



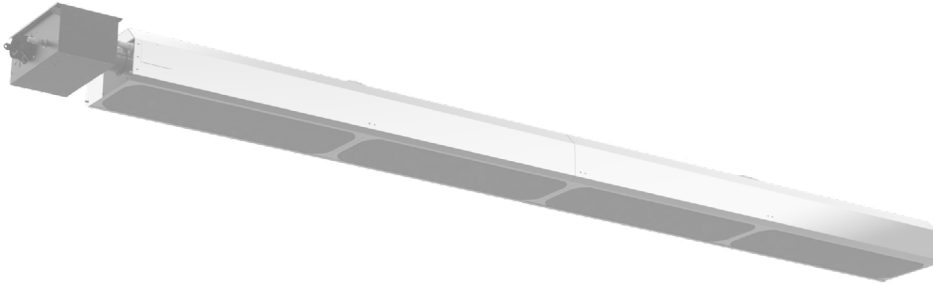
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August 2024

INSTALLATION AND SERVICE MANUAL

Decorative Two Stage Infrared Patio Heaters

Model MRL



! WARNING

1. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects, or other reproductive harm. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.
2. Do not locate ANY gas-fired units in areas where chlorinated, halogenated, or acidic vapors are present in the atmosphere. These substances can cause premature heat exchanger failure due to corrosion which can cause property damage, serious injury or death.
3. For either indoor or outdoor installation. Not for use in residential dwellings.

! CAUTION

As with all infrared equipment, clearances to combustible materials are critical. Be sure all units have reflectors installed along the entire length of the tube, and that they are not mounted at an angle greater than 45° from the horizontal plane. In locations used for storage of combustible materials, signs shall be clearly posted in the vicinity of the heater where readily apparent to material handlers to specify the maximum permissible stacking height to maintain required clearances from the heater to the combustibles.

FOR YOUR SAFETY

IF YOU SMELL GAS:

1. Open windows (indoor installation only).
2. Do not touch electrical switches.
3. Extinguish any open flame.
4. Immediately call your gas supplier.

FOR YOUR SAFETY

The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this unit is hazardous.

IMPORTANT

The use of this manual is specifically intended for a qualified installation and service agency. A qualified installation and service agency must perform all installation and service of these appliances.

Inspection upon Arrival

1. Inspect unit upon arrival. In case of damage, report it immediately to transportation company and your local Modine Sales Representative.
2. Check rating plate on unit to verify that power supply meets available electric power at the point of installation.
3. Inspect unit upon arrival for conformance with description of product ordered (including specifications where applicable).

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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 this radiant tube heater. You must read and understand all instructions and safety warnings before installing or servicing the radiant tube heater.

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 components included with your radiant tube heater. Refer to page 40 for a list of the kit contents for your series heater. Materials not included in the heater kit contents (e.g., screws, terminals, etc.) are the responsibility of the installer. Notify your product representative or Modine of any discrepancy or missing kit contents prior to installing unit.

Specifications

Chart 1.1 • MRL Specifications

Model Number	Gas Type (Select One)	BTU/h (High Fire)	BTU/h (Low Fire)	Length	Unit Weight (lbs.)	Recommended Mounting Height*	Radiant Surface Area (sq. ft.)	36" Baffle Sections
MRL-30-065	Nat. or Prop.	65,000	50,000	16'-4"	170	9' to 16'	26.7	4
MRL-30-080	Nat. or Prop.	80,000	52,000	16'-4"	170	9' to 16'	26.7	4
MRL-30-100	Nat. or Prop.	100,000	65,000	16'-4"	170	9' to 16'	26.7	4

* Typical or recommended mounting heights are provided as a guideline. Actual conditions may dictate variations from this data.

WARNING

California Proposition 65

This product can expose you to chemicals including lead and carbon monoxide, which are known to the State of California to cause birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

⚠ WARNING

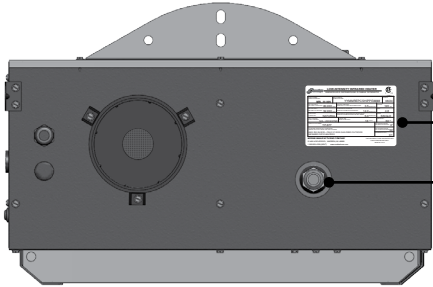


Read and understand all safety information and warnings in this manual before installation, operation, and maintenance of the radiant tube heater system.

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.

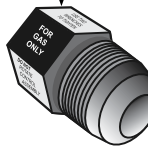
Back Panel



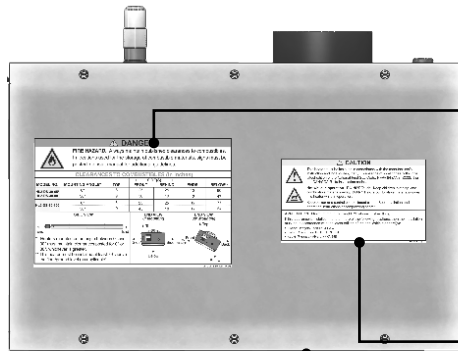
MRL-30-80N		YMMREPCSHIPPE###		08/24	
MAX HEAT OUTPUT 80,000 BTU/H	HEATED VOLUME 120 cu ft	HEATED LENGTH 14.0 INCHES	HEATED DIA. 4.8 INCHES	HEATED AREA 18 sq ft	HEATED PERIMETER 60 in
MAX HEAT INPUT 52,000 BTU/H	HEATED PRESSURE 1.0 INCHES W.C.	HEATED WEIGHT 5.0 INCHES W.C.	HEATED TYPE SINGLE	HEATED MATERIAL 304	HEATED FINISH G1
TYPE OF GAS NATURAL	HEATED WEIGHT 18 lbs	HEATED WEIGHT 5.0 INCHES W.C.	HEATED TYPE SINGLE	HEATED MATERIAL 304	HEATED FINISH G1
HEATED CATEGORY N/A - UNVENTED	HEATED WEIGHT 18 lbs	HEATED WEIGHT 5.0 INCHES W.C.	HEATED TYPE SINGLE	HEATED MATERIAL 304	HEATED FINISH G1
DISTRIBUTION CLASSIFICATION TP-87	HEATED WEIGHT 18 lbs	HEATED WEIGHT 5.0 INCHES W.C.	HEATED TYPE SINGLE	HEATED MATERIAL 304	HEATED FINISH G1

Rating Plate

F/N: LLTB018 (Natural Gas)
F/N: LLTB019 (Propane Gas)



Top Panel



MODEL NO.	MOUNTING ANGLE*	TOP		SIDE(S)		ENDS	BELOW
		FRONT	BEHIND	FRONT	BEHIND		
MRL-30-80-80	0°	6	25	12	12	12	60
MRF-30-35-(85-90)	30°	9	38	10	12	12	47
MRL-30-100	0°	8	35	22	12	12	77
MRF-30-100	30°	9	45	10	12	12	64

F/N: LLTCL018_M
Clearances to Combustibles Label

CAUTION

This heater must be installed in accordance with the manufacturer's instruction and local codes, if any. In absence of local codes, follow the latest edition of the National Fuel Gas Code, NFPA 54 (ANSI Z223.1) or the CAN/CSA B149 installation codes.

Hot while in operation. DO NOT Touch. Keep children, clothing, and combustible materials away. **DO NOT** store combustible materials under this heater while in operation.

Keep burner and control compartment clean. See installation and operating instructions accompanying heater.

APPLICATION: Minimum mounting height 7'9" above finished floor. If this appliance is installed in one or more of the following locations, then the installation must be in accordance with the latest edition of the applicable standard(s):

- Aircraft Hangars - ANSI / NFPA 409
- Parking Structures - ANSI / NFPA 88A
- Repair Garages - ANSI / NFPA 88B

F/N: LLTCL016a
Safety Label

MRL-30-80N		Serial No.: 0914XXXXXXX 0001		
Production Code: D8PL	Version: 9.11	Stock: none	Add-On:	
Data on this label is for the model shown on this label. If your heater has been converted, this information is not accurate. Please contact the factory for assistance.				
BURNER COMPONENTS: (Specify TP-#s)				
Gas Valve:	3E96-224-N	840	Diag. Unit:	On Circuit Board
Circuit Board:	MiniSO-24	851	Temp. Sensor:	N/A
Wire Harness:	3 PCS Harness	852	Transformer:	40 VA
N.O. Switch:	None	N/A	Flame:	Fasco Lg.
N.C. Switch:	None	N/A	Alt. Fan:	50Hz / 120V
N.C. Switch:	None	N/A	Alt. Fan Usage:	When Specified
N.C. V.L. Orifice:	None	N/A	Relief:	None
Diff. Switch:	1022	204E	Blow:	None
Diff. V.L. Orifice:	Grey	304E	24 Volt In.:	3 T-plug
Igniter:	Noton™	50	120 Volt In.:	2 x 4 Box
Burner:	Low-Mid	3072	Gas In.:	7/8" FC Flare
1/8" Tube:	4" Gen.	380	Extra V.L. Orifice:	None
Hot Lights:	Yellow - 120V	828		
HEATER TYPE:	Gas: TP-2048	3	3	Electric: LLV1038
C1	Air: TP-442	1.10"	1.50"	1.50"
For parts replacement information, contact factory at 586-756-0950 or visit www.dtp-co.com/parts.		Internal Use Only:		Special 1: MiniSO
		Tag:		None
		Special 2:		Plug-Wth.

Burner Control Box
Component Label
(located under the top panel)

Bottom Panel



F/N: LLLOG0XXX



LED CODE	FAULT STATUS	FAULT CODE DELAY
Initial flash on power up, then steady off	No fault, normal operation	No delay
Steady on	Module failure / Internal fault	No delay
1 flash	Ignition failure	3 minutes
2 flashes	APS air flow fault NOTE: fan/intake/exhaust	1-30 seconds
4 flashes	Erroneous flame signal	No delay
No flash on 117V start-up	Transformer fault	No delay

NOTE: Lockout LED CODE appears on completion of the soft lockout operation.

Left Panel
(Fan Compartment)

F/N: LLTB007(3)
(Affixed under the lid)

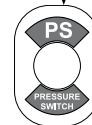
WARNING
Avoid Serious Injury, Death, or Property Damage. Maintain Clearances to Combustible to Prevent the Risk of Fire.

California Proposition 65
This product can expose you to chemicals including lead and carbon monoxide, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

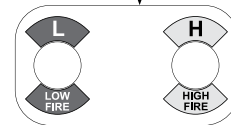
Clearances to combustibles must be maintained at all times in order to prevent the ignition of combustible materials. In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater's thermostats or, in the absence of such thermostats, in a conspicuous location. Clearances are provided on the heater's safety label and in the heater's Installation, Operation, and Maintenance manual. Product installation and operation must comply with applicable standards, codes, and regulations. Post this tag adjacent to the heater's thermostat or controls before operating the heater.

- INSTALLER: READ AND POST THIS NOTICE -

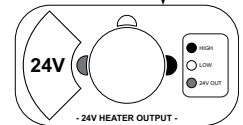
F/N: LL001 - Clearance Safety Tag
(Affix adjacent to heater's thermostat)



F/N: LLV2EP15



F/N: LLV2EP9



F/N: LLV3EP4
White Crescent

16" Burner Tube

Right Panel
(Valve Compartment)

SERVICE ACCESS PANEL
IGNITER & FLAME SENSE COMPARTMENT
1. Turn off gas & electricity.
2. Remove cover by lifting top cover upward and outward.
CAUTION: HOT SURFACE.
KEEP COVER IN PLACE. REMOVE FOR SERVICE ONLY.

SERVICE ACCESS PANEL
IGNITER & FLAME SENSE COMPARTMENT
1. Turn off gas & electricity.
2. Remove cover by lifting top cover upward and outward.
CAUTION: HOT SURFACE.
KEEP COVER IN PLACE. REMOVE FOR SERVICE ONLY.

F/N: LLTB026

2.0 Safety

Read and understand all safety information and warnings in this manual prior to installation, operation, and maintenance of this tube heater. Warnings indicate a potentially hazardous situation which, if not avoided, could result in death or injury.

⚠ WARNING



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

Warning Symbols

Safety is the most important consideration during installation, operation, and maintenance of the 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. This heater may not be used in a Class 1 or Class 2 Explosive Environment. Consult your local fire marshal, insurance carrier, and other authorities for approval if the proposed installation is in question.

Patio

This patio heater is specifically designed to provide heated comfort in an **outdoor environment**. When properly integrated into a patio design, the heaters generally increase the comfort levels.

High Altitude

The installation of this heater is approved, without modifications, for elevations up to 4,500 ft. above MSL (sea level). Contact Modine for installations above these elevations. Installation of this appliance at altitudes above 4,500 ft. (1372 m) shall be in accordance with local codes or, in the absence of local codes, ANSI Z223.1/NFPA 54 or CSA B149.1.

Standards, Certifications, and Government Regulations

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

In the absence of local codes, the installation must conform to the latest edition of:

United States: National Fuel Gas Code, ANSI Z223.1 (NFPA 54).

Canada: CAN/CGA B149.1 and .2, Canadian Electrical Code C22.1

Copies of the standards can be viewed or purchased through their respective publishers.

WARNING

Not For Use in Indoor Living Spaces. Installing this unit in residential indoor living spaces or sleeping quarters, such as bedrooms, basements, or garages, may result in property damage, serious injury, or death. This unit is approved for **unvented outdoor use only**.

Sprinkler Heads:

Fire sprinkler heads must be located at an appropriate distance from the heater to avoid accidental discharge of the fire suppression system. This distance may exceed the published clearances to combustibles (see Chart 2.2 on page 9). Certain applications will require the use of a higher classification of sprinkler heads or relocation of the heaters. Chart 2.1 is derived from NFPA 13 Table 3-2.5.1. Some manufacturers may supply sprinklers with temperature ratings that vary from the chart below. Consult the manufacturer of the sprinkler heads and NFPA 13 for more information.

Chart 2.1 • Sprinkler System Temperature Ratings

Classification	Max. Ceiling Temperature	Sprinkler Activation Temperature	Glass Bulb Color	Fusible Link Color
Ordinary	100°F	135°F - 170°F	Orange (135°F) Red (155°F)	Black or No Color
Intermediate	150°F	175°F - 225°F	Yellow (175°F) Green (200°F)	White
High	225°F	250°F - 300°F	Blue	Blue
Extra High	300°F	325°F - 375°F	Purple	Red
Very Extra High	375°F	400°F - 475°F	Black	Green
Ultra High	475°F	500°F - 575°F	Black	Orange
Ultra High	625°F	650°F	Black	Orange

Clearances to Combustibles

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

Moving Objects:

- Overhead doors
- Vehicle lifts
- Cranes
- Hoists

Hazards:

For maximum safety the building must be evaluated for hazards before installing the heating system. Examples 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

⚠ 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.

⚠ CAUTION

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.

Young children should be carefully supervised when they are in the same space as the heater.

Clothing or other flammable materials should not be hung from the heater or placed on or near the heater.

Any guard or other protective device removed for servicing the heater must be replaced prior to operating the heater.


Installation and repair should be done by a qualified service person. The heater should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required as necessary. It is imperative that the control compartment, air passageways, and burner(s) of the heater be kept clean.

When installing the heating system, the minimum clearances to combustibles for your series tube heater and system configuration must be maintained. These distances are shown in Chart 2.2 on page 9 and on the burner control box. If you are unsure of the potential hazards, consult your local fire marshal, fire insurance carrier, or other qualified authorities on the installation of gas fired tube heaters for approval of the proposed installation.

In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater's thermostat or in a conspicuous location.

The stated clearance to combustibles represents a surface temperature of 90°F (50°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.

⚠ WARNING



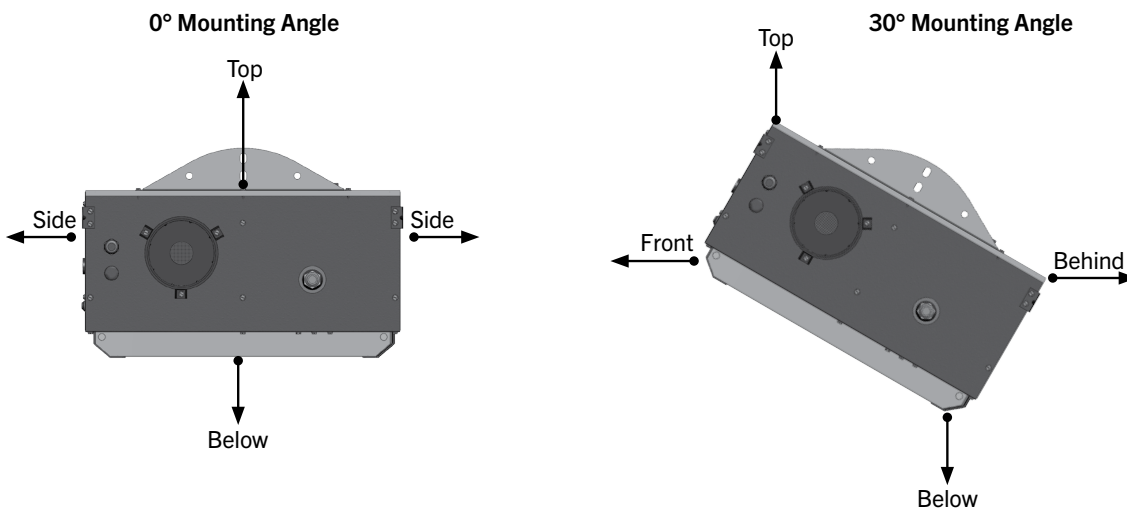
Failure to comply with the stated clearances to combustibles may result in personal injury, property damage, and/or death.

Chart 2.2 • Clearances to Combustible Materials in Inches (see Figure 2.1)

Model Number	Mounting Angle*	Sides		Top	Below	End
		Front	Behind			
MRL-30-65 [N, P]	0°	25	25	6	60	12
	30°	36	10	9	47	12
MRL-30-80 [N, P]	0°	25	25	6	60	12
	30°	36	10	9	47	12
MRL-30-100 [N, P]	0°	25	25	6	77	12
	30°	45	10	9	64	12

* Heaters mounted on an angle between 0° and 30° must maintain clearances posted for 0° or 30°, whichever is greater.

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, operation, 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. All installation manuals, along with national, state, 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, and reflectors. Inspect and evaluate the mounting conditions, gas supply, and wiring.

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

- What expectations does the end user have for coverage and comfort level of the space?
- Does the design meet the needs of the space?
- Have recommended mounting heights been observed?
- Have all clearances to combustibles been observed?
- Is the supply (burner) end of the heater located where more heat is required?
- Is it best to offset the heaters?

IMPORTANT: Fire sprinkler heads must be located at an appropriate distance from the heater. This distance may exceed the published clearances to combustibles as posted on the heater. Certain applications may require the use of high temperature sprinkler heads or relocation of the heaters. Refer to Chart 2.1 on page 7 and NFPA 13.

Sprinkler systems containing propylene glycol or other flammable substances are not to be used in conjunction with this heater without careful consideration for and avoidance of potential fire or explosion hazards. For further information consult NFPA 13.

The comfort level of a person or space may be diminished with wind velocities above 5 mph. The use of adequate wind barrier(s) may be required (see page 18).

Figure 3.1 • Heater Dimensions

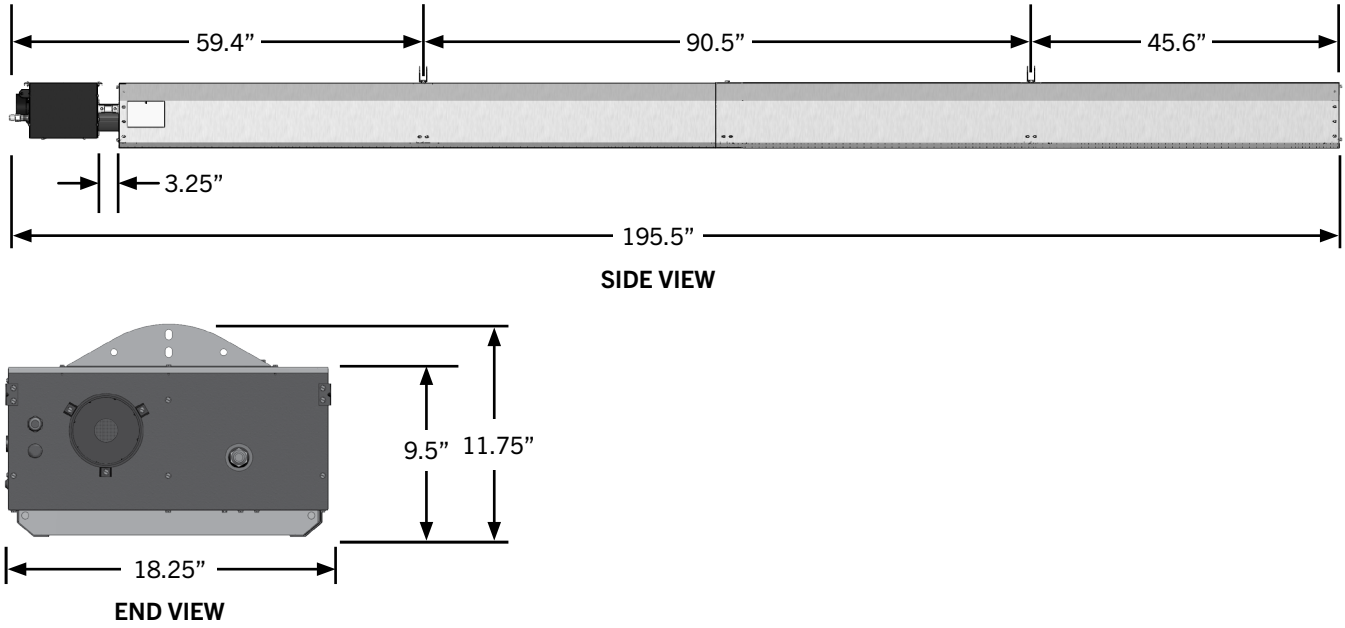
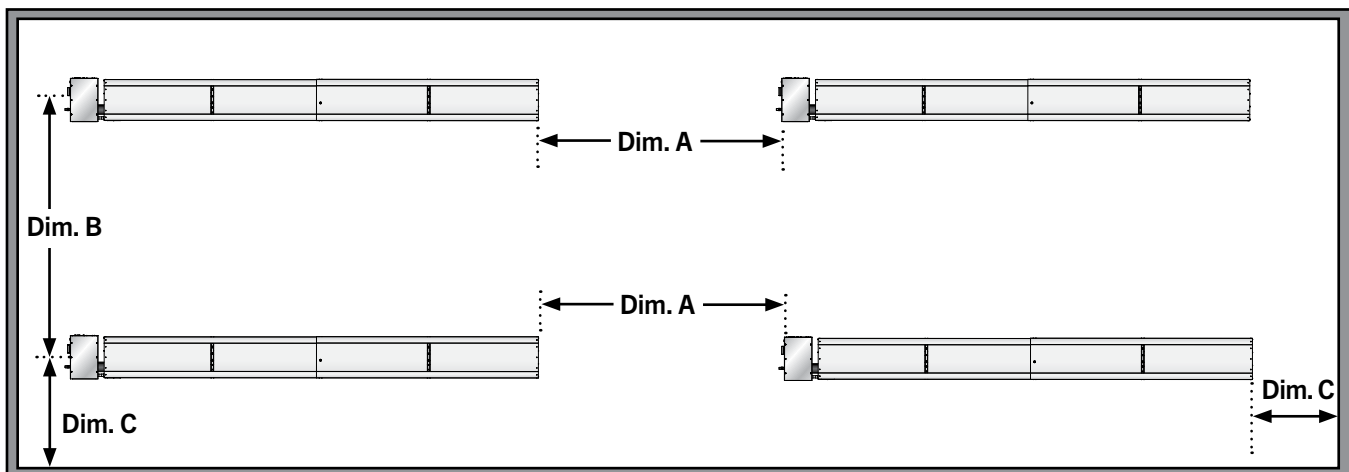


Chart 3.1 • Recommended Mounting Heights and Coverages for MRL Series Heaters

Max. Input (BTU/h)	Typical or Recommended Mounting Height*	Coverage Area Straight Config. (LxW)	Distance Between Heaters (ft.) Dim. A	Distance Between Heater Rows Dim. B	Max. Distance Between Heaters and Wall - Dim. C
65,000	9' - 16'	26' x 12'	10' - 20'	20' - 40'	16'
80,000	9' - 16'	26' x 12'	10' - 20'	20' - 40'	16'
100,000	9' - 16'	26' x 12'	10' - 20'	20' - 40'	16'

* Factory recommended mounting heights are listed as a guideline. If infrared heaters are mounted too low or too high, they may result in discomfort due to excessive heat or lack of heat. Modine 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 3.2 • Mounting Height Dimensions (see Chart 3.1 for dimensions)



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

Heater Assembly Instructions

⚠ WARNING



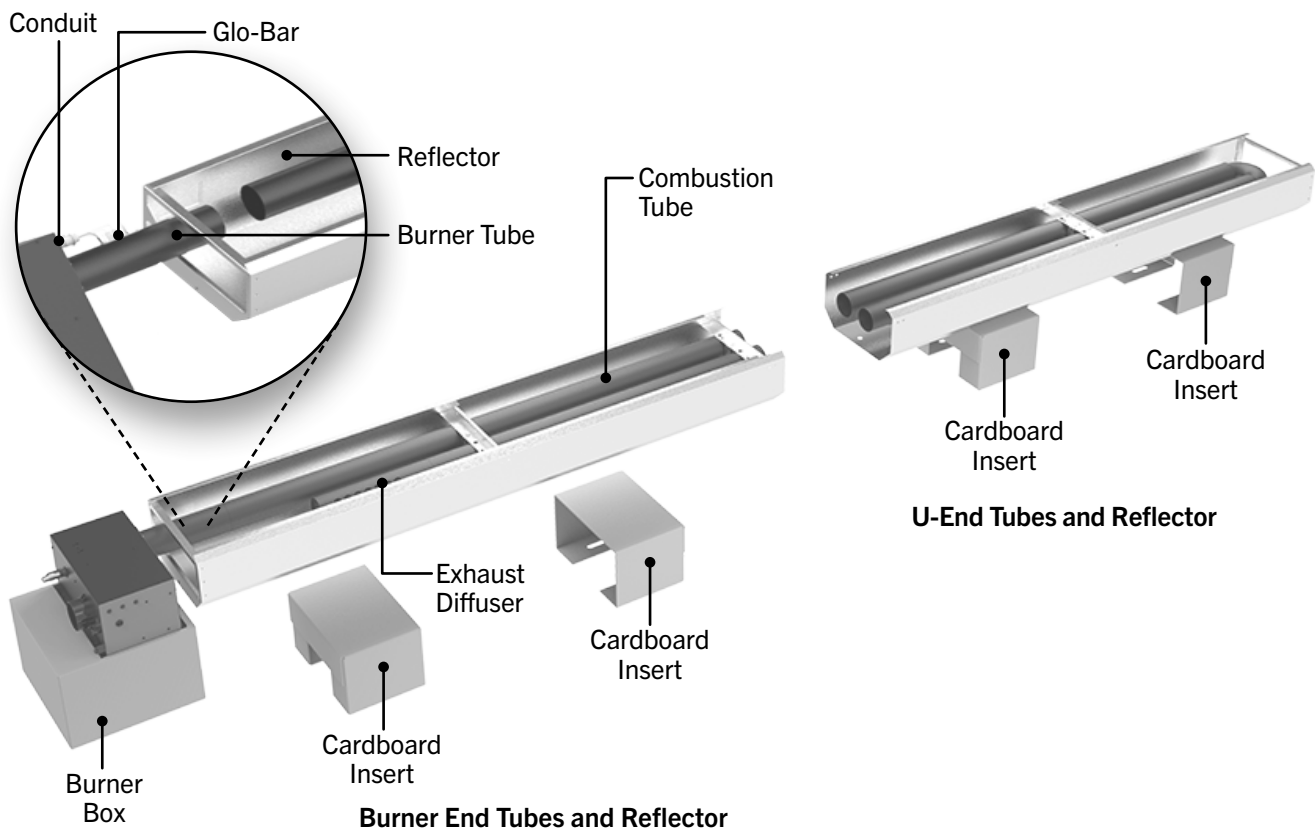
At least two people are required to assemble and hang this heater. Failure to follow these instructions can result in property damage, serious injury, or death.

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

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

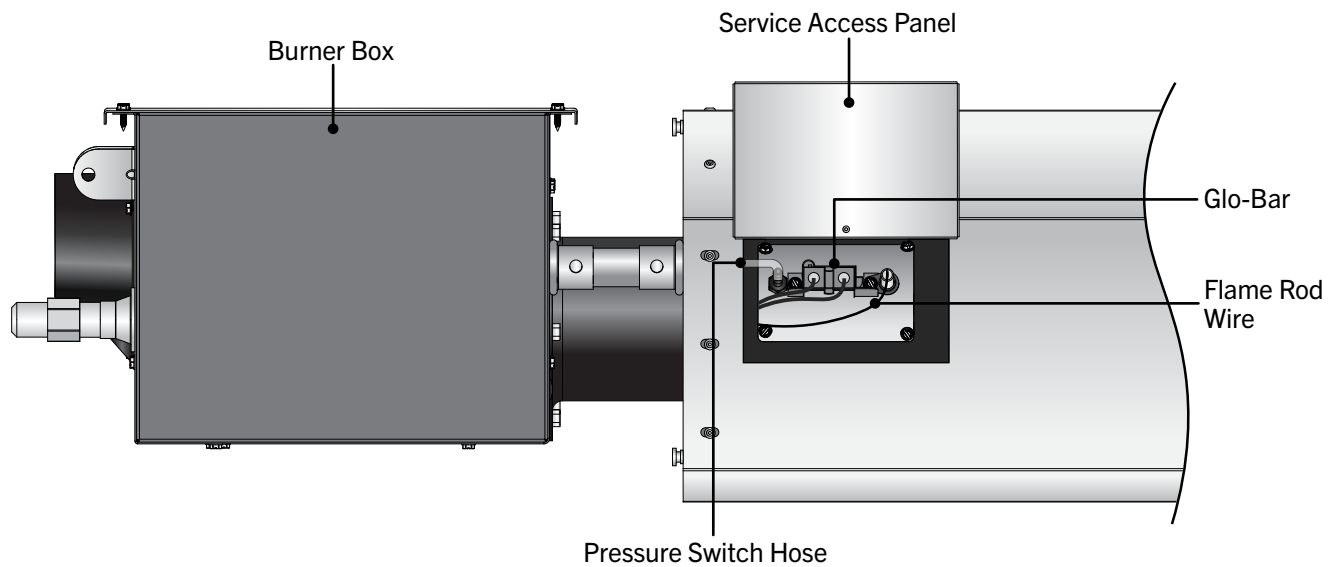
- ❶ Remove the burner end and U-end tube and reflector assemblies from the main box and place end-to-end in assembly area. Remove the cardboard inserts from each assembly and rotate 180°. Position each tube and reflector assembly on top of the cardboard inserts with the “U” end on the outside and tubes facing upward (see Fig. 3.3).
- ❷ Align both tube and reflector assemblies, then carefully slide the assemblies together, guiding the radiant tubes into one another. The U-end reflector will slightly overlap the burner end reflector. The tube and reflector assemblies are in the correct position when the reflector screw holes are aligned (see Fig. 3.7 on page 14).
- ❸ Using the four (4) #10 screws provided in kit contents box and a $\frac{5}{16}$ ” nut driver, secure the reflectors together so that the screws are hand tight. **Do not** overtighten as this will prevent the expansion and contraction of the reflectors.

Figure 3.3 • Assembly Layout



- ④ Open the burner carton, remove the burner box, and place the kit contents box at the end of the burner end tube and reflector assembly.
- ⑤ Disconnect the pressure switch hose, Glo-Bar connector, and flame rod wire from their respective connections on the burner tube. Remove the conduit nut from the end of the conduit and set aside. Holding the burner box on its side so as to keep the Glo-Bar clear, place the burner tube through the reflector, lining the swaged end up with the combustion tube (see Fig. 3.3). Rotate the burner box flat so the lid is facing downward. Carefully slide the burner tube into the combustion tube, and feed the conduit, hose, and wires through the conduit hole in the reflector. Slide the hose and wire through the conduit nut, then screw it onto the conduit and securely fasten.

Figure 3.4 • Service Access Panel Connections



- ⑥ Rotate the service access panel up so the Glo-Bar compartment is accessible. Reconnect the Glo-Bar, pressure switch hose, and flame rod wire, leaving the Glo-Bar connector just outside of the conduit (see Fig. 3.4). **Carefully rotate the service access panel back to its closed position.**
- ⑦ Ensure that the swaged end of the burner tube is completely inserted into the combustion tube, then secure with one (1) #10 self-drilling screw (included) where the two tubes overlap (see Fig. 3.7).

Figure 3.5 • Baffle Placement

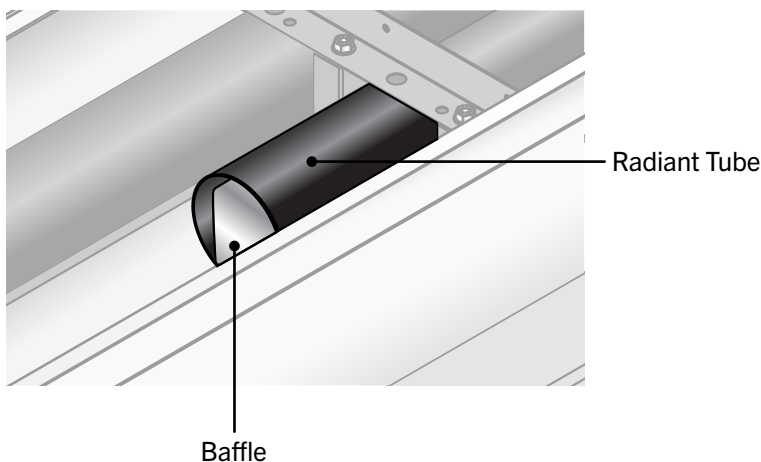
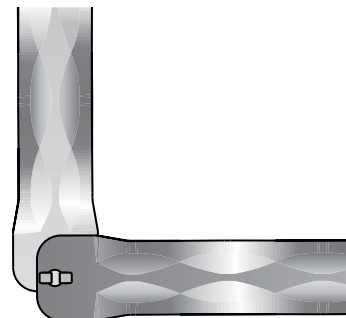
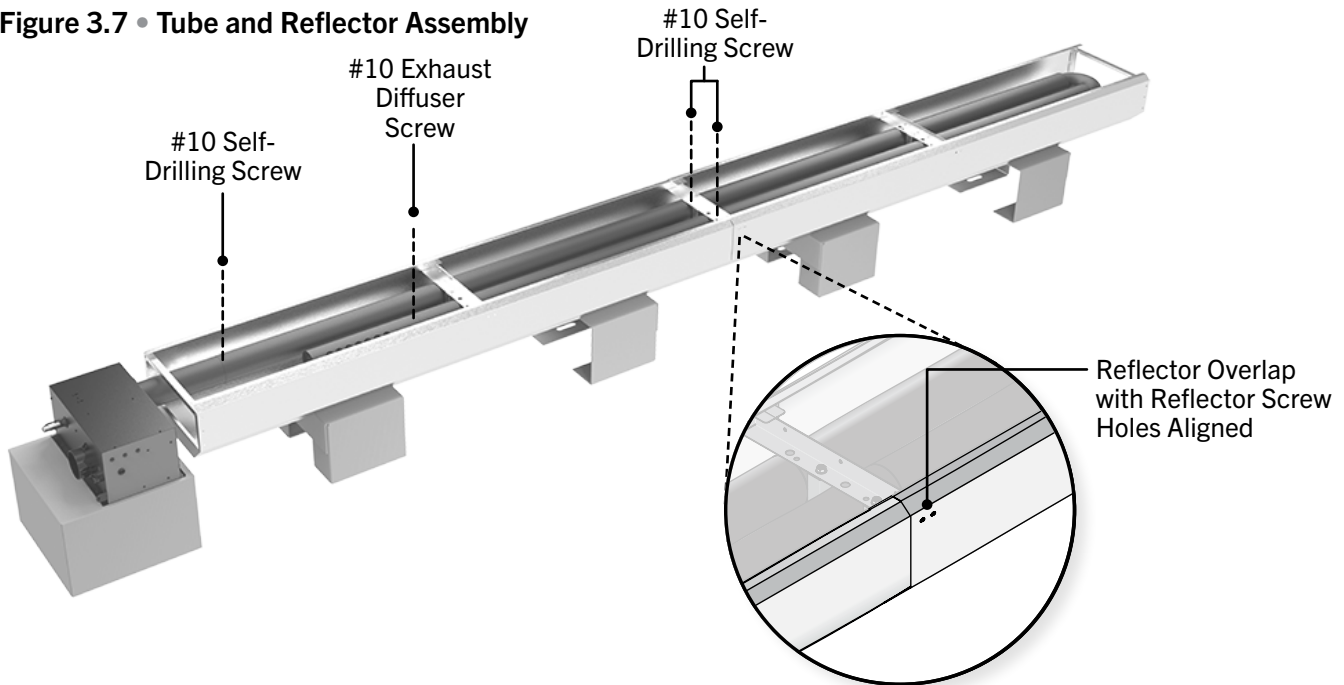


Figure 3.6 • Baffle Assembly



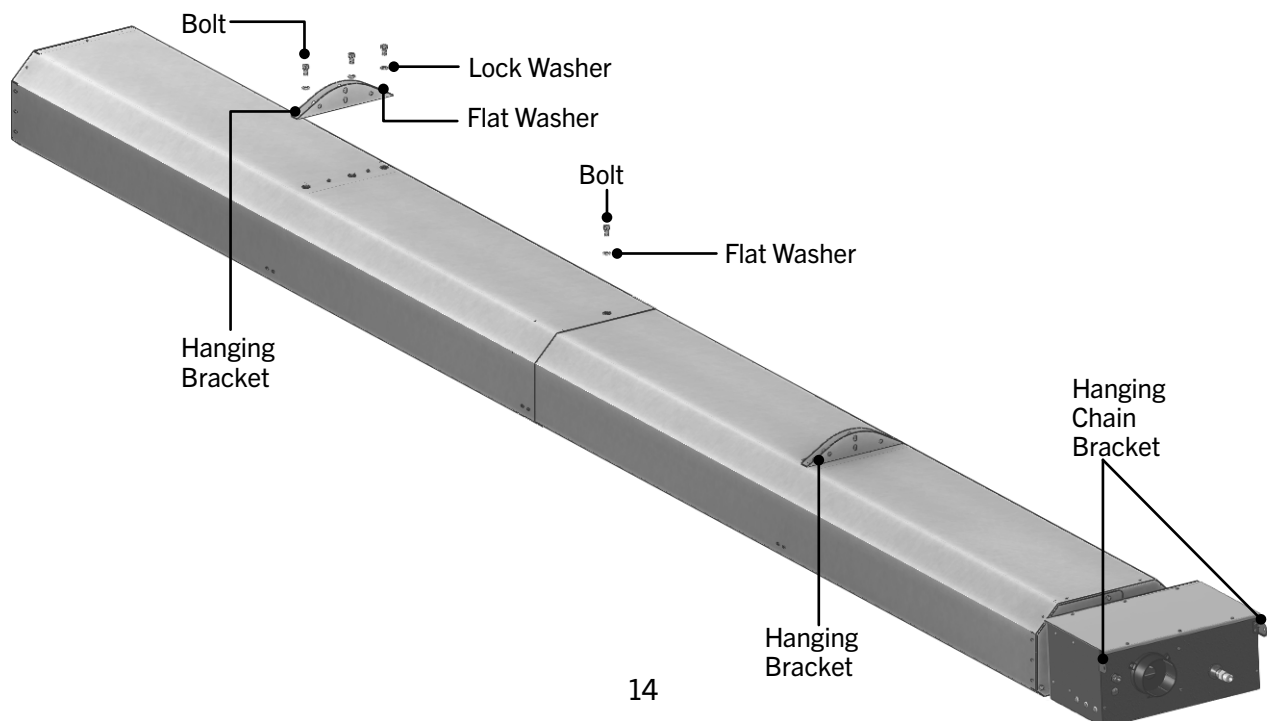
- 8 Remove the existing #10 screw holding the exhaust diffuser and set aside (see Fig. 3.7). Insert the baffle into the exhaust tube, locking each baffle together as they are inserted. Once in the tube, ensure the baffles are in the vertical position and flush with the end of the tube as shown in Fig. 3.5. Reattach the exhaust diffuser and secure with the original #10 sheet metal screw.

Figure 3.7 • Tube and Reflector Assembly



- 9 Secure both radiant tube sections together with one (1) #10 self-drilling screw (included) in each, inserting where the two tubes overlap (see Fig. 3.7).
- 10 With one person positioned at each end of the heater, carefully flip the unit over and set back down onto the cartons. Using the supplied bolts, lock washer, and flat washer, attach the hanging brackets to the top of the unit as shown in Fig. 3.8.
- 11 Insert the bolt, lock washer, and flat washer in the nutsert in the middle of the assembly and secure (see Fig. 3.8).

Figure 3.8 • Mounting Bracket Placement



Heater 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.

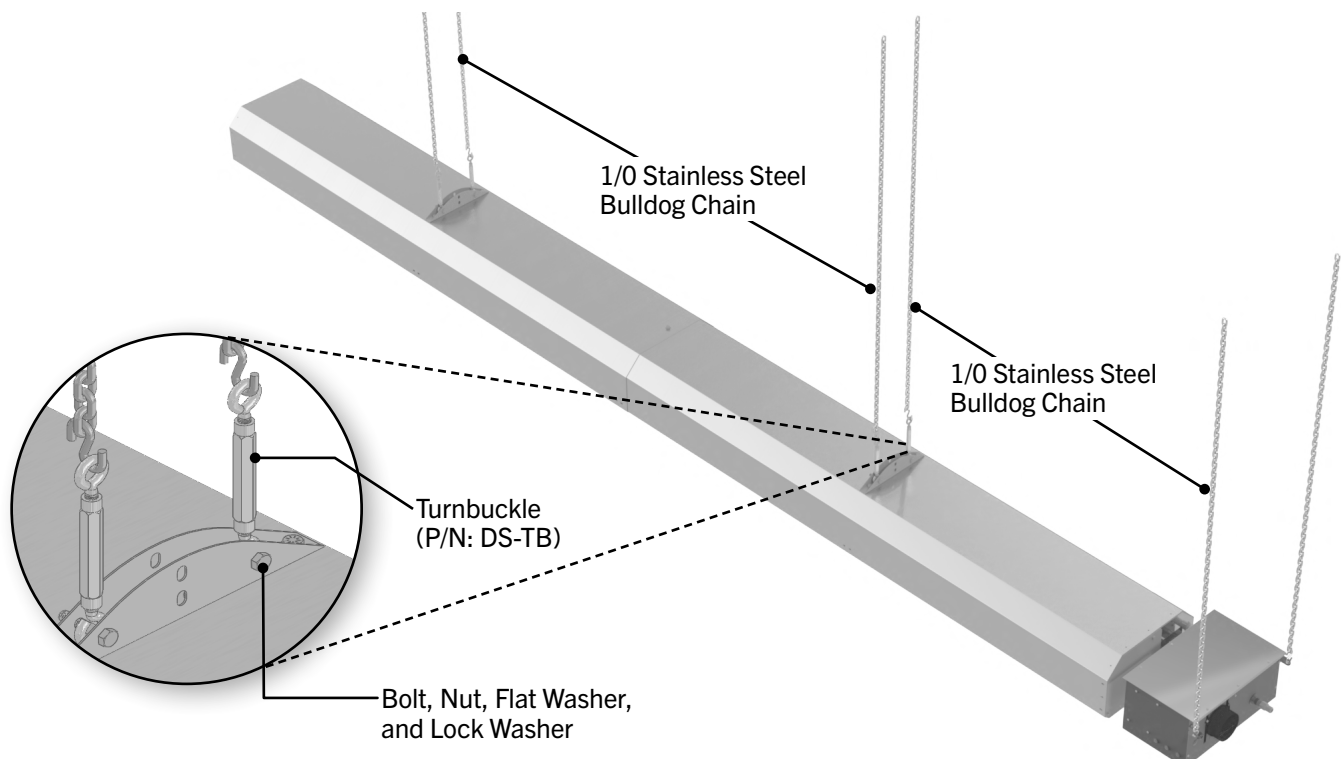


Failure to maintain minimum clearances to combustibles may result in fire and/or explosion, property damage, serious injury, or death. Always maintain minimum clearances and post clearance safety limit signs or the clearance safety tag where needed.

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

- ① Mark locations for hanging points.
- ② Prepare mounting surface. If necessary, weld blocks and drill holes.
- ③ Fasten beam clamp, screw hook, or other type of suspension anchor to hanging point.
- ④ Attach and close stainless steel S-hook and 1/0 stainless steel bulldog chain to anchor (see Fig. 3.9). Check that it is securely attached. **NOTE:** Threaded rod or optional hanging bracket kit may be used.
- ⑤ Attach stainless steel S-hooks to turnbuckles (P/N: DS-TB sold separately) and hanging bolts inserted through the hanging brackets. Adjust chain lengths until heater is level and equal weight distribution is achieved.
- ⑥ Once heater is level, insert egg crate assemblies by sliding in the reflector, 2 from each end (see Fig. 3.11 on page 17).
- ⑦ Follow instructions on page 17 to install end panels.

Figure 3.9 • Mounting the Heaters



Sway Bracing for High Air Movement and Outdoor Applications

For high air movement and outdoor applications, install side restraints (field supplied) to reduce side to side swaying as shown in Fig. 3.10. Side restraints should be installed so that they are angled at $45^\circ \pm 10^\circ$ and should be placed at every designated suspension point. It may be necessary to add additional support structures at the ceiling level for the connection of these side suspensions. Apply longitudinal (forward/backward) bracing (P/N: THGH10-3 or field supplied) at each reflector hanging bracket. The desired suspension material shall have a minimum work load rating of 200 pounds.

Figure 3.10 • Heater with Sway Bracing Installation

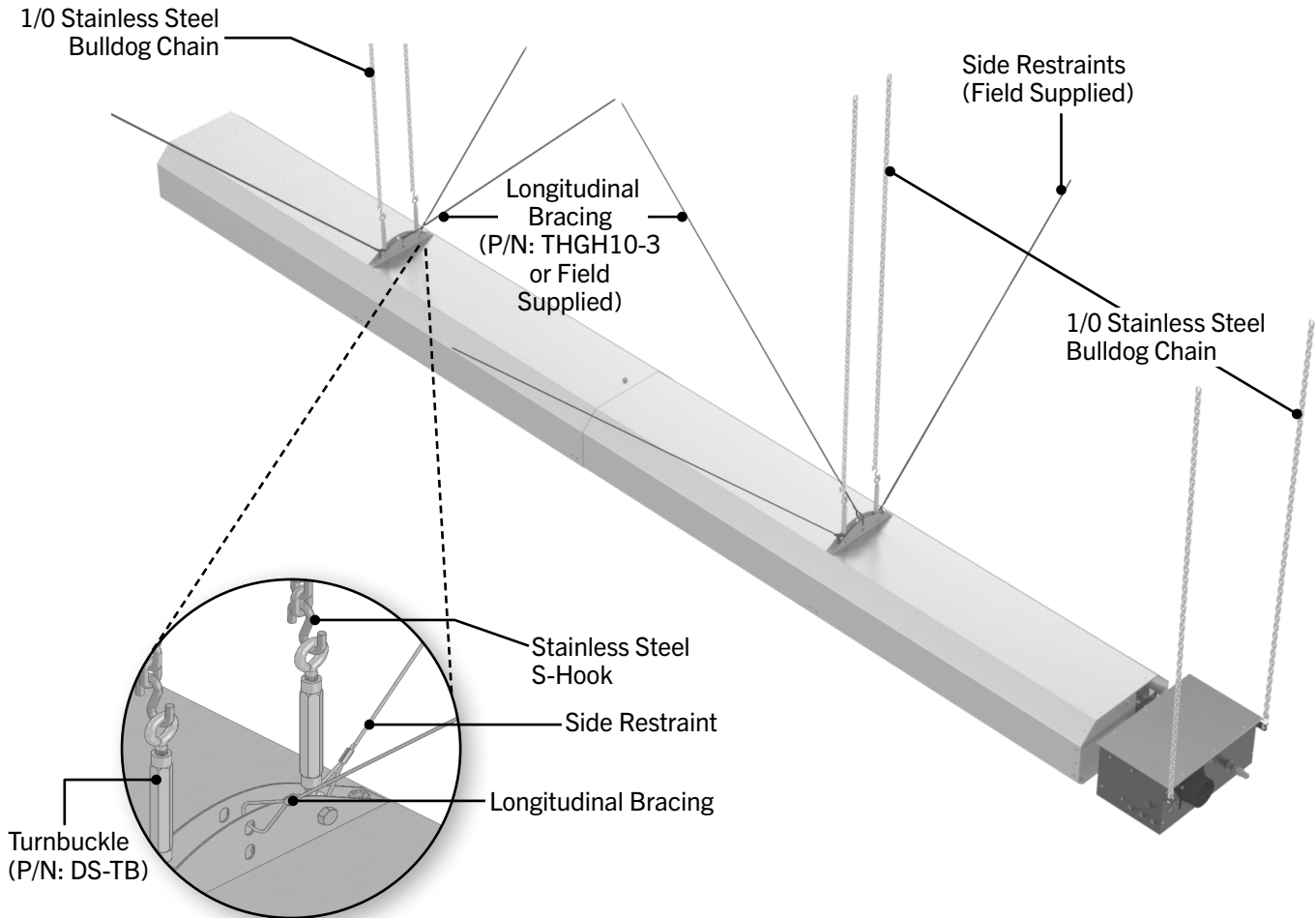
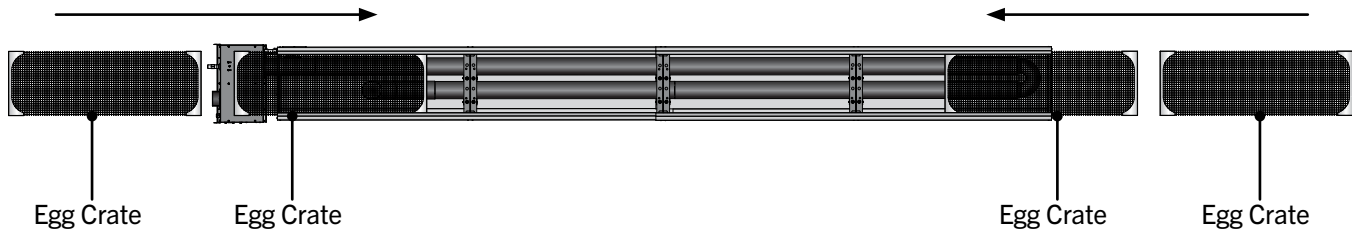


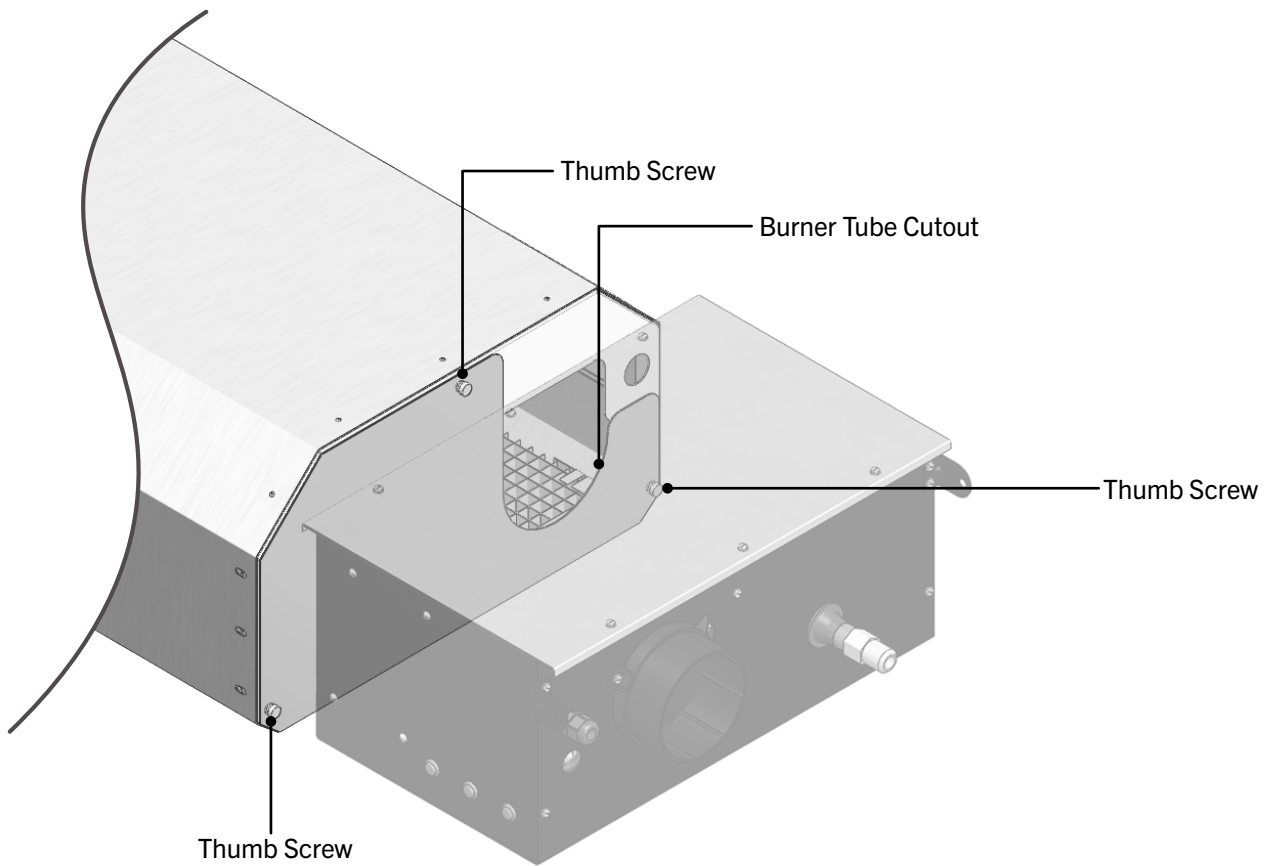
Figure 3.11 • Egg Crate Installation



End Panel Installation

- 1 Once egg crates are installed, place the reflector end panel flush on the end of the reflector, ensuring edges and screw holes are aligned. Secure with three (3) thumb screws (see Figure 3.12).
- 2 Repeat process with the U-end reflector end panel.

Figure 3.12 • End Panel Installation



Combustion Air Supply and Ventilation

The upper levels of the space to be heated are required to be properly ventilated to supply combustion air to the heaters and to sufficiently dilute the products of combustion. It is also important to keep the flue discharge area clear of gas piping and electrical wiring.

Provisions must be made to provide sufficient fresh air intake area and exhaust air outlet area. Natural or mechanical means shall be provided to supply and exhaust at least 4 CFM/1,000 BTU/h of total gas input of heaters installed. Exhaust openings for the removal of flue products must be above the level of the heater(s).

Where insufficient air movement exists, induced air displacement is required. A balanced system is essential to avoid negative building pressure which causes excessive infiltration, unfavorable drafts, and affects combustion efficiency.

Air displacement may be accomplished by either gravity or mechanical means. Mechanical exhausters are preferred and typically mounted at high points on the roof over where stagnant air accumulates inside. For a flat roof, considerations of prevailing winds, high and low pressure areas, and distribution of air movement must be taken into consideration when locating exhausters.

Best air distribution is accomplished by using a number of small exhausters versus one large exhauster. Provide a minimum of one square inch of inlet area per 1,000 BTU/h for combustion air supply. Inlet opening in the building should be well distributed, located high on the wall, and should direct incoming air upward to dilute products of combustion while preventing drafts at lower levels. Inlets are typically 1 to 3 square feet.

In certain applications, local codes may require that mechanical exhaust systems be interlocked with the heaters to enable both to function simultaneously or allow control of exhausters with a ceiling mounted humidistat.

Outdoor Unvented Operation

⚠ WARNING



This appliance must be used outdoors only! Use of this heater indoors may result in property damage, serious injury, or death.

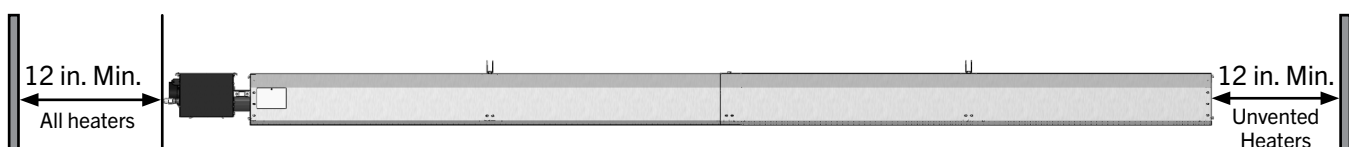
This is an unvented, outdoor appliance. If the use of wind barriers is required, consider the following:

- Where wind barriers are used, natural or mechanical means **must** be provided to supply and exhaust a minimum of 4 CFM/1,000 BTU/h 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.

- When the space requires mechanical ventilation, the exhaust openings for removing the flue products must be located above the level of the heater(s).

Figure 3.13 • Minimum End Clearances

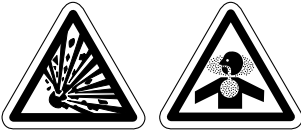


Gas Supply Installation Instructions

The gas supply to the unit heater must be connected and tested in accordance with national, state, and local codes along with guidelines in this manual. In the United States, refer to the latest edition of the ANSI Z223.1 (NFPA54) Standard. In Canada, refer to the latest edition of CAN/CGA B149.1 and .2.

Supply gas piping to the unit should conform with the local and national requirements for type and volume of gas handled, and pressure drop allowed in the line. Avoid pipe sizes smaller than ½”.

⚠ WARNING



Improperly connected gas lines may result in serious injury and death, explosion, poisonous fumes, toxic gases, or asphyxiation. Connect gas lines in accordance to national, state, provincial, and local codes.

Gas pressure to the appliance controls must never exceed ½” PSI (14” W.C.). Damage to the controls may result.

⚠ CAUTION

Gas lines should be purged of air as described in ANSI Z223.1 (NFPA 54) or CSA B149.1 (latest version). Installation of the piping must also conform with the local building codes or, in the absence of local codes, with the latest edition of the National Fuel Gas Code (NFPA 54).

NOTICE

The total input to the appliance must fall within +/- 5% of the rated input as indicated on the rating plate. Otherwise the heat exchanger may prematurely fail.

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 and the installation complies with national and local codes and requirements of the local gas company.
- 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.
- 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.

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 MRL Series heater is equipped to connect to the corrugated stainless steel tube (CSST) flexible gas connector (included). **Do not connect the main gas line directly to the heaters gas inlet without the use of the flexible connector.** All piping must be installed in accordance with the requirements outlined in the National Fuel Gas Code ANSI/Z223.1 (latest edition) or CSA B149.1. Support all gas piping with pipe hangers, metal strapping, or other suitable material. Do not rely on the heater to support the gas pipe.

When connecting piping to the unit, the use of a thread joint compound is required. The thread compound (pipe dope) shall be resistant to the action of the type of gas being used or any other chemical constituents of the gas to be conducted through piping. Use of Teflon® tape is not permitted.

! WARNING

Always use two (2) opposing wrenches to tighten mating pipe connections to prevent excessive torque on the gas valve and manifold pipe. Excessive torque can damage the valve and/or misalign the orifice, resulting in fire, explosion, serious injury, or death.

Connect the main gas supply line with an approved flexible connector or, if the authority having jurisdiction requires rigid piping, approved swing joints may be used. If swing joints are utilized, the heater must be allowed to freely expand and contract without causing undue stress on the gas pipe.

The heater shall not be connected to the building piping system with rigid pipe or semi-rigid metallic tubing, including copper. When using such material, an intermediate connection device that allows for the heater expansion must be used.

The gas outlet must be in the same room as the appliance is installed and must be 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 to electrically ground the heater.

Installation of the Gas Line to the Heater

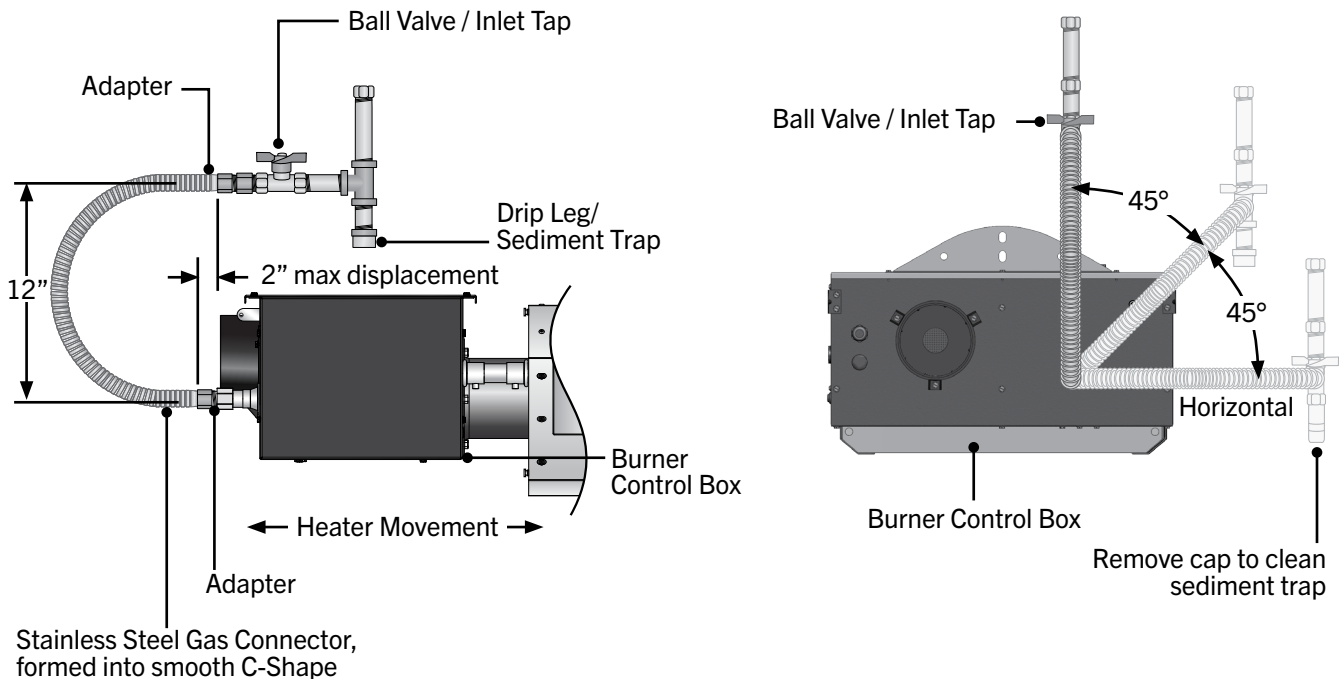
- ❶ Install a sediment trap / drip leg in the supply line at the lowest spot prior to the gas ball valve. The trap length shall be at least three inches long. Ideally, the trap would be installed as close as possible to the shut off. **NOTE:** For high pressure gas above 14" W.C., a high pressure regulator and ball valve must be utilized and located upstream of the flex connector.
- ❷ Install manual shut off ball valve with optional 1/8" NPT. Test connection towards the supply line. The manual shut off ball valve must be located within 6 feet of the appliance's service access door.
- ❸ Install the 5/8" flare to 1/2" NPT adapter piece downstream of the gas valve as shown in Figures 3.14-3.15. This piece is typically included with the flexible gas connector, loosely installed on one of the flare nuts. **NOTE:** Keep flare surfaces clean and free of sealing compounds. Only the pipe threads require sealing compounds.
- ❹ Form the 1/2" x 24" stainless steel flexible gas connector into a smooth C-shape, allowing approximately 12 inches between the flexible connector's end nuts (see Figure 3.14). The connector must reach from the gas supply to the appliance without stretching, kinking, or twisting.
- ❺ Attach the flexible connector to the 5/8" flare adapter on the gas line and the other end to the 5/8" flare on the heaters inlet pipe. **DO NOT** connect the connector flare nuts directly to pipe threads. Use only the adapters provided. **DO NOT** kink, twist, or over-torque the connector when installing.

⚠ CAUTION

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

Figure 3.14 • Gas Connection (Flexible Gas Connection Shown)

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



In Canada, the infrared heater shall only be connected with a Type I hose connector that is (a) certified as being in compliance with the *Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1*; and (b) of a length of 36 ± 6 in (90 ± 15 cm).

Refer to Chart 3.2 for natural gas and Chart 3.3 for propane to determine the cubic feet per hour (CFH) required for the type of gas and size of unit to be installed. To determine the proper pipe diameter, use the CFH value and the length of pipe necessary from Chart 3.4. In the case where several units are serviced by the same main gas line, the total capacity (CFH) and length of main must be adequate to service all appliances downstream of this main.

Chart 3.2 • Natural Gas Consumption

Model	Input High/Low	Manifold Pressure (Inches W.C.)	Min. Inlet Pressure (Inches W.C.)	Max. Inlet Pressure (Inches W.C.)	Gas Consumption (CFH)*
MRL-30-65N	65,000 (High)	3.5	5.0	14.0	61.9
	50,000 (Low)	2.2			47.6
MRL-30-80N	80,000 (High)	3.5	5.0	14.0	76.2
	52,000 (Low)	1.7			49.5
MRL-30-100N	100,000 (High)	3.5	5.0	14.0	95.2
	65,000 (Low)	1.8			61.9

* Assumes an average heating value of 1050 BTU/SCF and a Specific Gravity of 0.60.

Chart 3.3 • Propane Gas Consumption

Model	Input High/Low	Manifold Pressure (Inches W.C.)	Min. Inlet Pressure (Inches W.C.)	Max. Inlet Pressure (Inches W.C.)	Gas Consumption (CFH)*	Gallons p/ Hour
MRL-30-65P	65,000 (High)	10.0	11.0	14.0	26	0.71
	50,000 (Low)	4.8			20	0.54
MRL-30-80P	80,000 (High)	10.0	11.0	14.0	32	0.87
	52,000 (Low)	4.8			21	0.56
MRL-30-100P	100,000 (High)	10.0	11.0	14.0	40	1.08
	65,000 (Low)	4.8			26	0.71

* Assumes an average heating value of 2500 BTU/SCF and a Specific Gravity of 1.53.

Chart 3.4 allows for a 0.3 inch W.C. pressure drop in the supply pressure from the building main to the inlet of the unit. Refer to the chart for the appropriate range of inlet pressures for each gas type. When sizing the inlet gas pipe diameter, make sure that the unit supply pressure can be met after the 0.3 inch W.C. pressure drop has been subtracted from the main pressure. If the 0.3 inch W.C. pressure drop is too high, refer to NFPA 54 or the Gas Engineer's Handbook for other gas pipe capacities.

Install ground joint union with a brass seat and a manual shut-off valve adjacent to the unit for emergency shut-off and easy servicing of controls. A 1/8" NPT plugged tap that is accessible for a test gauge connection is also recommended, as illustrated in Figure 3.15.

A sediment trap must be installed in the supply line in the lowest spot prior to connecting to the heater. The trap length shall be at least three inches long. Ideally, the trap would be installed as close as possible to the shut-off, as shown in Figure 3.15.

Figure 3.15 • Recommended Hardware • Manual Shut Off and Sediment Trap

In Canada, infrared heater shall only be connected with a Type I hose connector that is (a) certified as being in compliance with the *Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1*; and (b) of a length of 36 ± 6 in (90 ± 15 cm).

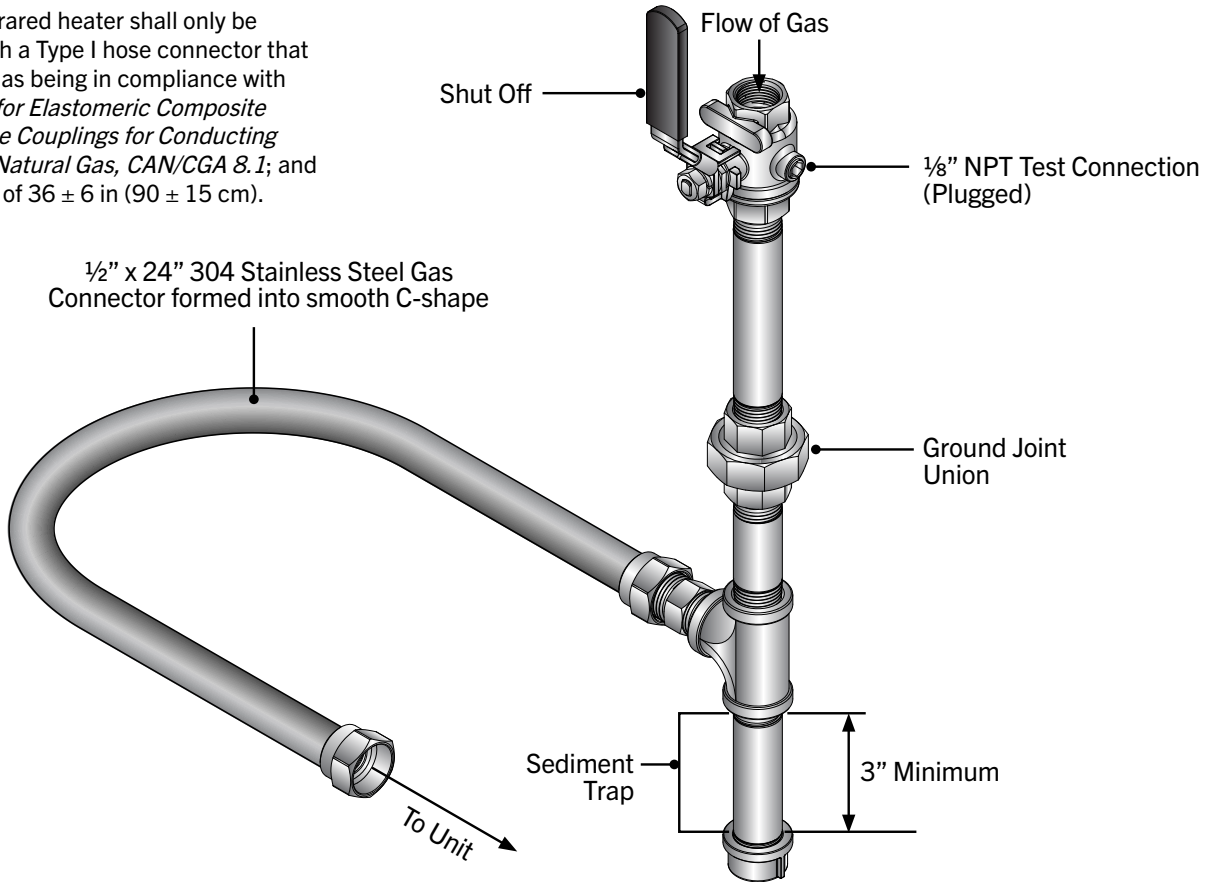


Chart 3.4 • Maximum Capacity for Schedule 40 Metallic pipe, in CFH

Pipe Length	1/2"		3/4"		1"		1 1/4"		1 1/2"		2"	
	Nat	Prop	Nat	Prop	Nat	Prop	Nat	Prop	Nat	Prop	Nat	Prop
10 feet	132	86	278	182	520	340	1050	686	1600	1046	3050	1993
20 feet	92	60	190	124	350	229	730	477	1100	719	2100	1373
30 feet	73	48	152	99	285	186	590	386	890	582	1650	1078
40 feet	63	41	130	85	245	160	500	327	760	497	1450	948
50 feet	56	37	115	75	215	141	440	288	670	438	1270	830
60 feet	50	33	105	69	195	127	400	261	610	399	1150	752
70 feet	46	30	96	63	180	118	370	242	560	366	1050	686
80 feet	43	28	90	59	170	111	350	229	530	346	990	647
90 feet	40	26	84	55	160	105	320	209	490	320	930	608
100 feet	38	25	79	52	150	98	305	199	460	301	870	569
125 feet	34	22	72	47	130	85	275	180	410	268	780	510
150 feet	31	20	64	42	120	78	250	163	380	248	710	464
175 feet	28	18	59	39	110	72	225	147	350	229	650	425
200 feet	26	17	55	36	100	65	210	137	320	209	610	399

The MRL Series heater is equipped to receive a gas supply line nipple of 1/2" NPT Schedule 40 metallic pipe. All piping must be installed in accordance with the requirements outlined in the National Fuel Gas Code ANSI/Z223.1 (latest edition) or CSA-B149.1. Support all gas supply piping with pipe hangers, metal strapping, or other suitable material. Do not rely on the heater to support the gas pipe.

When connecting piping to the unit, the use of a thread joint compound is required. The thread compound (pipe dope) shall be resistant to the action of liquefied petroleum gas or any other chemical constituents of the gas to be conducted through the piping. Use of Teflon® tape is not permitted.

⚠ WARNING



Always use two (2) opposing wrenches to tighten mating pipe connections to prevent excessive torque on the gas valve and manifold pipe. Excessive torque can damage the valve and/or misalign the orifice, resulting in fire, explosion, serious injury, or death.

Leak Testing

⚠ WARNING



Use a soap solution or equivalent for leak testing. Never test for leak with an open flame. Failure to comply could result in personal injury, property damage, or death.

Always leak test final gas assembly for gas leaks according to the procedures outlined in NFPA 54 and all local codes and/or standards.

For leak testing on pressures below ½" PSI

Before leak testing, close the field installed manual shut off valve shown on Figure 3.15 on the supply line to isolate the gas valve from the pressure.

NOTE: All factory installed gas connections have passed an approved leak test.

For leak testing on pressures above ½" PSI

When leak testing with pressures above ½" PSI (14" W.C.), the unit must be isolated from the supply pipe. Close the field installed manual shut off valve, disconnect the supply line to the unit, and temporarily cap the supply line for testing purposes.

⚠ WARNING



Gas pressures to the appliance controls must never exceed 14" W.C. (½" PSI). Supply pressures greater than 14" W.C. can damage the controls, resulting in personal injury, property damage, or death.

Electrical Requirements and Wiring Diagrams

⚠ WARNING



Shock hazard. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.

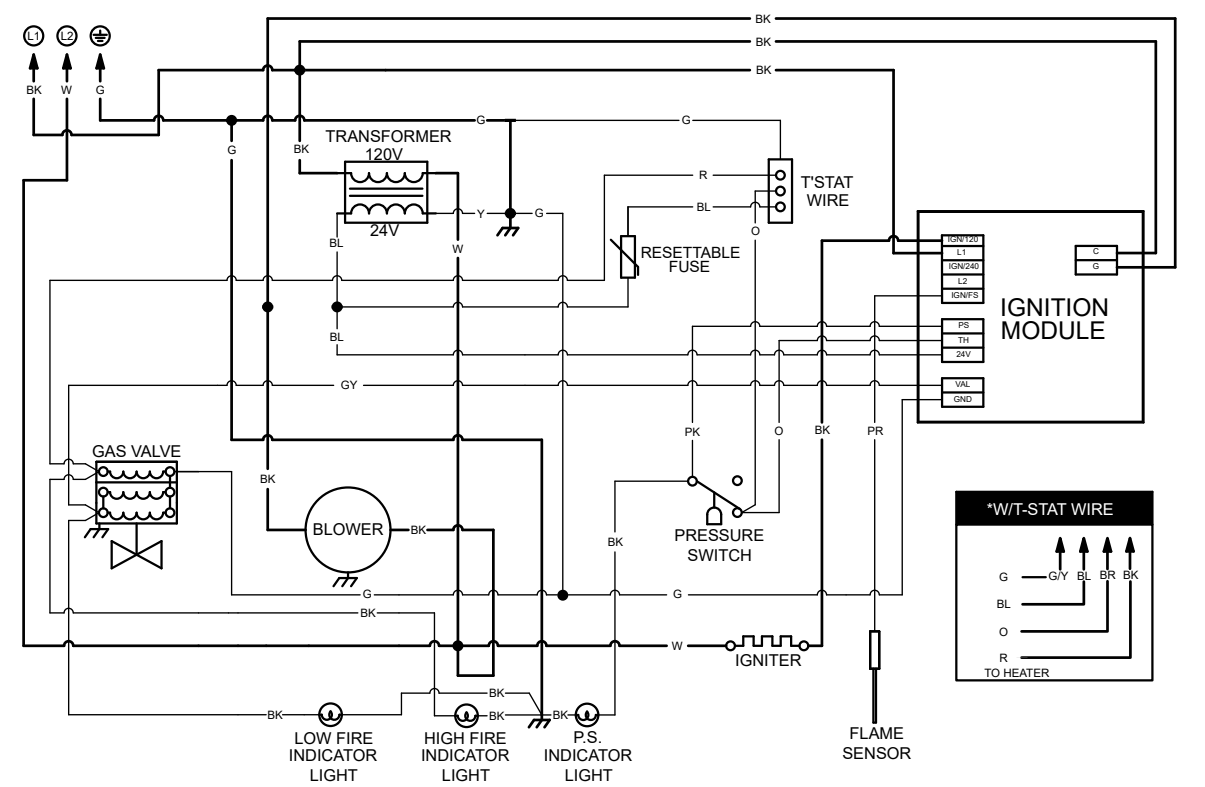
Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C minimum voltage.

All field installed wiring to the tube heater must be done in accordance with the national, state, provincial, local codes, and to the guidelines in this manual. In the United States, refer to the most current revisions to the Electrical Code ANSI/NFPA 70. The unit must be electrically grounded according to these codes. Line polarity must be observed when making field connections.

Internal Wiring Diagram

Before wiring this appliance, check the existing wiring; replace if necessary. If any of the original wire supplied with the appliance must be replaced, it must be replaced with copper wiring material having a rating of at least 300 V, 105°C.

Figure 3.16 • Internal Wiring Diagram



WIRING INFORMATION:

LINE VOLTAGE:

- FACTORY STANDARD —————
- FACTORY OPTION - - - - -
- FIELD INSTALLED - - - - -

LOW VOLTAGE:

- FACTORY STANDARD —————
- FACTORY OPTION - - - - -
- FIELD INSTALLED - - - - -

⚠ WARNING

Incorrect or improper wiring may result in shock, injury, or death. Field wiring to the heater must be connected and grounded in accordance with national, state, provincial, local codes, and to the guidelines in this manual. Refer to the most current revisions to the ANSI/NFPA 70 Standard.

All field wiring to the MRL Series heater must be done in accordance with the national, state, provincial, local codes, and the guidelines in this manual. In the United States, refer to the most current revisions to the Electrical Code ANSI/NFPA 70. In Canada, refer to CAN/CGA B149.1 and .2. The unit must be electrically grounded according to these codes.

Field Wiring Supply Voltage

Before proceeding with electrical connections, ensure that the supply voltage, frequency, phase, and current capacity meet the requirements specified on the rating plate. A dedicated line voltage supply with properly sized wire should run directly from the main electrical panel to the heater. The power to the unit must be protected with a circuit breaker appropriate for the load. The unit must be electrically grounded in accordance with local codes or, in their absence, with the latest edition of the National Electrical Code, ANSI / NFPA 70 and/or the Canadian Electrical Code CSA C22.1 (latest edition).

⚠ CAUTION

The power supply to the heater must be within +/- 5% of the voltage rating as indicated on the rating plate of the appliance. If input power does not meet these specifications, contact your utility company.

The heater comes equipped with a supply cord to connect the main power supply. It is located at the rear of the heater's burner box and utilizes a grounding prong. This plug must be connected into an appropriate outlet receptacle that is properly installed and grounded in accordance to local codes and ordinances.

The grounding receptacle must be installed within 5 feet of the heater's service panel and located in the space occupied by the appliance. When plugging in the heater, make sure the supply cord is protected from damage and keep all cords away from the heater's surfaces and out of the clearances to combustibles zone (see page 9). When routing the electrical supply for the unit, ensure that it does not interfere or obstruct the heater's service panel. Keep any electrical supply cord away from any heated surfaces.

⚠ WARNING**Electric Shock Hazard**

Do not force the three-prong plug into the grounded outlet, modify the plug, or use an adapter. Never operate this appliance if the cord or plug is damaged.

Thermostat Connection

NOTE: Different thermostats operate according to their particular features. Refer to thermostat specifications for details.

MRL Series heaters may be controlled by a thermostat or switch. The control voltage is 24 VAC (supplied by internal transformer) and the burner control box is equipped with a 60" black 24 VAC control wire. **Do not supply 120 VAC to the 24 VAC connection.**

Figure 3.17 • Field Wiring Diagram - Controlling a single heater with a single control device

Starting Amp Draw: 4.8 Amps

Running Amp Draw: 1.1 Amps

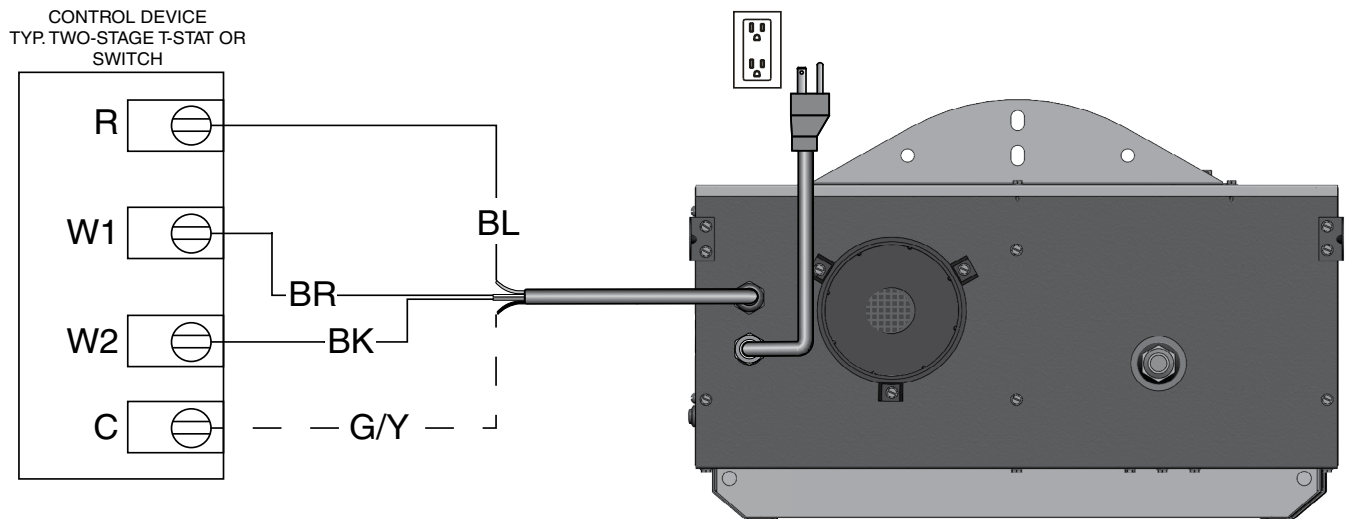
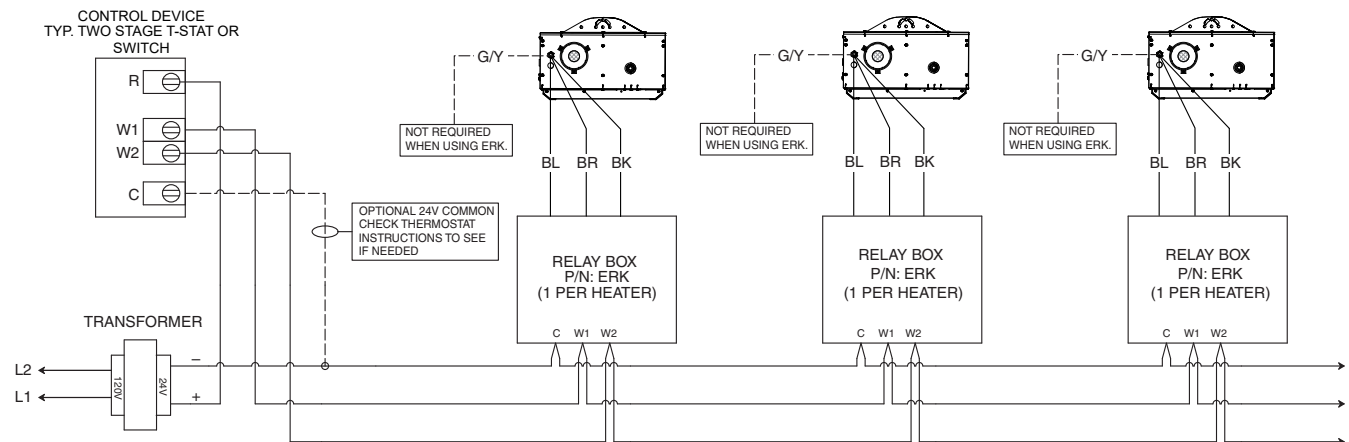


Figure 3.18 • Field Wiring Diagram - Controlling multiple heaters with a single control device

Starting Amp Draw: 4.8 Amps

Running Amp Draw: 1.1 Amps



Field Wiring:

- 1 When controlling multiple heaters with a single control device, one ERK or ERK-HE per heater is required.
- 2 An external 24 VAC transformer (0.2 Amp) per heater is required (supplied by installer).
- 3 Maintain electrical polarity when hooking up multiple heaters.
- 4 Allow heaters to be switched by zones for heating flexibility.
- 5 Do not attempt to install transformer inside of heater.

4.0 Operation

Sequence of Operation

Standby: The ignition module (circuit board) continually checks for internal faults, circuit integrity, and relay contact positioning.

Starting Circuit: Upon a call for heat, the control verifies that the differential switch is in the proper position (open). The control energizes the fan. Once operational static pressure is achieved, the differential switch will close initiating the ignition sequence. The glo-bar is powered and the gas valve opens after 45 seconds. If the flame is not sensed, the heater will attempt to re-ignite for a total of three (3) trials for ignition before proceeding to Soft Lockout.

Low Fire Running Circuit: After ignition, the flame rod monitors burner flame. If sense of flame is lost, the control closes the gas valve within one second and a new trial sequence (identical to the starting sequence) is initiated. If flame sense is not established within 8.5 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to Soft Lockout. The control can be reset by briefly interrupting the power source.

High Fire Running Circuit: The second stage on the gas valve is powered directly from the second stage of the thermostat. In order for high fire to engage, low fire must be energized as well. The thermostat determines which stage to maintain for the desired temperature.

Shut Down: When the thermostat is satisfied, the fan will enter a two (2) minute post-purge cycle.

Diagnostics

This heater is equipped with a resettable inline fuse. 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 attempt to light (gas pressure, valve, no flame sense, etc.), the heater will enter a Soft Lockout period for 30 minutes, then attempt to light three more times before entering 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. Refer to Chart 4.1 below for a description of LED codes.

Figure 4.1 • External LED Operation Indicator Lights

NOTE: Hard Lockout LED CODE will appear upon completion of the Soft Lockout sequence of operation.

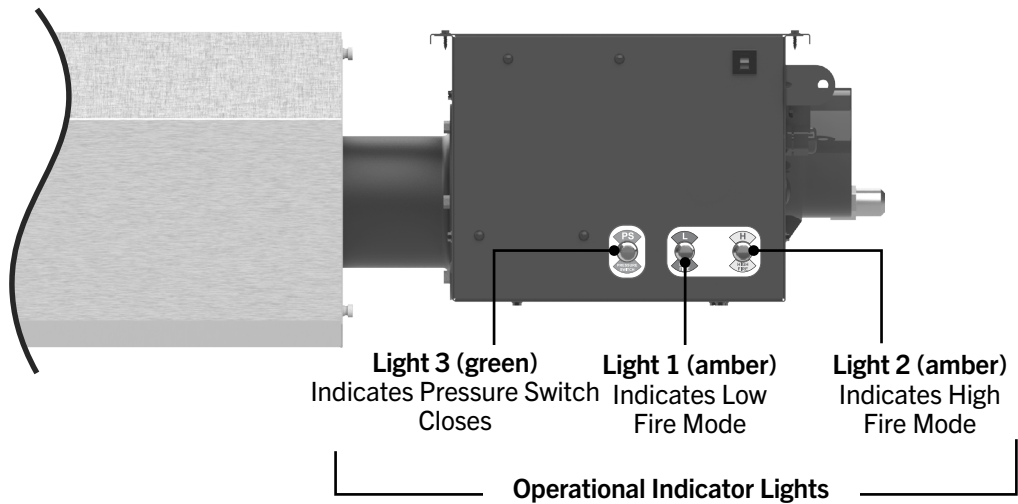
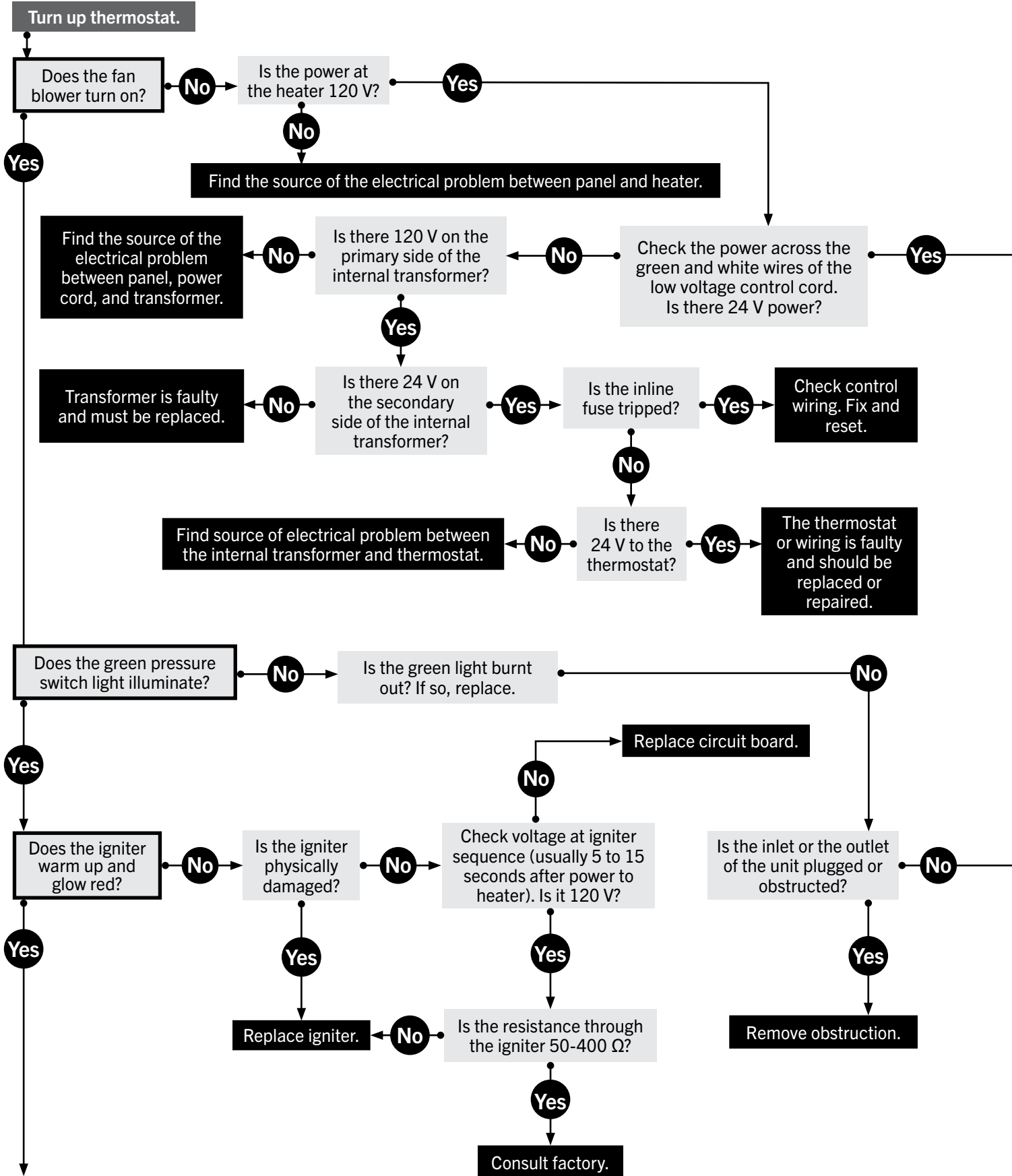


Chart 4.1 • LED Fault Code Status (Located on Circuit Board Inside Control Box)

LED Code	Fault Status	Fault Code Delay*
Initial flash on power up, then steady off	No fault, normal operation	No Delay
Steady ON	Module failure / Internal fault	No Delay
1 flash	Ignition failure	3 minutes
2 flash	APS (Air Proving Switch) Fan / Intake / Exhaust	1 - 30 seconds
4 flashes	Erroneous flame signal	No Delay
No flash on 117 V startup	Transformer fault	No Delay

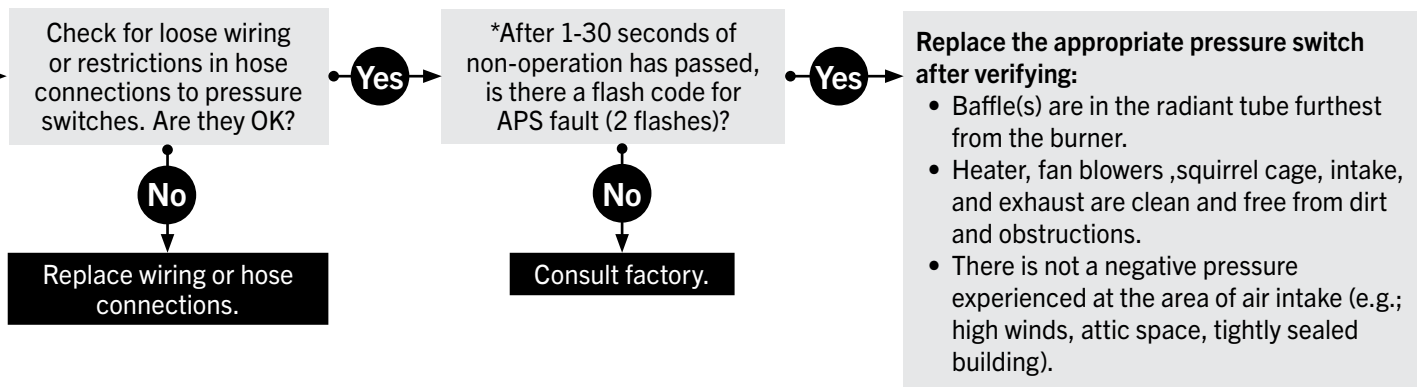
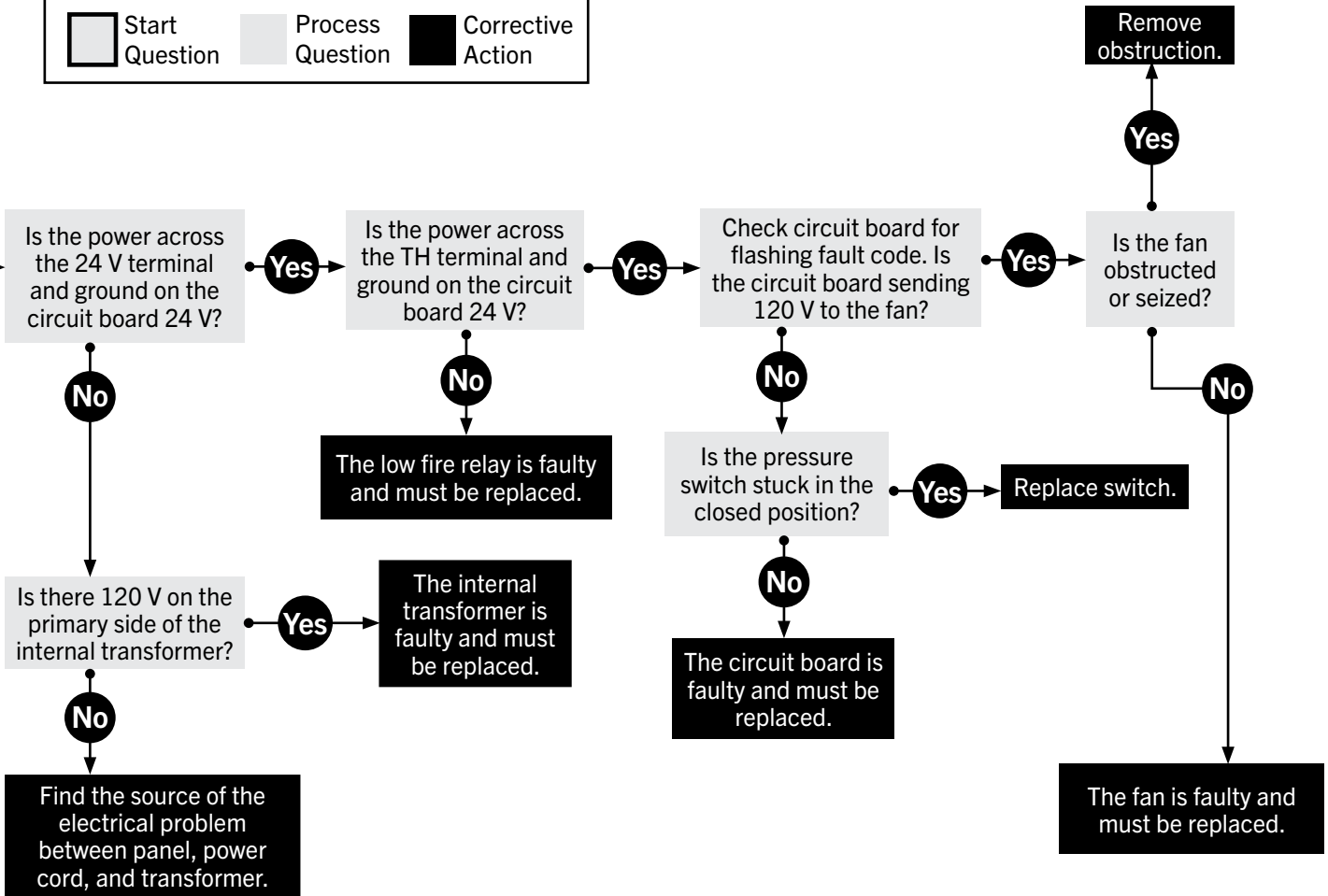
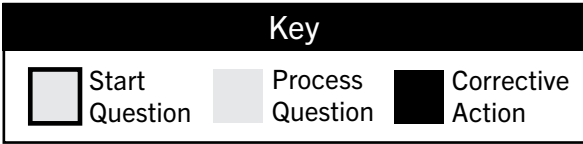
* Some LED codes have a time delay before the LED will flash.

5.0 Troubleshooting Guide



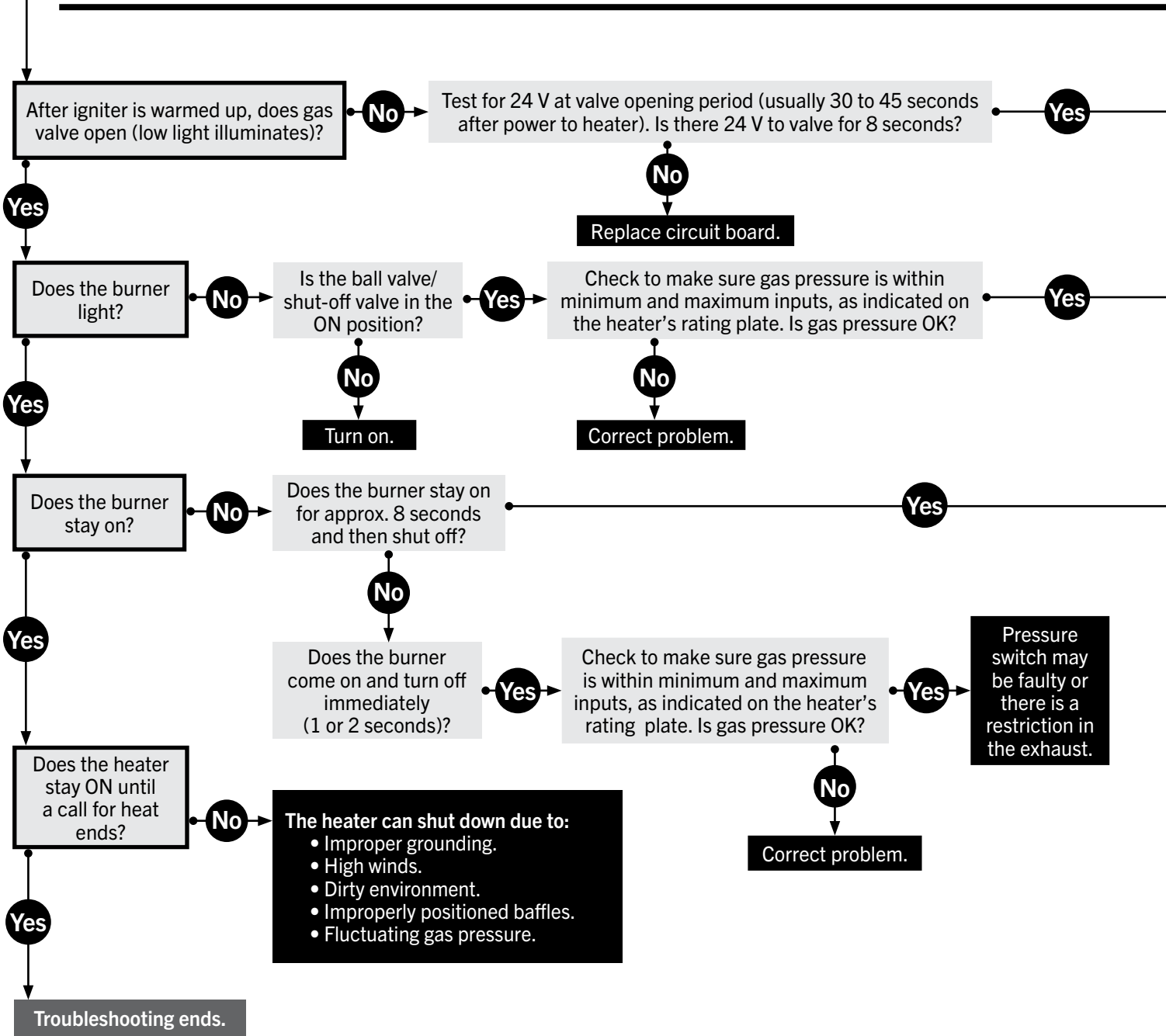
Continued on page 32

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.

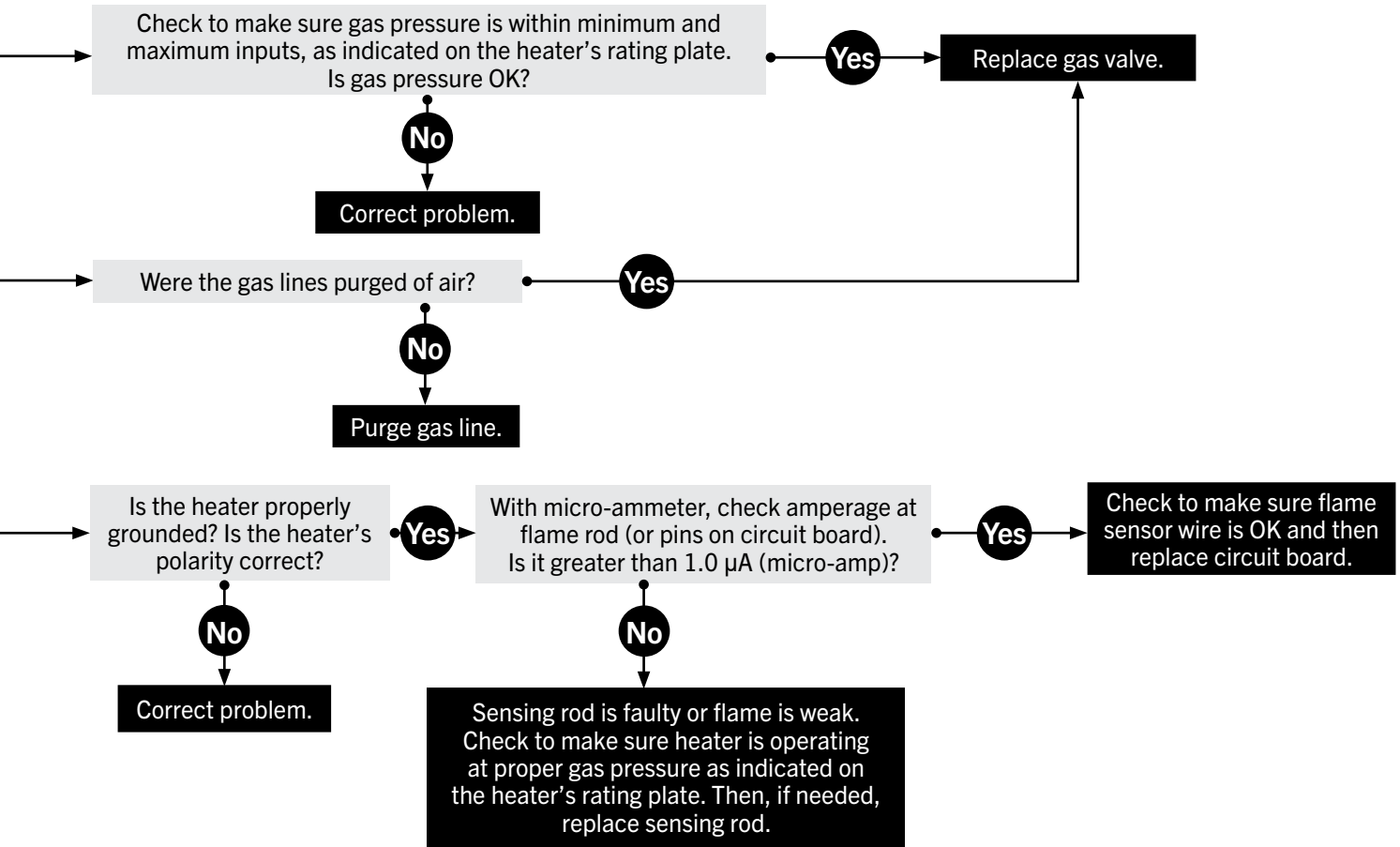


*Refer to LED diagnostic Fault Code Chart; p.29.

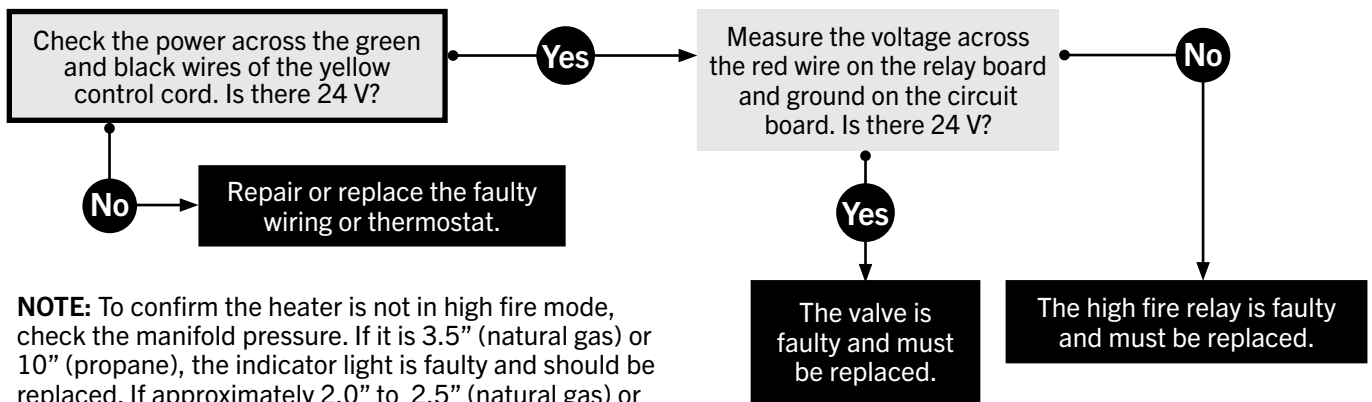
Continued from page 30.



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.



If the heater does not enter high fire mode, check the following:



NOTE: To confirm the heater is not in high fire mode, check the manifold pressure. If it is 3.5" (natural gas) or 10" (propane), the indicator light is faulty and should be replaced. If approximately 2.0" to 2.5" (natural gas) or 5.0" to 6.5" (propane), the heater is in low fire mode and the troubleshooting steps described here should be followed.

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 Maintenance and 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 ensure 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.

- **Clearances to Combustibles:** Inspect the area near the unit to be sure there is no combustible material located within the minimum clearance requirements listed in this manual. Under no circumstances should combustible material be located within the clearances specified in this manual. Failure to provide proper clearance could result in personal injury or equipment damage from fire.
- **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.

To check gas tightness of the safety shut-off valves, turn off the manual valve upstream of the appliance combination control. Remove the hex head plug on the inlet side of the combination control and connect a manometer to that tapping.

Turn the manual valve on the apply pressure to the combination control. Note the pressure reading on the manometer, then turn the valve off. Any loss of pressure indicates a leak. If leak is detected, use a soap solution to check all threaded connection. If no leak is found, combination control is faulty and must be replaced before putting appliance back in service.

- **Blower Motor:** 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.
- **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.

Figure 7.2 • Tube and Reflector Components

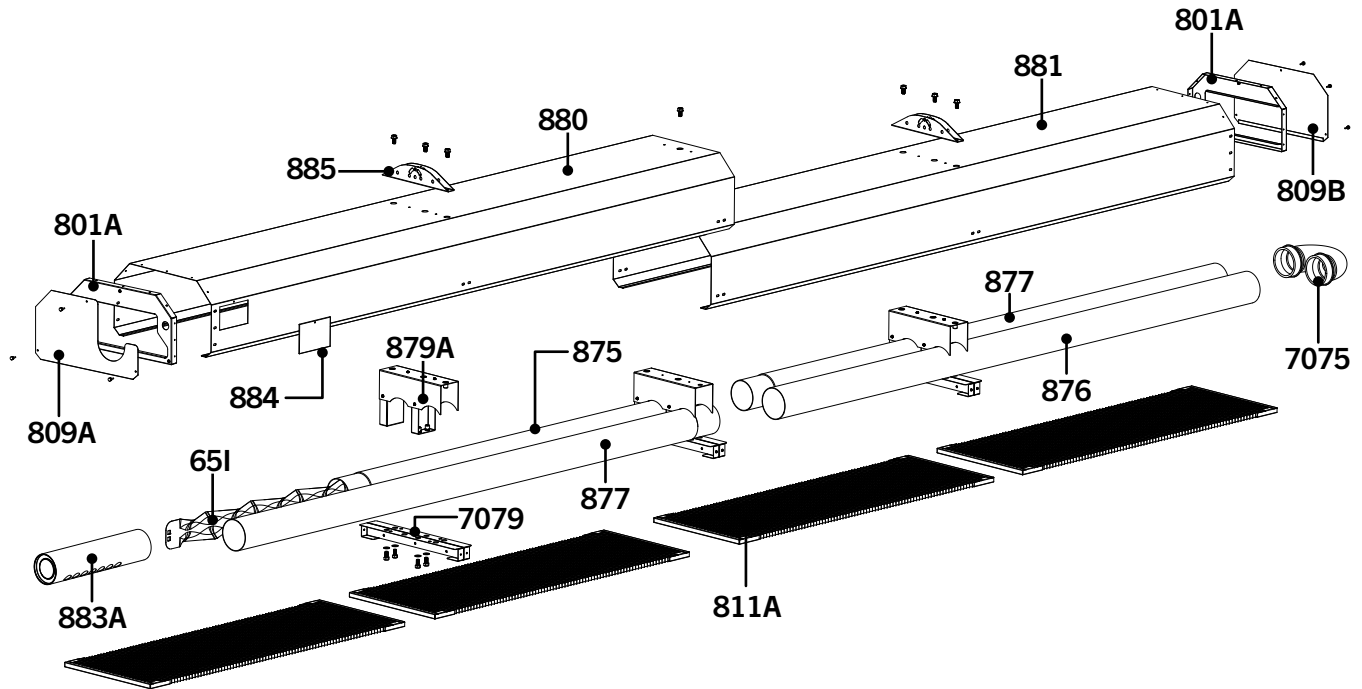
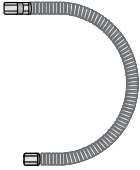
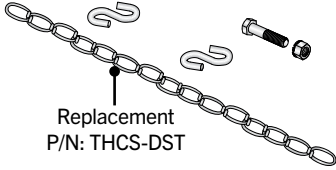
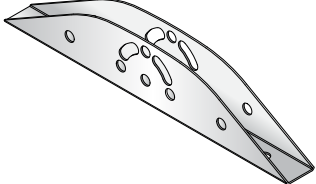
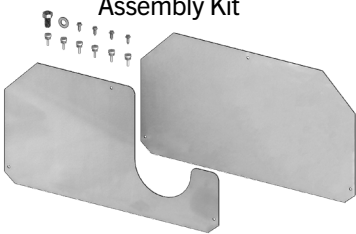
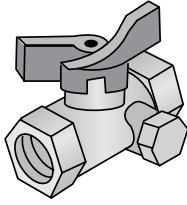



Chart 7.1 • Parts List (cont.)

Part No.	Description	Part No.	Description
TP-321	Ignition Plate Gasket	TP-876	7' Unswaged Tube
TP-333	6 ft. Black 120 VAC Power Cord	TP-877	7' Swaged Tube
TP-334	Yellow Control Cord	TP-879A	Mounting Bracket Assembly (Qty. 3)
TP-383A	Glo-Bar™ Ignitor Plate	TP-880	Burner End Reflector
TP-801A	Reflector End Cover Support	TP-881	U-End Reflector
TP-802B	End Panel, Left - Black	TP-883A	Exhaust Diffuser
TP-804B	Burner Control Box Outer Shell - Black	TP-884	Service Access Panel
TP-809A	Reflector End Cover (Burner End)	TP-885	Mounting Bracket
TP-809B	Reflector End Cover (U-End)	TP-1018	Diff. Switch Silicone Sensing Tube (Exhaust)
TP-811A	Egg Crate Assembly (4 Per Heater)	TP-1135	Resettable Inline Fuse
TP-826	40 VA Transformer	TP-1428	Green Operational Indicator Light
TP-828	Amber Operational Indicator Light	TP-3014	Air Orifice (consult factory)
TP-840A	Two-Stage Natural Gas Valve Assembly	TP-3072	Burner (Green)
TP-841A	Two-Stage Propane Gas Valve Assembly	TP-3252	Wire Harness
TP-851B	35-66 Diagnostic Circuit Board	TP-7075	U-Bend
TP-875	5' Swaged Tube	TP-7079	Mounting Bracket Assembly Support (Qty. 3)

Kit Contents Check List

Chart 7.2 • Kit Contents for MRL Series

MRL Series Kit Contents		
<p>TP-83 1/2" x 24" 304 Stainless Steel Flexible Gas Connector</p> 	<p>DSR-HANG* Hanging Kit</p>  <p>Replacement P/N: THCS-DST</p>	<p>TP-885 Hanging Bracket (x2)</p> 
<p>DSR-ASSY Assembly Kit</p> 	<p>TP-33B 1/2" Shut-Off Valve (Ball Valve & Inlet Tap)</p> 	<p>9-516.1 MRL Series Installation, Operation, and Maintenance Manual</p> 
Part No.	Description	Quantity
TP-33B	1/2" Shut-Off Valve and Inlet Tap	1
TP-83	1/2" x 24" 304 Stainless Steel Flexible Gas Connector	1
TP-885	Hanging Bracket	2
DSR-ASSY	3/8-16 x 1" Bolt (7), Flat Washer (7), Lock Washer (7), #10 x 5/8" Stainless Steel Self-Drilling Screw (8), Thumb Screw (6), Reflector End Panel Bracket (Burner End), Reflector End Panel Bracket (U-End)	1
DSR-HANG*	3/8-16 x 1 3/4" Stainless Bolt (4), Stainless Steel Keps Nuts (4), Stainless Steel S-Hooks (12), #1/0 Stainless Steel Bulldog Chain (6)	1
Filled By:		

* DSR-HANG Kit is not included when optional hanging bracket kit (P/N: DS-BKT20 or DS-BKT33) is ordered.

COMMERCIAL WARRANTY

Seller warrants its products to be free from defects in material and workmanship, EXCLUSIVE, HOWEVER, of failures attributable to the use of materials substituted under emergency conditions for materials normally employed. This warranty covers replacement of any parts furnished from the factory of Seller, but does not cover labor of any kind and materials not furnished by Seller, or any charges for any such labor or materials, whether such labor, materials or charges thereon are due to replacement of parts, adjustments, repairs, or any other work done. This warranty does not apply to any equipment which shall have been repaired or altered outside the factory of Seller in any way so as, in the judgment of Seller, to affect its stability, nor which has been subjected to misuse, negligence, or operating conditions in excess of those for which such equipment was designed. This warranty does not cover the effects of physical or chemical properties of water or steam or other liquids or gases used in the equipment.

BUYER AGREES THAT SELLER'S WARRANTY OF ITS PRODUCTS TO BE FREE FROM DEFECT IN MATERIAL AND WORKMANSHIP, AS LIMITED HEREIN, SHALL BE IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, WHETHER ARISING FROM LAW, COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE, THERE ARE NO OTHER WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, WHICH EXTEND BEYOND THE PRODUCT DESCRIPTION CONFIRMED BY BUYER AND SELLER AS OF THE DATE OF FINAL AGREEMENT.

This warranty is void if the input to the product exceeds the rated input as indicated on the product serial plate by more than 5% on gas-fired and oil-fired units, or if the product in the judgment of SELLER has been installed in a corrosive atmosphere, or subjected to corrosive fluids or gases, been subjected to misuse, negligence, accident, excessive thermal shock, excessive humidity, physical damage, impact, abrasion, unauthorized alterations, or operation contrary to SELLER'S printed instructions, or if the serial number has been altered, defaced or removed.

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY COMPONENT WHICH

SHALL, WITHIN THE APPLICABLE WARRANTY PERIOD DEFINED HEREIN AND UPON PRIOR WRITTEN APPROVAL, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER. FOR GAS-FIRED PRODUCTS INSTALLED IN HIGH HUMIDITY APPLICATIONS AND UTILIZING STAINLESS STEEL HEAT EXCHANGERS, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO TEN YEARS FROM DATE OF SHIPMENT FROM SELLER.

These warranties are issued only to the original owner-user and cannot be transferred or assigned. No provision is made in these warranties for any labor allowance or field labor participation. Seller will not honor any expenses incurred in its behalf with regard to repairs to any of Seller's products. No credit shall be issued for any defective part returned without proper written authorization (including, but not limited to, model number, serial number, date of failure, etc.) and freight prepaid.

OPTIONAL SUPPLEMENTAL WARRANTY

Provided a supplemental warranty has been purchased, Seller extends the warranty herein for an additional four (4) years on certain compressors. Provided a supplemental warranty has been purchased, Seller extends the warranty herein for an additional four (4) years or nine (9) years on certain heat exchangers.

EXCLUSION OF CONSUMABLES & CONDITIONS BEYOND SELLER'S CONTROL

The above referenced warranty shall not be applicable to any of the following items: refrigerant gas, belts, filters, fuses and other items consumed or worn out by normal wear and tear or conditions beyond Seller's control, including (without limitation as to generality) polluted or contaminated or foreign matter contained in the air or water utilized for heat exchanger (condenser) cooling or if the failure of the part is caused by improper air or water supply, or improper or incorrect sizing of power supply.

<u>Component</u> Applicable Models	"APPLICABLE WARRANTY PERIOD"
<u>Heat Exchangers</u> Gas-Fired Units except PSH/BSH	TEN YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN ONE HUNDRED TWENTY-SIX MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
<u>Heat Exchangers</u> Low Intensity Infrared Units <u>Compressors</u> Condensing Units for Cassettes	FIVE YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN SIXTY-SIX MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
<u>Burners</u> Low Intensity Infrared Units <u>Other</u> Components excluding Heat Exchangers, Coils, Condensers, Burners, Sheet Metal	TWO YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TWO YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN THIRTY MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
<u>Heat Exchangers/Coils</u> Indoor and Outdoor Duct Furnaces and System Units, PSH/BSH, Steam/Hot Water Units, Oil-Fired Units, Electric Units, Cassettes, Vertical Unit Ventilators <u>Compressors</u> Vertical Unit Ventilators <u>Burners</u> High Intensity Infrared Units <u>Sheet Metal Parts</u> All Products	ONE YEAR FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN ONE YEAR FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN EIGHTEEN MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

