESUBMIT
☐ SUBMIT SPECIFIED PRODUCT

CORRECTIONS OR COMMENTS MADE ON SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH DRAWINGS AND SPECIFICATION REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES, CAPACITIES AND DIMENSIONS, SELECTING FABRICATION, CO-ORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

ANTARES ENGINEERING GROUP INC.
DATE 11-02-2020 PERS S.S.

PERFORMANCE & DRAWINGS

SRP
SUPERIOR
RADIANT PRODUCTS

Submittal Data

Model UA/UX/UXR

Low Intensity Infrared Heaters

SUPERIOR RADIANT PRODUCTS

Project: Car Wash Heater
Engineer:
Contractor:
Model #:

Date: 2/5/20
Submitted by:
Approved by:

General Specification

Fuel Type *(Check one)*
- [x] Natural Gas
- [ ] LPG

Heat Exchanger *(Check one)*
- [x] Heat Treated Aluminized Steel
- [ ] Hot Rolled
- [ ] Stainless Steel

Inlet Gas Pressure
Minimum: Natural Gas @ 5" W.C.
LPG @ 11" W.C.
Maximum: Natural Gas & LPG @ 14"

Electrical: *(Select thermostat)*
120VAC, 60 Hz, 1A
36" long, 3 Prong Power Lead
- [ ] Line Voltage
- [x] 24v Thermostat

Manifold Gas Pressure
Nat. Gas: 3.5" W.C.
LPG: 10.5" W.C.

Gas Connection
½" NPT (female)

Flue/Air Connections
4" Diameter Connection
Maximum Vent Length = 30 feet
Maximum fresh Air Length = 30 feet
Vent + Fresh Air = 50 feet max.

Accessories
(Check all that apply)
- [x] Thermostat Type CE139
- [ ] Vent Terminal
- [ ] Wall Thimble
- [x] Gas Flex Connector
- [ ] Shut Off Valve
- [ ] U Bend Pkg.
- [ ] Side Reflectors
- [ ] Elbow Package
- [ ] Flue Connecting Tee (4x4x6)
- [ ]
- [x] S.S. Burner Box
- [ ]

MODEL	RATE BTUH	FACTORY APPROVED HEATER LENGTH *(Check length - feet)*										PROJECT MODIFICATION *(length - feet)*	Quantity on Project
~~UA/UX/UXR-40~~	~~40,000~~		~~10~~		~~20~~		-		-				
~~UA/UX/UXR-60~~	~~60,000~~		~~15~~		~~20~~		~~30~~		-				
~~UA/UX/UXR-80~~	80,000	2	20		~~30~~		~~40~~		-				2
~~UA/UX/UXR-100~~	~~100,000~~		~~20~~		~~30~~		~~40~~		~~50~~				
~~UA/UX/UXR-125~~	~~125,000~~		~~30~~		~~40~~		~~50~~		-				
~~UA/UX/UXR-150~~	~~150,000~~		~~40~~		~~50~~		~~60~~		-				
~~UA/UX/UXR-175~~	~~175,000~~		~~50~~		~~60~~		-		-				
~~UA/UX/UXR-205~~	~~205,000~~		~~50~~		~~60~~		~~70~~		-				
~~UA/UX/UXR-220~~	~~220,000~~		~~60~~		~~70~~		-		-				

CSA CERTIFIED ®

DESIGN CERTIFIED ®

Introduction

Superior Radiant Products is a company in the infrared heating industry founded on the principles of product quality and customer commitment.
Quality commitments are evidenced by superior design, a regard for design detail and an upgrade of materials wherever justifiable.
Customer commitment is apparent through our ready responses to market demands and a never ending training and service support program for and through our distributor network.
Superior Radiant offers its 20 years of infrared expertise in a cost effective unitary heater design as culmination of that commitment. **Series UA/UX/UXR** models are field assembled, low intensity infrared heaters that are easy to install and maintain, and which were engineered with significant input from our customers. They are designed to provide economical operation and trouble-free service for years to come.

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 USA and CSA B149.1 and B149.2 Installation Codes in Canada.
This heater maybe 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 USA 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 USA 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 USA and CSA B149.1 and B149.2 Installation Codes in Canada.
A 1/8” 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 USA, 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 USA and CSA B149.1 and B149.2 Installation Codes in Canada for proper location, sizing and installation of vents as well as information on clearance requirements when penetrating combustible walls for venting purposes.

General Specifications

Gas Supply

Inlet Pressure

Natural Gas:	Minimum	5.0" W.C.	~~Propane Gas:~~	~~Minimum~~	~~11.5" W.C.~~
	Maximum	14.0" W.C.		~~Maximum~~	~~14.0" W.C.~~

Manifold Pressure

Natural Gas:	3.5" W.C.	~~Propane Gas:~~	~~10.5" W.C.~~

Inlet Connection

Natural Gas ~~or Propane~~: ½" female NPT

Electric Supply

120 VAC, 60 HZ, 1 Amp: 36" cord with grounded 3 prong plug

Flue and Outside Air Connection

4" O.D. male connection for flue adapter and outside air (optional) provided at the heater

Dimensional Charts

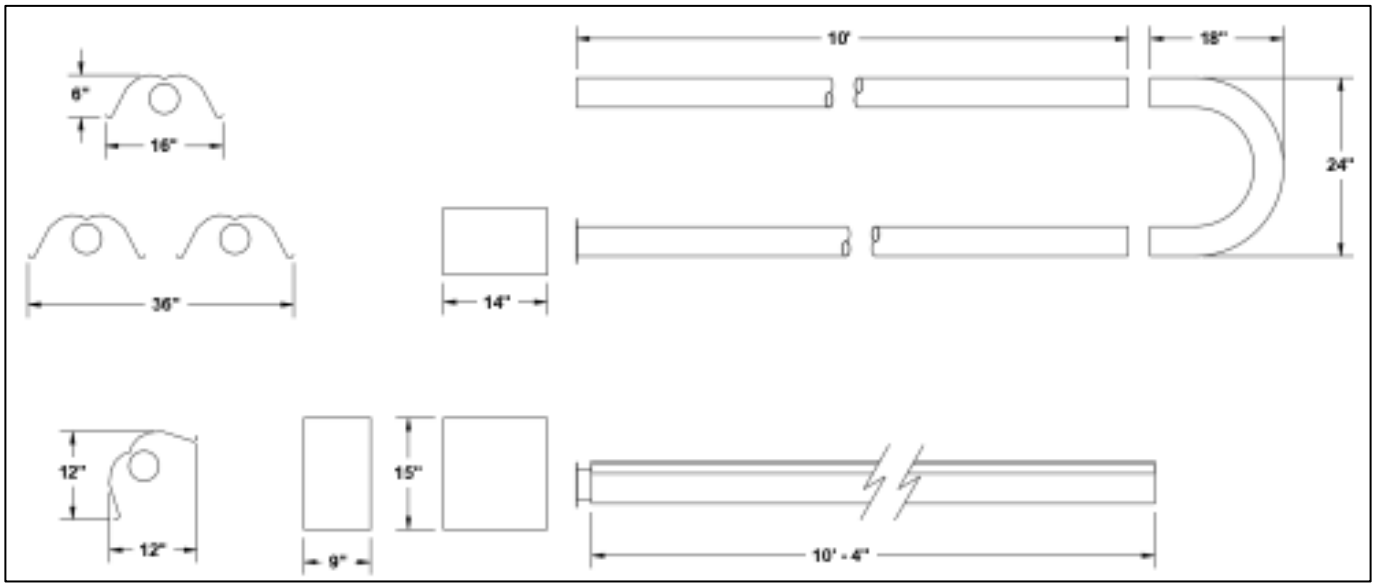


Figure 1: Overall Dimensional Information

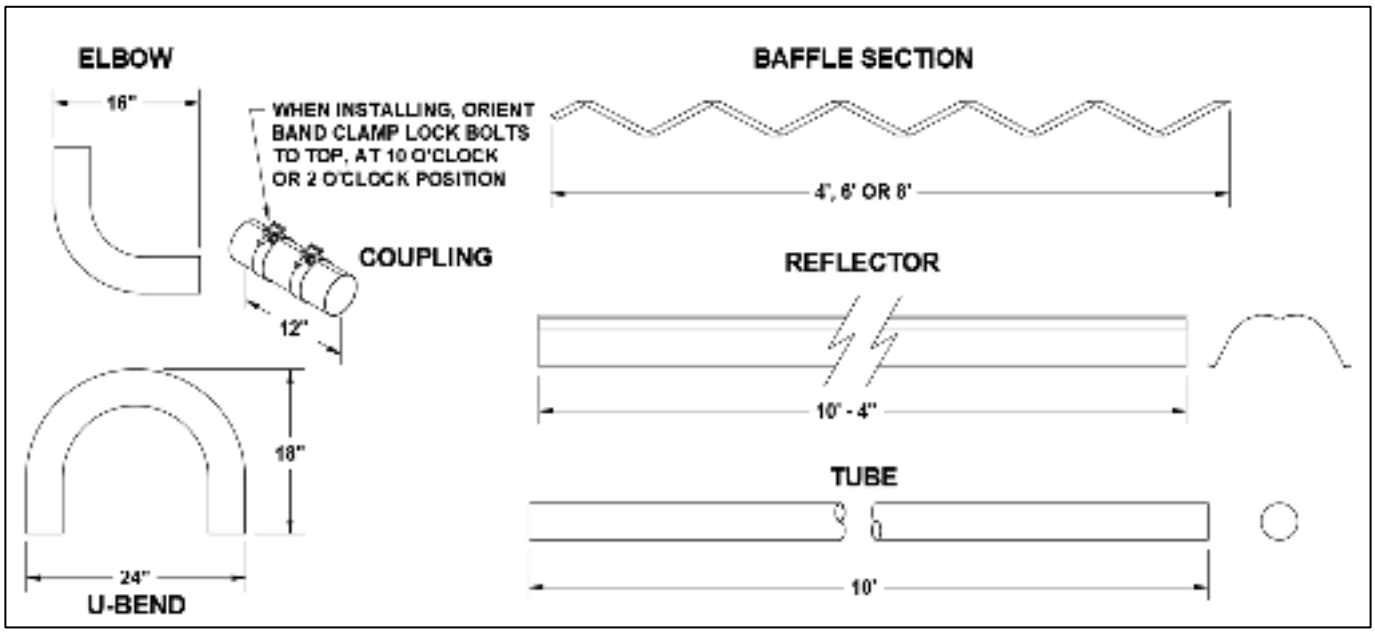


Figure 2: Component Dimensional Information

Configurations

Table 1: Configuration Information

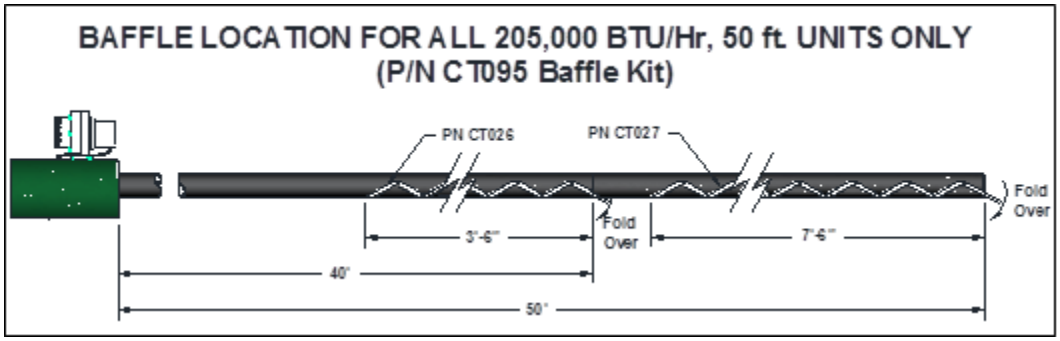
Model * Special Configurations available – see below	Rate (BTU/Hr)	Heat Exchanger Length ft. (m)		Baffle ft.(m)	Baffle Kit P/N
		Minimum	Maximum		
UA/UX/UXR-40	40,000	10' (3m)	20' (6m)	6' (1.8m)	CT045
UA/UX/UXR-60*	60,000	20' (6m)	30' (9m)	6' (1.8m)	CT046
UA/UX/UXR-80*	80,000	20' (6m)	30' (9m)	12' (3.6m)	CT047
UA/UX/UXR-100*	100,000	20' (6m)	30' (9m)	12' (3.6m)	CT047
UA/UX/UXR-125*	125,000	30' (9m)	50' (12m)	12' (3.6m)	CT047
UA/UX/UXR-150*	150,000	40' (12m)	60' (18m)	6' (1.8m)	CT046
UA/UX/UXR-175	175,000	50' (15m)	60' (18m)		
UA/UX/UXR-205*	205,000	60' (18m)	70' (21m)		
UA/UX/UXR-220	220,000	60' (18m)	70' (21m)		

Note:

- Baffles are always placed in the last section of radiant tube.
- Baffles are either aluminized or stainless steel sections 6' long.
- When only 6' is required an aluminized steel baffle is installed, except on the UA/UX/UXR-40,000 where a special 6' stainless steel baffle with a red identification tab must be installed.
- When 12' is required, a 6' stainless steel baffle is inserted first into the end tube followed by another 6' aluminized baffle. The stainless steel baffle is now closest to the burner.

***The following Special Configurations are also approved:**

60,000 BTU/Hr	15' heat exchanger with 6' Stainless steel baffle with red tab (Natural Gas Only)
80,000 BTU/Hr	40' heat exchanger with NO baffle or 6' aluminized baffle.
100,000 BTU/Hr	40' or 50' heat exchanger with NO baffle or 6' aluminized baffle
125,000 BTU/Hr	50' heat exchanger with 6' aluminized baffle
150,000 BTU/Hr	60' heat exchanger with NO baffle
205,000 BTU/Hr	50' heat exchanger with a 4' baffle at 40', and a 8' baffle at 50'.

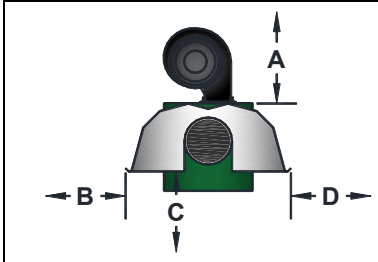
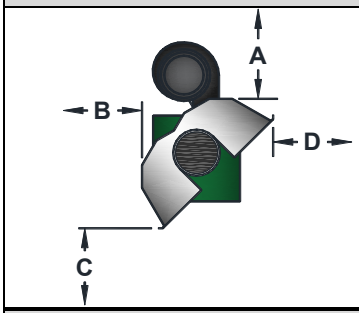
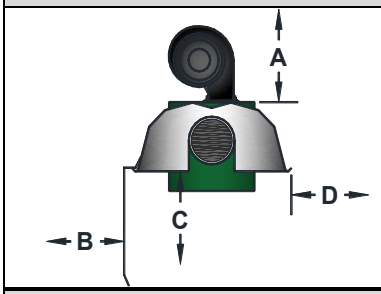
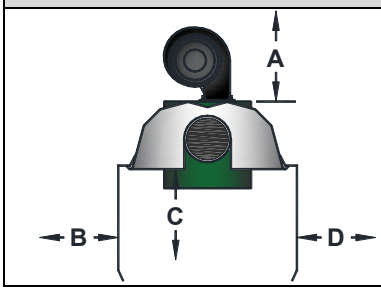


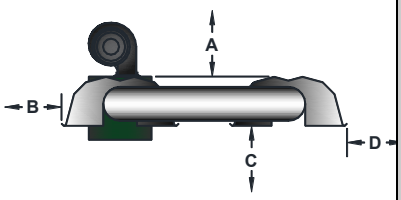
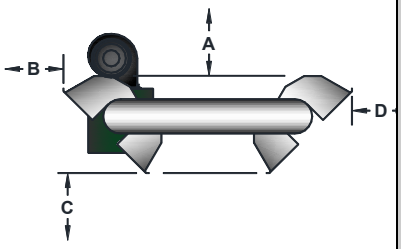
Baffle Location UA/UX/UXR-205 Models, 50ft

Clearance to Combustibles

A general clearance of 18 (0.5 m) in every direction is recommended for servicing only around each Burner and air supply (at the far end of each radiant tube). Also, to ensure adequate air flow in and around the Heating System.

Table 2: Minimum Clearance to Combustibles Inches (cm)

		Model No.: UA/UX/UXR								
Reflector Configurations	**Dim** In (cm)	~~40~~ **MBH**	~~60~~ **MBH**	**80 MBH**	~~100~~ **MBH**	~~125~~ **MBH**	~~150~~ **MBH**	~~175~~ **MBH**	~~205~~ **MBH**	~~220~~ **MBH**
Horizontal 	**A**	2(5)	2(5)	2(5)	2(5)	4(10)	4(10)	6(15)	6(15)	6(15)
	B	18(46)	25(63)	26(66)	30(76)	33(84)	36(91)	40(102)	44(46)	46(117)
	C	45(114)	58(147)	62(157)	67(170)	71(180)	74(188)	78(198)	80(203)	83(211)
	D	18(46)	25(63)	26(66)	30(76)	33(84)	36(91)	40(102)	44(46)	46(117)
45° Reflector Tilt 	**A**	4(10)	4(10)	4(10)	4(10)	6(15)	6(15)	8(20)	8(20)	8(20)
	B	4(10)	4(10)	4(10)	4(10)	4(10)	4(10)	4(10)	4(10)	4(10)
	C	40(102)	50(127)	58(147)	67(170)	70(178)	71(180)	74(188)	78(198)	81(205)
	D	38(97)	46(117)	50(127)	58(147)	63(160)	64(163)	67(170)	72(183)	77(196)
One Side Extension 	**A**	2(5)	2(5)	2(5)	2(5)	4(10)	4(10)	6(15)	6(15)	6(15)
	B	4(10)	4(10)	4(10)	4(10)	4(10)	4(10)	6(15)	6(15)	6(15)
	C	50(127)	58(147)	63(160)	73(185)	76(193)	78(198)	80(203)	84(203)	84(203)
	D	35(89)	38(97)	42(107)	45(114)	50(127)	52(132)	54(137)	56(142)	58(147)
Two Side Extension 	**A**	2(5)	2(5)	2(5)	4(10)	4(10)	4(10)	6(15)	6(15)	6(15)
	B	9(23)	16(41)	18(46)	18(46)	22(56)	24(61)	26(66)	29(74)	31(79)
	C	50(127)	58(147)	64(163)	71(180)	78(198)	80(203)	82(208)	86(218)	88(224)
	D	9(23)	16(41)	18(46)	18(46)	22(56)	25(64)	26(66)	29(74)	31(79)

Reflector Configurations	Dim In (cm)	Model No.: UA/UX/UXR 40 MBH	60 MBH	80 MBH	100 MBH	125 MBH	150 MBH	175 MBH	205 MBH	220 MBH
U-Tube, Horizontal 	**A**	-	2(5)	2(5)	2(5)	4(10)	4(10)	6(15)	6(15)	6(15)
	B	-	25(64)	28(71)	30(76)	34(86)	37(94)	40(102)	45(114)	46(117)
	C	-	59(150)	62(157)	71(180)	74(188)	76(193)	78(198)	82(208)	88(224)
	D	-	22(56)	26(66)	30(76)	33(66)	36(84)	40(102)	44(112)	46(117)
U-Tube, Opposite 45° 	**A**	-	4(10)	4(10)	4(10)	4(10)	4(10)	8(20)	10(25)	10(25)
	B	-	46(117)	50(127)	54(137)	63(160)	64(163)	67(170)	72(183)	74(188)
	C	-	51(129)	54(137)	64(163)	69(175)	71(180)	74(188)	78(198)	81(206)
	D	-	16(41)	18(46)	18(46)	22(56)	24(61)	26(66)	29(74)	32(81)
Unvented	**Above**	12(30)	12(30)	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)
	End	26(66)	26(66)	26(66)	26(66)	26(66)	32(81)	32(81)	32(81)	32(81)
Vented	**End**	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)	18(46)

Note: All dimensions shown are measured from outside surface of all tubes, reflectors and fittings

Installation

Installation Sequence

Generally, there is no unique sequence for installation of the burner or heat exchanger. A review of the job site will usually indicate a logical installation order. However, time and expense can be saved if installation is begun at the most critical dimension, watching for interference from overhead doors, cranes, auto lifts etc. Figure 3 provides a general overview of the components utilized in the installation, as well as their general relationship.

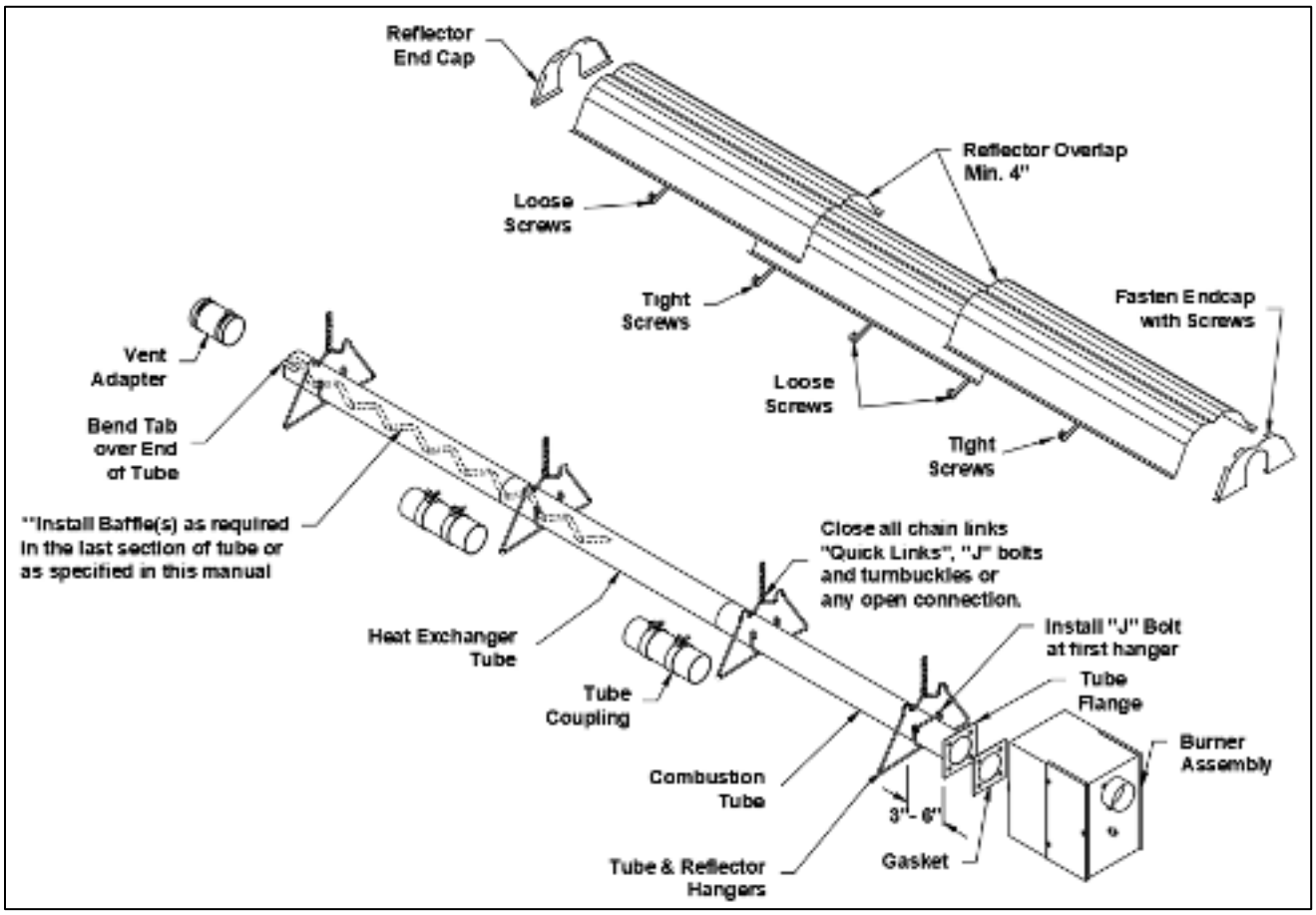


Figure 3: General Overview of Installation

ELBOW AND "U-TUBE" INSTALLATION

- If required by the heater layout, install 90° elbows or U-tube where indicated. Refer to Figure 17 for details.

Note: Elbows or U-tubes are typically installed without reflectors. To reduce the above clearance to combustibles distance use miter reflectors (see Figure 18) and refer to Clearance to Combustibles information.

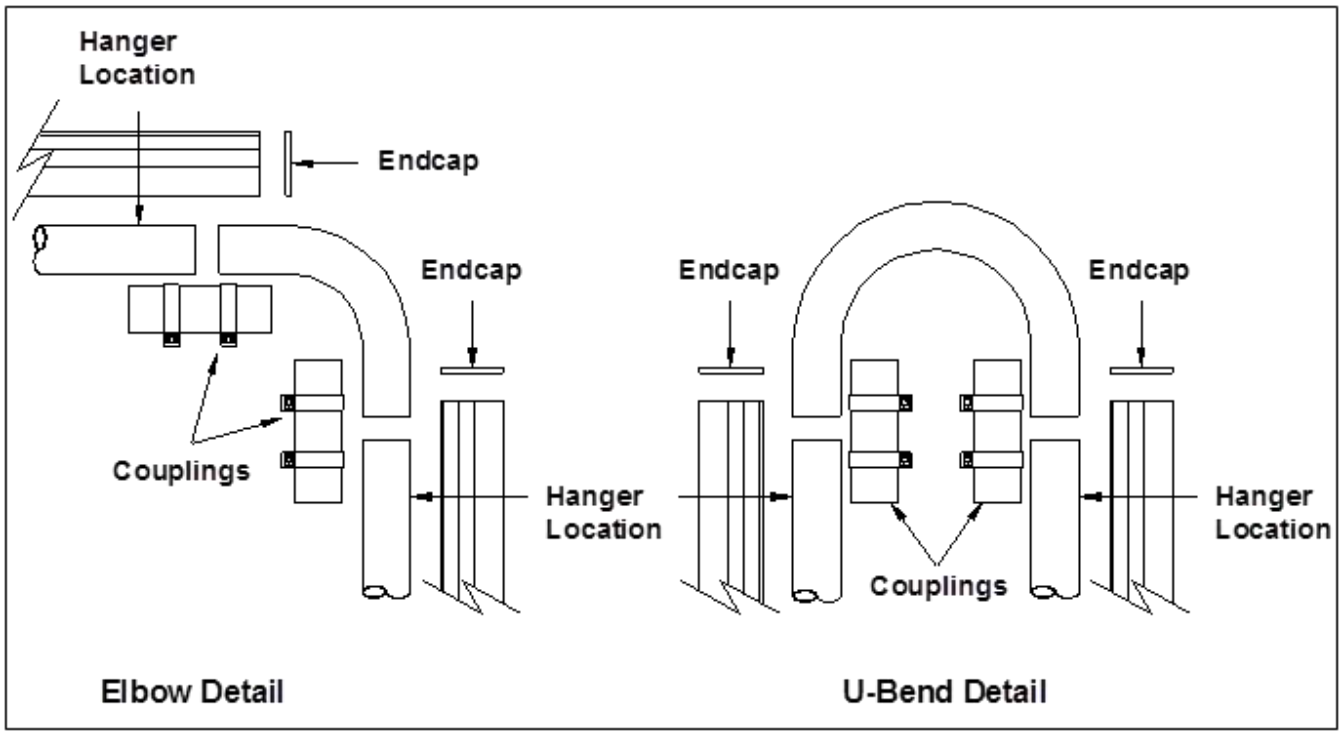


Figure 17: 90° Elbow and U-Tube Assembly Detail

- Elbows or U Tubes must be located not less than 10' from the burner in UA/UX/UXR-100 and smaller models, not less than 15' from the burner in UA/UX/UXR-125 to UA/UX/UXR-150, and not less than 20' from the burner in UA/UX/UXR-175 and larger models.

Venting / Combustion Air Ducting

General Requirements

- Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the USA and CSA B149.1 Installation Codes in Canada, as well as all local requirements for general venting guidance.
- Optional outside air supply may be directed to the heater horizontally or vertically.

IMPORTANT

- Maximum total vent length allowed for any model heater is 30' (9m).
- Maximum total fresh air inlet duct length allowed for any model heater is 30' (9m).
- Total of vent length plus outside air supply duct length cannot exceed 50' (15m) for any heater with minimum heat exchanger length.
- If condensation in the vent pipe or outside air supply duct is a problem, shorten or adequately insulate the section.
- Install a minimum 18” (45 cm) straight length of duct for air intake or vent before any Tee or elbow.
- Do not install any elbow or 45 fitting to bring vent lower than the horizontal tube system.

Note: The above stated requirements assume a maximum of 2 elbows in the total combination of vent and air supply duct. Subtract 5' of allowable length for each elbow if 3 or more elbows are used.

Un-Vented Operation

- Requirements for combustion air supply and dilution air vary by jurisdiction, building type and specific installation details. **See local codes for guidance**. In general, fresh air ventilation must be provided to the building space at **3 cfm per 1000 BTU/Hr in Canada and 4 cfm per 1000 BTU/h in USA**. The exhaust fan must be electrically interlocked with the heater.
- Optional outside air supply is not recommended for unvented heaters due to possible pressure imbalances in the building space.

Ensure that minimum combustible clearances are maintained for unvented heaters. Refer to Table 2, for required clearance dimensions.

Vented Operation

Horizontal Venting

- The heater operates at a positive vent pressure.
- Use an approved to S636 or UL1738 Category III venting system, or a single wall vent pipe with all joints and seams sealed with heat-resistant pliable sealant, such as high temperature RTV silicone for temperatures up to 650°F [343°C]. Prior to placing the heater in operation conduct a leak test with heater running using a soap solution.

- When venting through combustible walls, use approved vent terminal Tjernlund VH1-4, or SRP supplied deflector vent terminal with an approved insulating thimble.
- When venting through non-combustible walls, use SRP supplied deflector vent terminal. Recommended extension of the terminal past the outside wall surface is 18" minimum.

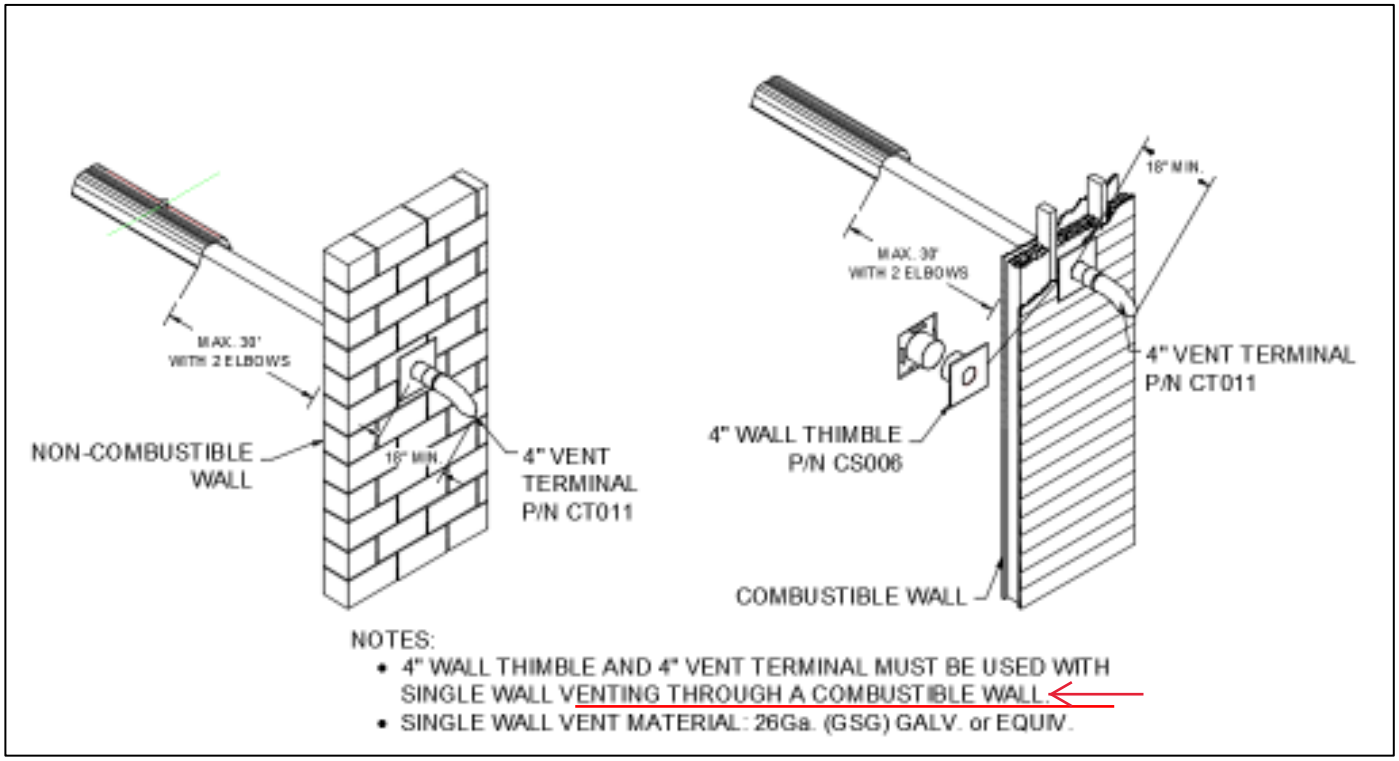


Figure 23: Horizontal Venting

Vertical Venting

- The heater operates at a negative vent pressure.
- Refer to the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) in the USA and CSA B149.1 Installation Codes in Canada, to size for Category I (B-vent) fan assisted appliances.
- Minimum vent pipe size is 4"(10cm) for an individual heater
- Use of an approved thimble to pass through combustible roof materials is required.
- Use of an approved vent cap is required.
- Check local codes for vertical vent size.

Note: For any heater with minimum heat exchanger length when venting through a roof, use single-wall vent pipe in the building and an approved clearance roof thimble. A B type vent for the portion of the vent system passing through the roof may be used. Use B type vent materials for stacks above the roof line. If using vent lengths greater than 15' (5m), condensation will form in the vent pipe. Insulation and additional sealing measures (high temperature silicone at all seams) may be required.

Common Vertical Venting

- Common vent sizing information is defined in the appropriate gas installation code (Refer to ANSI Z223.1 and CSA B149.1 for sizes and installation information).
- Connection locations to the common vent should be offset to avoid pressure interferences between heaters, refer to ANSI Z223.1 and CSA B149.1.
- Use of approved thimble to pass through combustible roof material is required. Additionally, B type vent materials are required for stacks above the roof line. Use of approved vent cap is required.
- All heaters to a common vent are recommended to operate at the same time. Connect the electrical circuit to the same thermostat to ensure simultaneous operation.

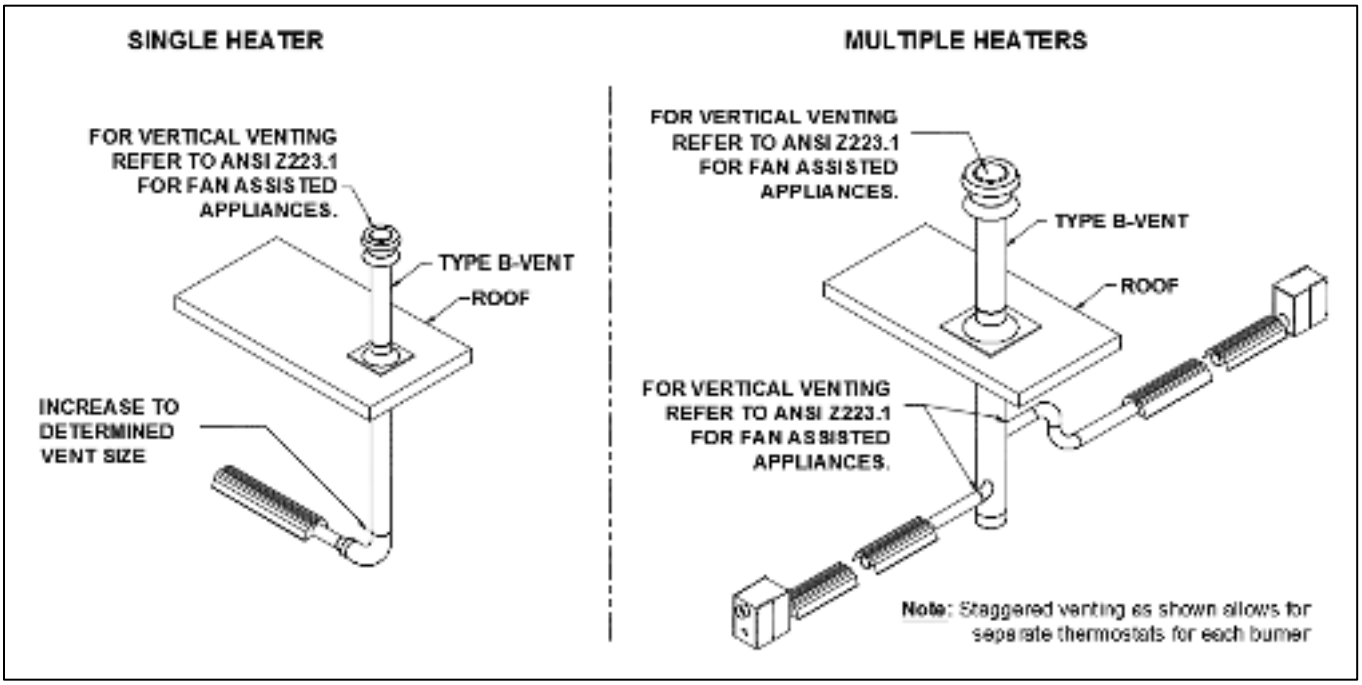


Figure 24: Common Vertical Venting

Note: Horizontally vented heaters must be individually vented and cannot use a common vent.

Combustion Air Supply (Optional)

- An outside combustion air supply is strongly recommended if the building space encloses a negative pressure due to exhaust etc. or if the building contains materials which would expose the heater to halogenated hydrocarbon atmospheres.
- The outside air terminal must be of an approved type, and should be located at an elevation equal to or below the vent terminal elevation to prevent back-venting of flue gases into the burner compartment.
- Install single wall pipe or PVC pipe and fittings with a 12” linear section of flexible duct to allow movement of the heater. *Do not use flexible duct throughout the entire length of fresh air duct. This may cause nuisance air switch tripping.*

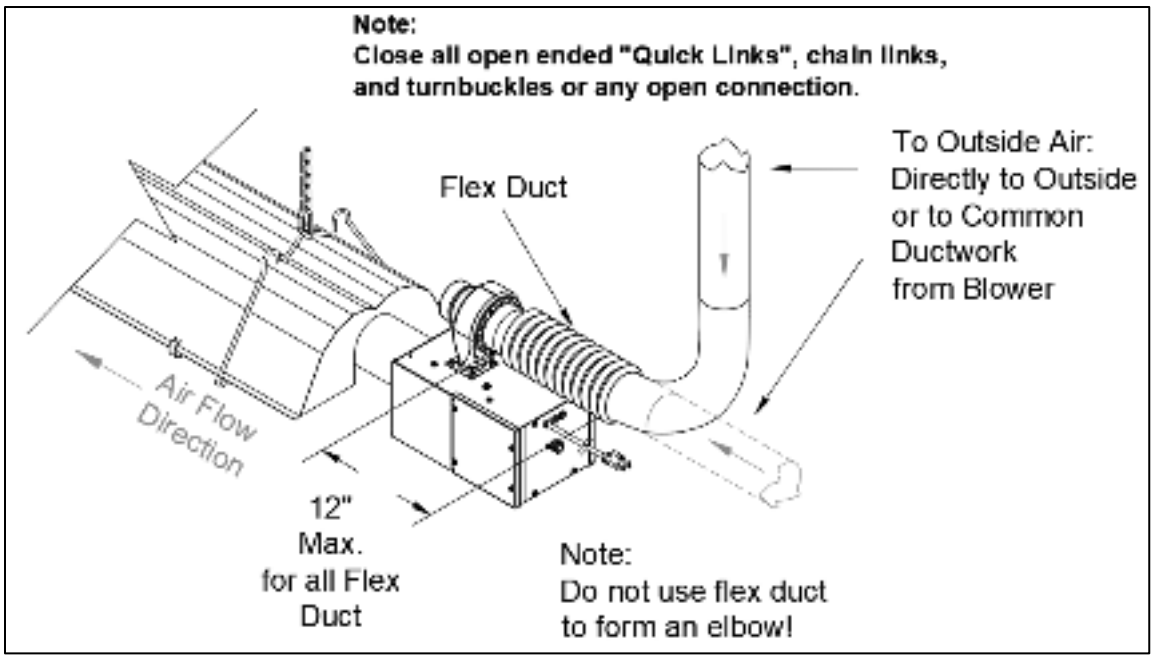


Figure 25: Installation of Outside Air as supply for Combustion

Electrical Wiring

Heaters are normally controlled by line voltage (120V) or low voltage (24V) thermostats. They are both wired directly. In all cases, heaters must be grounded in accordance with the National Electric Code, ANSI/NFPA 70 in the USA, and the Canadian Electric Code, CSA C22.1 in Canada, and must comply with all local requirements. Heaters may also be controlled with a manual line switch or timer switch in place of the thermostat. Refer to Figure 28 & 29 for guidance on electrical wiring of heaters.

If any of the original wire as supplied with the heater must be replaced, it must be replaced with wiring having a rating of at least 105°C temperature service and 600 volts capability.

UA, UX Models

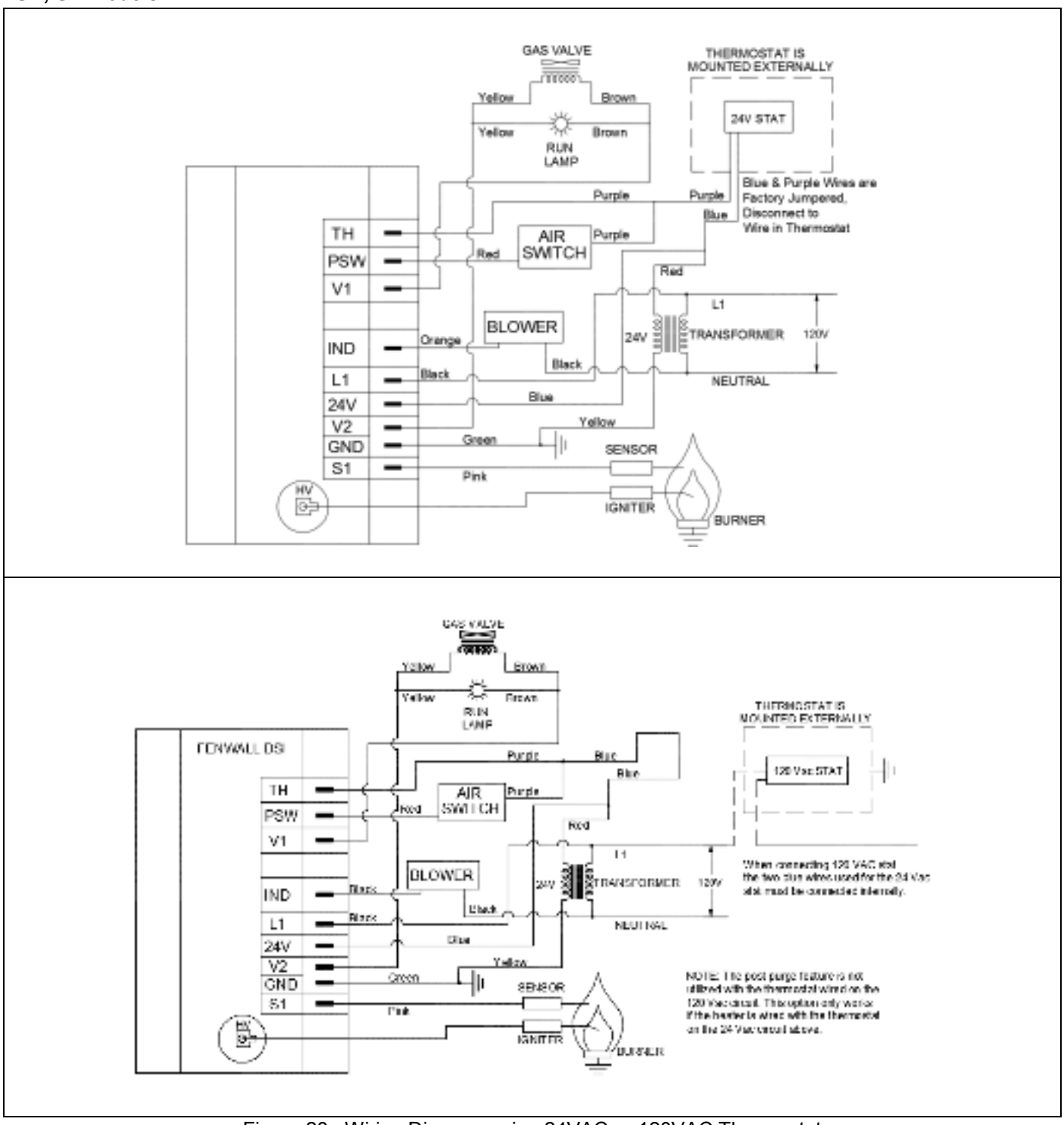


Figure 28: Wiring Diagram using 24VAC or 120VAC Thermostat

UXR Models Only

The following wiring diagram is for UXR models only

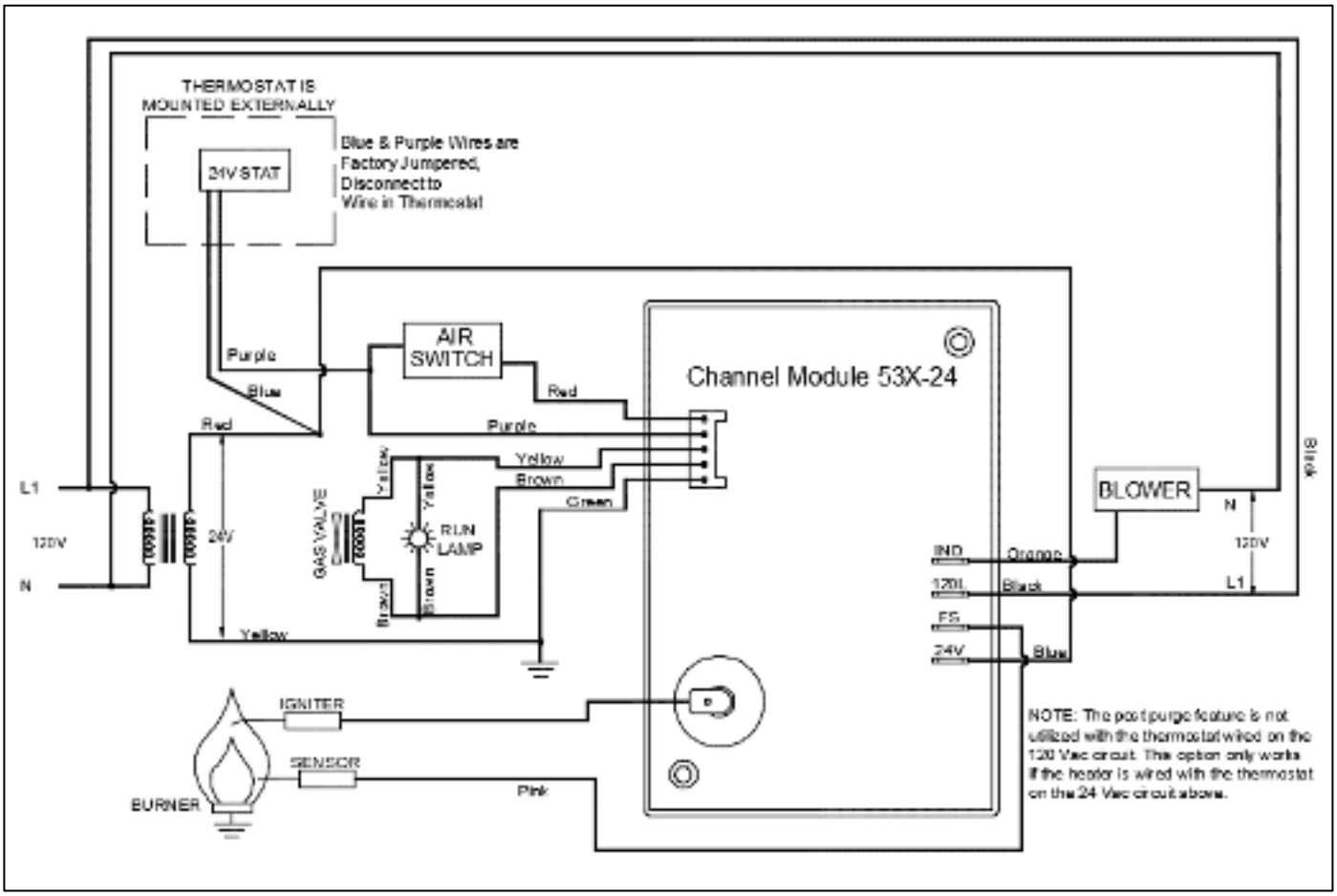


Figure 29: UXR 24VAC Wiring Diagram