

Brant Radiant Heaters, Ltd.

MP Series

Gas-Fired Infrared Tube Heater



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. Une installation, un réglage, une modification, une réparation ou un entretien incorrect peut entraîner des dommages matériel, des blessures ou la mort. Lisez attentivement les instructions d'installation, de fonctionnement et d'entretien avant de procéder à l'installation ou à l'entretien de cet équipement.

⚠ WARNING



Not for residential use! This heater is **NOT** approved for use in any residential application. This includes, but is not limited to, attached garages, solariums, living quarters, etc. Installation in residential spaces may result in property damage, asphyxiation, serious injury or death. Consult your local fire marshall and/or insurance carrier if unsure of your application.

Interdit pour usage résidentiel. Ne pas utiliser cet appareil à la maison, dans les chambres à coucher, dans les garages attenants, etc.



This is **NOT** an explosion proof heater. Where there is a possibility of exposure to flammable vapors, consult the local fire marshall, the fire insurance carrier and other authorities for approval of proposed installation.

Cet émetteur n'est pas un appareil antideflagrant. Lorsqu'il y a risque de contact avec des vapeurs inflammables, consulter le commissaire local des incendies, la compagnie d'assurance incendie ou tout autre autorité compétente pour approbation de l'installation.



Storage of gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance may result in fire or explosion. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Always maintain published clearance to combustibles.

Il est interdit d'utiliser des liquides inflammables ou dégager des vapeurs inflammables à proximité de tout appareil fonctionnant au gaz.

For Your Safety

If you smell gas:

- Open windows.
- Do not touch electrical switches.
- Extinguish any open flame.
- Do not try to light any appliances.
- Immediately call your gas supplier from a neighbour's phone.

Consignes De Sécurité

Si vous sentez une odeur de gaz:

- Ouvrez les fenêtres.
- Ne touchez pas aux interrupteurs électriques.
- Éteignez toute flamme nue.
- Contactez immédiatement votre compagnie de gaz.

Keep these instructions for future reference.

Form #: LIOBRHMP 02/12

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1.0 Introduction

Overview

The intent of this manual is to provide information regarding general safety, installation, operation and maintenance of the tube heater. You must read, and understand, the instructions and safety warnings in this manual before installing the tube heater. Additional literature on this and other products is available at www.brantradiant.com.

Heater Components

Prior to installation, verify that the heater's gas type and voltage (as listed on the rating plate) match that of your application. Also verify that you have received all heater contents included with your tube heater. Reference page 60 for a list of the kit contents for your model heater. Materials not included in the heater kit contents (e.g., screws, vent material, terminals, etc.) are the responsibility of the installer. Notify your product representative or Brant Radiant Heaters Ltd. of any discrepancy or missing kit contents prior to installing unit.

Specifications

Chart 1.1 • Specifications

Model Number	Gas Type (Select one)	Blast Mode Rate (BTU/h Input)	Standard Modulating Range (BTU/h Input)	Straight Length	U-Tube Length	Min. Dist. From Burner to Elbow or U-bend	Standard Weight (lbs.)	Stainless Steel Weight (lbs.)	Recommended Mounting Height	Combustion Chamber (Black Coated)	Radiant Emitter Tube(s) (Black Coated)	36" Baffle Pieces
MP-25-80	N or LP	85,000	52,000 - 80,000	26'-9"	13'-1"	10 ft.	120	N/A	12' to 20'	Alum	Alum	5
MP-30-80	N or LP	85,000	52,000 - 80,000	31'-5"	**17'-9"	10 ft.	160	195	12' to 20'	Alum	Alum	4
MP-30-115	N or LP	120,000	75,000 - 115,000	31'-5"	**17'-9"	15 ft.	160	N/A	14' to 22'	Alum	Alum	5
MP-40-80	N or LP	85,000	52,000 - 80,000	41'-1"	22'-9"	10 ft.	190	235	12' to 20'	Alum	Alum	3
MP-40-115	N or LP	120,000	75,000 - 115,000	41'-1"	22'-9"	15 ft.	190	235	15' to 25'	Alum	Alum	4
MP-40-150	N or LP	155,000	97,500 - 150,000	41'-1"	22'-9"	20 ft.	190	235	15' to 28'	Titan	Alum	5
MP-50-115	N or LP	120,000	75,000 - 115,000	50'-9"	**27'-5"	15 ft.	235	290	15' to 28'	Alum	Alum	3
MP-50-150	N or LP	155,000	97,500 - 150,000	50'-9"	**27'-5"	20 ft.	235	290	17' to 30'	Titan	Alum	4
MP-50-200	N or LP	200,000	130,000 - 194,000	50'-9"	**27'-5"	25 ft.	235	N/A	19' to 37'	Titan	Alum	2
MP-60-150	N or LP	155,000	97,500 - 150,000	60'-5"	32'-5"	20 ft.	265	330	17' to 32'	Titan	Alum	3
MP-60-200	N or LP	200,000	130,000 - 194,000	60'-5"	32'-5"	25 ft.	265	N/A	19' to 37'	Titan	Alum	1
MP-70-200	N or LP	200,000	130,000 - 194,000	70'-1"	**37'-3"	25 ft.	300	N/A	19' to 42'	Titan	Alum	1

* Model requires stainless steel tube clamp (P/N: TP-220) to be located at the seam between the primary combustion chamber and the secondary combustion tube downstream of the burner control box.

** Model requires 5EA-SUB accessory package when installing in a 'U' configuration (P/N: TF1B).

IMPORTANT: Reference box label to determine the number of required baffles sections for each model heater.

Titan = Black coated titanium stabilized aluminized steel.

Alum = Black coated aluminized treated steel.

2.0 Safety

⚠ WARNING



This heater must be installed and serviced by a trained gas installation and service personnel only! Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

Warning Symbols

Safety is the most important consideration during installation, operation and maintenance of the tube heater. You will see the following symbols and signal words when there is a hazard related to safety or property damage.

⚠ WARNING

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

⚠ CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Notice indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Applications

This is **not** an explosion proof heater. No tube heater may be used in a Class 1 or Class 2 Explosive Environment. Consult your local fire Marshall, insurance carrier and other authorities for approval if the proposed installation is in question.

Commercial / Industrial

Unless otherwise indicated, tube heaters are designed and certified for use in industrial and commercial buildings, such as warehouses, manufacturing plants, aircraft hangars and vehicle maintenance shops. For maximum safety the building must be evaluated for potential problems before installing the heating system. A critical safety factor to consider before installation is the clearance to combustibles.

⚠ WARNING

Not For Residential Use. Installation of a commercial tube heater system in residential indoor spaces may result in property damage, serious injury or death.

Standards, Certifications and Government Regulations

Installation of this tube heater must comply with all applicable local, provincial and national specifications, regulations and building codes. Contact the local building inspector and/or fire marshall for guidance.

In the absence of local codes, the installation must conform to the latest edition of CAN/CGA B149.1 Canadian Electrical Code C22.1

Building Type

Public Garages:

This heater must be installed in accordance with the latest edition of CAN/CGA B149.1

- Heaters must not be installed less than 8 ft. (2.4 m) above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater.
- When installed over hoists, minimum clearances to combustibles must be maintained from the upper most point of objects on the hoist.

Aircraft Hangars:

This heater must be installed in accordance with the latest edition of CAN/CGA B149.1

- In areas adjoining the aircraft storage area (e.g., shops, offices) the bottom of heaters shall be installed no less than 8 ft. (2.4 m) above the floor.
- Suspended or elevated heaters shall be located in spaces where they shall not be subject to damage by aircraft, cranes, movable scaffolding or other objects.

Provisions shall be made to assure accessibility to suspended tube heaters for recurrent maintenance purposes.

Building Location

High Altitude:

Installation of this tube heater is approved, without modifications, for elevations up to 6,000 feet (1,829 m) MSL (sea level). Contact the factory for installations above these elevations.

The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.

Non-Standard BTU Gas:

Unless otherwise noted on the rating plate, this infrared heater is designed and orificed to operate on standard BTU gas. Contact the factory if utilizing non-standard BTU gas.

Building Aspect

Electrical:

The tube heater must be electrically grounded in accordance with the Canadian Electrical Code CSA C22.1 Part 1 (latest edition).

Venting:

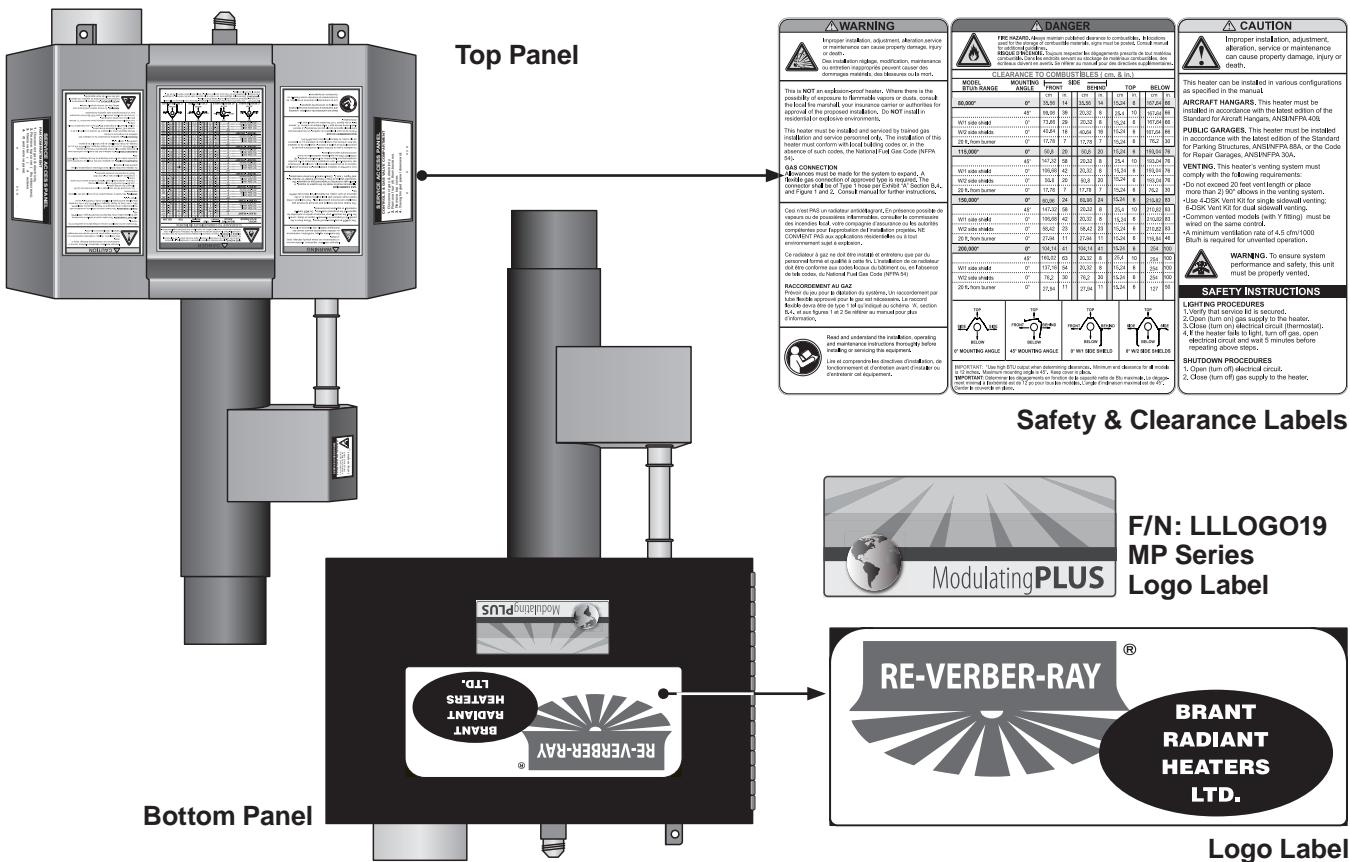
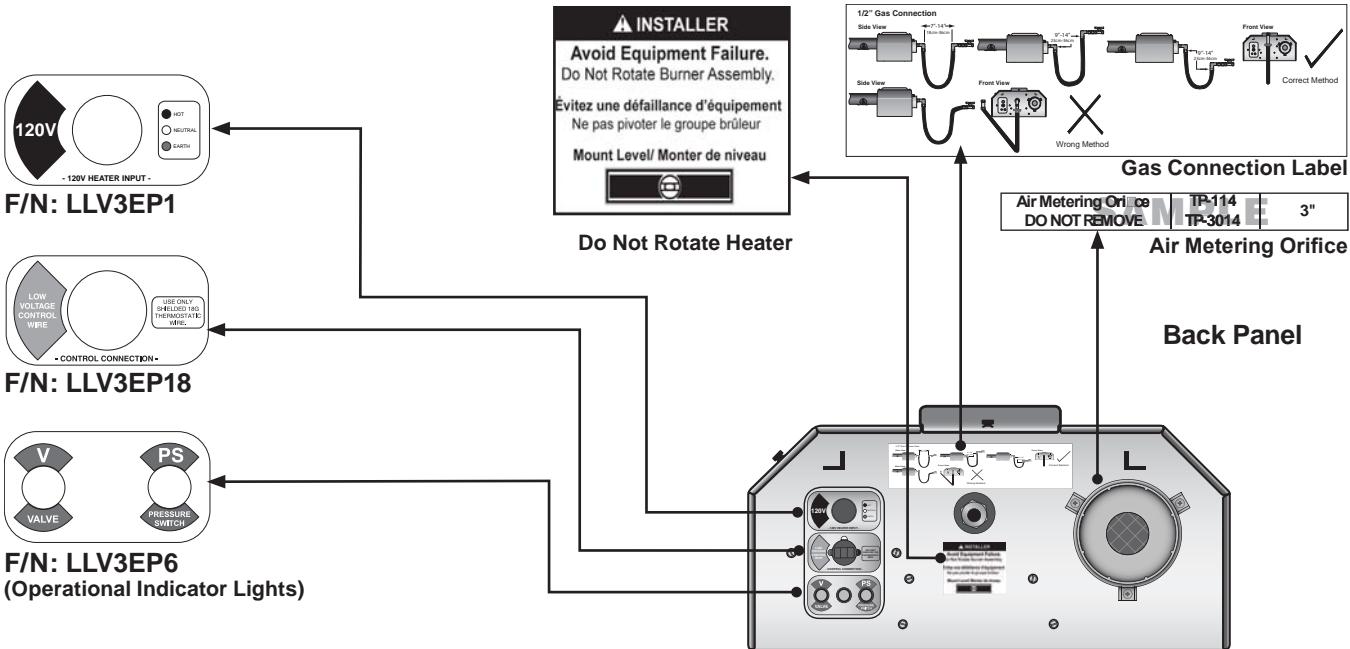
Venting must be installed in accordance with the requirements within this manual and to CAN/CGA B149.1 Installation Codes for Gas Burning Appliances.



Read and understand all safety information and warnings in this manual before installation, operation and maintenance of the radiant tube heater system.

Safety Labels and Their Locations

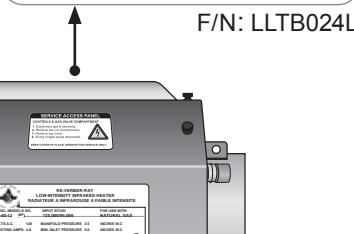
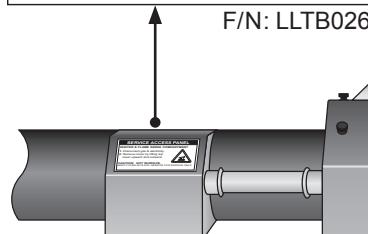
Product safety signs or labels should be replaced by the product user when they no longer are legible. Contact either your local distributor or the product manufacturer for obtaining replacement signs or labels.



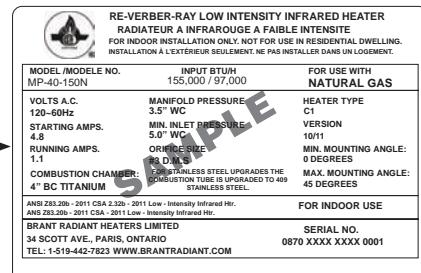
F/N: LLLOGO19
MP Series
Logo Label



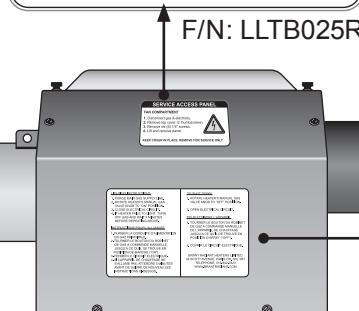
Logo Label



Controls Compartment



Rating Plate

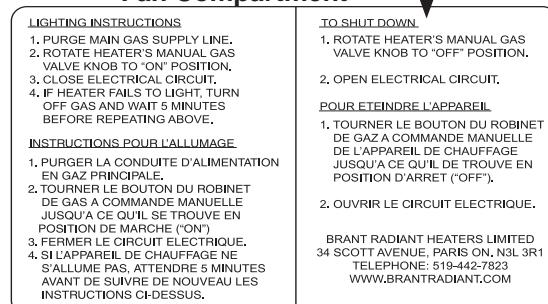


Fan Compartment

16" Burner Tube

Combustion Chamber

Radiant Tube(s)



Lighting /Shut Down Instructions Label



Yellow Titanium Alloy Tag
(150,000 BTU/H models and greater)

Clearance to Combustibles

! WARNING



Placement of explosive objects, flammable objects, liquids and vapors close to the heater may result in explosion, fire, property damage, serious injury or death. Do not store or use explosive objects, liquids or vapor in the vicinity of the heater.

Clearance to combustibles is defined as the minimum distance that must exist between the tube surface, or reflector, and any combustible items (see Figure 1.1). It also pertains to the distance that must be maintained from moving objects around the tube heater.

Clearance to Combustibles

⚠ WARNING



Placement of explosive objects, flammable objects, liquids and vapors close to the heater may result in explosion, fire, property damage, serious injury or death. Do not store or use explosive objects, liquids and vapor in the vicinity of the heater.

Hazards:

For maximum safety the building must be evaluated for hazards before installing the heating system. Examples of hazards include, but are not limited to:

- Gas and electrical lines
- Combustible and explosive materials
- Chemical storage areas
- Areas of high chemical fume concentrations
- Provisions for accessibility to the heater
- Adequate clearances around air openings
- Combustion and ventilating air supply
- Vehicle parking areas
- Vehicles with lifts or cranes
- Storage areas with stacked materials
- Lights
- Sprinkler heads
- Overhead doors and tracks
- Dirty, contaminated environment

If you are unsure of the potential hazards, consult your local fire Marshall, fire insurance carrier or other qualified authorities on the installation of gas fired tube heaters for approval of the proposed installation.

A critical safety factor to consider before installation is the clearances to combustibles. **Clearance to combustibles** is defined as *the minimum distance you must have between the tube surface, or reflector, and the combustible item*. Considerations must also be made for moving objects around the tube heater. The following is a partial list of items to maintain clearances from:

Combustible items:

- Wood • Paint
- Paper • Parked vehicles
- Fabric • Gasoline
- Chemicals • Storage racks

Moving Objects:

- Overhead doors
- Vehicle lifts
- Cranes
- Hoists

IMPORTANT: Fire sprinkler heads must be located at an appropriate distance from the heater to avoid an inadvertent discharge. This distance may exceed the published clearance to combustibles. Certain applications may require the use of high temperature sprinkler heads or the relocation of the heaters.

⚠ CAUTION

Fire sprinkler systems containing propylene glycol, antifreeze or other potentially flammable substances shall not to be used in conjunction with this heater without careful consideration for and avoidance of inadvertent discharge hazards. For further information consult NFPA 13. Always observe applicable provinces and local codes.

When installing the tube heater system, clearances to combustibles for the model tube heater and configuration must be maintained. Refer to Chart 2.1 below to determine the required distances for your model.

Chart 2.1 • Clearance to Combustibles in Centimeters (See Figure 1.1 for Mounting Angles)

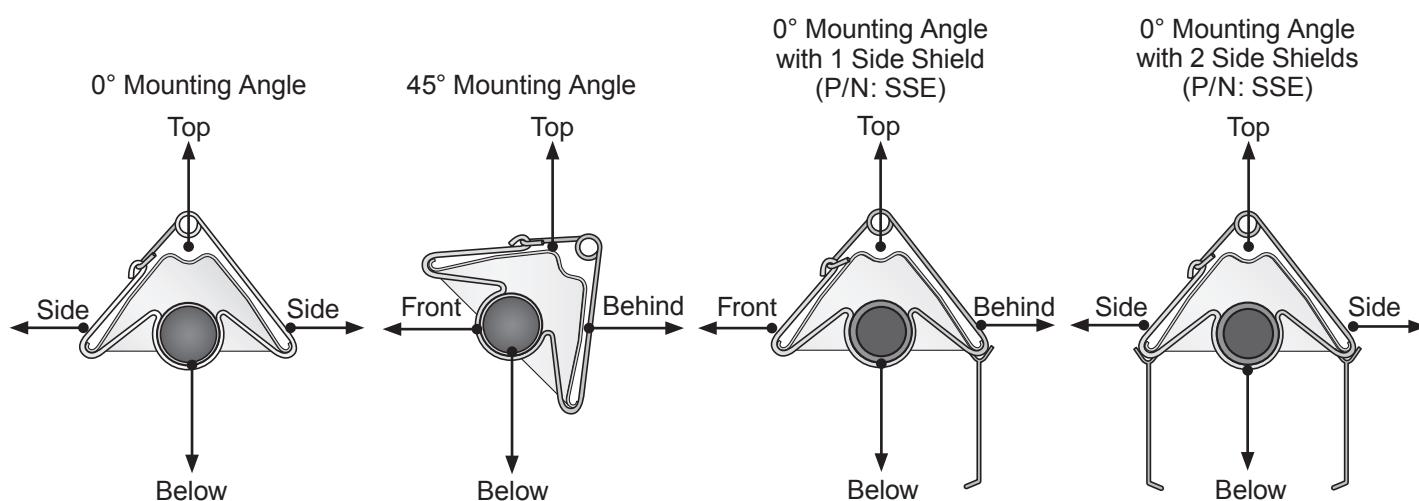
Model Number	Mounting Angle*	Sides			Below
		Front	Behind	Top	
MP-(25,30,40)-80[N,P] with 1 side shield with 2 side shields 20 ft. from burner	0°	35.56	35.56	15.24	167.64
	45°	99.06	20.32	25.4	167.64
	0°	73.66	20.32	15.24	167.64
	0°	40.64	40.64	15.24	167.64
	0°	17.78	17.78	15.24	76.2
MP-(30,40,50)-115[N,P] with 1 side shield with 2 side shields 20 ft. from burner	0°	50.8	50.8	15.24	193.04
	45°	147.32	20.32	25.4	193.04
	0°	106.68	20.32	15.24	193.04
	0°	50.8	50.8	15.24	193.04
	0°	17.78	17.78	15.24	76.2
MP-(40,50,60)-150[N,P] with 1 side shield with 2 side shields 20 ft. from burner	0°	60.96	60.96	15.24	210.82
	45°	147.32	20.32	25.4	210.82
	0°	106.68	20.32	15.24	210.82
	0°	58.42	58.42	15.24	210.82
	0°	27.94	27.94	15.24	116.84
MP-(50,60,70)-200[N,P] with 1 side shield with 2 side shields 20 ft. from burner	0°	104.14	104.14	15.24	254
	45°	160.02	20.32	25.4	254
	0°	137.16	20.32	15.24	254
	0°	76.2	76.2	15.24	254
	0°	27.94	27.94	15.24	127

The minimum end clearance for all models is 12 inches.

* Maximum mounting angle is 45°. Heaters mounted on an angle between 0° to 45° must maintain clearances posted for 0° or 45°; whichever is greater.

The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.

Figure 2.1 • Mounting Angles



3.0 Installation

⚠ WARNING



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

Read and understand, the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

Only trained, qualified gas installation and service personnel may install or service this equipment.

Design Considerations and Prechecks

Placement of infrared heaters is influenced by many factors. Aside from safety factors, considerations such as the number of heater or vent elbows that are allowed, maximum vent lengths, ducting of combustion air and combining exhaust vents are a few examples. This installation manual, along with national, provincial and local codes address these issues. It is critical that you read, understand and follow all guidelines and instructions.

To ensure a properly designed heating system, a layout should be developed for the correct placement of the burner control box, tubes, vents and combustion air intake ducts. Inspect and evaluate the mounting conditions, vent locations, gas supply and wiring.

When designing an infrared radiant heating system, consider the following:

- Has the building's heat loss been evaluated?
- Does the design meet the needs of the space?
- Have recommended mounting heights been observed?
- Have all clearance to combustibles situations been observed?
- Is the supply (burner) end of the heater located where more heat is required?
- Is it best to offset the heaters and/or rotate the reflectors towards the heat zone?
- Are extra guards, side shields, 'U' or 'L' reflector covers required?
- Does the heater require outside fresh air for combustion?
- Is the environment harsh or contaminated (requiring outside air for combustion)?
- Are chemicals or vapors a concern (requiring outside air for combustion or additional ventilation)?

When heated, materials high in hydrocarbons (solvents, paint thinner, mineral spirits, formaldehydes, etc.) can evaporate. This may result in odors or fumes being emitted into the environment. To correct this problem, clean the area and/or introduce additional ventilation. The heaters themselves, when installed and serviced in accordance with the installation manual, do not emit foul odors into the environment.

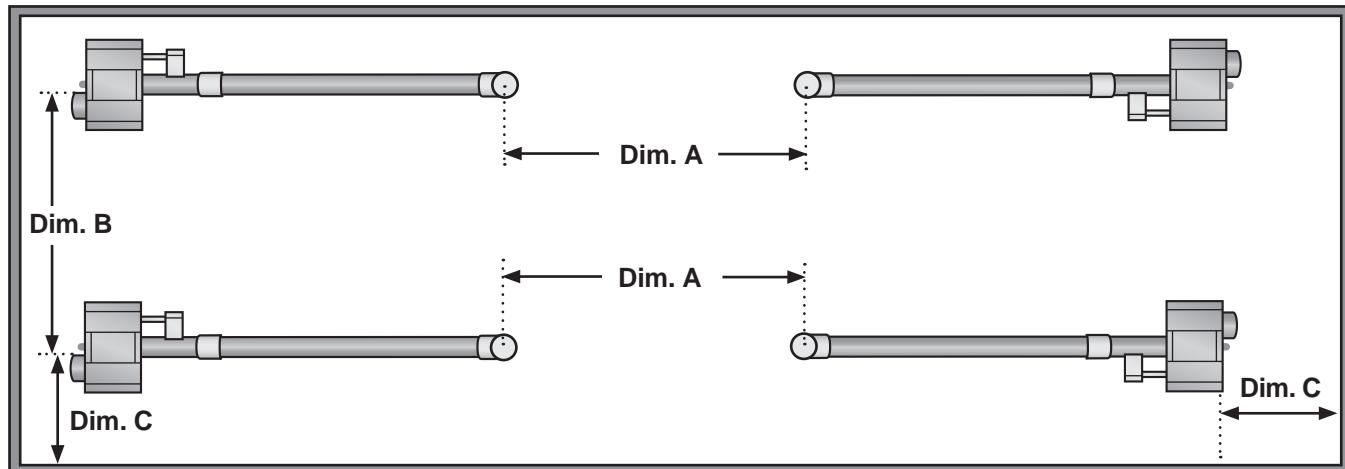
Chart 3.1 • Recommended Mounting Heights and Coverages

NOTE: This chart is provided as a guideline. Actual conditions may dictate variation for this data.

Model	BTU Range	Recommended Mounting Height (ft.)	Coverage Area Straight Config. (LxW)	Coverage Area U-Tube Config. (LxW)	Distance Between Heaters (ft.) Dimension A	Distance Between Heater Rows (ft.) Dimension B	Maximum Distance Between Heaters and Wall (ft.) Dimension C
25 ft.	80 MBH	12' - 20'	22' x 15'	N/A	20' - 30'	30' - 50'	18'
30 ft.	80 MBH	12' - 20'	22' x 15	N/A	20' - 30'	30' - 50'	18'
	115 MBH	12' - 20'	33' x 18'	18' x 15'	20' - 30'	30' - 50'	20'
40 ft.	80 MBH	10' - 16'	40' x 16'	22' x 14'	10' - 20'	20' - 40'	20'
	115 MBH	12' - 20'	33' x 18'	18' x 15'	20' - 30'	30' - 50'	18'
	150 MBH	16' - 30'	45' x 26'	24' x 20'	30' - 40'	40' - 60'	25'
50 ft.	115 MBH	15' - 25'	55' x 24'	28' x 19'	20' - 30'	30' - 50'	25'
	150-200 MBH	16' - 30'	56' x 30'	29' x 23'	30' - 40'	40' - 60'	25'
60 ft.	150-200 MBH	17' - 40'	67' x 34'	34' x 26'	30' - 40'	40' - 60'	25'
70 ft.	200 MBH	17' - 40'	78' x 38'	39' x 29'	30' - 40'	40' - 60'	30'

Factory recommended mounting heights are listed as a guideline. If infrared heaters are mounted too low or too high, they may result in discomfort or lack of heat. Brant Radiant Heaters Ltd. generally recommends observing the recommended mounting heights to optimize comfort conditions. However, certain applications such as spot heating, freeze protection, outdoor patio heating or very high ceilings may result in the heaters being mounted outside of the factory recommended mounting heights.

Figure 3.1 • Mounting Height Dimensions (see Chart 3.1 for measurements)



Note: Dimensions A, B & C are based upon heaters hung at the factory recommended mounting height.

Hanger Placement and Suspension

⚠ WARNING



Improper suspension of the tube heater may result in collapse and being crushed. Always suspend from a permanent part of the building structure that can evenly support the total force and weight of the heater.



Failure to maintain minimum clearance to combustibles may result in fire and/or explosion, property damage, serious injury or death. Always maintain minimum clearances and post Clearance Safety Limit signs (P/N: BR-SIGN) where needed.

Suspension of the heater must conform to applicable codes referenced in the Safety section and these instructions.

① Lay all radiant tubing out in the following order. Position tubes in approximate location (see figure 3.2).

- 10 ft. primary combustion chamber.
- Radiant emitter tubes.

Important! 150,000-200,000 BTU/h models must use the 10 ft. titanium alloy treated combustion chamber as the first tube downstream of the burner control box. The combustion chamber has a yellow identification label located on the swaged end of the tube (remove label prior to starting up heater).

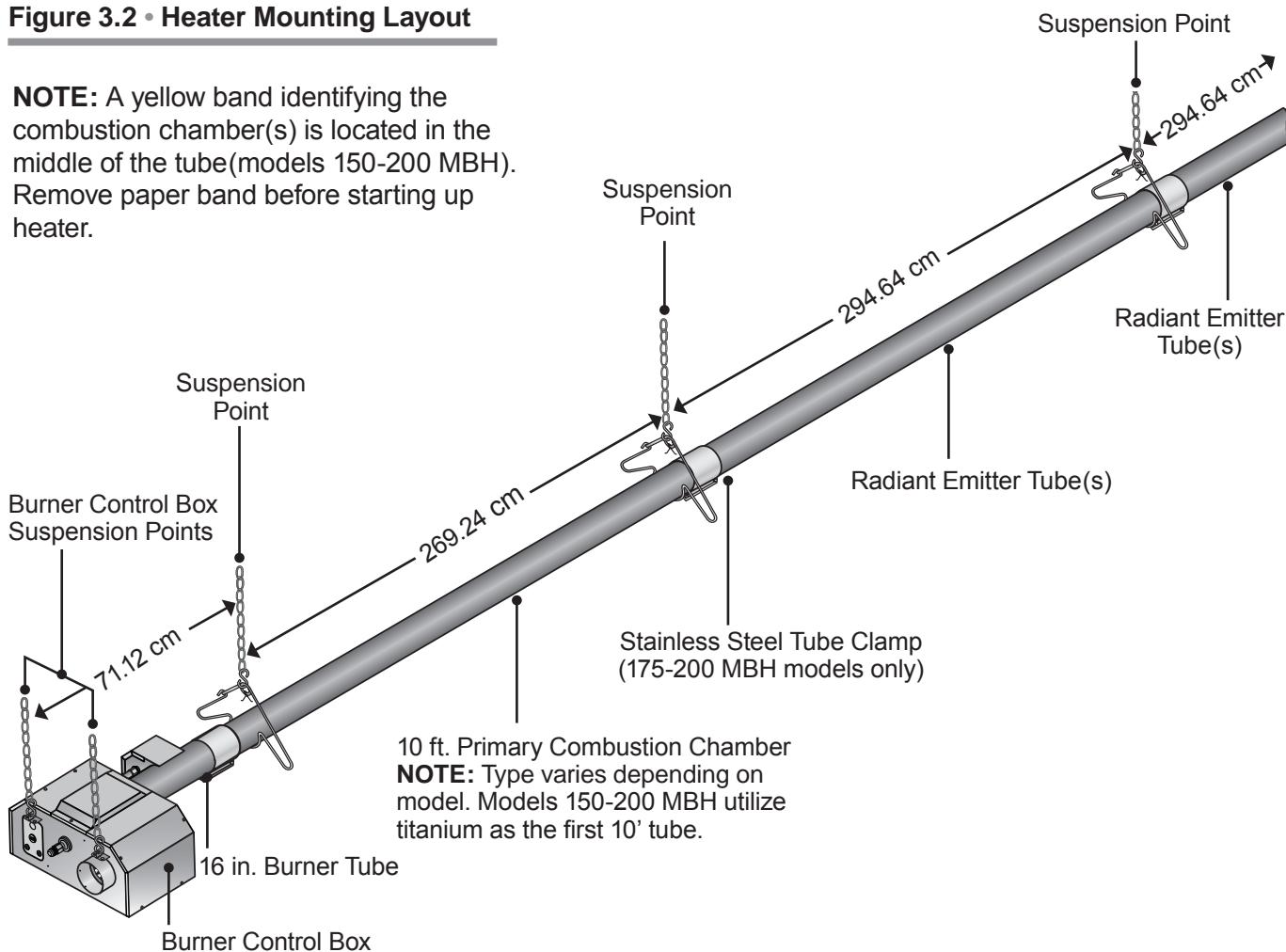
② Mark locations for hanging points.

NOTE: If the available hanging points do not allow for the recommended spacing then additional hangers (P/N: TP-19B) may be necessary.

- The spacing between the burner control box mounting brackets and the first hanger should be approximately 2'-4"(0.7 m).
- The space between the first two hangers placed on the first tube, should be approximately 8'-10"(2.7 m).
- The space between hangers thereafter, one per tube, should be approximately 9'-8"(3 m).

Figure 3.2 • Heater Mounting Layout

NOTE: A yellow band identifying the combustion chamber(s) is located in the middle of the tube (models 150-200 MBH). Remove paper band before starting up heater.

**Chart 3.2 • Heater Mounting Requirements and Weights**

Model	Dimension Straight Configuration	Suspension Points	Control Box Stabilizer	Shipping Weight	Chain Set Qty. Straight Configuration (P/N: THCS)	Chain Set Qty. w/U-bend (TF1B) Configuration	Optional Brass Knuckle (P/N:BK)
MP-25	21'-9" / 261"	3	2	120 lbs.	5	6	3
MP-30	31'-5" / 377"	4	2	160 lbs.	6	8	4
MP-40	41'-1" / 493"	5	2	190 lbs.	7	8	5
MP-50	50'-9" / 609"	6	2	235 lbs.	8	10	6
MP-60	60'-5" / 725"	7	2	265 lbs.	9	10	7
MP-70	70'-1" / 841"	8	2	300 lbs.	10	12	8

Refer to page 18 for U-bend configuration dimensions.

Model requires 5EA-SUB accessory package when installing in a U-shaped configuration.

- ③ Prepare mounting surface, if necessary weld blocks, drill holes (see figure 3.3).

NOTE: The burner control box and radiant tubes should be in straight alignment and level.

- ④ Fasten beam clamp, screw hook or other type of suspension anchor to hanging point.

- ⑤ Attach and close S-Hook (P/N: S-HOOK) and #1 double-loop chain (P/N: THCS) to anchor. Check that it is securely attached. **NOTE:** Threaded rod and turnbuckles may be used.

- ⑥ Attach hangers to chains. Adjust chain lengths until radiant tubing is level and equal weight distribution is achieved. Chains must be straight up and down. Do not install chains at an angle as this can result in tube warpage or separation.

Figure 3.3 • Mounting the Hangers

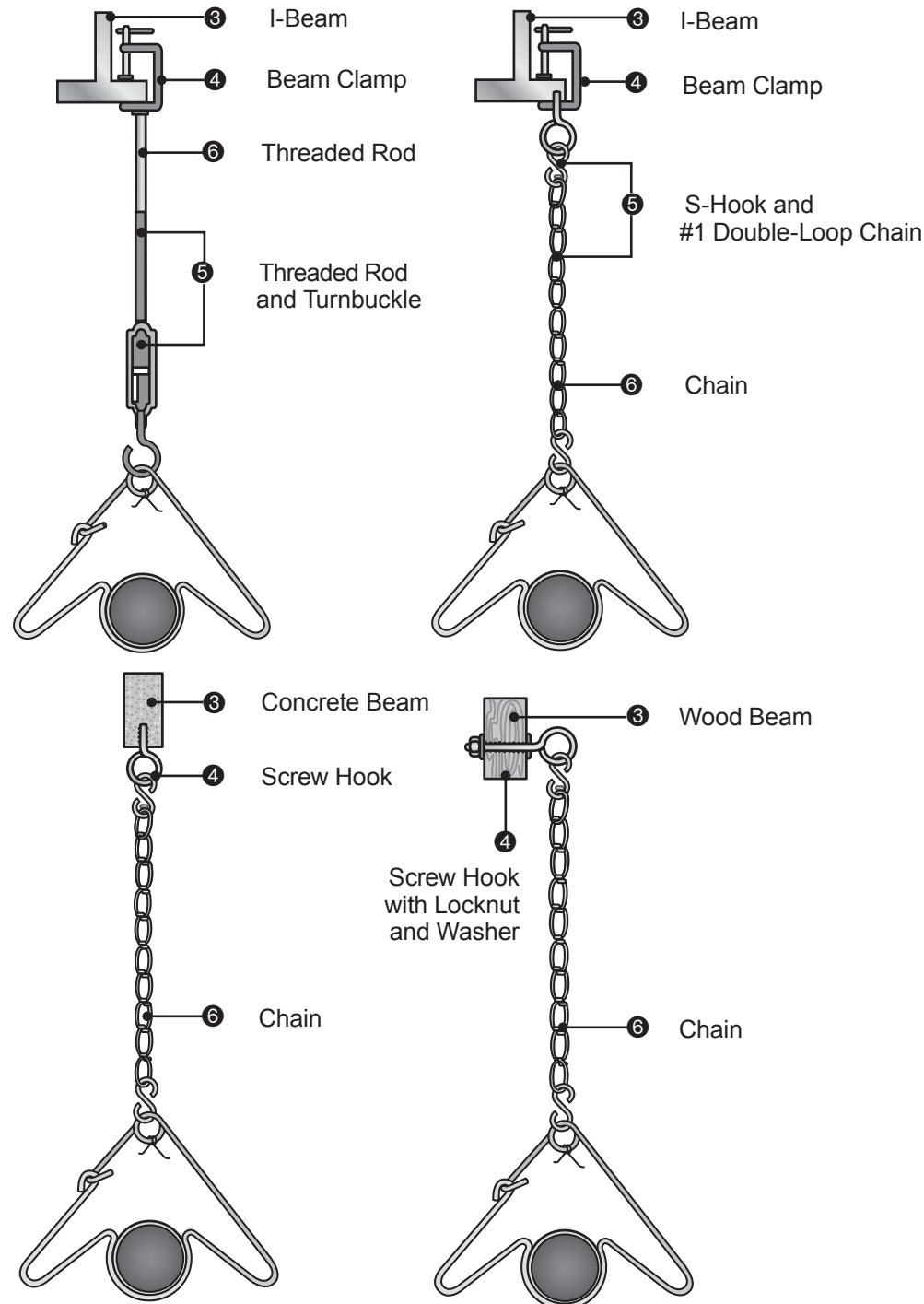
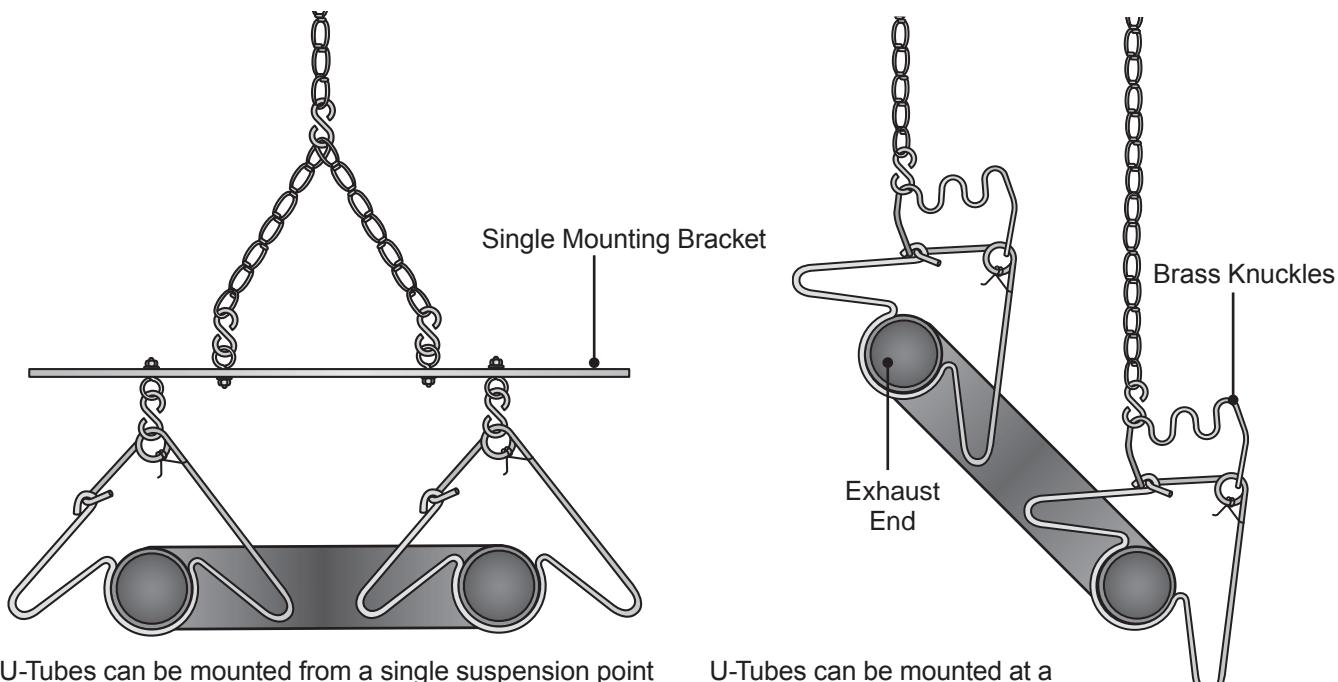
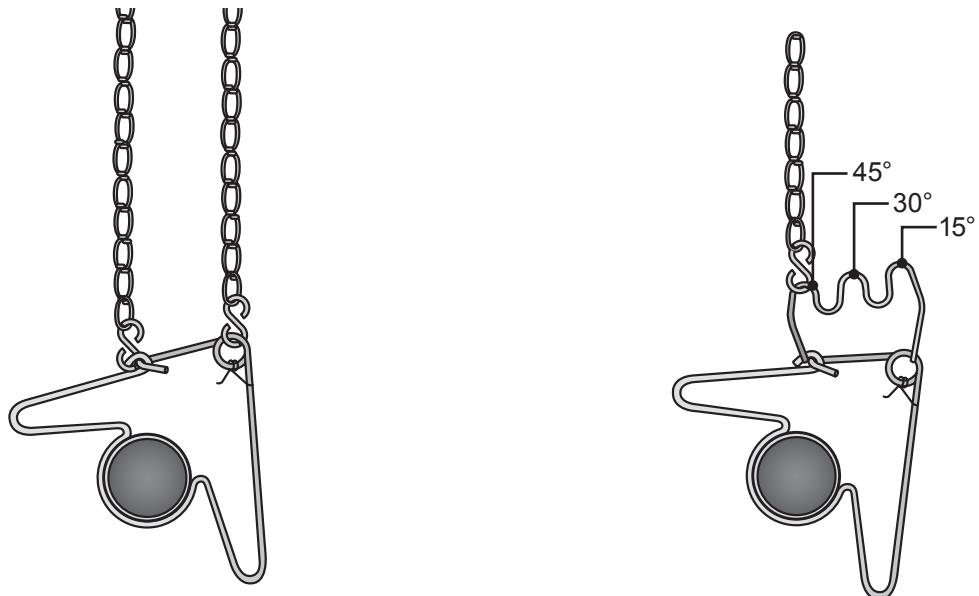


Figure 3.4 • U-Tube Hanger Mounting Options

U-Tubes can be mounted from a single suspension point using a Single Mounting Bracket (P/N: SMB) with five S-hooks and #1 double-loop chains.

U-Tubes can be mounted at a 15, 30 or 45 degree angle with two suspension points, using two Brass Knuckles (P/N: BK) fittings, #1 double-loop chains and S-hooks.

Figure 3.5 • Angled Hanger Mounting Options

For 45 degree hanging angle use two S-hooks and two #1 double-loop chains.

For variety of hanging angles, use the Brass Knuckle (P/N: BK) fitting with a #1 double-loop chain and S-hook.

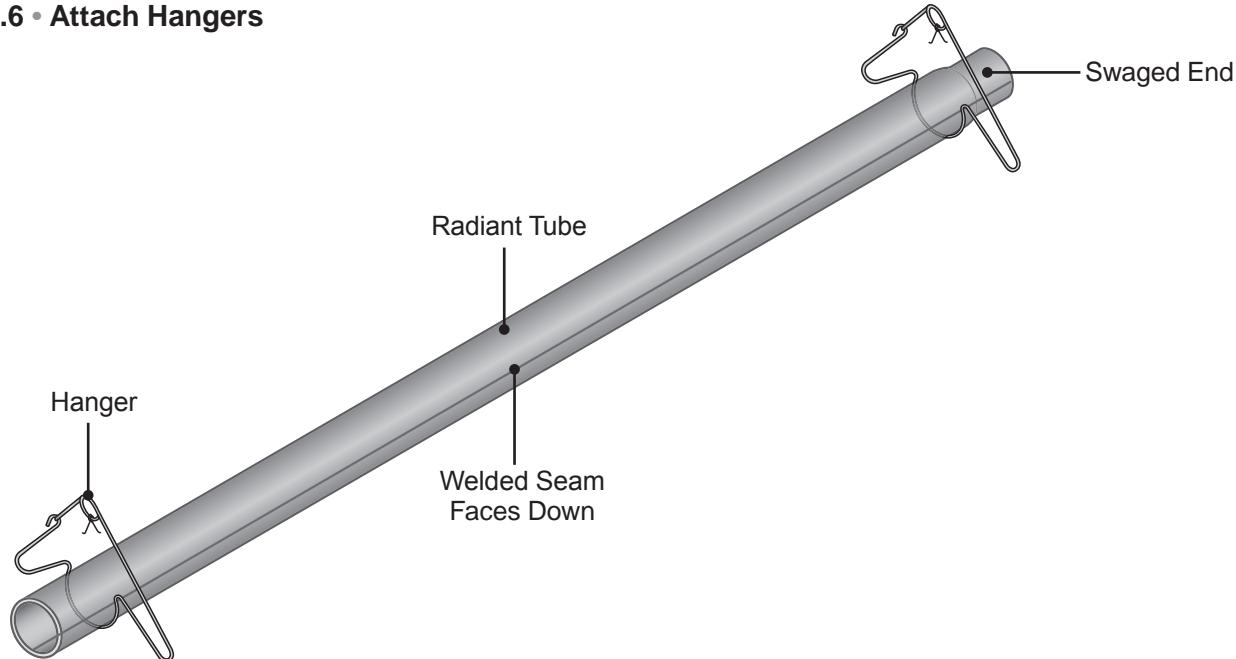
Radiant Tube Assembly

To install the radiant tubes:

- 1 Place tubes in hangers with the welded seam facing downward and the swaged end of the tube towards the exhaust end of the heater system (see figure 3.6).

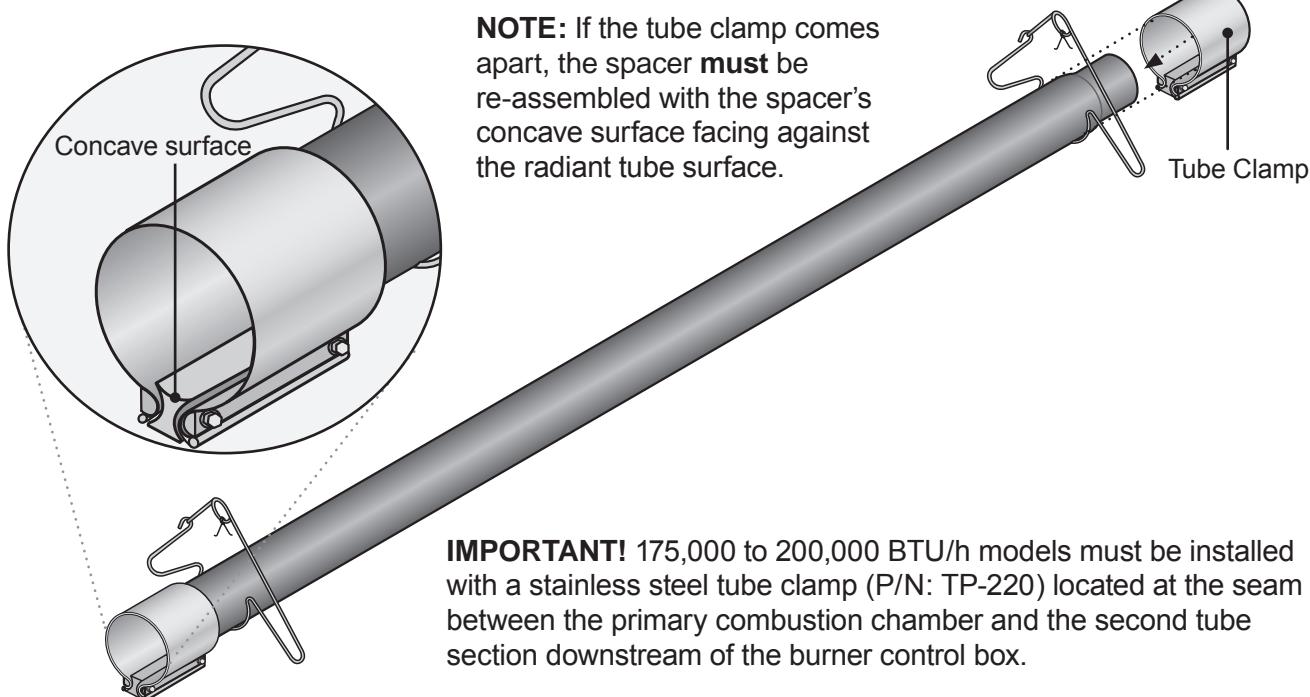
Refer to page 23 for tube installation sequence. Place the combustion chamber as the first tube connected to the burner control box. Models 150-200 MBH utilize a titanium combustion chamber with yellow identification tag.

Figure 3.6 • Attach Hangers

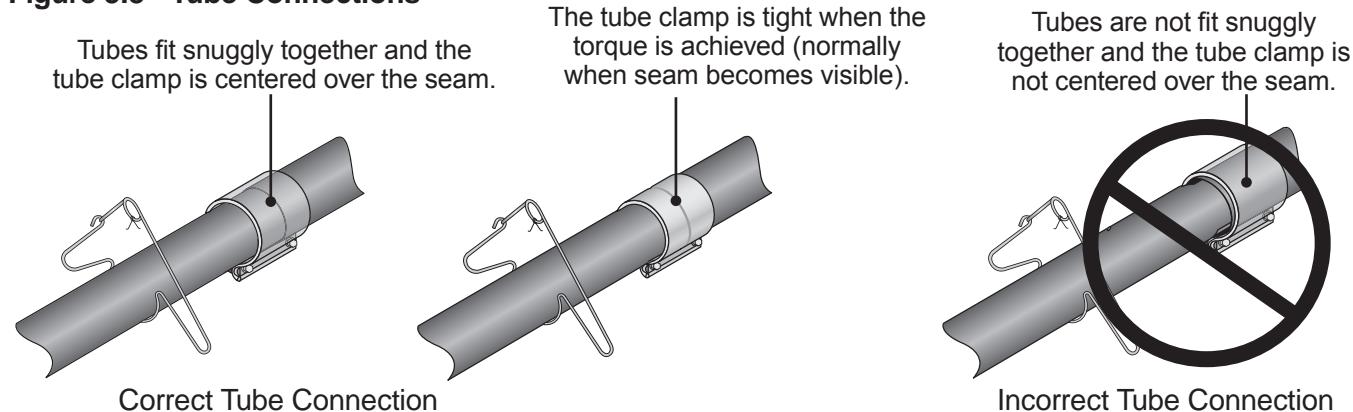


- 2 Slide tube clamps onto radiant tubes (see figure 3.7)

Figure 3.7 • Attach Tube Clamps



- ③ Slip-fit the radiant tube sections together until tightly connected (install the swaged end of each tube towards exhaust end). **NOTE:** If it is difficult to mate the tubes, they may be installed incorrectly.
- ④ Center tube clamps over the seam where two radiant tube sections connect. If necessary, rotate tube clamps so they will not interfere with the reflector end caps during expansion and contraction of the heater.
- ⑤ Tighten tube clamp bolts to secure. When proper compression is obtained (40-60 ft-lbs. torque) the tube seam will create a visible mark on the tube clamp. **NOTE:** Excessive torque may damage the tube clamp.
- ⑥ Determine the location of the burner control box and note the placement of the mounting chains.

Figure 3.8 • Tube Connections

Optional Elbow or U-Bend Accessory Configuration

A 90 degree elbow or 180 degree U-bend accessory fitting may be installed in the radiant tube heating system. Refer to Chart 3.3 on page 18 for minimum distance requirements from the burner control box.

When installing an Elbow or U-Bend Accessory Fitting:

- The top clearance of an uncovered (no reflector) elbow or U-bend accessory fitting to combustibles is 18 in. (0.45 m)
- If operating the heater unvented, separate the intake air to the heater from its exhaust products a minimum of 4 ft., further separation may be necessary. Combustion air may also be supplied.
- A maximum of two 90° elbows or one 180° U-bend can be installed on a heater.
- Remove one 36 in. section of baffle. Refer to baffle assembly section on page 22.

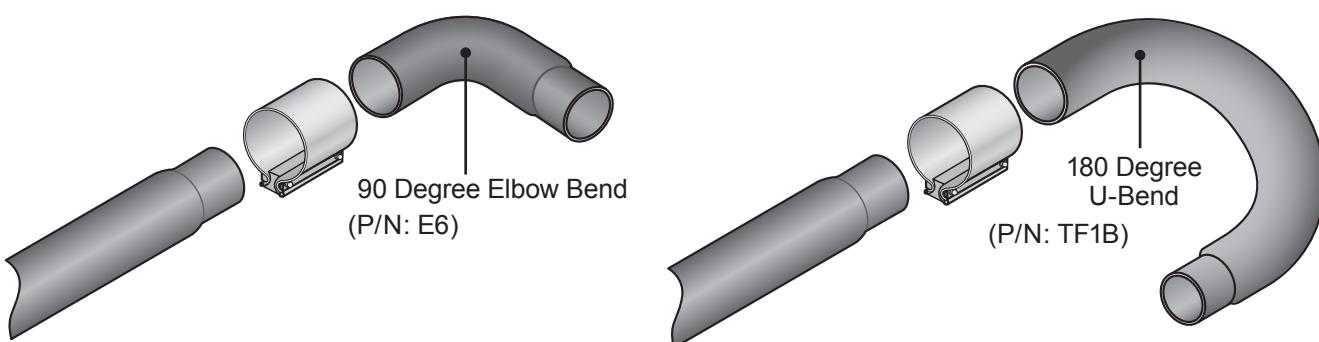
Figure 3.9 • Optional Tube Connections

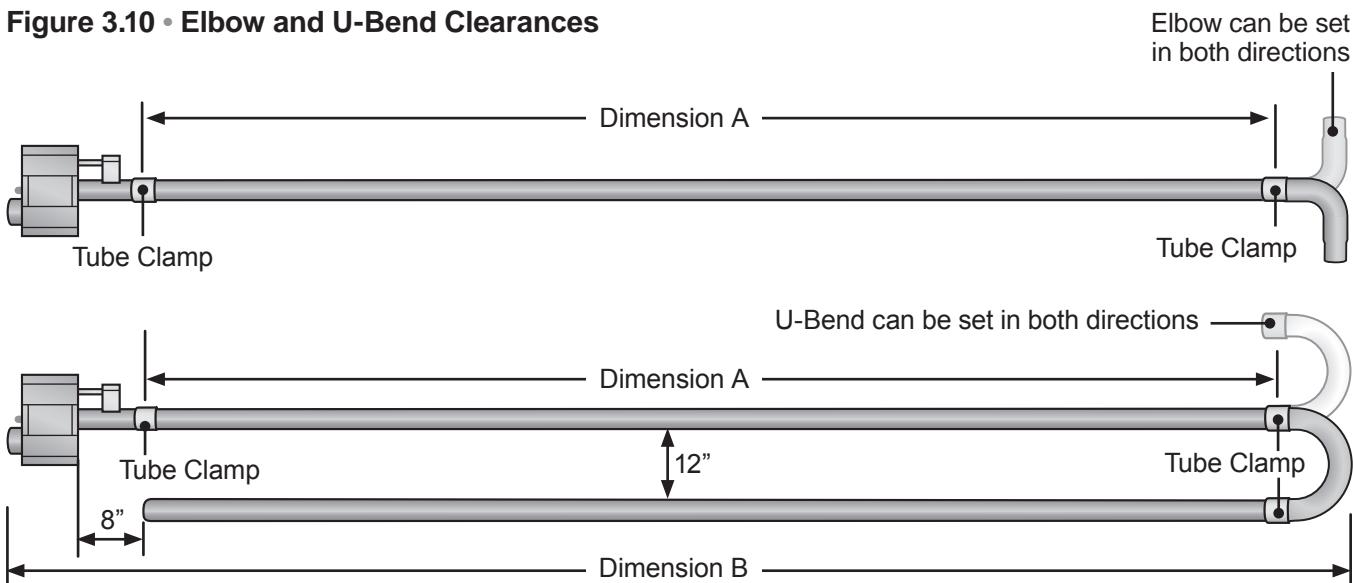
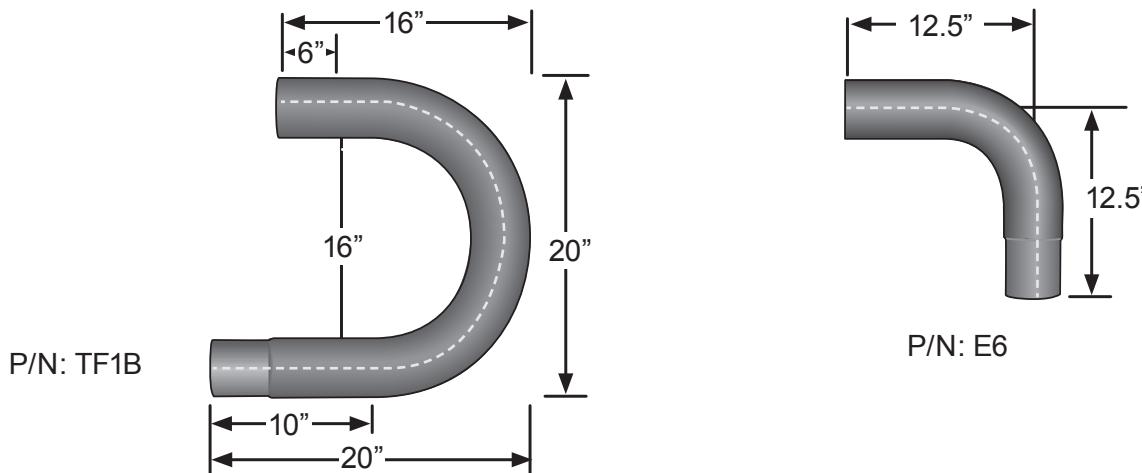
Figure 3.10 • Elbow and U-Bend Clearances**Figure 3.11 • U-Bend and Elbow Dimensions**

Chart 3.3
Minimum Distance From Burner Control Box to Elbow or U-bend Accessory Fitting

Models (MBH)	Dimension A
80	10 ft.
115	15 ft.
150 - 200	20 ft.
200	25 ft.

NOTE: Maintain a 36" minimum distance from vent to combustion air intake on heaters fitted with a U-bend accessory fitting.

Chart 3.4
Overall Dimensions for Heaters Configured With U-Bend (P/N: TF1B)

Model	Dimension B	Notes
MP3-25	13' - 1" / 157"	N/A
MP3-30	17' - 9" / 213"	Requires P/N: 5EA-SUB*
MP3-40	22' - 9" / 273"	N/A
MP3-50	27' - 5" / 329"	Requires P/N 5EA-SUB*
MP3-60.	32' - 5" / 389"	N/A
MP3-70	37' - 3" / 447"	Requires P/N5EA-SUB

* 5EA-SUB may only be ordered at the time of heater production. Field corrections require two (2) TR-60 packages.

Burner Control Box Suspension

Suspending the burner control box must be done in accordance with applicable codes listed in the Safety section and these instructions.

The burner control box must be in straight alignment with all radiant tubes and level. Contact your local distributor or the factory to see if your application allows for the rotation of the burner control box.

- ① Determine the mounting chain locations for hanging the burner control box.
- ② Fasten beam clamp, screw hook or other type of suspension anchor to hanging point.
- ③ Attach S-hook and chain assembly (P/N: THCS) to anchor. Check that it is securely connected.
- ④ Attach chain assemblies and S-hooks to mounting brackets on the burner control box. Adjust chain lengths until level and in straight alignment with radiant tubes. Burner sight glass will be visible from the floor.

Figure 3.12 • Burner Control Box Assembly • Side View

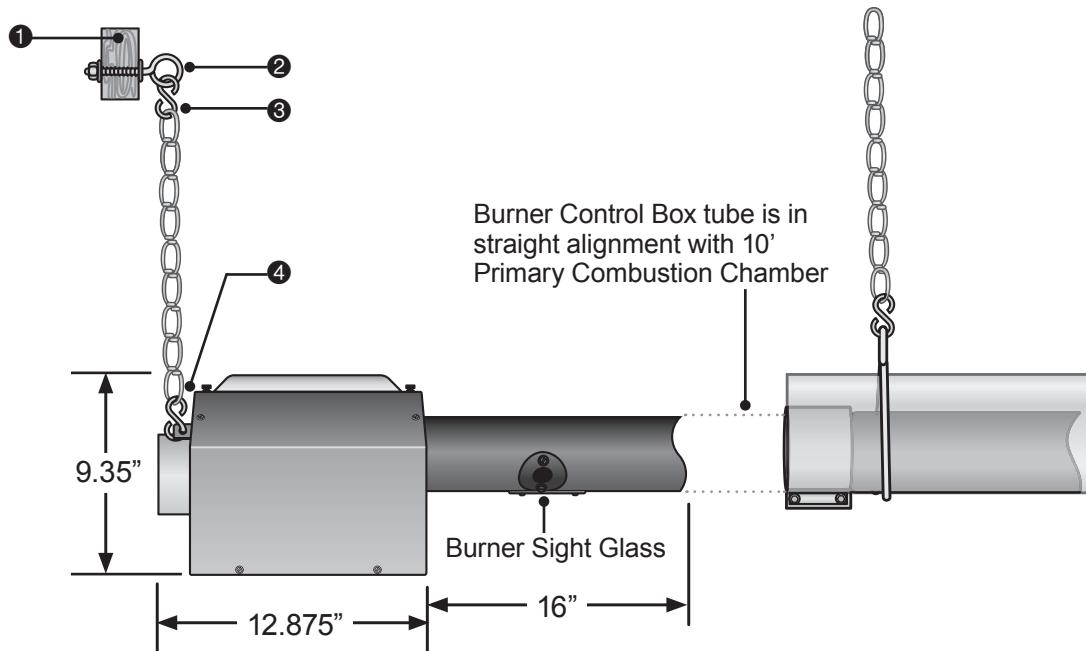
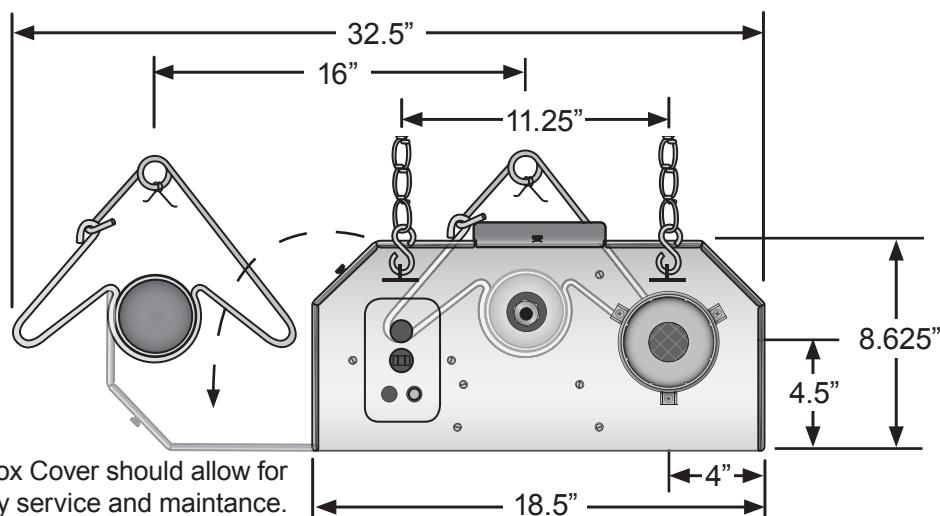


Figure 3.13 • Burner Control Box with U-Bend • End View



Reflector Assembly

To install the reflectors (see figure 3.14):

- ① Attach the reflector center supports onto radiant tubes.
- ② Slide each reflector section through the hangers and adjust the reflector tension spring into the V-groove on the top of the reflector. The reflectors should overlap approximately 4 inches.
- ③ To prevent the reflectors from shifting, secure the reflector sections together using sheet metal screws, except at the expansion joint (see page 23). **NOTE:** Installer to supply sheet metal screws.
- ④ Attach reflector end caps with polished finish inward, to each end of the reflector run. Secure with clips.

Reflectors, and reflector accessories, direct infrared energy to the floor level. The reflector assembly depends on the heater configuration, proximity to combustibles and space surrounding the heater.

Before you begin assembly, determine if the use of reflector accessories are necessary (see Chart 3.5).

Figure 3.14 • Reflector Assembly

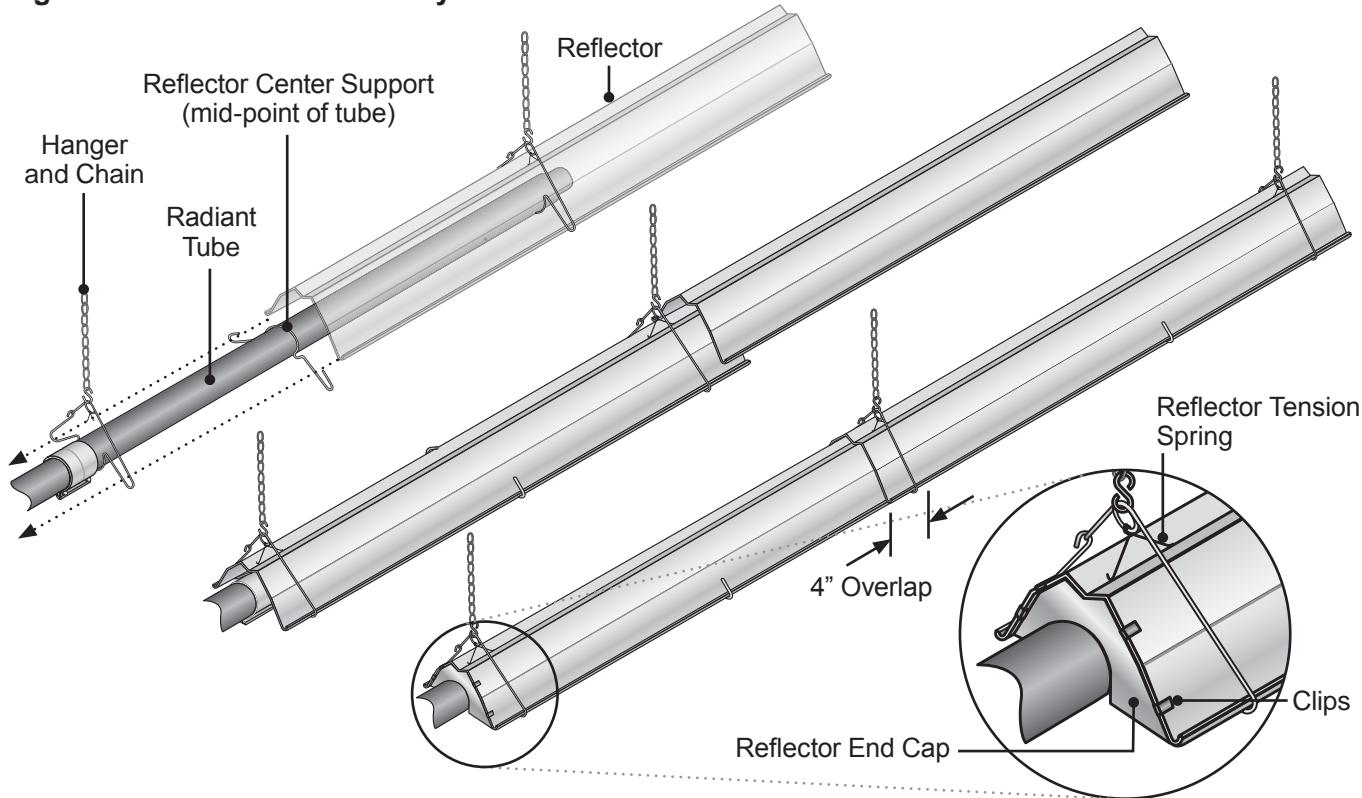


Figure 3.15 • Width of Installed Reflector - Top View

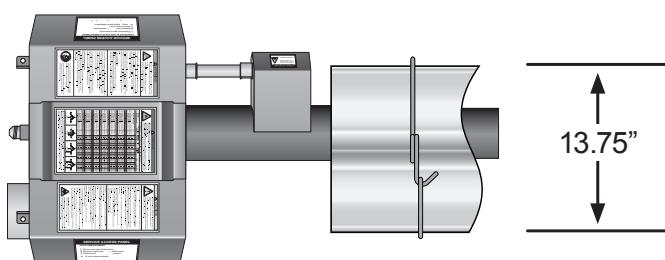


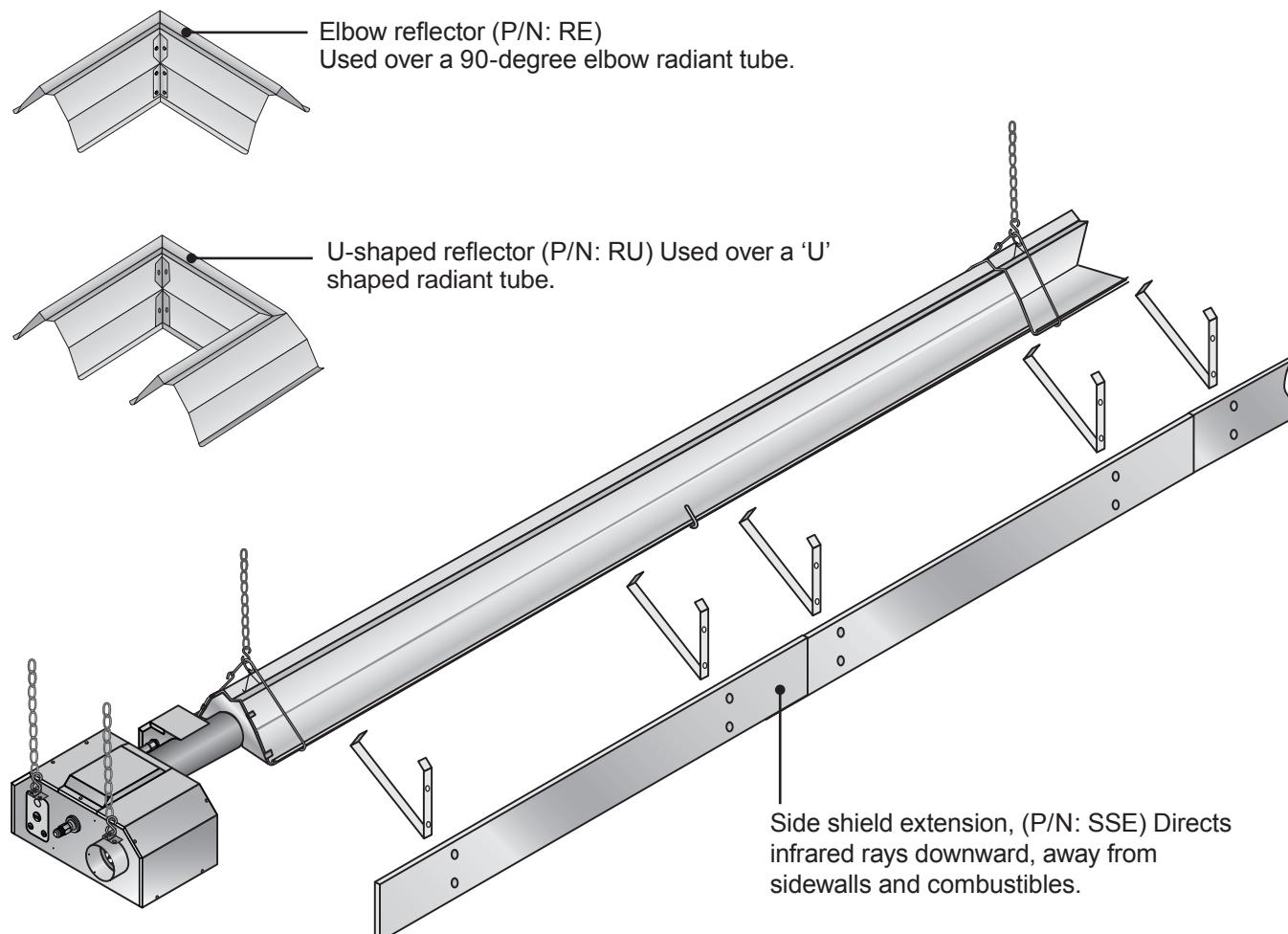
Chart 3.5
Common Optional Accessories

Reflector Accessory	Description	Part Number
Elbow Reflector*	90° bend, highly polished aluminum reflector elbow designed to fit atop one elbow accessory fitting.	RE
U-Reflector*	180° bend, highly polished aluminum reflector U-bend designed to fit atop one U-bend accessory fitting.	RU
Side Shield Extension**	Highly polished side shield extension used to direct infrared rays downward, away from sidewalls and combustibles.	SSE
Protective Guard	Used to prevent debris or objects from becoming lodged between the radiant tube and reflector. Required when mounting heaters below 8 ft.	PG

* Reflectors cannot be rotated when used with a reflector elbow (RE), U-shaped reflector (RU), or side shield (SSE).

** Refer to the Clearance to Combustible chart see page 9 for minimum distances to combustibles when side shield extension(s) are used.

Figure 3.16 • Reflector Shield Accessories



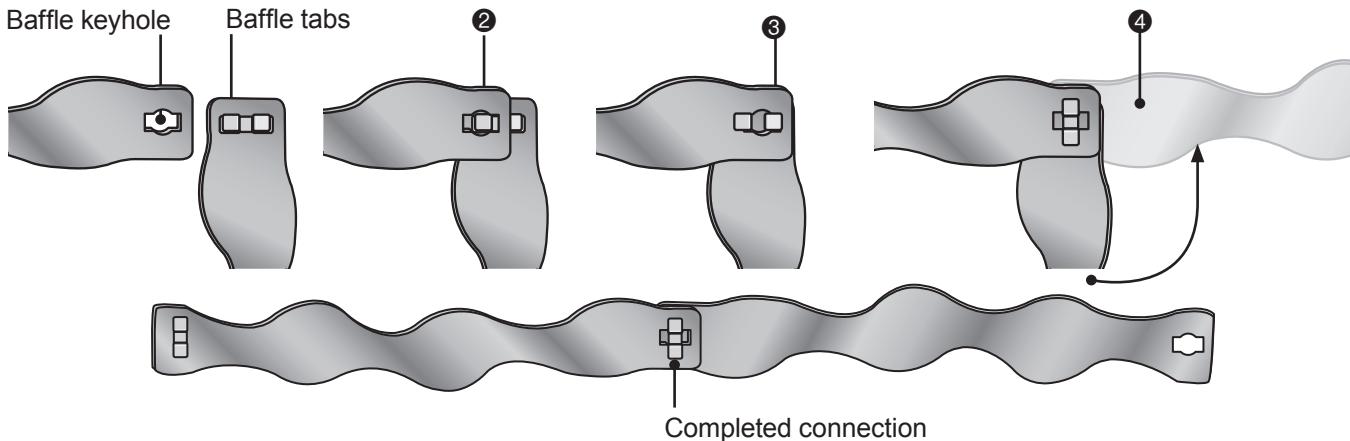
Baffle Assembly and Placement

Different models and inputs utilize specific baffle lengths. Remove all enclosed baffle sections from box and retain with applicable heater. Reference shipping label for proper baffle size.

To assemble the baffles: **NOTE:** Baffles may be inserted into the tube while being assembled.

- ① Determine the number of baffles needed for your model number. **Remove one 36 in. baffle section if heater is fitted with an elbow (P/N: E6) or U-bend (P/N: TF1B) accessory.**
- ② Orient the baffle tabs at a 90° angle to the baffle keyhole (see figure 3.17).
- ③ Insert one baffle tab into keyhole and slide completely to one side until both baffle tabs appear in the keyhole.
- ④ Adjust the tabs to the center of the keyhole and rotate the baffle 90 degrees to lock the baffle sections together.
- ⑤ Repeat this process with all remaining baffle sections to complete assembly.

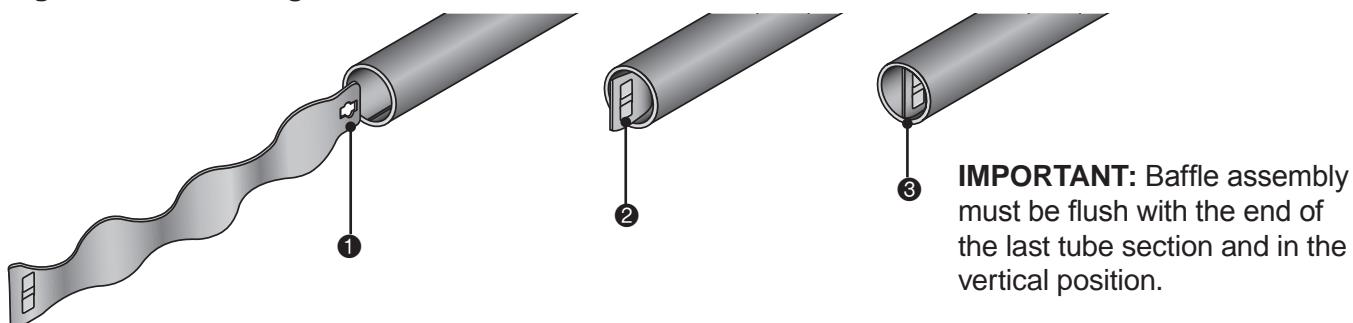
Figure 3.17 • Assembling the Baffles



To insert the baffles:

- ① Insert baffles with the keyhole end first.
- ② Rotate baffle assembly so that it is in the **vertical position**.
- ③ Slide baffle assembly into the last radiant tube section, furthest from the burner control box.
NOTE: Baffle assemblies longer than 10 ft. will continue to be fed into next tube section. **When the heater is configured with a 'U' or 'L' shaped accessory fitting** It may be necessary to cut the baffle in two sections. In this case, place as much baffle as possible downstream of the fitting and the remainder just before the fitting.

Figure 3.18 • Inserting the Baffles



IMPORTANT: Baffle assembly must be flush with the end of the last tube section and in the vertical position.

Tube Installation Sequence

Figure 3.19 • Tube Installation Sequence

Important! The combustion chamber & radiant tube sections must be installed in the following order.



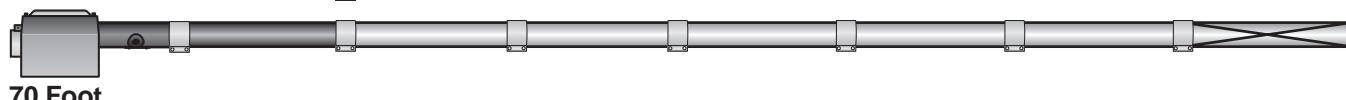
Stainless steel clamp location on 175 - 200 MBH models (P/N: TP-220).



Stainless steel clamp location on 175-200 MBH models (P/N: TP-220).



Stainless steel clamp location on 175-200 MBH models (P/N: TP-220).



Key



Burner Control Box with
16-inch Burner Tube



Standard Tube Clamp



Black Coated Combustion
Chamber Tube*



Stainless Steel Tube
Clamp (P/N: TP-220)
*175-200 MBH models only - Located
between 1st and 2nd 10 ft. tube sections.*



Black Coated Aluminized Combustion
Chamber/Radiant Emitter Tube



Baffle Location

*Aluminized tubes (50,000 to 125,000 BTU/h models); Titan tubes (150,000 to 200,000 BTU/h models).

Venting

⚠ WARNING



Insufficient ventilation and/or improperly sealed vents may release gas into the building which could result in health problems, carbon monoxide poisoning or death.



Improper venting may result in fire, explosion, injury or death.

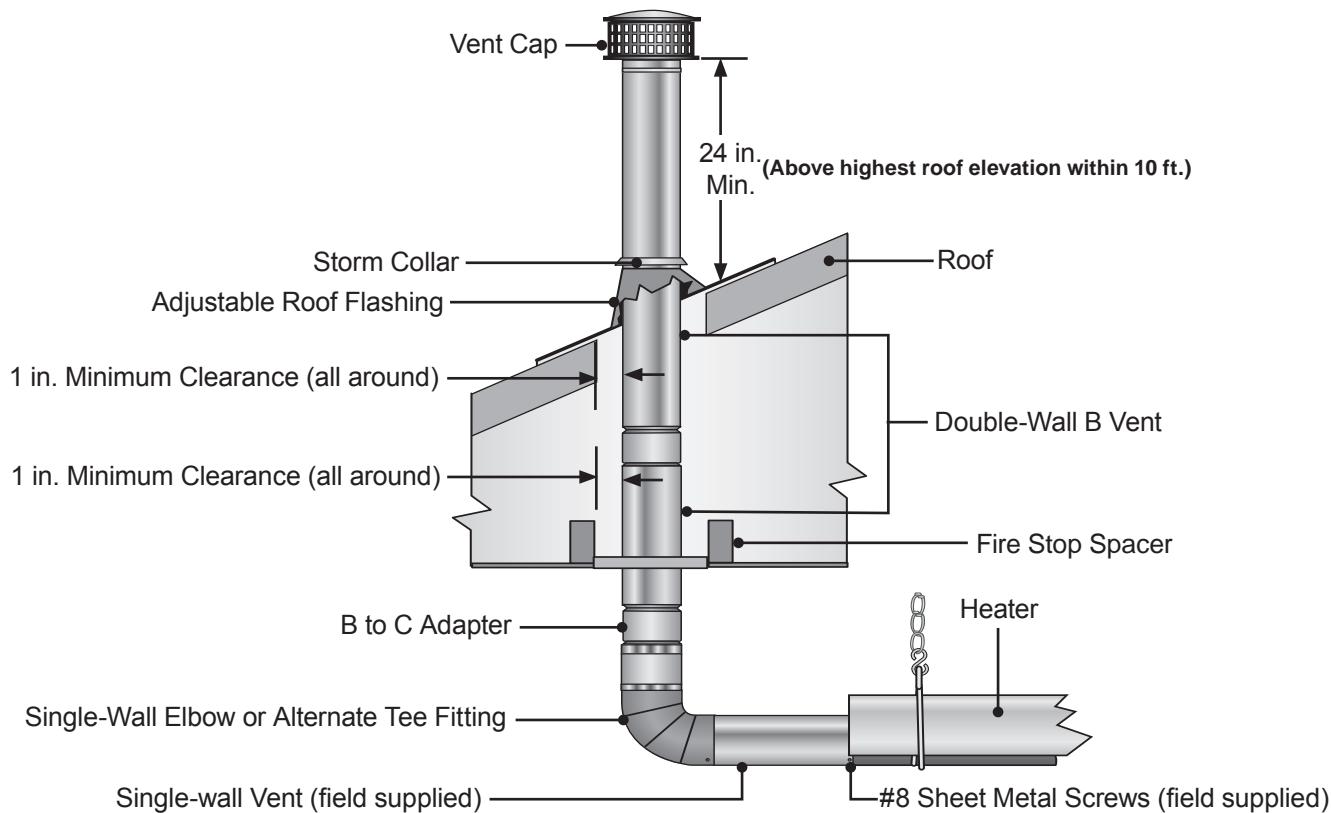
Seal vent pipes with high temperature sealant and three (3) #8 sheet metal screws. Vent enclosed spaces and buildings according to the guidelines in this manual and to the latest edition of the CAN/CGA B149.1 Standard.

The heating system may operate either vented or unvented (see page 28). Venting can terminate through the sidewall (horizontal) or the roof (vertical) and be individually or commonly vented.

Follow these guidelines and all applicable codes for all models, prior to installing vent material. Local codes may vary. In the absence of local codes, refer to and comply with the current CAN/CSA B149.1.

Venting Requirements

- 4 in. single wall galvanized steel vent pipe or Dura/Connect single wall flexible exhaust vent must be used.
- Secure vent pipe to the swaged exhaust end of tube exchanger using three (3) #8 x 3/8 sheet metal screws (field supplied). Seal with high temperature silicone sealant (field supplied).
NOTE: Tube clamps provided in kit are not to be used for this connection.
- Seal single wall vent joints with high temperature sealant (field supplied) and three (3) #8 sheet metal screws (field supplied).
- Single wall galvanized vent pipe must be insulated in cold environments.
- Do not use more than two 90 degree elbows in the exhaust vent.
- To maintain clearances to combustibles, the use of an approved wall or roof thimble and double-wall Type-B vent is required for the portion of vent pipe that runs through combustible material in the building wall or roof (see figures 3.19 & 3.20).
- Maximum vent length for all models is 20ft. (6 m).
- Maintain a 36" minimum distance from vent to combustion air intake on heaters fitted with a U-bend accessory fitting.

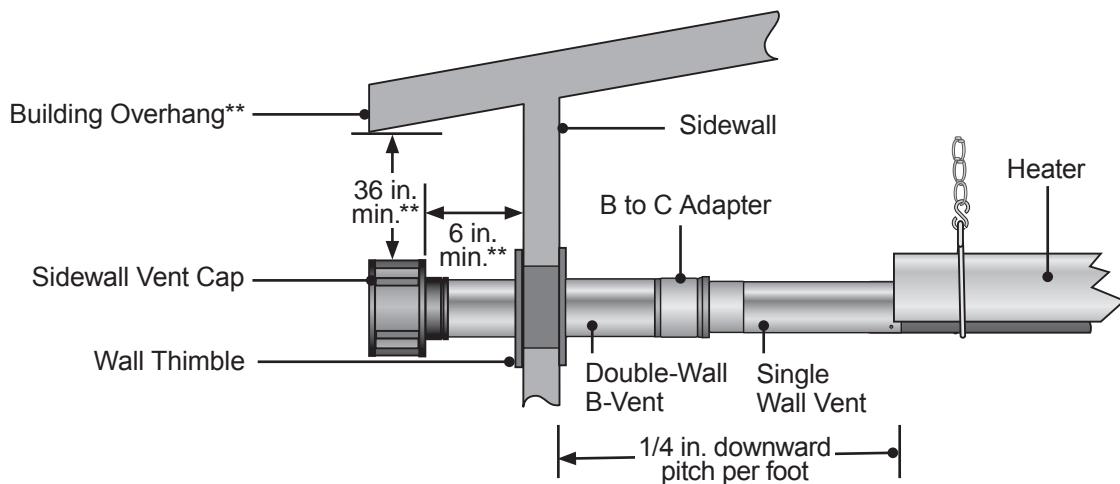
Figure 3.20 • General Vent Requirements

Sidewall Venting

Guidelines:

Vent Pipe Angle

- To prevent moisture from entering the heater system, slope the vent pipe down toward the outlet $1/4$ in. per foot of length. **Do not** pitch the heater.
- **Vent must extend beyond any combustible overhang if the vent is less than 36 in. below the combustible overhang.

Figure 3.21 • Sidewall Venting Requirements

Vent Termination

- Vents must terminate a minimum of 3 ft. (.9 m) from a window or door that may be opened, and non-mechanical air supply inlet or combustion air inlet into the building.
- Vents must terminate a minimum of 6 ft. (1.8 m) from a mechanical air supply inlet.

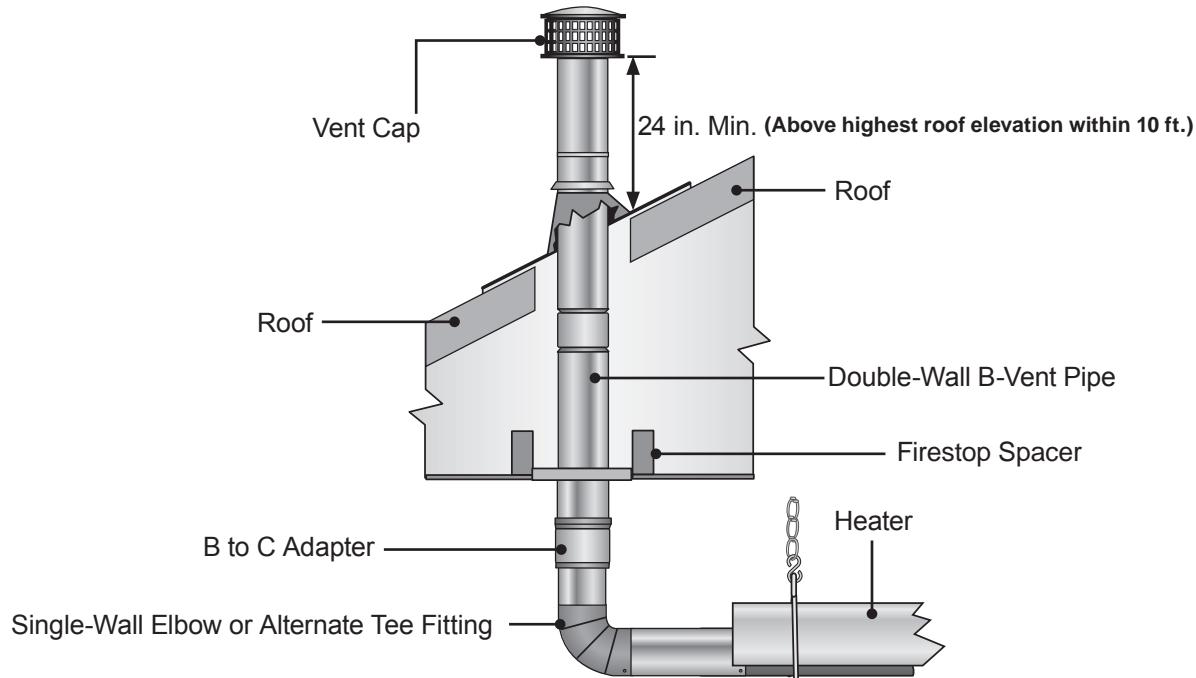
Rooftop Venting

Guidelines:

Vent Locations and Clearances

- Separate air intake duct from vent pipe a minimum of 4 ft. (1.2 m) by placing vent pipes higher than adjacent air intake duct.
- Venting may utilize standard B-vent cap.
- The vent terminal must extend a minimum of 2 ft. (.6 m) above the roof.

Figure 3.22 • Rooftop Venting - Side View



Common Venting

- A staggered arrangement or a dual exhaust assembly (P/N: Y) must be used when joining two heaters to a common vent so that by-products of one heater do not flow into the adjoining vent of the other heater.
- 6 in. diameter double-wall Type B-vent and 6 in. vent cap must be used.
- Common vented heaters **must be** controlled with the same thermostat. **Do not operate individually.**

Figure 3.23 • Common Rooftop Venting - Side View

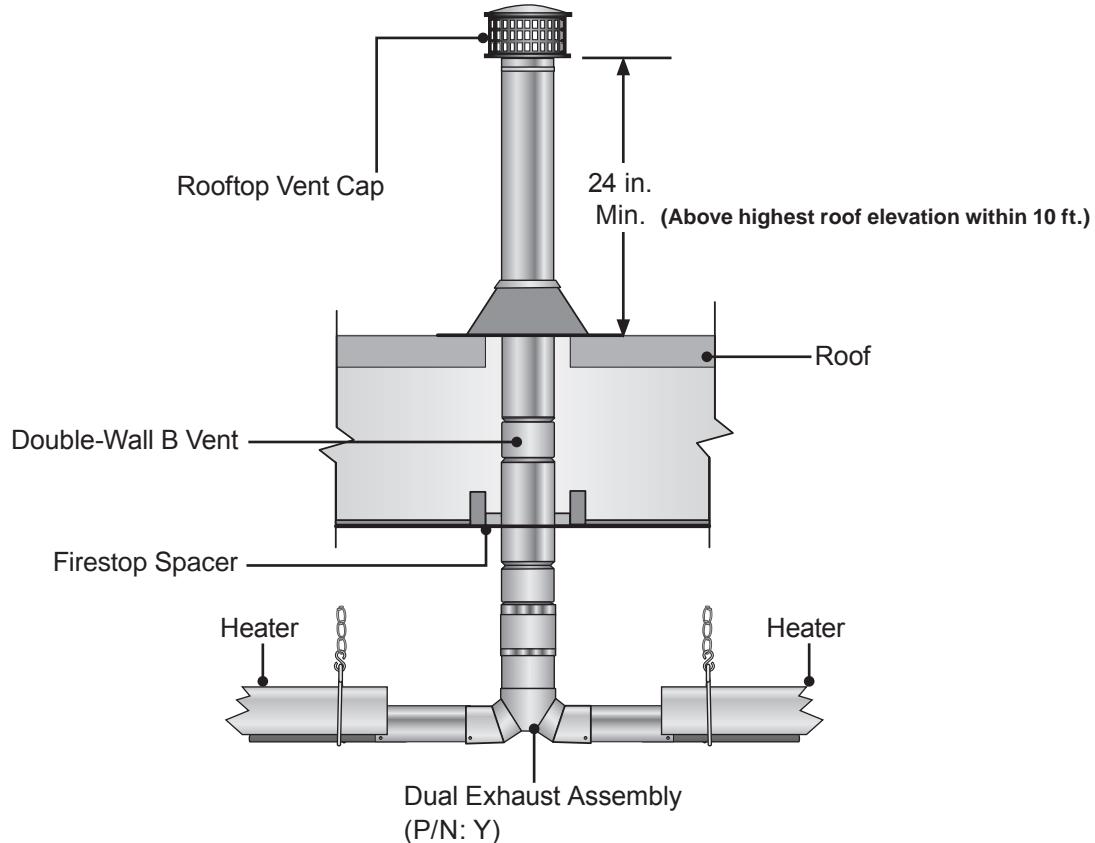
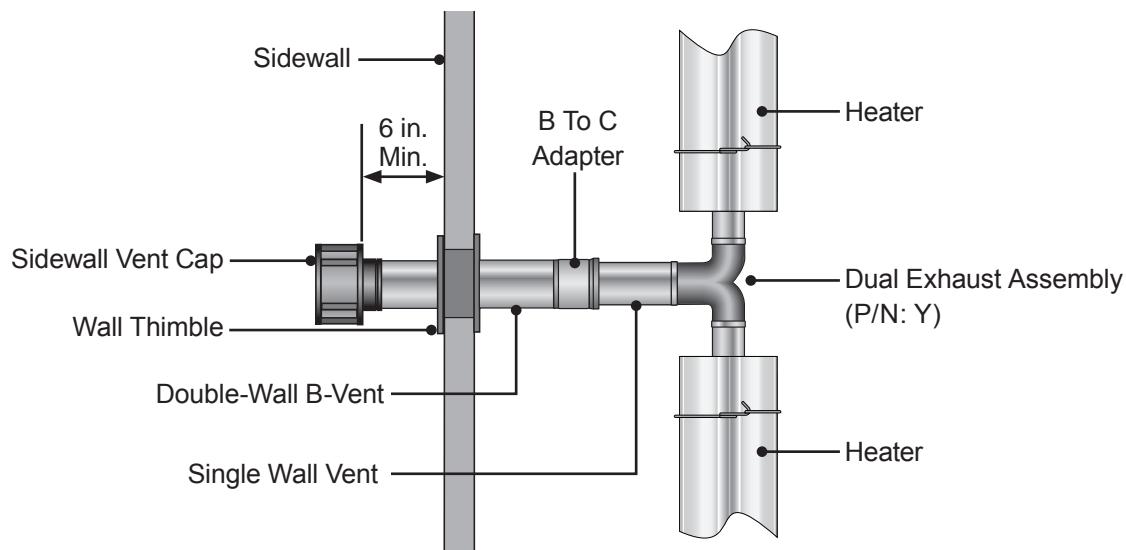


Figure 3.24 • Common Sidewall Venting - Top View



Optional Unvented Operation

⚠ WARNING



Not for residential use. The use of unvented tube heaters in residential indoor spaces may result in property damage, serious injury or death. Use unvented operation in commercial and industrial installations with proper ventilation rates only.

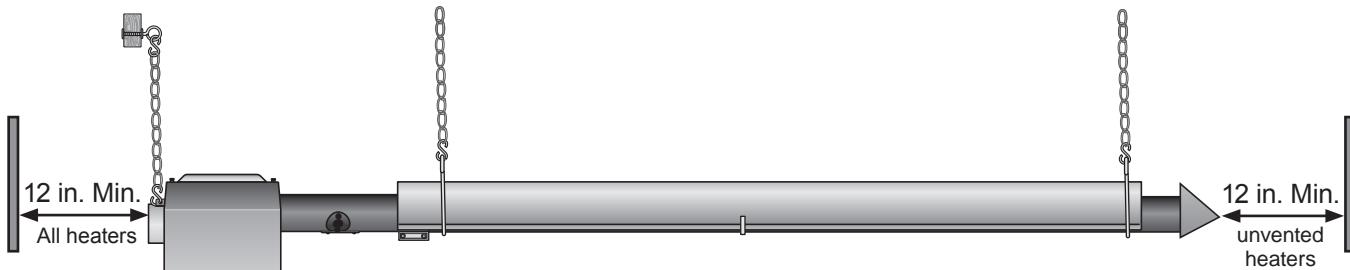
When using an unvented configuration, consider the following:

- A factory supplied vent cap/diffuser (P/N: WVE-GALV) must be used.
- Where unvented heaters are used, natural or mechanical means **must** be provided to supply adequate ventilation - a minimum of 4 cfm/1000 BTU/h (0.38 m³/kW) input of installed heaters.

NOTE: Gravity or mechanical means may be used to accomplish the air displacement. Local codes may require that the mechanical exhaust system be interlocked with the electrical supply line to the heaters, enabling both to function simultaneously.

- The minimum clearance between the air intake and the exhaust terminal is 4 ft. **NOTE:** Maintain a 36" minimum distance from vent to combustion air intake on heaters fitted with a U-bend accessory fitting.
- Exhaust openings for removing the flue products must be located above the level of the heater(s).
- Use of combustion air intake.

Figure 3.25 • Minimum End Clearances



Combustion Air Requirements

Combustion air may be supplied to the heater by indoor or outdoor means.

If using combustion air intake from indoors, the required volume of the space must be a minimum of 50 ft³ per 1000 BTU/h (4.8 m³/kW) unless the building is of unusually tight construction. If the building is of unusually tight construction with air infiltration rates of less than 0.40 air changes per hour, outside combustion air is typically needed unless the sheer size of the building allows otherwise. Contact the factory for further determination of air infiltration rates.

Non-contaminated outside air for combustion must be ducted to the heater if any of the following apply:

- Chemicals such as chlorinated or fluorinated hydrocarbons (typical sources are refrigerants, solvents, adhesives, degreasers, paints, paint removers, lubricants, pesticides, etc.).
- High humidity.
- Contaminants such as sawdust, welding smoke, etc.
- Negative building pressure.
- Unusually tight construction where there is an air infiltration rate of less than 0.40 air changes per hour.

Combustion air intake may be located on either the sidewall or roof (see figures 3.25 - 3.27).

Figure 3.26
Vertical Outside Air Supply for Single Heater Intake • Side View

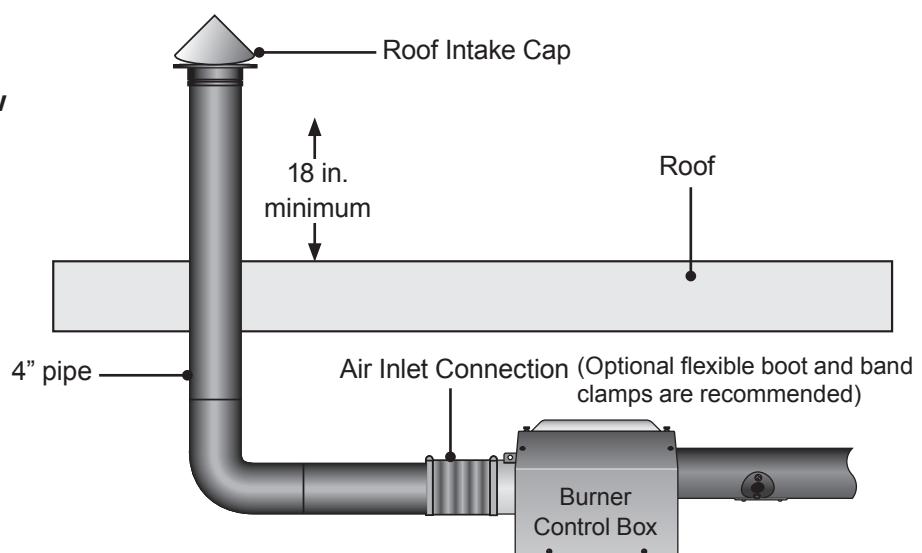


Figure 3.27
Horizontal Outside Air Supply for Single Heater Intake • Side View

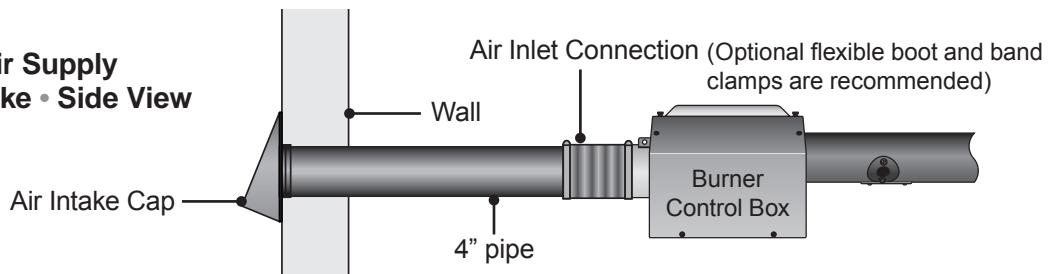
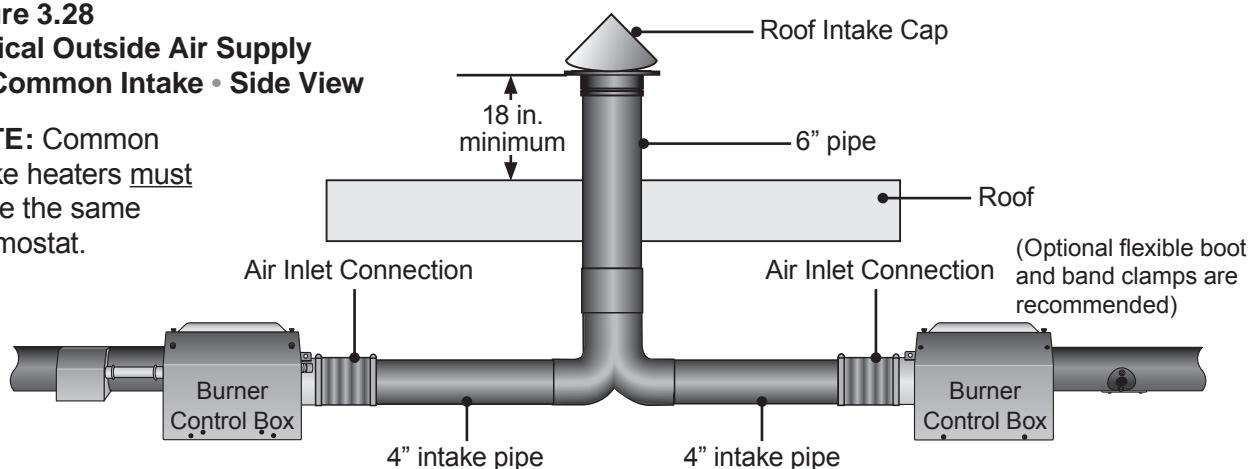


Figure 3.28
Vertical Outside Air Supply for Common Intake • Side View

NOTE: Common intake heaters must share the same thermostat.



Guidelines:

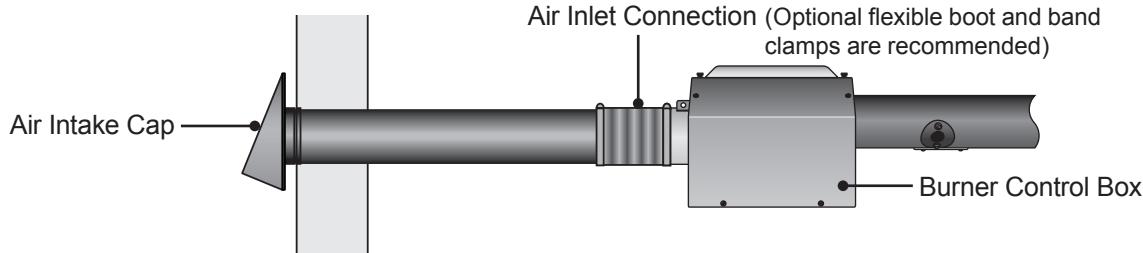
Chart 3.7

Limitations for length and size of combustion air intake duct

Single Heater Intake		Dual Heater Intake	
Air Intake Duct Size	Max. Intake Length	Duct Size	Max. Intake Length
4 in.	20 ft.	4 in. (single)/6 in. (dual)	20 ft.
5 in.	30 ft.	4 in. (single)/8 in. (dual)	30 ft
6 in.	40 ft.	Consult factory for longer intake lengths.	

General

- No more than two 90 degree elbows are allowed.
- Allow for expansion. Use a 4 in. flexible hose to connect the duct to the burner control box.
- In humid environments, use insulated duct, PVC pipe or DWV (drain waste vent) to prevent condensation on the outer surface.
- Do not draw air from attic space.
- A factory approved wall intake cap (P/N: WIV-4) must be used with horizontal outside intake ducts. The wall intake cap (P/N: WIV-4) must be installed to prevent blockage. Locate the intake where dirt, steam, snow, etc. will not contaminate or clog the intake screen.
- Separate air intake duct from vent pipe a minimum of 4 ft. Also, place vent pipe higher than adjacent air intake duct.



Gas Supply

⚠ WARNING



Improperly connected gas lines may result in fire, explosion, poisonous fumes, toxic gases, asphyxiation or death. Connect gas lines in accordance to national, state, provincial and local codes along with the guidelines in this manual.

Important! Before connecting the gas supply to the burner control box:

- Verify that the heater's gas type (as listed on the rating plate) matches that of your application.
- Check that the gas piping and service has the capacity to handle the total gas consumption of all heaters being installed, as well as any other gas appliances being connected to the supply line.
- Check that the main gas supply line is of proper diameter to supply the required fuel pressures.
- If utilizing used pipe, verify that its condition is clean and comparable to a new pipe. Test all gas supply lines in accordance with local codes.

- Test and confirm that inlet pressures are correct. Refer to the heater rating plate for gas type and the required minimum and maximum pressures (see Chart 3.8). The gas supply pipe must be of sufficient size to provide the required capacity and inlet pressure to the heater (if necessary, consult the local gas company). Do not exceed the maximum allowed pressures for the heater, the space or the gas piping system.

Chart 3.8 • Manifold Pressure

Type of Gas	Required Manifold Pressure	Minimum Inlet Pressure	Maximum Inlet Pressure
Natural	3.5 Inches W.C	5.0 Inches W.C	14.0 Inches W.C
Liquefied Petroleum	10.0 Inches W.C	11.0 Inches W.C	14.0 Inches W.C

NOTE: Check manifold pressure at the tap on the gas valve. Small variations in manifold pressure (actual vs. published) may exist due to changing atmospheric conditions. Readings will be above atmospheric pressure.

Pressure Equivalents: 1 inch W.C. equals .058 oz/sq. in. equals 2.49 mbar.

To connect the gas:

⚠ WARNING



Failure to install, operate or service this appliance in the approved manner may result in property damage, injury or death. Only trained, qualified gas installation and service personnel may install or service this equipment.

The installation must conform with local building codes or, in the absence of such codes, the current CAN/CSA B149.1 Code.

Important! The heating system will expand and contract during operation. Allowances for expansion must be made between the connection to the heater and the gas supply. Excessive bending, kinks, twists or vibration must be avoided. A flexible gas connection of approved type is required. The supplied Type 1 hose installed in one plane, and without sharp bends, kinks or twists is recommended.

The gas pipe and connection **must** be supported independently. Do not install gas supply line in a manner that bears the weight of the heater. Connect the main gas supply line with the supplied approved flexible connector (Figure 3.30-3.31) or, if national or local codes require rigid piping, a swing joint. See the safety messages at the beginning of this section.

The gas outlet must be in the same room as the appliance and accessible. It may not be concealed within or run through any wall, floor or partition. When installing the heater in a corrosive environment (or near corrosive substances), use a gas connector suitable for the environment. Do not use the gas piping system to electrically ground the heater.

- ① Install a sediment trap / drip leg if condensation may occur at any point of the gas supply line. This will decrease the possibility of loose scale or dirt in the supply line entering the heater's control system and causing a malfunction. **NOTE:** High pressure gas above 14 Inches W.C. (water column pressure) requires a high pressure regulator and ball valve (optional).

- ② Form the Type 1 hose connector (supplied) into a smooth U-shape allowing a maximum of 14 in. between the flexible connector's end nuts (see Figure 3.30).
 - ③ Attach the ball valve (optional) to the gas supply pipe. Apply pipe compound to NPT adapter threads to seal the joint. Use only a pipe compound resistant to LP.
- NOTE:** Provide a 1/8 in. NPT plugged tapping accessible for test gauge connection immediately upstream of gas connection to the heater (provided an optional ball valve).

⚠ CAUTION

When using a Type 1 hose connector, **do not** attach the connector nuts directly to the gas pipe supply. Connector nuts must be installed to an approved adapter.

- ④ Attach the Type 1 hose connector to the adapter and burner control box inlet. Seal the joints.
- NOTE:** Excessive torque on the manifold may misalign the orifice. **Always** use two wrenches to tighten mating pipe connections.
- ⑤ Final assembly must be tested for gas leaks according to CAN/CSA B149.1 and .2 Codes and all local codes and/or Standards.

⚠ WARNING



Testing for gas leaks with an open flame or other sources of ignition may lead to a fire or explosion and cause serious injury or death. Test in accordance with CAN/CSA codes.

Figure 3.29 • 1/2" Type 1 Hose Gas Connection

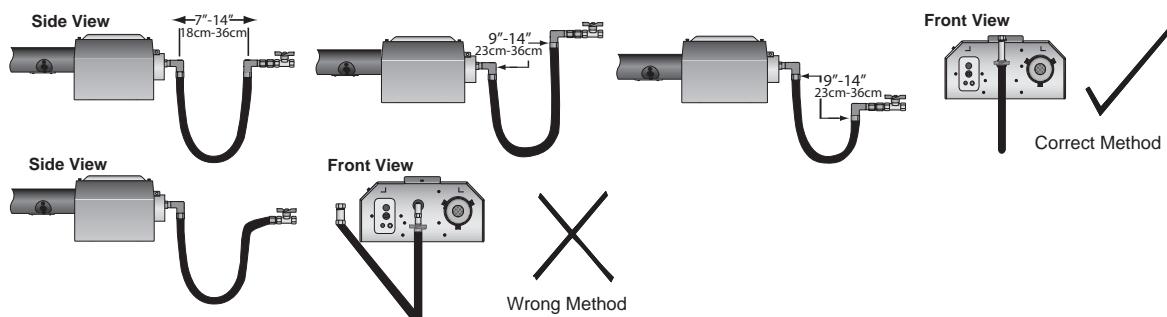


Figure 3.30 • 3/4" Type 1 Hose Gas Connection

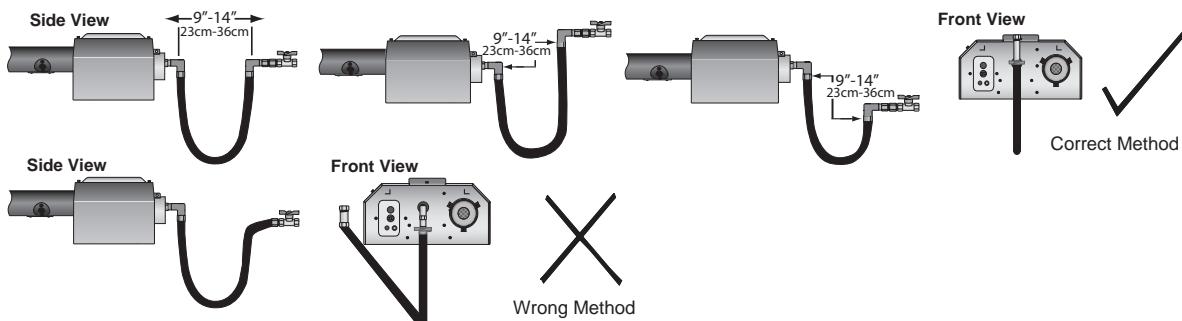
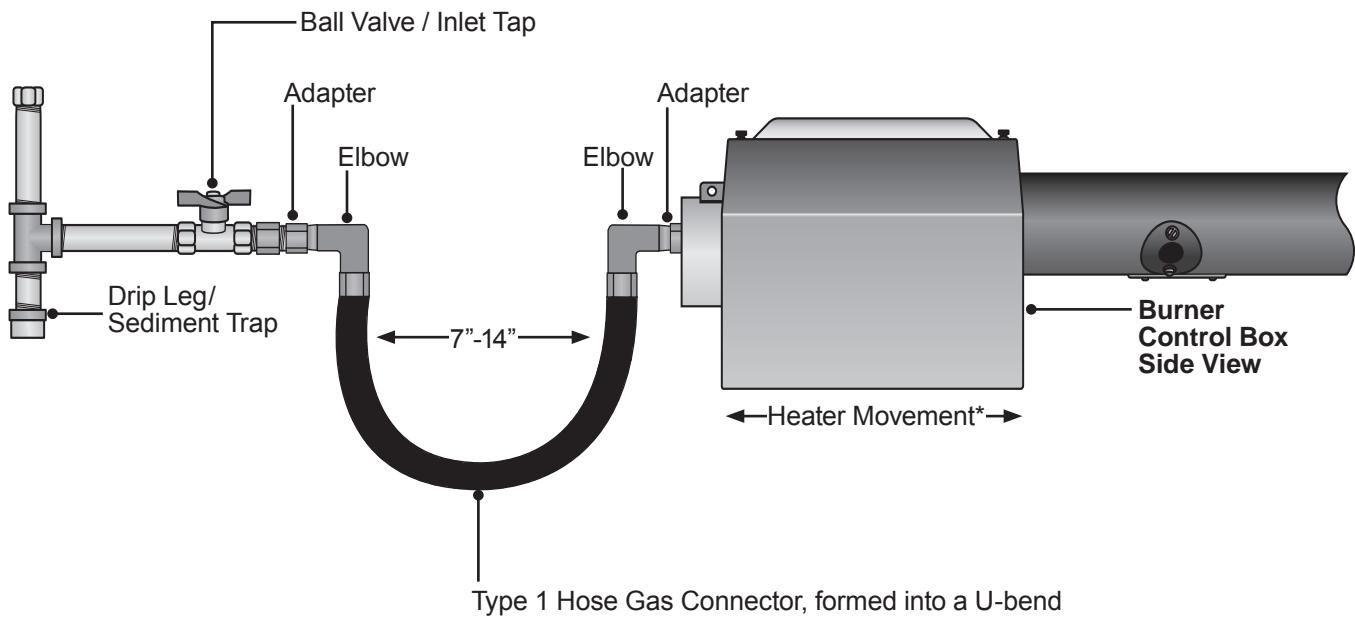
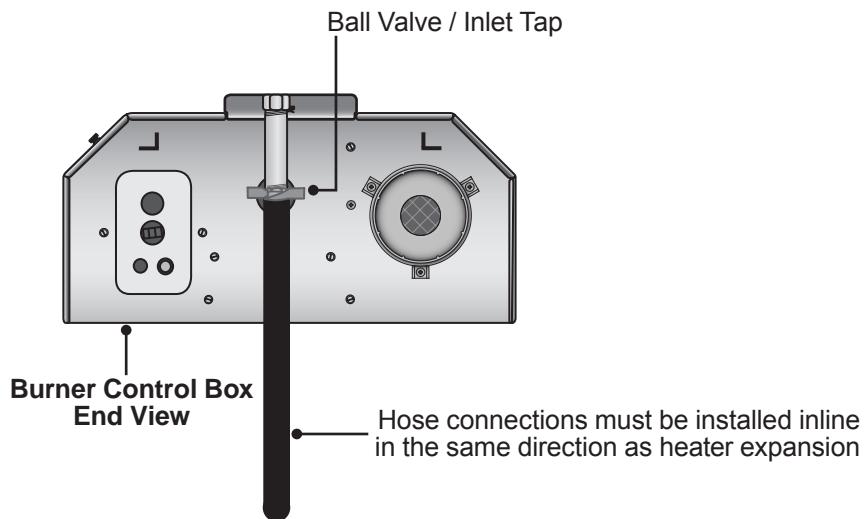


Figure 3.31 • Gas Connection (Type 1 Hose Gas Connector shown) • Side View

NOTE: Do not exceed 14 Inches W.C. to the appliance.

**Figure 3.32 • Gas Connection (Type 1 Hose Gas Connector shown) • End View**

*The tube heater expands and contracts during operation. Follow the installation instructions to ensure allowances are made for this movement. To ensure your safety, and comply with the terms of the warranty, all units must be installed in accordance with these instructions.

Allowances for Expansion

Allowances must be made for the system to expand as detailed in the Heater Expansion Chart below. The supplied Type 1 hose gas connector is recommended. If, however, local codes require rigid piping to the heater, a swing joint can be used.

Chart 3.9 • Heater Expansion Chart

Exchanger length and gas input will determine overall expansion. Heaters in a typical installation will expand towards both the burner and vent ends. Review for proper flexible gas connection.

Exchanger Length		Fixed or High-Fire Gas Input BTU/h	Expansion Length	
Feet	Meters		Inches	Millimeters
25	6.1	80,000	1 3/4	44.5
30	9.2	80,000	1 7/8	47.6
30	9.2	115,000	2	50.8
40	12.2	80,000	1 3/4	44.5
40	12.2	115,000	2	50.8
40	12.2	150,000	2 1/2	63.5
50	15.3	115,000	2	50.8
50	15.3	150,000	2 1/2	63.5
50	15.3	200,000	2 3/4	69.9
60	18.3	150,000	2 1/2	63.5
60	18.3	200,000	2 3/4	69.9
70	21.4	200,000	2 3/4	69.9

⚠ WARNING



Improper installation, adjustment, alteration, service or maintenance can cause property damage, serious injury or death. Read and understand the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Only trained, qualified gas installation and service personnel may install or service this equipment.

Not for residential use! Do not use this heater in the home, sleeping quarters, attached garages, etc. **Installation of a commercial tube heater system in residential indoor spaces may result in property damage, serious injury or death.**

Gas Requirements

Manifold pressure of the heater is pre-set at the factory. No adjustment should be necessary. During the verification process, a tolerance of $\pm 10\%$ of the full scale is acceptable due to varying atmospheric conditions.

Type of Gas	Manifold Pressure		Inlet Pressure	
	@ Maximum Rate	@ Minimum Rate	Minimum	Maximum
Natural	4.10 Inches. W.C.	1.65 Inches W.C.	6.00 Inches W.C.	14.00 Inches W.C.
Propane	11.0 Inches. W.C.	4.80 Inches W.C.	12.00 Inches W.C.	14.00 Inches W.C.

Electrical Requirements

- 120 Volt - 60 Hz GRD, 3-wire.
- Low voltage thermostat connection.
- Starting current 4.8 amps.
- Running current 1.1 amps.

NOTICE

Shielded thermostat wire of 18 AWG is recommended for connection to the heater from the thermostatic controller. The MP Series heater is pre-set by the factory for use with the Premium User Interface (TP-PUI).

⚠ WARNING



Electric Shock

Field wiring to the tube heater must be connected and grounded in accordance with national, state, provincial, local codes and to the guidelines in the manual. In the United States refer to the most current revisions to the ANSI/NFPA 70 Standard and in Canada refer to the most current revisions to the CSA C22.1 Part I Standard.

Thermostat and Other Controls

The MP Series heater is designed to operate on various control configurations. The available control options are:

- A. Premium User Interface.
- B. Potentiometer with On/Off switch.
- C. Single-Stage Thermostat with optional room temperature sensor.

“A” Premium User Interface

The Premium User Interface (TH-PUI) is a smart logic controller that offers the optimal performance out of your MP Series heater. It modulates the heater(s) with a full PID Controller considering various inputs and outputs. It utilizes the current set temperature, the room temperature (based on an on-board thermistor or an externally connected zone sensor), mode selected, and other items to set the speed of modulation. Therefore, the heater output immediately responds to a change in air temperature. For installation of this device, see Figure 3.34 on Page 39.

“B” Potentiometer

A linear 10k Ohm potentiometer can be used as a control device for the MP Series. This allows the user to manually control the heaters firing rate based on the dial position. The heater will modulate in increments of 1%, and vary from minimum firing rate to the full firing rate. An On/Off switch or timer is necessary to allow for the heater to shut off. For installation with this device, see Figure 3.35 on Page 40.

“C” Single-Stage Thermostat

A single stage heating thermostat can be used as a control device for the MP Series. This allows the user to utilize a desired field supplied thermostat that best suits their individual needs. The heat control is designed for use with a 2-wire heating system, (R & W) and is low voltage. The heater cannot power the thermostat. The thermostat selected must not have a heat anticipator. For installation with this device, see Figure 3.36 on Page 41.

NOTICE

When using a single stage thermostat, the use of a zone sensor is highly recommended. The unit will operate without this accessory, but will then only modulate based on a predetermined algorithm that considers cycle timing and history. Therefore the heater will not respond to rapid changes in air temperatures.

Zoning Heaters and Configuring ‘Master/Slave’ Heaters

The MP Series is designed to allow for several heaters within the same zone to simultaneously modulate in synchronization when connected to a single control device. This configuration requires one ‘Master’ heater that is connected directly to the heat control device, and the remaining ‘Slave’ heaters are to be wired to the ‘Master’ heater. The ‘Slave’ heaters will modulate based on the control signal from the ‘Master’ heater. During the operation of the system, all the ‘Slave’ heaters will modulate at the same percentage rate of the full input as the ‘Master’ heater.

When wiring multiple heaters together for zoning, the heaters must be wired in series with a ‘Master’ heater utilizing a shielded thermostat wire. Connect the heaters via the appropriate wiring diagram. See Pages 38-41 for more information.

Building Management Systems and Other Remote Analog Signals

A Building Management System or a Remote Analog Signal may be used as a controlled device for the MP Series. This allows the heater(s) to be controlled directly by the output of the Building Management System directly dictates the heaters firing rate. The analog signal can be either 0-10VDC or 4-20mA.

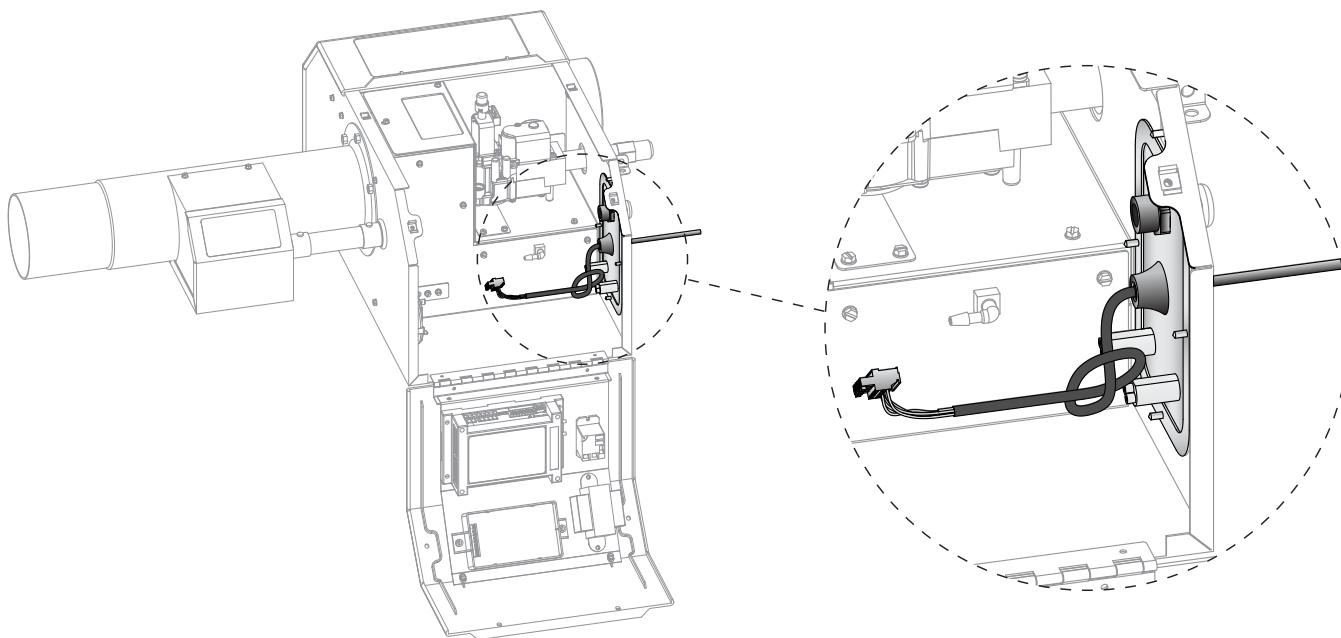
A Premium User Interface (P/N: PUI) MUST be used in order to connect the Building Management System to the heater.

Field Wiring

Field Supplied Control Wire: 18AWG plenum rated thermostat wire that is shielded w/ drain wire is recommended for optimal performance.

Installing the Control Wire: Each heater includes a thermostat wire grommet to allow for thermostat wire to be brought into the burner box. Insert the grommet into the low voltage wiring access hole. Feed the thermostat wire through the grommet, piercing the rubber with the wire to ensure a tight seal. Ensure enough wire length is available to make the proper connections. Tie the thermostat wire into a loose knot, as shown in Figure 3.33. Ensure knot is loose enough to not cause any damage to the wire. This will allow for a strain relief for the connections to the heater.

Figure 3.33 • Image for feeding the wire and showing the knot



Connections to the Heater: The control devices are connected to the Modulating Circuit Board (P/N: TP-3250) via the thermostat terminal strips provided. The installer must select the appropriate thermostat terminal strip to connect to the board depending on the control configuration desired. The unit will provide the suitable voltage for each control device. **DO NOT** provide an external power supply to the thermostat terminal strips. Damage to the circuit board may result and is not covered by warranty.

Three (3) thermostat terminal strips are included with each heater to allow for connections to the heater. Note that only one terminal strip will be used for each application, as selected by the installer. The remaining thermostat terminal strips can be discarded or kept with the manual for future reference.

- TP-3228 – 8 circuit terminal strip to be used with Diagram “A”.
- TP-3225 – 5 circuit terminal strip to be used with Diagram “B”.
- TP-3224 – 4 circuit terminal strip to be used with Diagram “C”.

Figure 3.34 • Field Wiring Diagram “A”

A. Premium User Interface

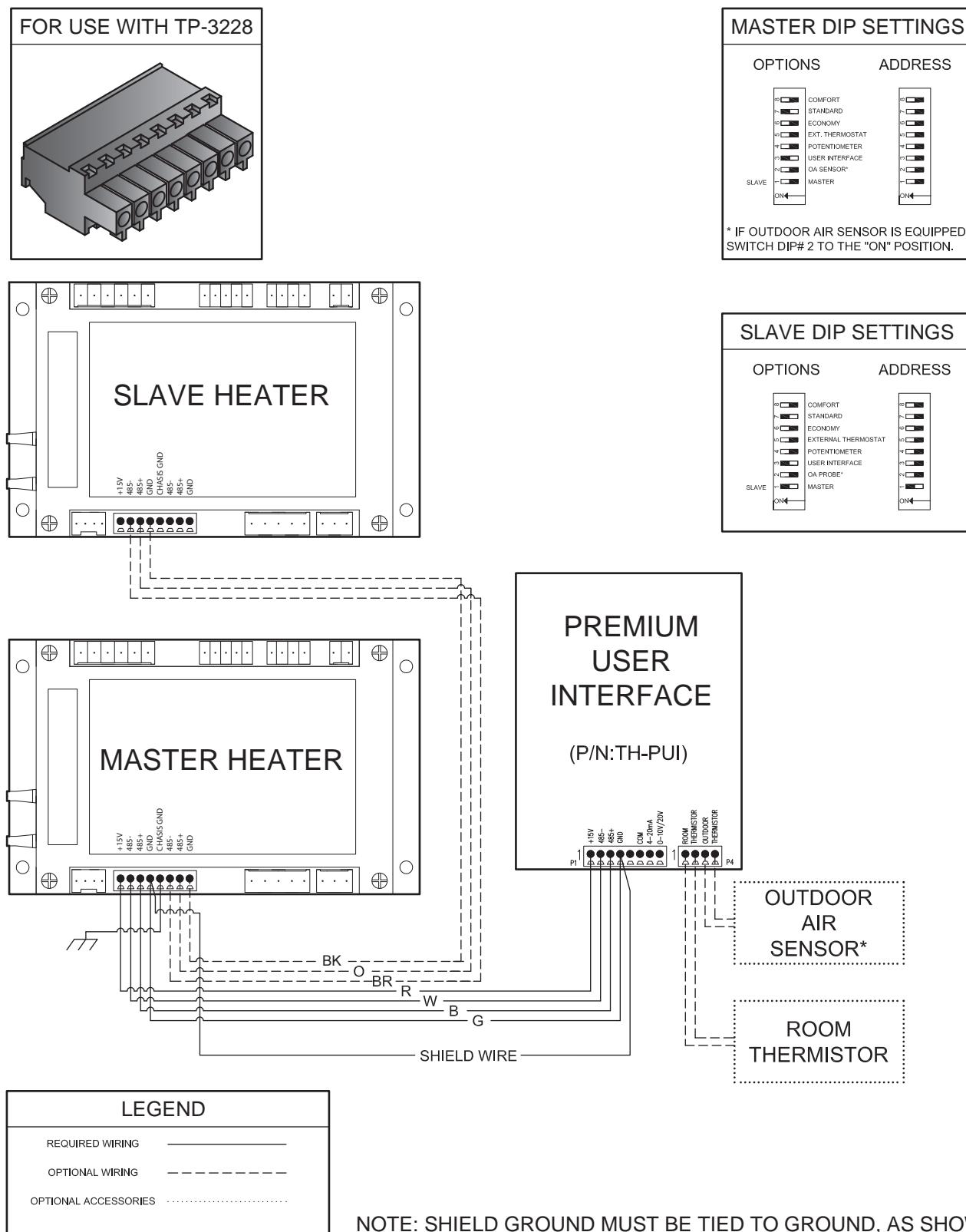


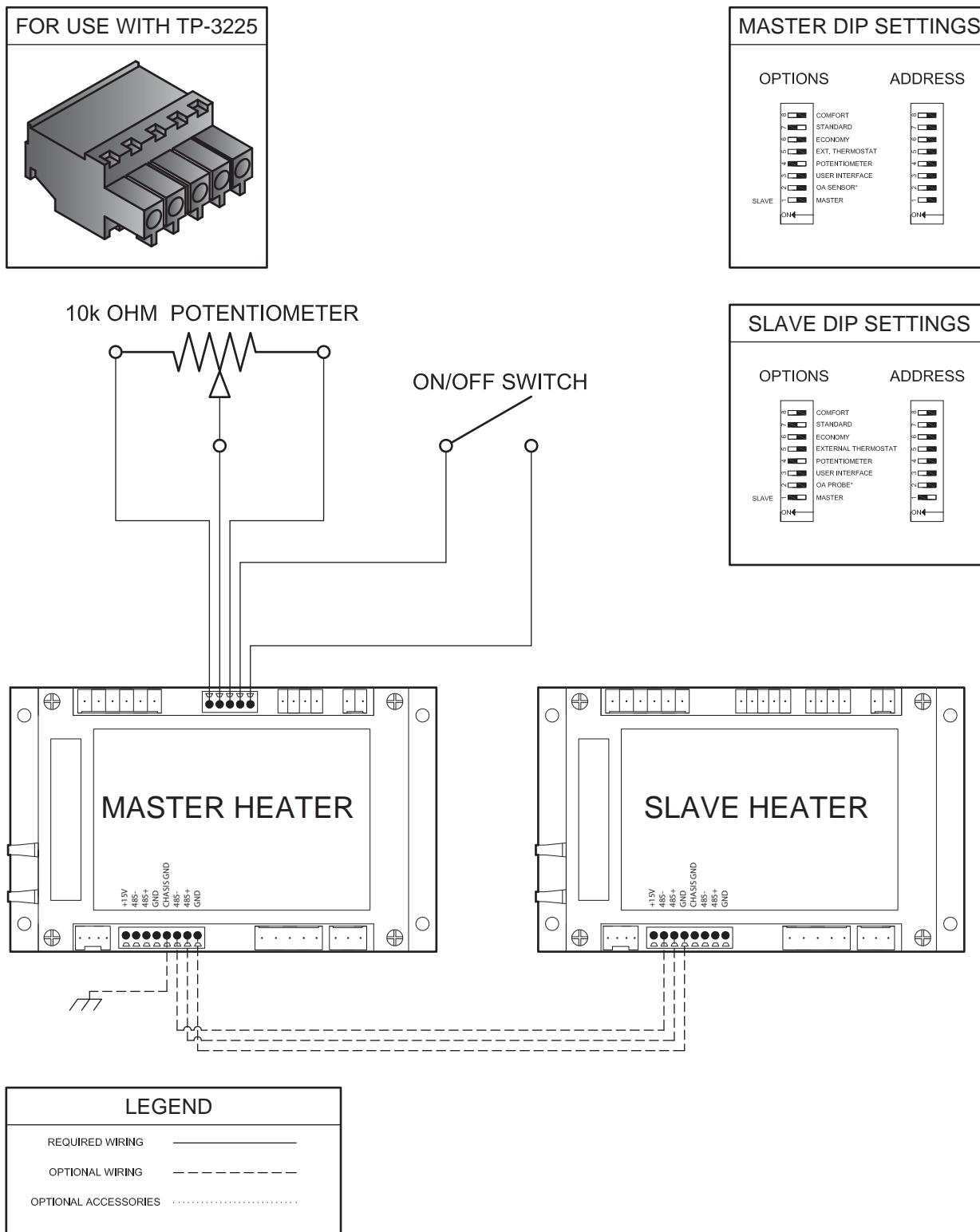
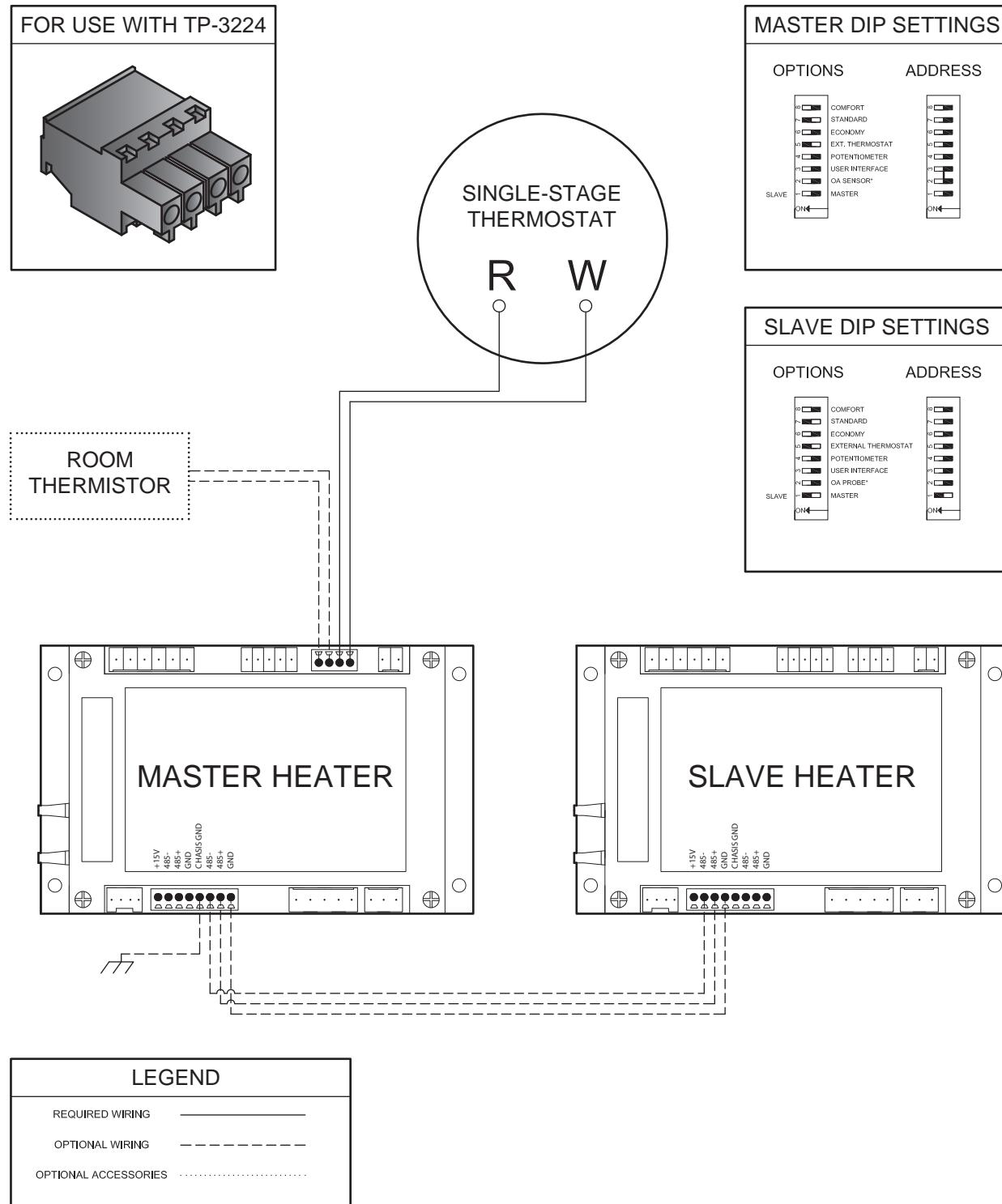
Figure 3.35 • Field Wiring Diagram “B”**B. 10k OHM Potentiometer**

Figure 3.36 • Field Wiring Diagram “C”

C. Single-stage thermostat

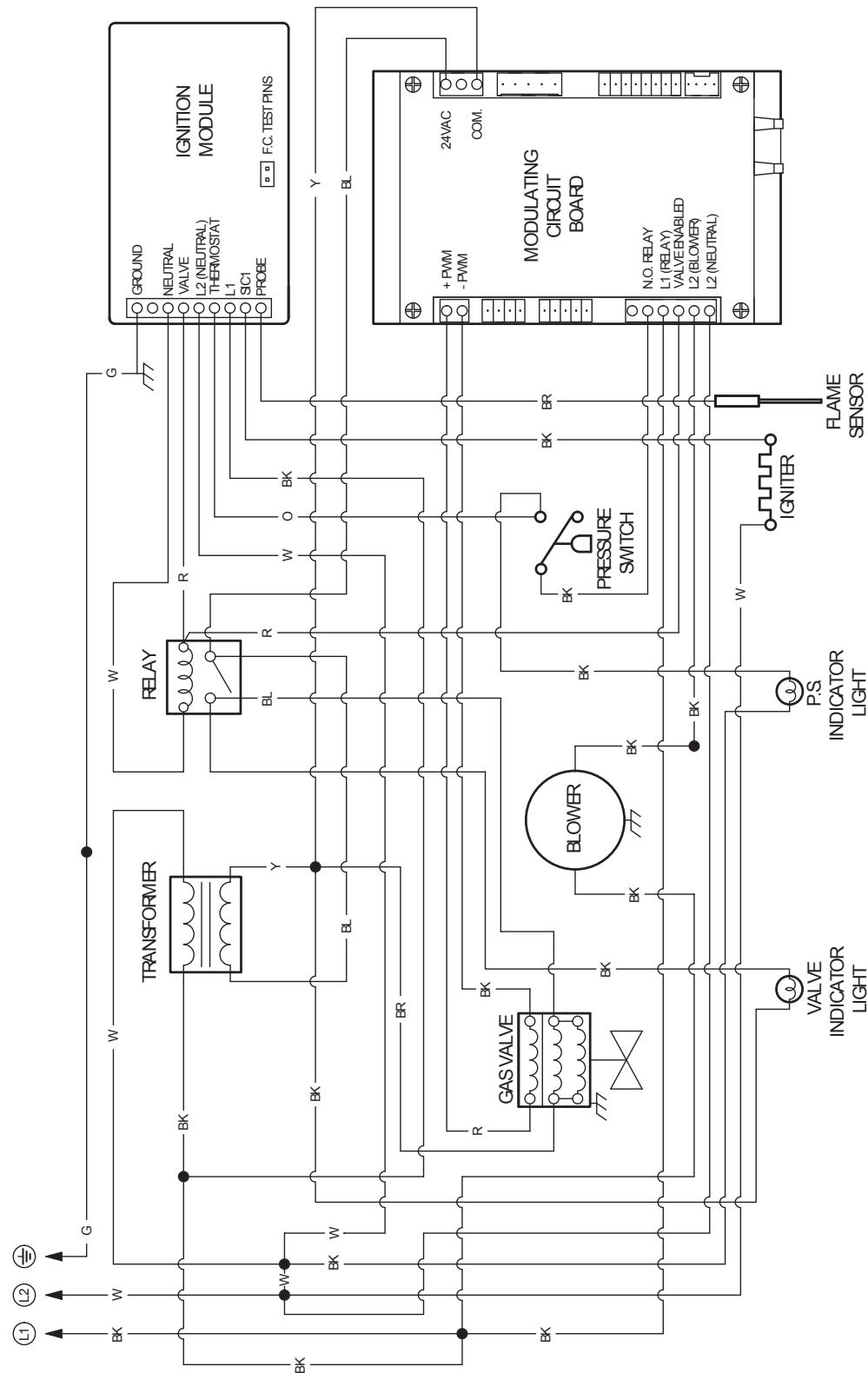


Field Wiring

Before field wiring this appliance - Check existing wiring; replace if necessary.

Note: If any of the original wire supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C and a voltage rating of 660V.

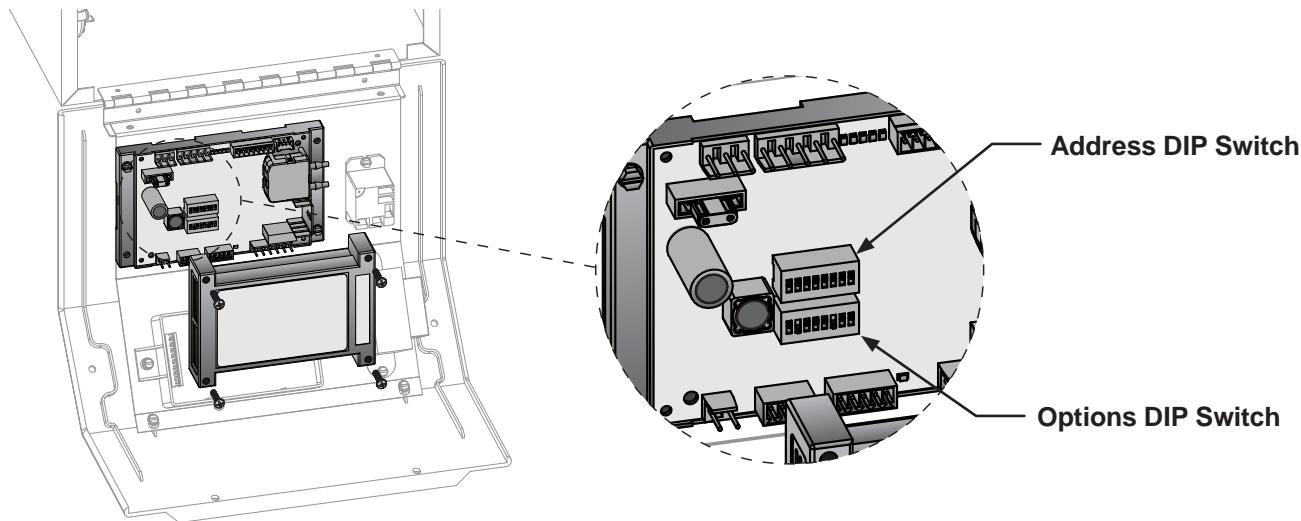
Figure 3.37 • MP Series Internal Wiring Diagram



Configuring the Heater

The MP Series heater utilizes DIP switches on the modulating controller to configure various options available. The DIP switches are located under the modulating circuit board cover (See Figure 3.38), and are labeled “Options” and “Address”. These switches have to be configured correctly in order for the unit to properly function.

Figure 3.38 • Projected View of DIP Switches



‘Options’ DIP Switches

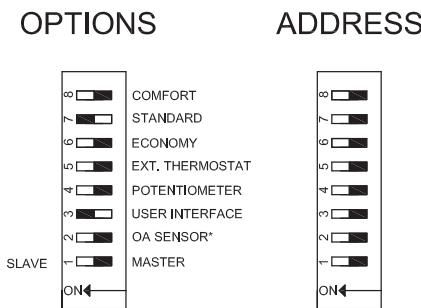
- ① **‘Master/Slave’:** This switch determines if the heater is a ‘Master’ or ‘Slave’.
 - **‘Master’ Option:** Selected if heater is stand-alone or ‘Master’ of a zoned system.
 - **‘Slave’ Option:** Selected if heater is a ‘Slave’ in a zoned system and is connected to a ‘Master’.
- ② **Outdoor Air Probe:** This switch determines if an outdoor air sensing probe is installed (sold separately, must be used in conjunction with a Premium User Interface).
- ③ **Premium User Interface:** This switch determines if a Premium User Interface (TH-PUI) is used as a heat demand control device. (Use Field Wiring Diagram A - Figure 2.2).
- ④ **Potentiometer:** This switch determines if a linear taper 10K Ohm potentiometer is used as a heat demand control device. (Use Field Wiring Diagram B - Figure 2.3).
- ⑤ **THERMOSTAT:** This switch determines if a single stage thermostat is used as a heat demand control device (Use Field Wiring Diagram C - Figure 2.4).
- ⑥ **Economy Mode*:** This switch determines if ‘Economy Mode’ is the desired mode of operation.
- ⑦ **Standard Mode*:** This switch determines if ‘Standard Mode’ is the desired mode of operation.
- ⑧ **Comfort Mode*:** This switch determines if ‘Comfort Mode’ is the desired mode of operation.

*If Premium User Interface is connected, the mode selection switches are inoperative. Modes are selected from the controller. For more information on the modes, see Page 46.

Standard Configuration: From the factory, the heater is configured as follows:

- ① 'Master' Heater: **ON**
- ② Outdoor Air Probe: **OFF**
- ③ Premium User Interface: **ON**
- ④ Potentiometer: **OFF**
- ⑤ Thermostat: **OFF**
- ⑥ Economy Mode: **OFF**
- ⑦ Standard Mode: **ON**
- ⑧ Comfort Mode: **OFF**

Figure 2.7 • Standard Configuration of DIP Switches



*If outdoor air sensor is equipped, switch DIP#2 to the ON position.

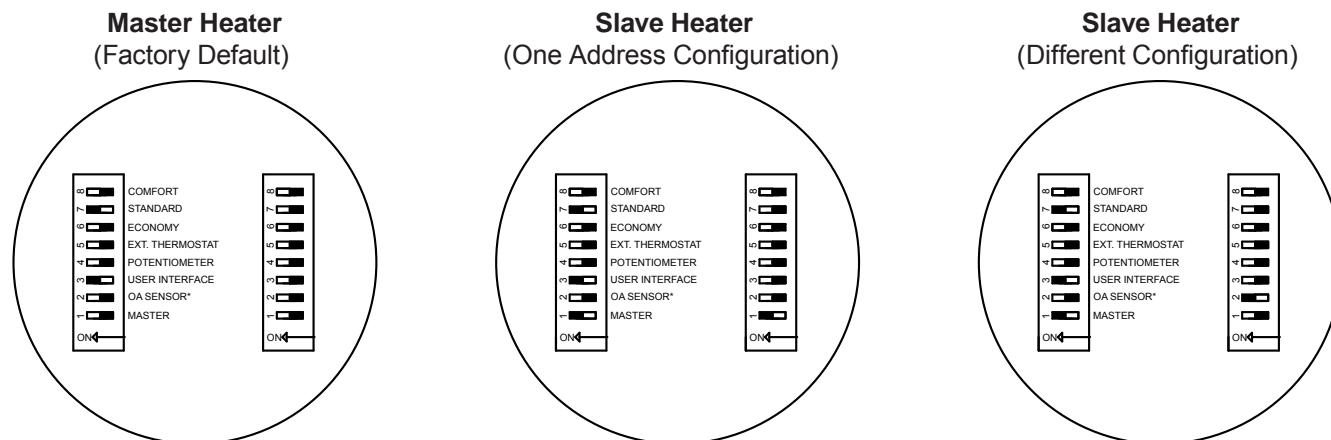
Use Diagram "A" on Page 37 for connecting the Premium User Interface to the heater.

'Address' DIP Switches

The Address DIP Switches are only utilized in a 'Master/Slave' installation or for BMS configurations. All other configurations ignore the settings of these switches. When addressing a heater for a 'Master/Slave' configuration, the 'Slave' heaters must be addressed for proper operation. Each 'Slave' must have its own unique configuration, determined by the installer. Up to 256 unique combinations can be configured.

Setting the 'Slave' Heater(s): The 'Slave' heater configuration is set by selecting the 'Slave' position on switch #1 in the "Options" DIP Switches. The address switches become active when the 'Slave' configuration is selected. On the Address DIP Switches, configure each heater so that each heater has its own unique configuration. An example is provided below for a three heater zone system.

Figure 3.39 • Example of three DIP Switches



4.0 Operation

⚠ WARNING



This heater must be installed and serviced by trained gas installation and service personnel only.

Do not bypass any safety features or the heater's built in safety mechanisms will be compromised.

Sequence of Operation

There are two (2) main controllers for the MP Series heater. The TP-351A is the ignition controller, and is responsible for the ignition sequence, flame monitoring, and safety lock-out features. The TP-3250 is the modulating controller, and is responsible for the call for heat, modulating the gas valve and blower speed, selecting the performance curve or mode, and handles various passive inputs and outputs for controlling devices. These two devices will be referred to as their TP-#'s during the sequence of operation.

Standby:

TP-351A - 120VAC is held at the circuit of the circuit board.

TP-3250 - 24VAC and 120VAC is held at the circuit board.

Starting Circuit:

The TP-3250 checks various inputs to select the performance curve, model, and appropriate mode of operation. After successful determination of all internal checks, the TP-3250 will output the conditioned 120VAC to the blower motor and 120VAC to the common side of the pressure switch.

Once operational static pressure is achieved, the differential switch will close, sending the 120VAC to the TP-351A and the PS indicator light, initiating the ignition sequence. The glo-bar is energized with 120VAC for 45 seconds from the TP-351A. Once the time is achieved, the TP-351A switches on the 120VAC for the valve circuit and switches off the power to the glo-bar. The 120VAC from the TP-351A valve circuit is used to power the coil side of the isolation relay and sends power to the TP-3250 to indicate the start of the ignition sequence. The isolation relay switches 24VAC from the transformer to the primary coil of the gas valve and valve indicator light.

Once the gas valve circuit is energized from the TP-351A, flame should be present on the burner and visible through the sight glass. The flame rod monitors the burner flame through flame rectification, and can be measured in micro-amps (this can be verified at the flame current test pins on the TP-351A). Minimum required micro-amps are 1.0mA, and should be present during burner operation.

If the burner fails to light or flame is not detected within 8 seconds, the gas valve circuit is de-energized and the control performs an "inter-purge" delay before attempting another ignition sequence. The control will attempt 2 additional trials of ignition before entering the soft lock out sequence. In the soft lockout sequence, the gas valve will be turned off immediately. After 1 hour, if the thermostat is still calling for heat, the TP-351A will automatically reset and attempt a new trial for ignition. After multiple attempts to ignite the burner have failed, the TP-351A enters a hard lockout mode. The control will not open the gas valve unless there is an intervention by the user. The reset can be done by either resetting the thermostat or removing the 120 VAC for a period of 5 seconds.

Running Circuit:

After ignition, the flame rod continuously monitors the flame presence. If sense of flame is lost for a time of 1.0 seconds or greater, the TP-351A closes the gas valve circuit and a new trial for ignition sequence is initiated.

Modulating Circuit:

Pre-heat – During the ignition sequence, the TP-3250 operates the blower and gas valve at 100% operation to optimize ignition. Once ignition is established, the heater will enter a pre-heat cycle for 90 seconds, operating the blower motor and gas valve at 100%. However, if the heater has cycled in the previous 5 minutes, the controller will skip the pre-heat cycle, and go straight to modulating operation.

The blower motor and modulating coil on the gas valve are energized directly from the TP-3250 modulating controller. The controller utilizes PID logic to match the selected performance curve to the heater's operation. Based on the determined system configuration, the control will operate as needed to match the desired system performance.

Performance Curves

The MP Series is programmed to operate on several different performance curves. These curves are to allow the user to select the desired operation that best accommodates their specific needs. The performance curves can be selected either by the Premium User Interface (TP-PUI) or by setting the DIP switches located under the control cover (Pages 43-44). The three modes are as follows:

- **Economy Mode:** Unit operates to maximize thermal efficiency.
- **Comfort Mode:** Unit operates to maximize perceived human comfort.
- **Standard Mode:** Unit operates as a balance between comfort and economy mode.

Economy Mode: Economy Mode is intended to maximize thermal efficiency. It is designed to provide a system that is more thermally efficient than the other modes due to quicker dissipation of heat. This mode is recommended for applications such as:

- | | |
|--|--|
| <ul style="list-style-type: none">• Aircraft hangars• Car washes• Unpopulated warehouses | <ul style="list-style-type: none">• Pole barns• Foundries |
|--|--|

Comfort Mode: Comfort Mode is designed to minimize temperature differentials across the length of the heater. It is intended to provide a system that has a greater perceived comfort than the other modes because of the reduction of extreme temperature zones. This mode is recommended for applications such as:

- | | |
|--|--|
| <ul style="list-style-type: none">• Patios• Loading docks• Break areas and lunch rooms• Kennels | <ul style="list-style-type: none">• Parts counters and service desks• Golf driving ranges• Woodworking shops |
|--|--|

Standard Mode: Standard Mode is a balance between Comfort Mode and Economy Mode. It is intended to provide a system that is moderately thermal efficient while still minimizing the greater temperature differentials associated with economy mode. This mode is recommended for applications such as:

- Populated warehouse heating
- Service garages
- Fire Stations
- Manufacturing
- Auto showrooms

Shut-down:

When the thermostat is satisfied, the TP-3250 will de-energize the 120VAC power to the common side of the pressure switch, de-energizing the thermostat circuit on the TP-351A. The blower motor will continue to cycle for a period of 2 minutes for a post-purge cycle.

NOTE: Due to the PID Controller optimizing the output of the heater, the unit may run for a short period after the call for heat has been satisfied.

For extended shut down periods:

- ① Set external controller devices to off or lowest setting.
- ② Turn OFF the 120VAC to the heater.
- ③ Turn OFF the manual shut-off valve in the heater's gas supply line.
- ④ Prior to start up after seasonal extended shut-down, an inspection of the heater must be performed by trained gas installation and service personnel. This will ensure optimal operation and years of trouble-free service.

Diagnostics

Lockout:

The controls will automatically lockout the heater system when an external or system fault occurs. There are two types of lockout:

Soft Lockout: The heater will attempt to light three times. In the event of a failed ignition, (gas pressure, valve, no flame sense etc.), the heater will enter a soft lockout period for 15 minutes and then attempt to light three more times before entering a Hard Lockout mode.

Hard Lockout: If proof of flame is not established, a component failure occurs or blockages are evident, the heater will enter hard lockout. If lockout occurs, the control can be reset by briefly interrupting the power source. The control will not open the gas valve unless there is an interruption by the user.

Figure 4.1 • Operational Indicator Lights (see Charts 3.1 through 3.3 for Operation & Diagnostic LEDs)

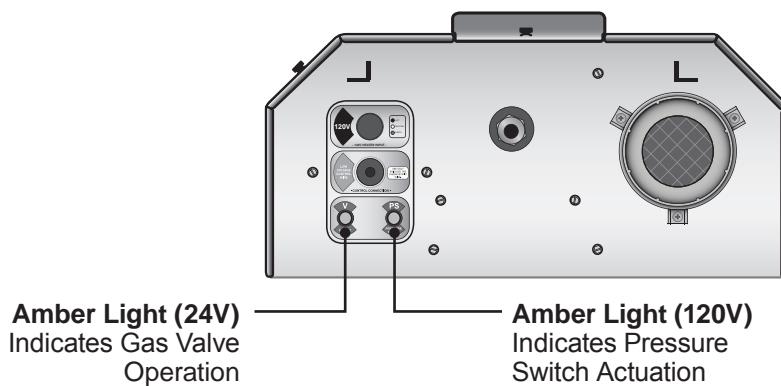


Figure 4.2 • Circuit Board LEDs

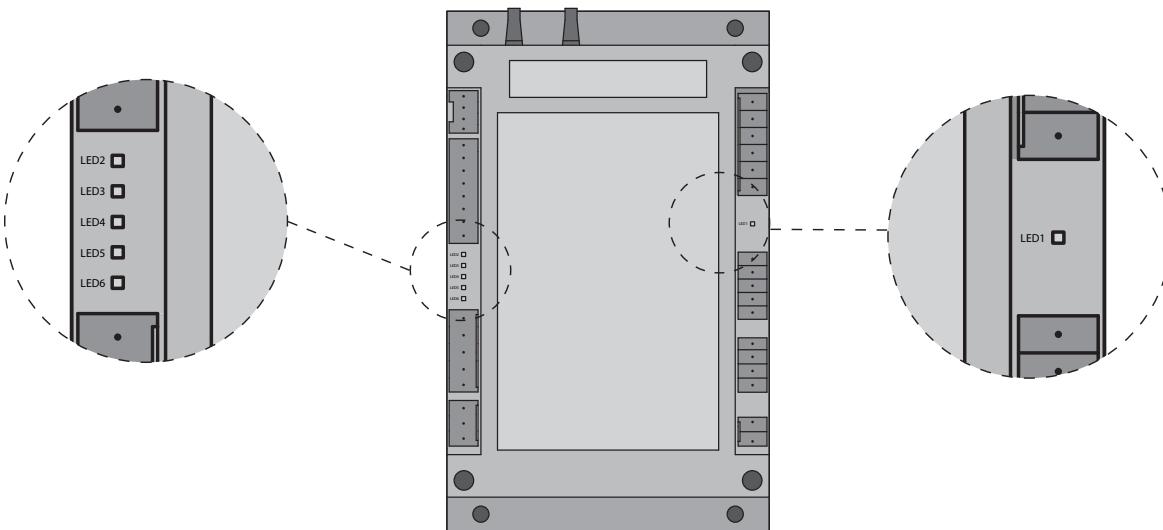


Chart 4.1 • Operation LED

LED	Color	Description	Operation
1	Green	Relay ON	On if relay ON to ignition module.

Chart 4.2 • Diagnostic LEDs

LED	Color	Description	Operation
2	Green	Power	On if power to unit.
3	Green	Heat	On if call for heat.
4	Green	Fan	On if fan energized.
5	Green	Valve	On if valve energized.
6	Red	Service	Errors (see Chart 3.3).

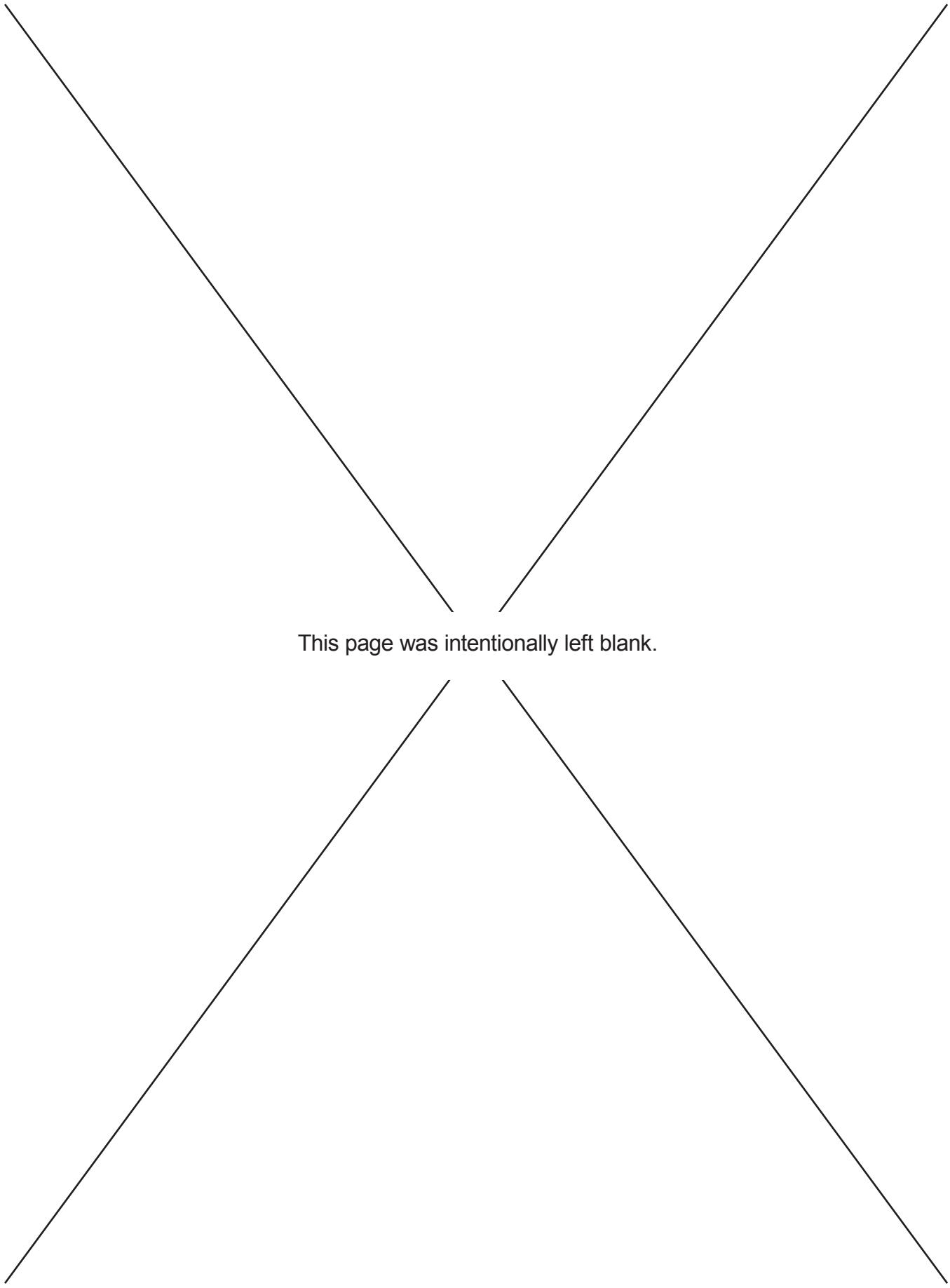
Chart 4.3 • Flash Code Status LED (located on Circuit Board)

Each of the following status codes is a two digit number with the first digit determined by the number of short flashes and the second digit by the number of long flashes.

LED Short Flash: 0.5 Seconds ON, 0.5 Seconds OFF.

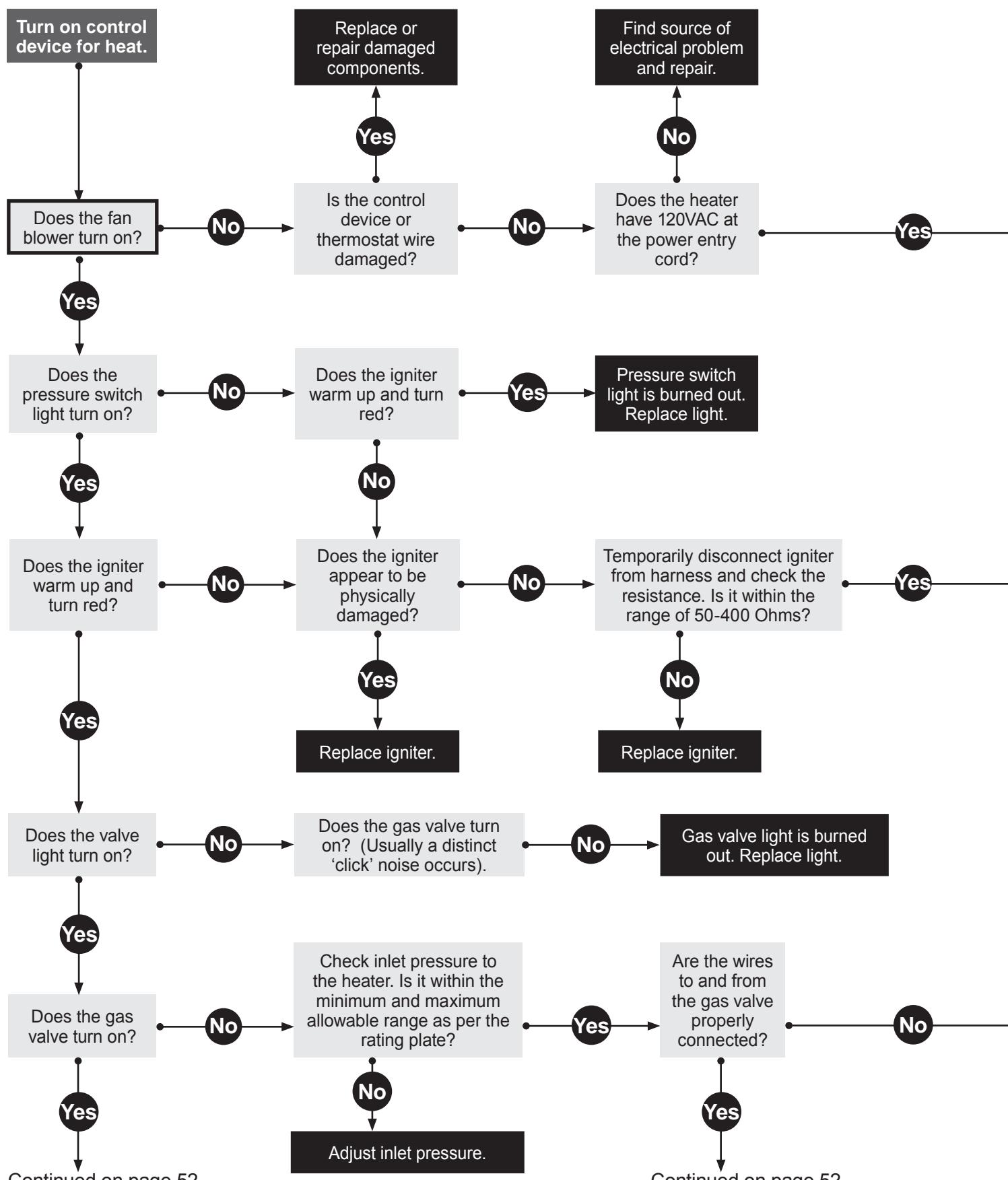
LED Long Flash: 1.5 Seconds ON, 1.5 Seconds OFF.

LED CODE (Number of Flashes)	STATUS / ERROR
1-1	Long Run Time - Actual temperature fails to rise after 4 hours of consecutive running.
1-2	Blower - Fan is on but static pressure is not reading properly.
1-3	Ignition Module Failure - Ignition module failed to initiate sequence of ignition.
1-4	Ignition Soft Lockout - Control will auto reset after 15 minutes. See lockout in diagnostics section.
2-1	Ignition Hard Lockout - Ignition module will NOT auto reset; unit will not operate unless there is an interruption by the user.
2-2	Sensor Error - External temperature sensor is shorted or reading open.
2-3	Internal Software Error - Failure with software on modulating controller.
2-4	Model Selection or Setup Error - Invalid model selection DIP Switch configuration
3-2	Error with User Interface - Short was detected in user interface.



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5.0 Troubleshooting Guide



Continued on page 52

Continued on page 52

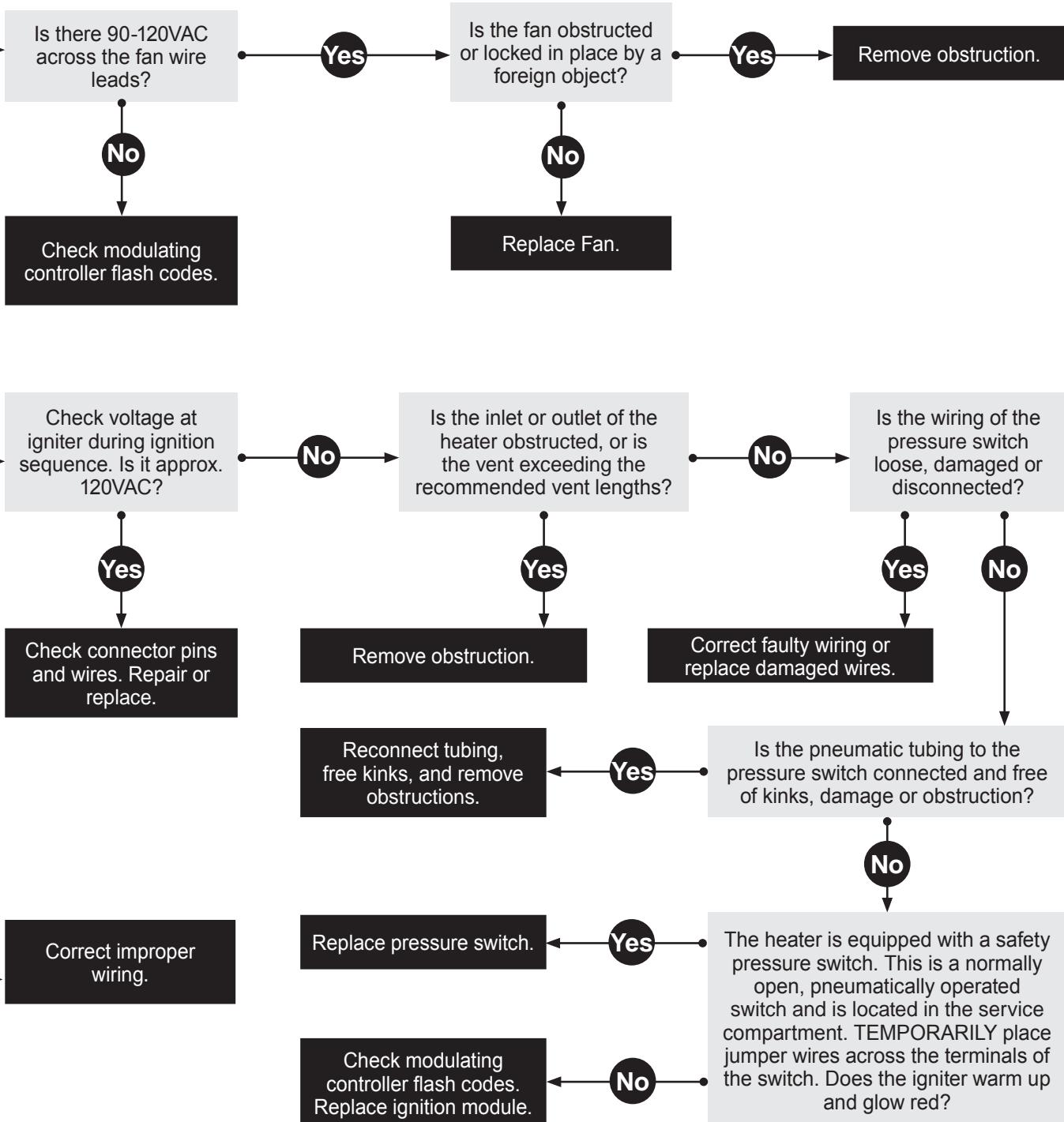
NOTICE

Bypassing any switch is intended for testing purposes only. Do not leave switch bypassed during normal operation or the heater's built-in safety mechanisms will be compromised.

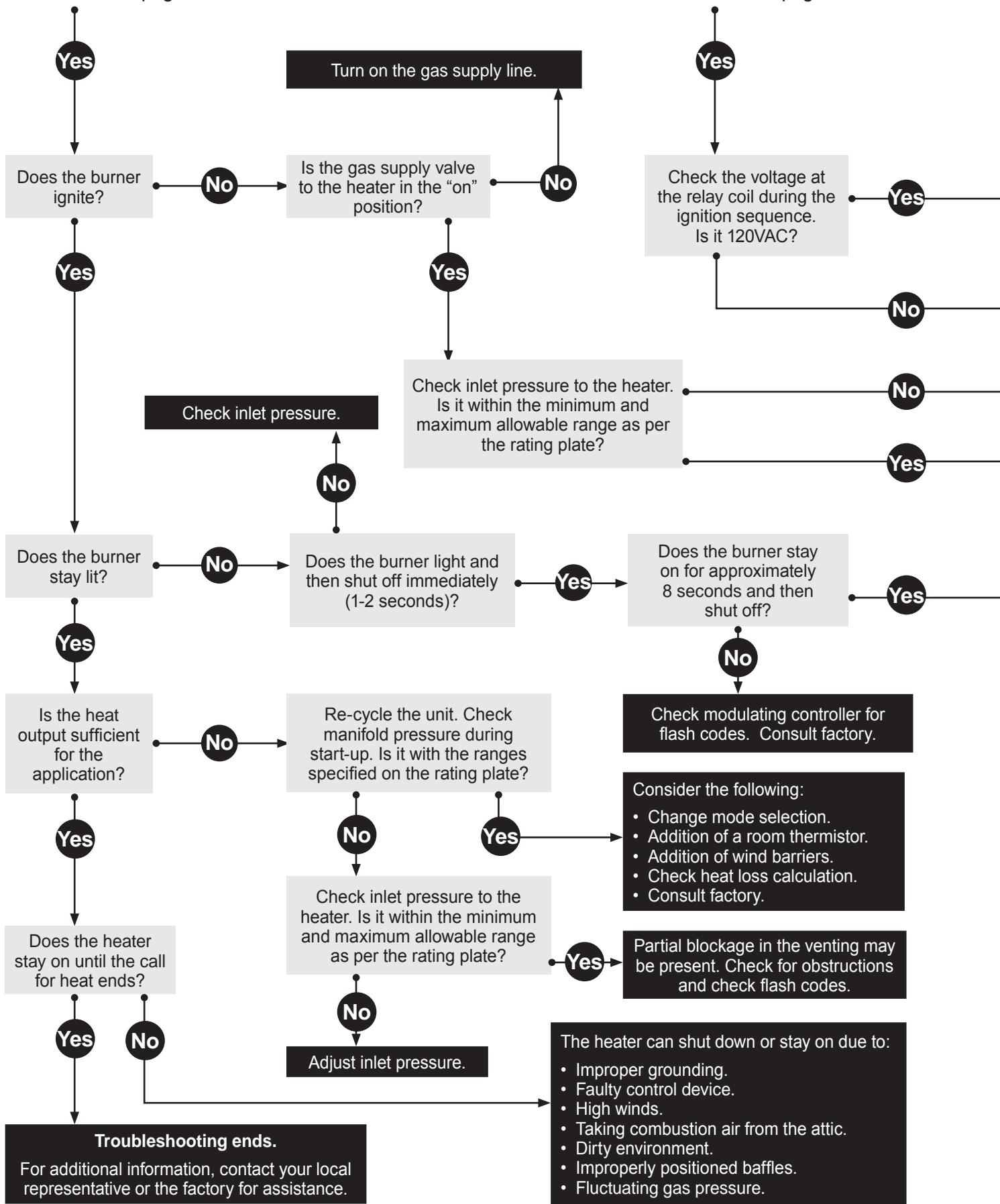
Key

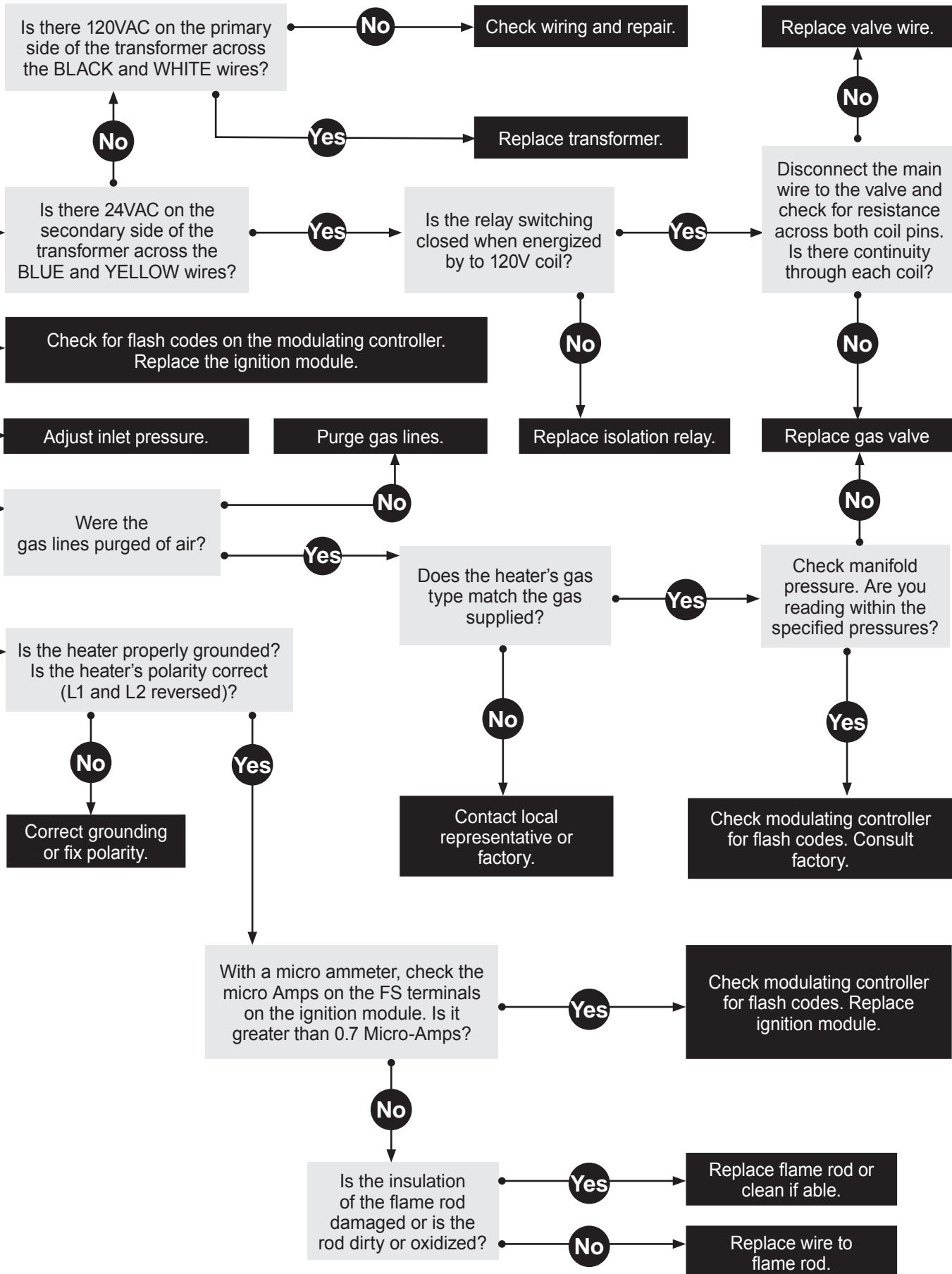
 Start Question  Process Question

 Corrective Action



Continued from page 50





6.0 Maintenance

! WARNING



Personal injury or death may result if maintenance is not performed by properly trained gas installer or service personnel. Contact the installing distributor or place of purchase for service. Do not operate heating system if repairs are necessary.



Allow heater to cool prior to servicing.

Disconnect power to heater before servicing.

Use protective glasses when maintaining the heater.

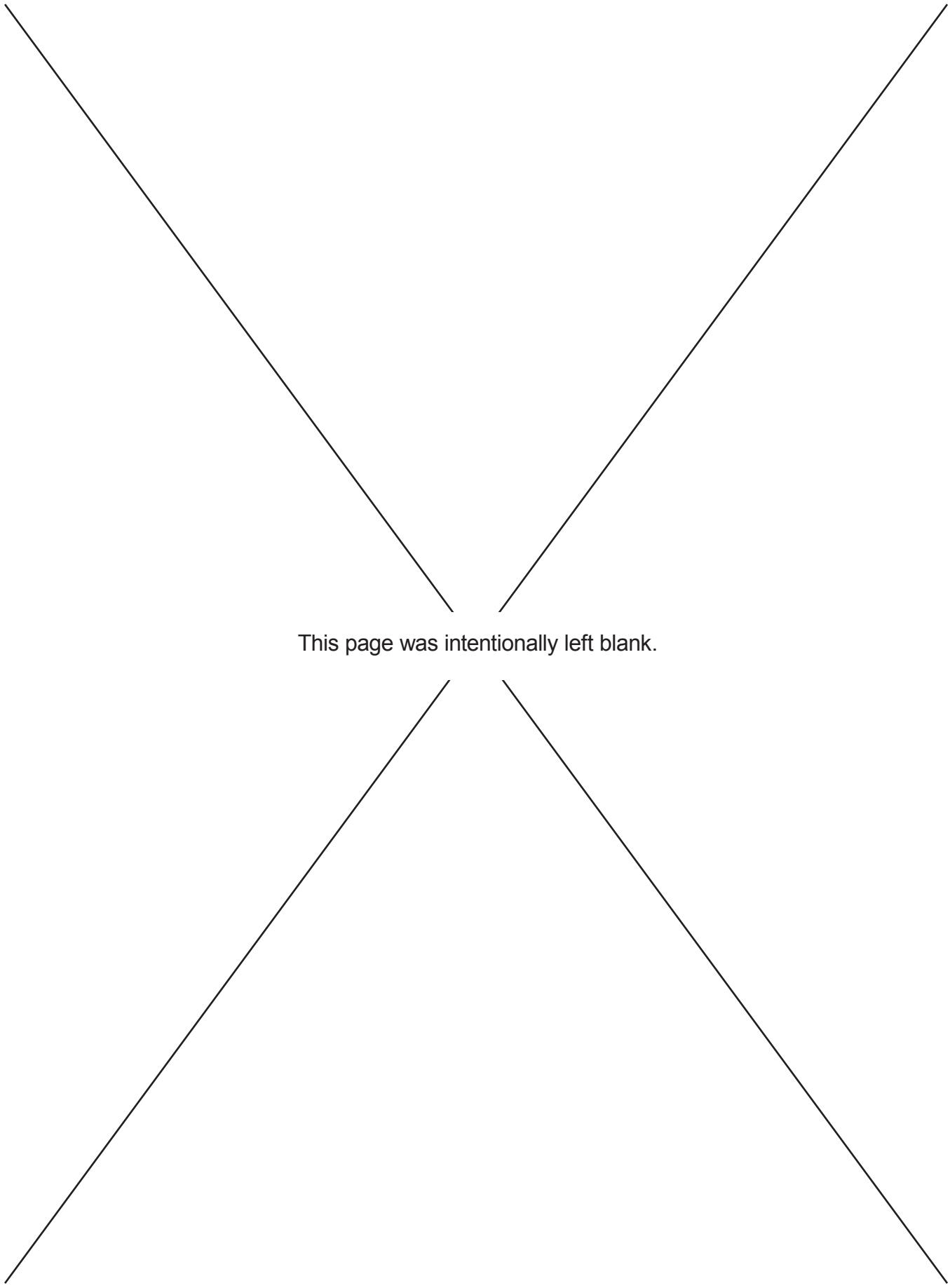
Routine Inspection:

At least once per year, the heating system should be inspected and serviced by trained gas installation and service personnel only. This inspection should be performed at the beginning of the heating season to insure that all heater components are in proper working order and that the heating system operates at peak performance. Particular attention should be paid to the following items.

- Blower Motor: Annual oiling of the blower motor with SAE 20 oil will extend bearing life significantly. Ensure that the squirrel cage in the blower is kept clean. If dirt becomes a problem, installation of outside air intake ducts for combustion is recommended.
- Vent pipe system: Check the outside termination and the connections at the heater. Inspect the vent exhausts for leakage, damage, fatigue, corrosion and obstructions. If dirt becomes a problem, installation of outside air intake ducts for combustion is recommended.
- Combustion air intake system (when applicable): Check for blockage and/or leakage. Check the outside termination and the connection at the heater.
- Heat exchangers: Check the integrity of the heat exchangers. Replace if there are signs of structural failure. Check for corrosion and/or buildup within the tube exchanger passageways.
- Burner: Check for proper ignition, burner flame and flame sense. Flame should extend directly outward from burner without floating or lifting.
- Wiring: Check electrical connections for tightness and/or corrosion. Check wires for damage.
- Gas Connection: Inspect the integrity of the gas connection to the heater. Check for leaks, damage, fatigue or corrosion. Do not operate if repairs are necessary and turn off gas supply to the heater. Contact service personnel.
- Reflectors: Inspect the integrity of the reflectors for damage, separation, missing or misaligned sections. Do not operate if repairs are necessary. Repair or replace as required.

To maintain effective infrared heating, always keep both sides of the reflector clean. Dirt and dust can be vacuumed up or wiped with a soap and water solution. Use metal polish if the reflectors are severely dirty.

Contact service personnel if repairs are necessary. Do not operate unit.



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Heater Components and Parts List

Figure 6.1 • Burner Assembly Components

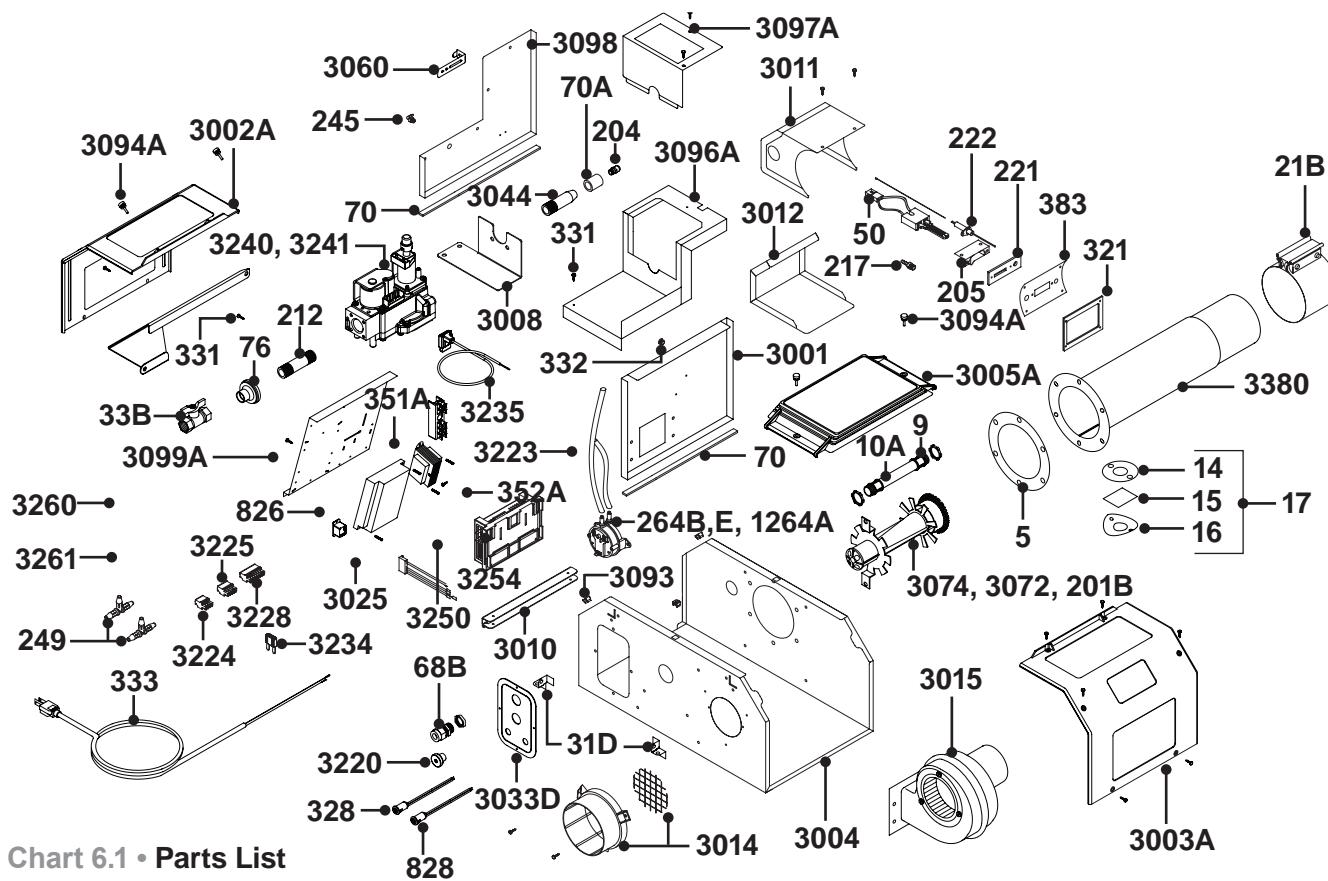
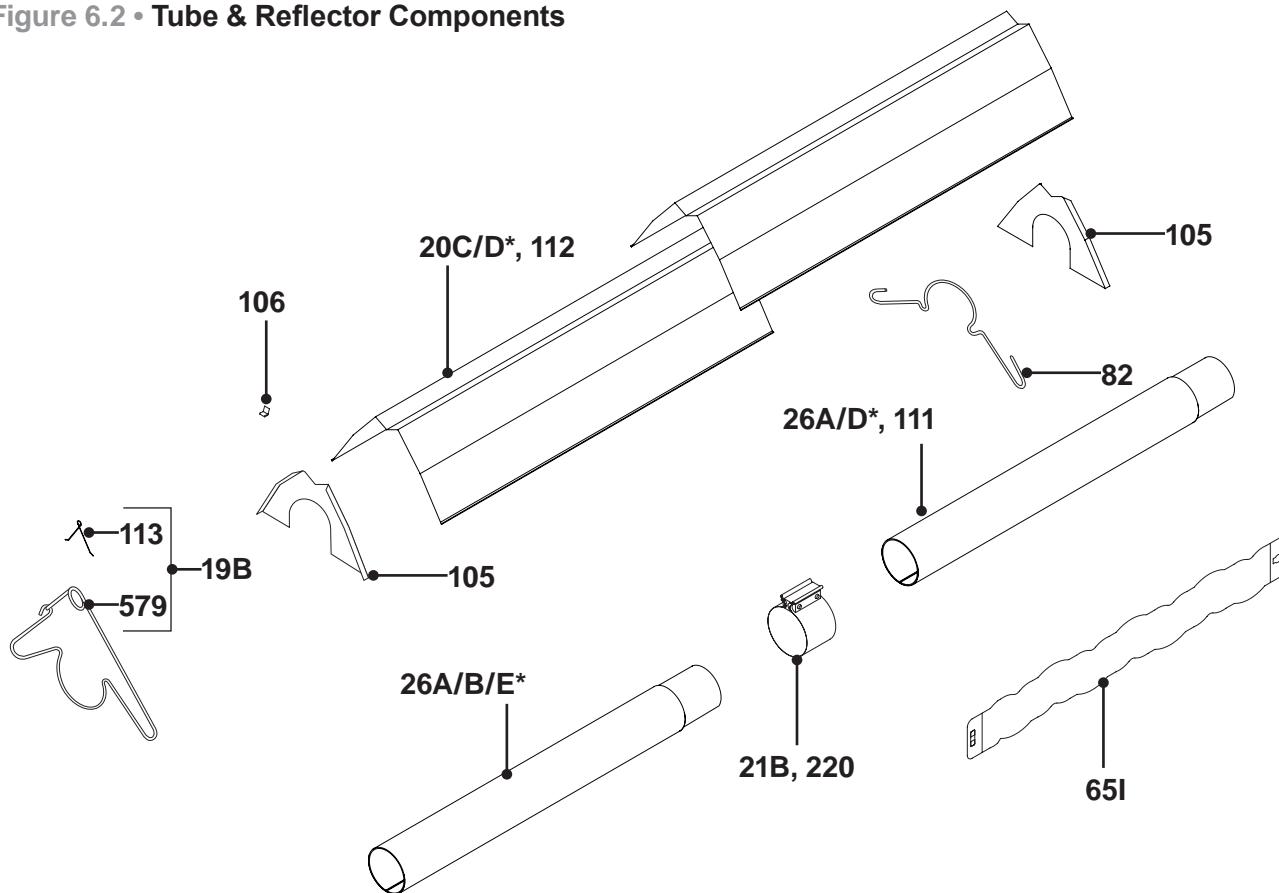


Chart 6.1 • Parts List

Part #	Description	Part #	Description
TP-5	Flange Gasket	TP-76	3/8" Rubber Grommet
TP-9	3/4" EMT Conduit Coupling	TP-82	Reflector Center Support (RCS)
TP-10A	3/4" x 4" EMT Conduit	TP-105	Aluminum Reflector End Cap
TP-14	Sight Glass Gasket	TP-106	Reflector End Cap Clips (8 pieces)
TP-15	Sight Glass	TP-111	5 ft. x 4" Black Coated Aluminized Steel Tube
TP-16	Sight Glass Washer	TP-112	5 ft. Polished Aluminum Reflector
TP-17	Sight Glass Kit	TP-113	Reflector Tension Spring
TP-19B	4" Wire Hanger w/ Tension Spring	TP-201B	High BTU Burner (Color Code - TAN)
TP-20C	10 ft. Polished Aluminum Reflector	TP-204	Gas Orifice (Consult Factory)
TP-20D	10 ft. Stainless Steel Reflector	TP-205	Glo-Bar Holder
TP-21B	4" Standard Tube Clamp	TP-212	1/2" N.P.T x 3" Pipe Nipple
TP-26A	10 ft. Aluminized Radiant / Combustion Tube	TP-217	Brass 1/8" N.P.T. Barb Fitting
TP-26B	10 ft. Titanium Stabilized Combustion Tube	TP-219	12" Pneumatic Tube for Pressure Switch
TP-26D	10 ft. 304 Stainless Steel Radiant Tube	TP-220*	Stainless Steel Tube Clamp
TP-26E	10 ft. 409 Stainless Steel Combustion Tube	TP-221	Glo-Bar Holder Gasket
TP-31D	Interlocking Mounting Bracket (Qty. 2)	TP-222	Flame Rod
TP-33B	1/2" NPT Shut-off Ball Valve w/ Inlet Tap	TP-245	Plastic 1/8" N.P.T. 90° Barb Fitting
TP-50	Glo-Bar Igniter	TP-249	3/16" Pneumatic Tee (Qty. 2)
TP-65I	3 ft. Interlocking Turbulator Baffle	TP-264B	Differential Pressure Switch
TP-68B	1/2" Strain Relief Bushing	TP-264E	Differential Pressure Switch
TP-70	1/2" x 10" Control Box Gasket (Qty. 2)	TP-321	Ignition Plate Gasket
TP-70A	1" x 6" Manifold Gasket	TP-328	120VAC Yellow Indicator Light

Figure 6.2 • Tube & Reflector Components



Part #	Description	Part #	Description
TP-331	Green Self-tap Ground Screw (Qty. 2)	TP-3044	Gas Manifold
TP-332	1/4" Divider Grommet	TP-3060	Pressure Switch Mounting Bracket
TP-333	6 ft. Black Power Cord w/ Ground	TP-3072	Low BTU Burner (Color Code - GREEN)
TP-351A	Potted Circuit Board - Ignition Controller	TP-3074	High BTU Burner (Color Code - ORANGE)
TP-352A	Wire Harness for Ignition Controller	TP-3093	#8-32 Cage Nut (Qty. 4)
TP-383	Glo-Bar Igniter Plate	TP-3094A	#8-32 X 1/2" Metal Thumb Screw
TP-579	4" Wire Hanger	TP-3096A	Valve Compartment Bottom Panel
TP-826	40VA Transformer (120Primary / 24Secondary)	TP-3097A	Valve Compartment Top Panel
TP-828	24VAC Yellow Operational Indicator Light	TP-3098	Valve Compartment Side Panel
TP-1018	20" Pneumatic Tube for Pressure Switch	TP-3099A	Controls Mounting Panel
TP-1264A	Differential Pressure Switch	TP-3220	Thermostat Wire Grommet
TP-3001	Divider Panel	TP-3223	Anti-Kink Coil (Qty. 2)
TP-3002A	Plastic End Panel, Control Compartment	TP-3224	Thermostat Terminal Strip, 4 Circuit (C)
TP-3003A	Plastic End Panel, Fan Compartment	TP-3225	Thermostat Terminal Strip, 5 Circuit (B)
TP-3004	Control Box	TP-3228	Thermostat Terminal Strip, 8 Circuit (A)
TP-3005A	Plastic Valve Chamber Lid	TP-3234	Mini Fuse for TP-3250 (3A)
TP-3008	Gas Valve Mounting Bracket	TP-3235	Valve Coil Main Cord (24VRAC)
TP-3010	Service Panel Hinge	TP-3240	Natural Gas Valve Assembly
TP-3011	Igniter Box	TP-3241	Propane Gas Valve Assembly
TP-3012	Igniter Box Cover	TP-3250	Circuit Board - Modulating Controller
TP-3014	Plastic Air Orifice with Screen	TP-3254	Wire Harness for Modulating Controller
TP-3015	Fan Blower Assembly (PSC Motor)	TP-3260	4 1/2" Pneumatic Tube (Qty 3)
TP-3025	120VAC Coil Relay	TP-3261	10" Pneumatic Tube (Qty 2)
TP-3033D	Power Entry Plate	TP-3380	16" HSI Burner Tube w/ Flange and Fittings

* 200,000 BTU/h models only.

7.0 Limited Warranty

One-Year Limited Warranty. Radiant Tube Heaters covered in this manual, are warranted by Brant Radiant Heaters Limited to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Brant Radiant Heaters Limited designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at Brant Radiant Heaters Limited's option. For limited warranty claim procedures, see PROMPT DISPOSITION below. This limited warranty gives purchasers specific legal rights which vary from jurisdiction to jurisdiction.

Additional Limited Warranty. In addition to the above mentioned one-year warranty, Brant Radiant Heaters Limited warrants the original purchaser an additional extension on the combustion chamber, radiant tubes and stainless steel burner. This extension excludes electrical/purchased components. See specific product warranties on page 60 of the Series Manual.

General Conditions. The Company will not be responsible for labor charges for the analysis of a defective condition of the heater or of the installation of replacement parts. The warranties provided herein will not apply if the input of the heater exceeds the rated input at time of manufacturing or if the heater in the judgement of the Company has been subjected to misuse, excessive dust, improper conversion, negligence, accident, corrosive atmospheres, excessive thermal shock, excessive vibration, physical damage to the heater, alterations by unauthorized service personnel, operation contrary to the Company's instructions or if the serial number has been altered, defected, or removed. The Company shall not liable for any default or delay in the performance of these warranties caused by contingency beyond its control, including war, government restriction or restraints, strikes, fire, flood, short or reduced supply of raw materials, or parts.

The warranties herein shall be null and void if the heater is not installed by a competent heating contractor and/or if the heater is not installed according to Company instructions, normal industry practices and/or if the heater is not maintained and repaired according to Company instructions. Normal product degradation and wear (rust, oxidation, etc.) does not constitute a material defect and applicable warranty claim.

Limitation of Liability. To the extent allowable under applicable law, Brant Radiant Heaters Limited's liability for consequential and incidental damages is expressly disclaimed. Brant Radiant Heaters Limited's liability in all events is limited to and shall not exceed the purchase price paid.

Warranty Disclaimer. Brant Radiant Heaters Limited has made a diligent effort to provide product information and illustrate the products in this literature accurately; however, such information and illustrations are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions. Except as provided below, no warranty or affirmation of fact, expressed or implied, other than as stated in the "LIMITED WARRANTY" above is made or authorized by Brant Radiant Heaters Limited.

Product Suitability. Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Brant Radiant Heaters Limited attempts to assure that its products comply with as many codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of the product, installation, and use will comply with them. Certain aspects of disclaimers are not applicable to consumer products: e.g.,(a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you: (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you: and (c) by law, during the period of this limited warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

Prompt Disposition. Brant Radiant Heaters Limited will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Brant Radiant Heaters Limited at address below, giving dealer's name, address, date and number of the dealer's invoice, and describe the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you file claim with carrier.

Notes

8.0 MP Series Kit Contents Check List

MP Series Kit Contents - Reference the length column for your model.							
Part No.	Description	25 ft.	30 ft.	40 ft.	50 ft.	60 ft.	70 ft.
RH-1/2	1/2" Type 1 Rubber Hose	1	1	1**	1**	1	1
RH-3/4	3/4" Type 1 Rubber Hose	0	0	1**	1**	1	1
TP-19B	4" Hanger w/ Tension Spring	3	4	5	6	7	8
TP-21B	4" Tube Clamp	2	3	4	5*	6*	7*
TP-82	4" Reflector Center Support	2	3	4	5	6	7
TP-105	Reflector End Cap	2	2	2	2	2	2
TP-106	Reflector End Cap Clips	8	8	8	8	8	8
TP-3220	Thermostat Wire Grommet	1	1	1	1	1	1
TP-3224	Terminal Strip Connector 'A'	1	1	1	1	1	1
TP-3225	Terminal Strip Connector 'B'	1	1	1	1	1	1
TP-3228	Terminal Strip Connector 'C'	1	1	1	1	1	1
LIOMP	MP Series Insert Manual	1	1	1	1	1	1

Filled By:

NOTE:

* One 4" stainless steel tube clamp (P/N: TP-220) is provided for each 175,000 - 200,000 BTU model. Place as shown on page 23.

** RH1/2- 30" x 1/2" diameter Type 1 hose supplied with Models 125,000 BTU/h and below.
RH3/4- 30" x 3/4" diameter Type 1 hose supplied with Models 150,000 BTU/h and greater.

Approvals

- CSA.
- Indoor approval.
- Outdoor approval with OD-Kit.
- Commercial approval.

Limited Warranty

- 1 year - Burner box components.
- 5 years - Combustion and radiant tubes.
- 10 years - Stainless steel burner.