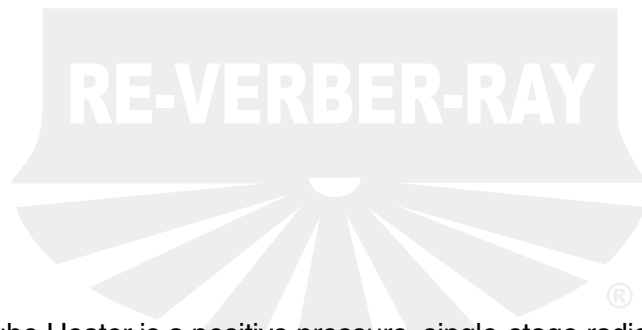


CX Series Insert Manual



For complete installation instructions, see the Tube Heater General Manual that accompanies this Series Insert Manual.



The CX Series Infrared Tube Heater is a positive pressure, single-stage radiant heater system. This insert manual is a supplement to the Tube Heater General Manual and provides specific information related to the CX Series model. All persons involved with the installation, operation and maintenance of the heater system must read and understand the information in this insert manual and the accompanying Tube Heater General Manual.

⚠ WARNING



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

This heater must be installed and serviced by trained gas installation and service personnel only. Failure to comply could result in personal injury, asphyxiation, death, fire or property damage.



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 thermostats or in the absence of such thermostats, in a conspicuous location.



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, asphyxiation or death.**

For Your Safety

If you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone.
- Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Keep these instructions for future reference.

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NOTE: See page 10 for a list of available models and specifications.

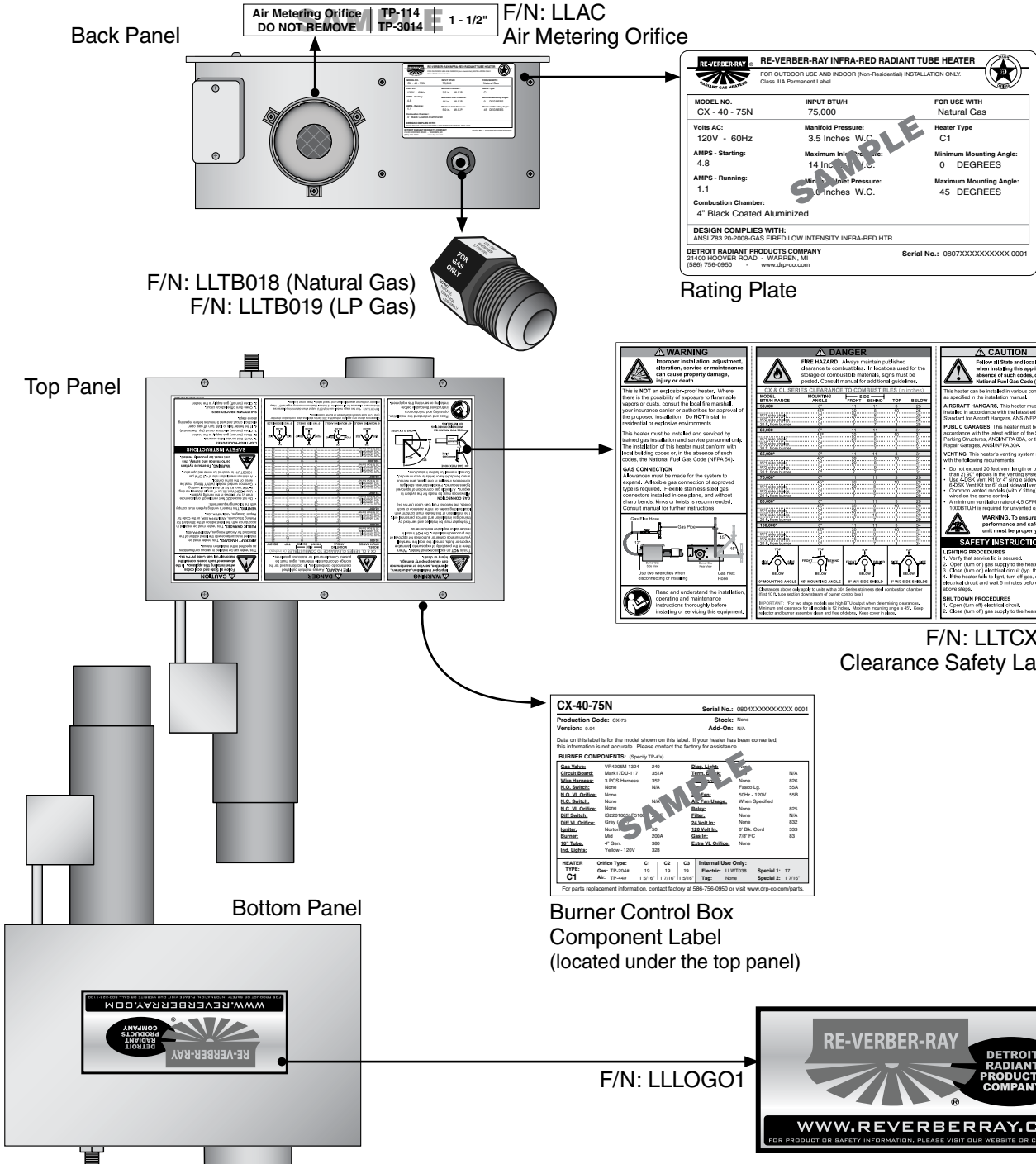
1.0 Safety

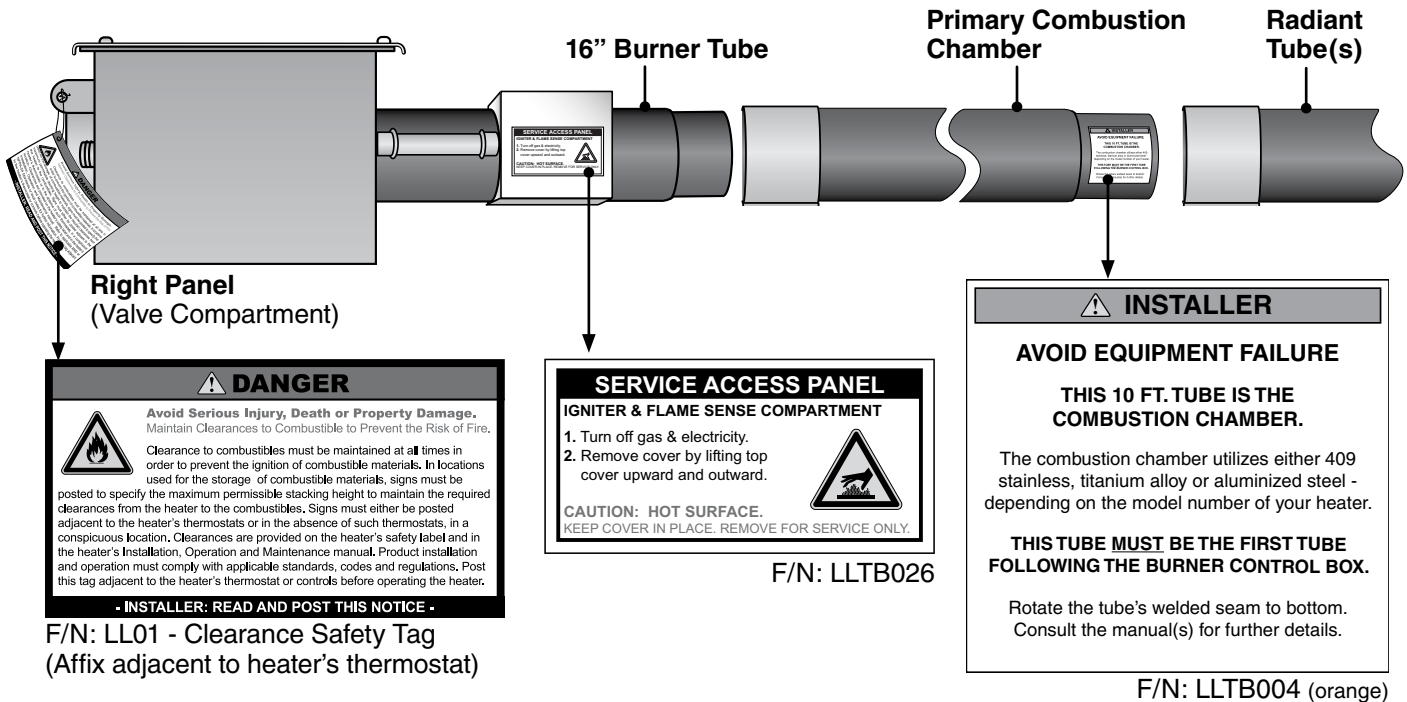
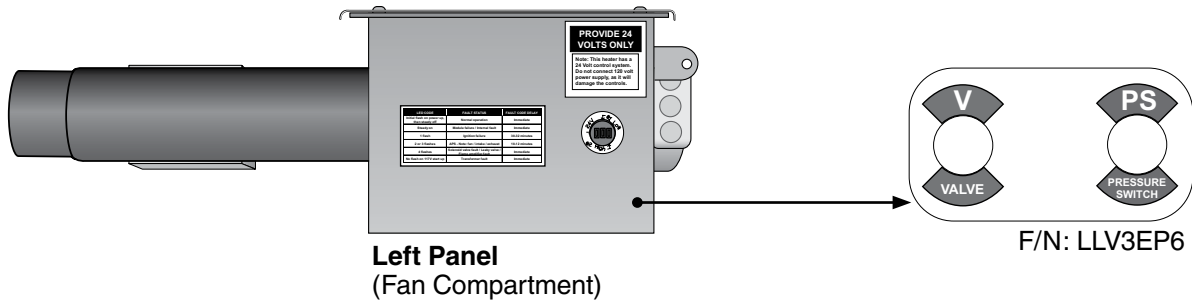


Read and understand all safety information and warnings in this insert manual and the Tube Heater General Manual before installation, operation and maintenance of the radiant tube heater system.

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.





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.

When installing the tube heater system, clearances to combustibles for your series tube heater and configuration must be maintained. Refer to Chart 1.1 on the following page to determine the required distances for your model.

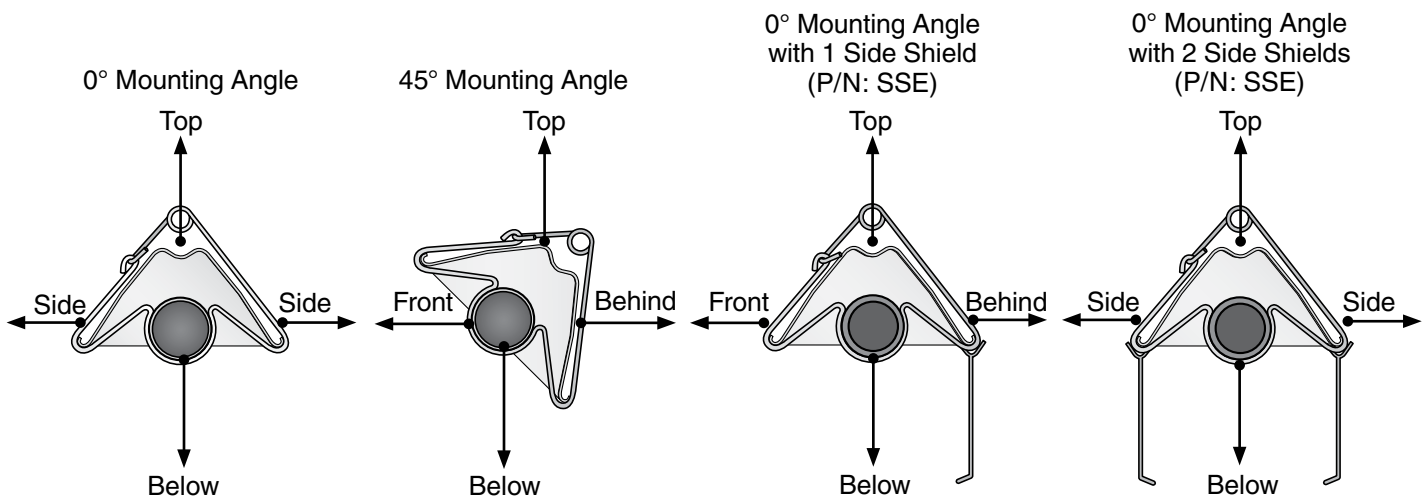
The stated clearance to combustibles represents a surface temperature of 90°F (32°C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to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

Chart 1.1 • Clearance to Combustibles in Inches (see Figure 1.1 for Mounting Angles)

Model Number	Mounting Angle*	Sides		Top	Below	
		Front	Behind			
CX (30, 40) - 50 [N, P]	0°	11	11	3	25	
	45°	39	8	10	25	
	with 1 side shield	0°	29	8	3	25
	with 2 side shields	0°	9	9	3	25
	20 ft. from burner	0°	7	7	3	25
CX (30, 40) - 60 [N, P]	0°	11	11	3	31	
	45°	39	8	10	31	
	with 1 side shield	0°	29	8	3	31
	with 2 side shields	0°	9	9	3	31
	20 ft. from burner	0°	7	7	3	31
CX (40, 50) - 75 [N, P]	0°	11	11	3	29	
	45°	39	8	10	29	
	with 1 side shield	0°	29	8	3	29
	with 2 side shields	0°	9	9	3	29
	20 ft. from burner	0°	7	7	3	29
CX (40, 50) - 80 [N, P]	0°	11	11	3	29	
	45°	39	8	10	29	
	with 1 side shield	0°	29	8	3	29
	with 2 side shields	0°	16	16	3	29
	20 ft. from burner	0°	7	7	3	29
CX 50 - 100 [N, P]	0°	11	11	3	34	
	45°	39	8	10	34	
	with 1 side shield	0°	29	8	3	34
	with 2 side shields	0°	16	16	3	34
	20 ft. from burner	0°	7	7	3	34

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

Figure 1.1 • Mounting Angles



2.0 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.

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.**

Instructions for the following are detailed in the Tube Heater General Manual:

- Design considerations
- Hanger suspension and placement
- Tube layout and assembly
- Burner control box suspension
- Reflectors (and accessories)
- Venting and combustion air intake
- Gas requirements
- Baffle assembly

NOTE: Electronic versions of all manuals are available at www.detroitradiant.com

Gas Requirements

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.



IMPORTANT: Consult the Tube Heater General Manual (LIOGTa) for gas connection requirements.

Electrical Requirements

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

Wiring

⚠ WARNING

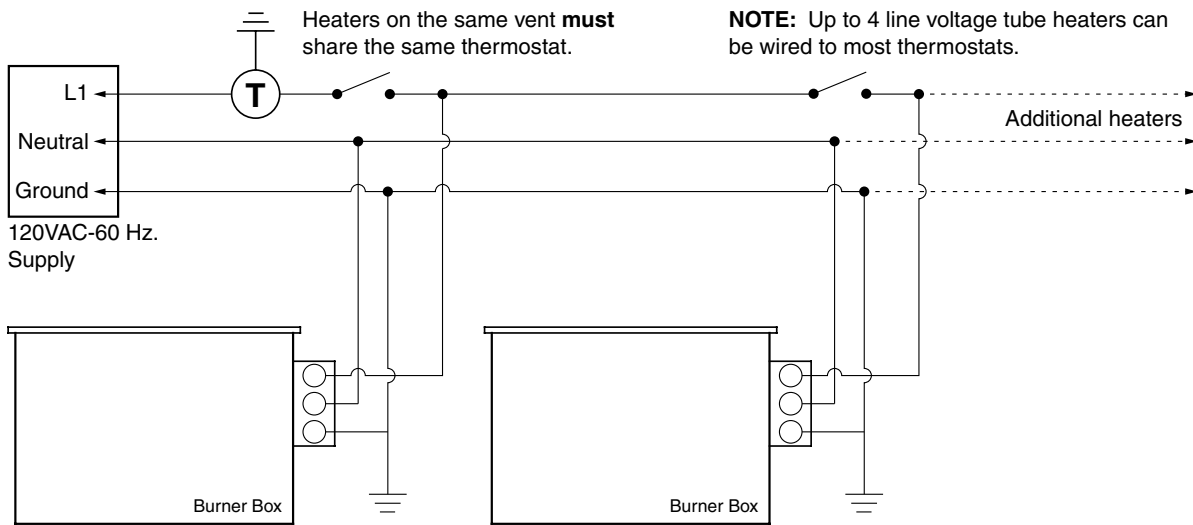


Electric Shock

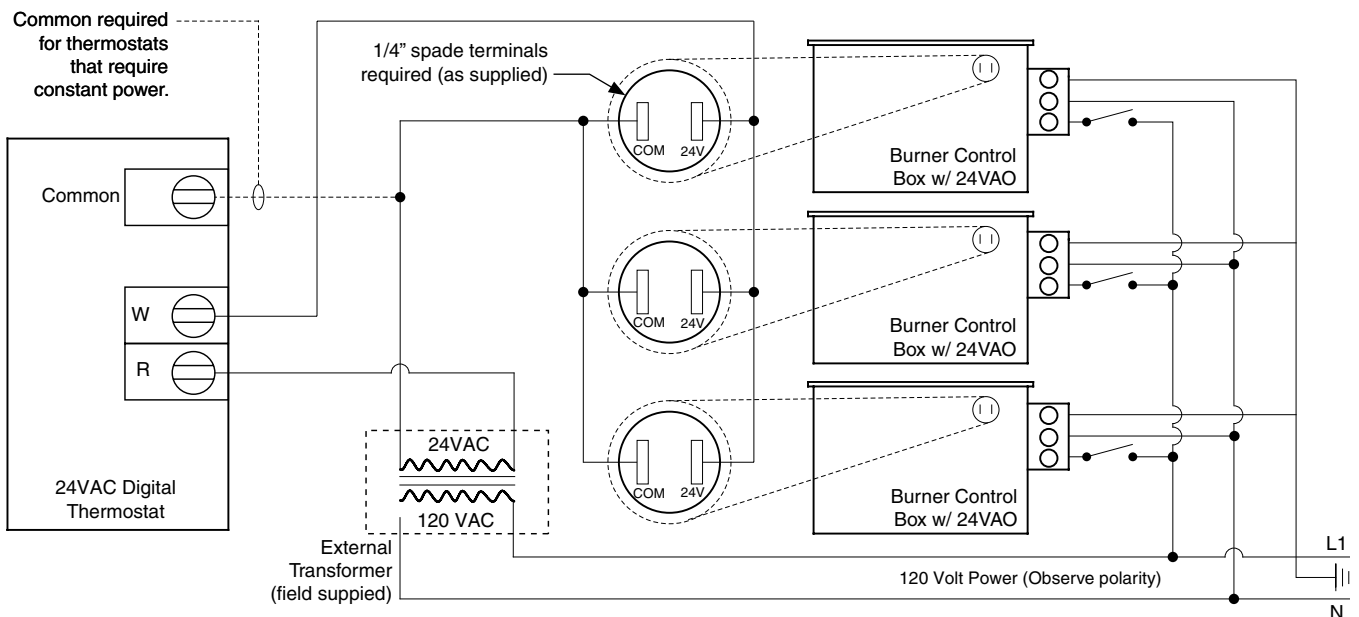
Field wiring to the tube heater must be connected and grounded in accordance with national, state, provincial, local codes and to the guidelines in the Tube Heater General Manual and Series Insert Manual. In the United States refer to the most current revisions to the ANSI/NFPA 70 Standard and in Canada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

Figure 2.1 • Field Wiring Diagrams

A. 120VAC Single/Multiple Line Voltage Heater(s)



B. 24VAO (Internal Relay Option)

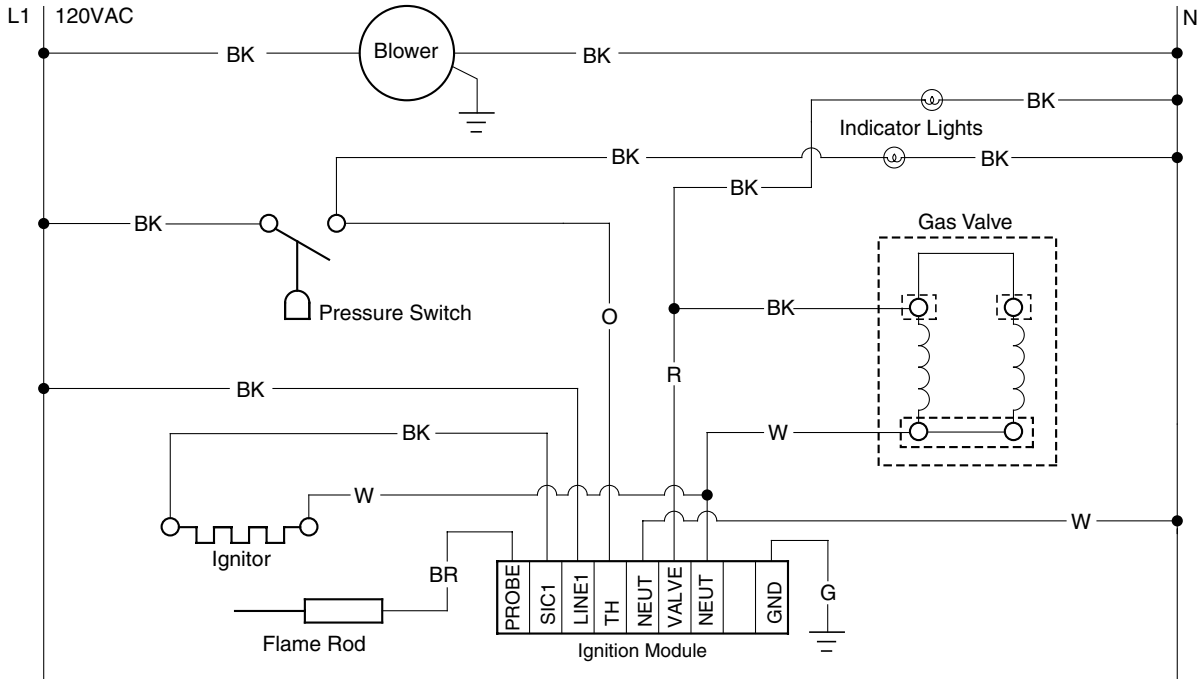


Before field wiring this appliance - Check existing wiring; replace if necessary.

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.

Figure 2.2 • Internal Wiring Diagrams

A. Ladder Diagram - TP-351A



B. Block Diagram - TP-351A

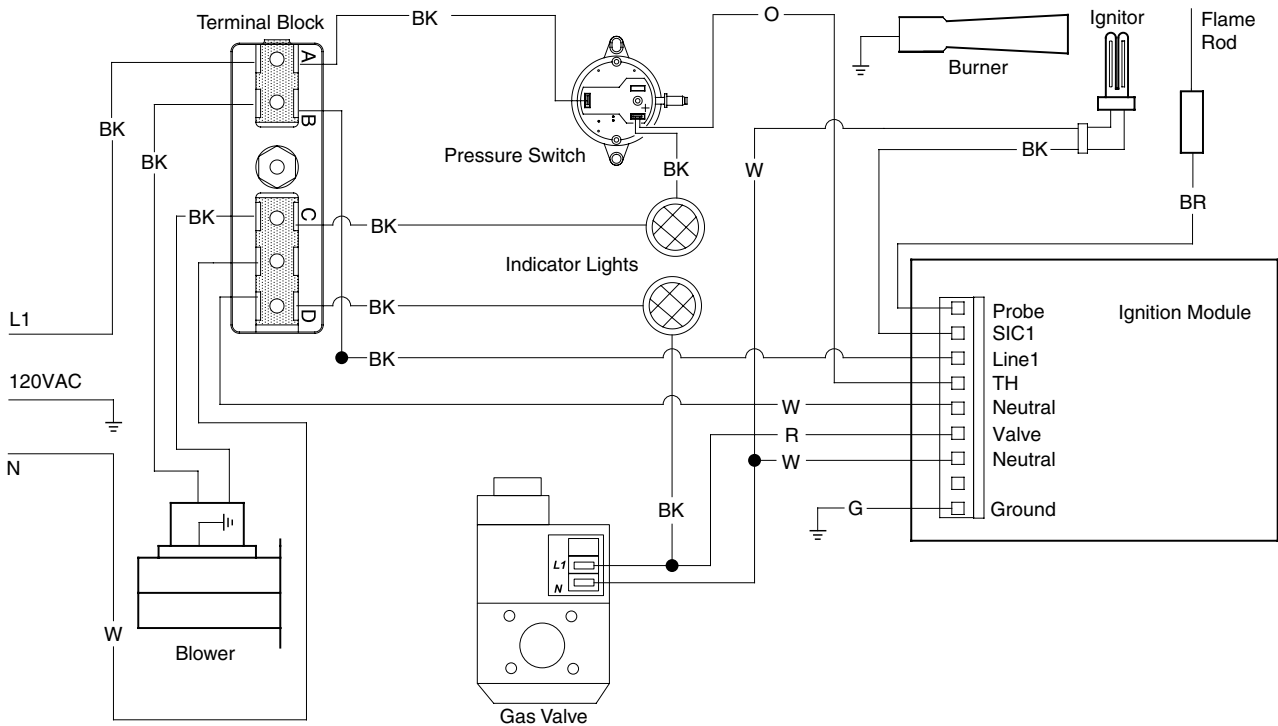
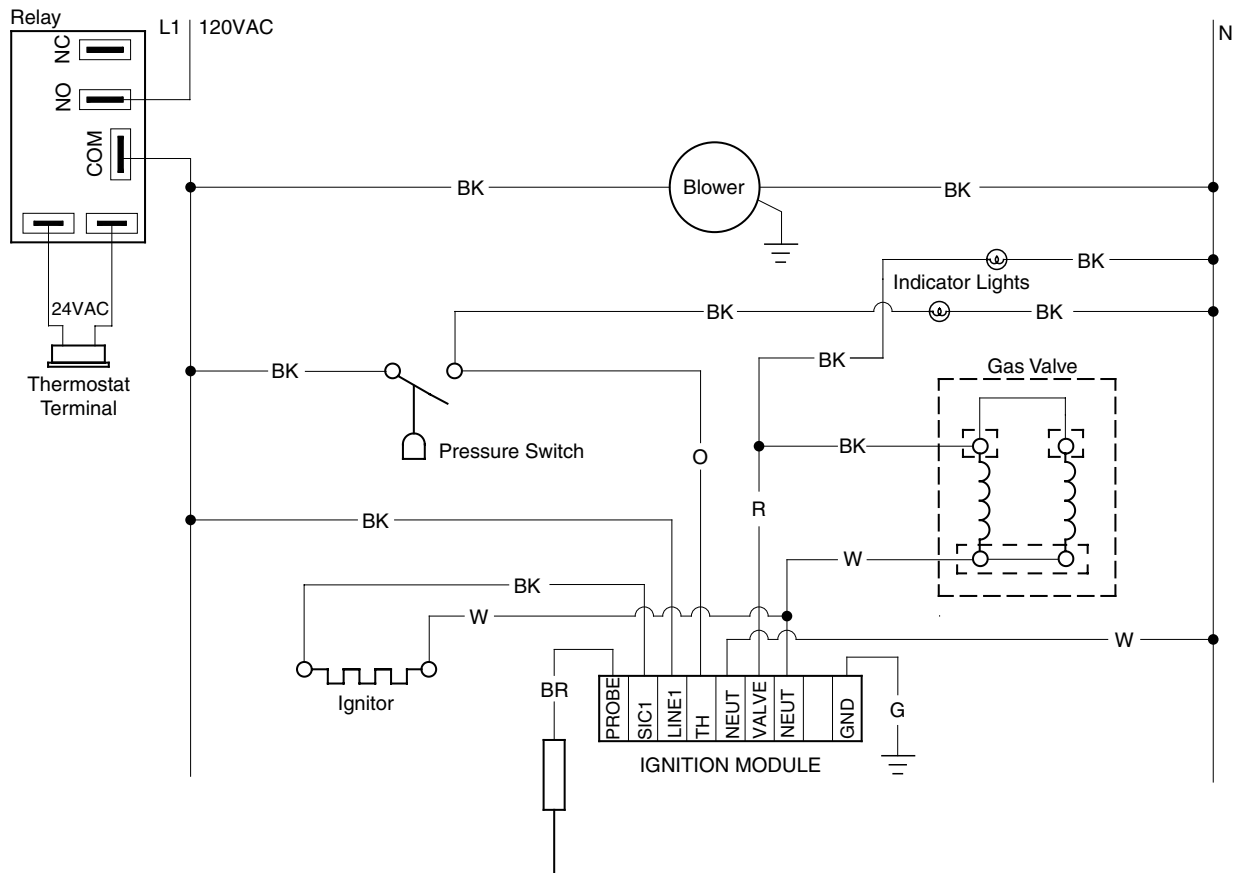
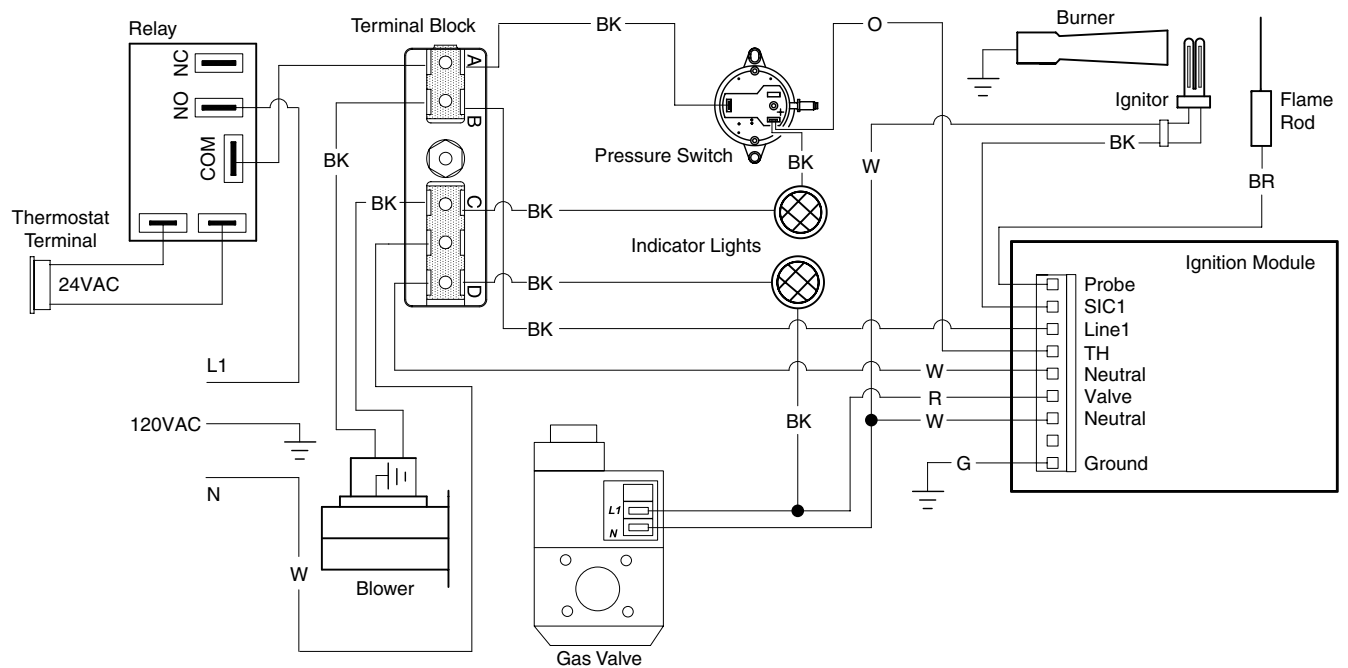


Figure 2.3 • Alternative Wiring Diagrams

A. TP-351A Ladder Diagram - Internal Relay Option (24VAO)



B. TP-351A Block Diagram - Internal Relay Option (24VAO)



Specifications

Chart 2.1 • Specifications

Model Number	Gas Type (select one)	BTU/H	Straight Length	U-Tube Length	Standard Weight (lbs.)	Recommended Mounting Height	Combustion Chamber (uncoated)	Combustion Chamber (uncoated)	Radiant Emitter Tube(s) (black coated)	Radiant Surface Area (sq. ft.)	36" Baffle Sections
CX-30-50	N or LP	50,000	31'-4"	*17'-8"	160	9' to 14'	304SS	UC Alum	Alum	30.4	6
CX-30-60	N or LP	60,000	31'-4"	*17'-8"	160	9' to 14'	304SS	UC Alum	Alum	30.4	6
CX-40-50	N or LP	50,000	41'-0"	22'-8"	190	9' to 14'	304SS	UC Alum	Alum	40.5	6
CX-40-60	N or LP	60,000	41'-0"	22'-8"	190	9' to 14'	304SS	UC Alum	Alum	40.5	6
CX-40-75	N or LP	75,000	41'-0"	22'-8"	190	10' to 15'	304SS	UC Alum	Alum	40.5	5
CX-40-80	N or LP	80,000	41'-0"	22'-8"	190	10' to 15'	304SS	UC Alum	Alum	40.5	5
CX-50-75	N or LP	75,000	50'-8"	*27'-4"	235	11' to 15'	304SS	UC Alum	Alum	50.6	5
CX-50-80	N or LP	80,000	50'-8"	*27'-4"	235	11' to 15'	304SS	UC Alum	Alum	50.6	5
CX-50-100	N or LP	100,000	50'-8"	*27'-4"	235	12' to 16'	304SS	UC Alum	Alum	50.6	5

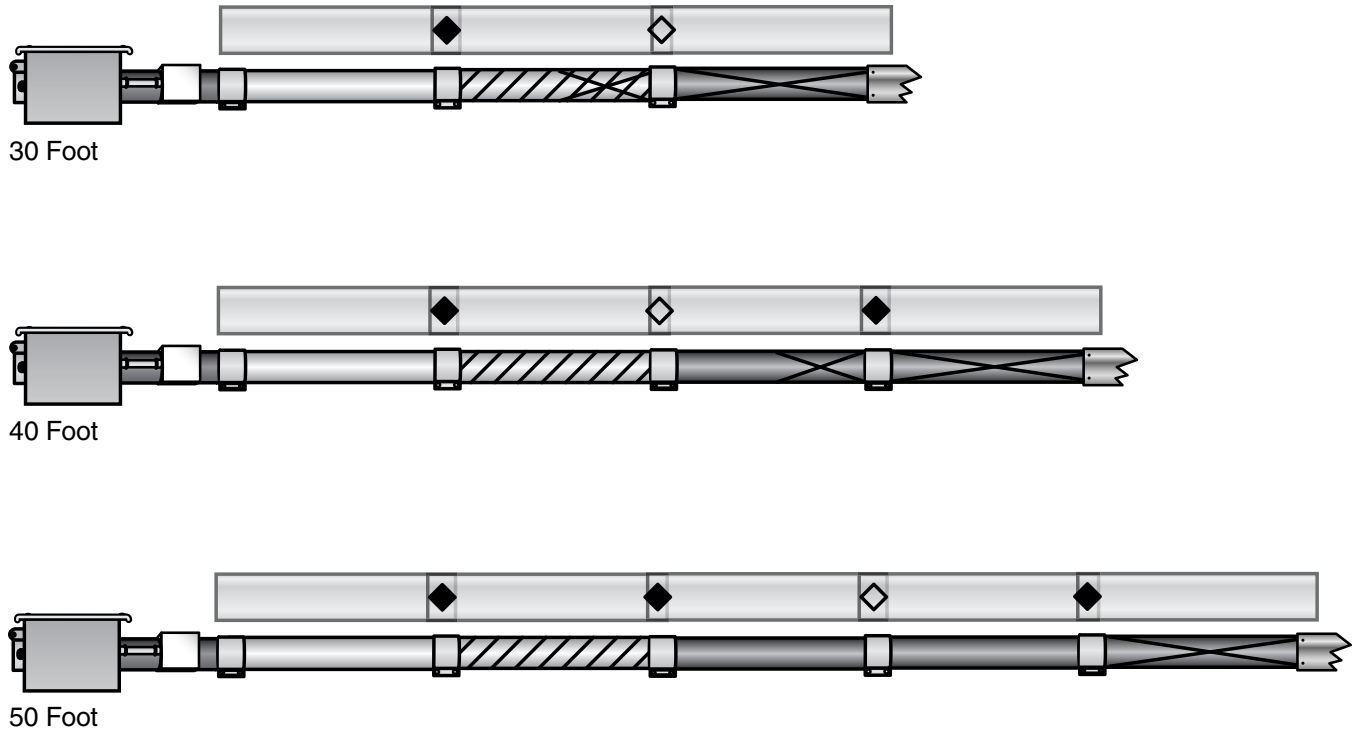
* Model requires 5EA-SUB accessory package when installing in a 'U' configuration (P/N: TF1B).

304SS = Uncoated 304 Series stainless steel.
 UC Alum = Uncoated aluminized treated steel.
 Alum = Black coated aluminized treated steel.

Tube Installation Sequence

Figure 2.4 • Tube Installation Sequence and Baffle Location

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



Key	
	Burner Control Box with 16" Burner Tube
	Uncoated 304 Series Stainless Steel Combustion Chamber Tube
	Uncoated Aluminized Radiant Emitter Tube
	Black Coated Aluminized Radiant Emitter Tube
	Standard Tube Clamp
	Baffle Location
	Secure vent material to exchanger with three #8 sheet metal screws. Seal with high temperature silicone sealant. Do not use tube clamp.

NOTE: Refer to the Tube Heater General Manual, Chart 3.6 (page 23) for secured reflector joints.

3.0 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.

Note: Reference the Tube Heater General Manual for installation requirements.

Sequence of Operation

Starting Circuit: Upon a call for heat, the fan is energized. Once operational static pressure is achieved, the differential switch will close initiating the ignition sequence. After a 5-second delay, the hot surface igniter is energized for 45 seconds and the control allows the gas valve to open.

The trial for ignition is 8 seconds. If flame sense is not established within 8.5 seconds, the heater will attempt two (2) additional ignition sequences before proceeding to soft lockout. Soft lockout automatically retries after one (1) hour or the control can be reset by briefly interrupting the power source.

Running Circuit: After ignition, the flame rod monitors burner flame. If sense of flame is lost, the control immediately acts to reignite the gas-air mixture (identical to the starting sequence). 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.

Thermostat

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

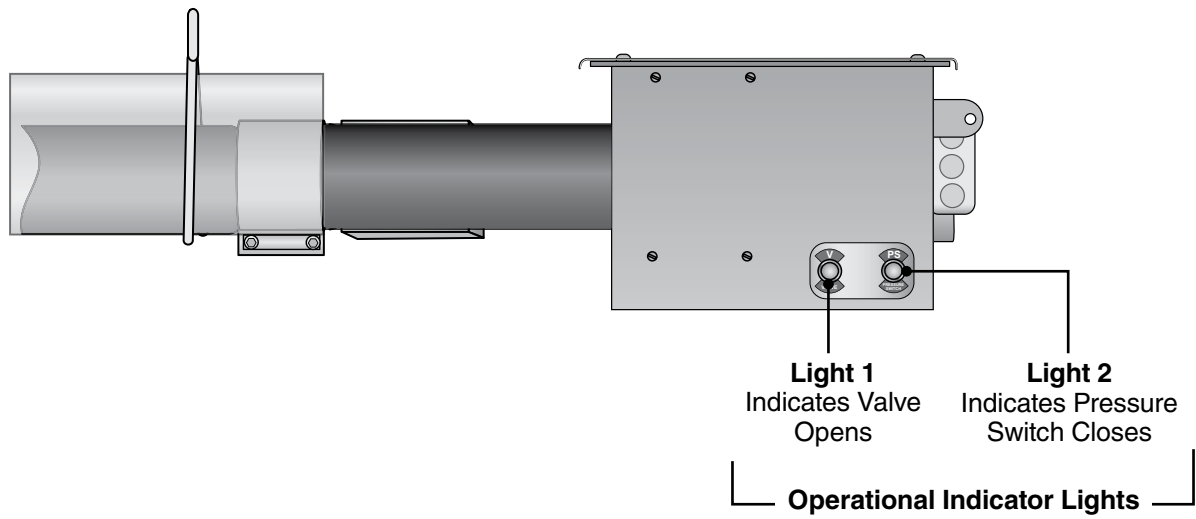
The CX Series comes standard requiring a 120VAC connection to the thermostat. An optional 24VAC internal relay (24VAO) may be factory installed if the heater is to be controlled via a 24VAC thermostat. A 40VA transformer is necessary when using the 24VAO option (Figure 2.1B).

NOTE: A relay transformer may be used in lieu of the factory installed 24VAO option.

Operational Indicator Lights

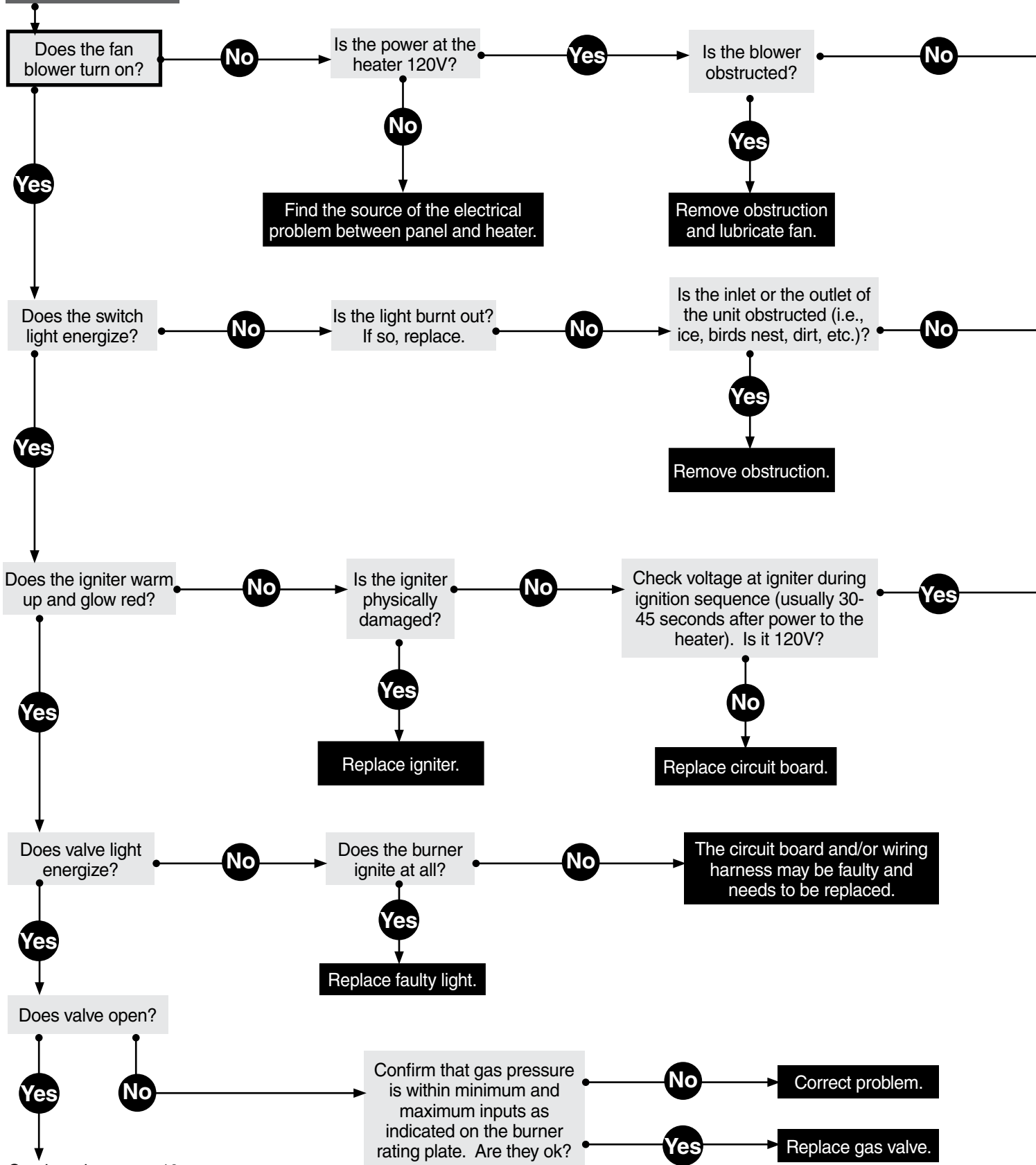
The externally located operational indicator lights are provided to assist in troubleshooting of the heater. Refer to the pages 14-17 for additional troubleshooting.

Figure 3.1 • Operational Indicator Lights



4.0 Troubleshooting Guide

Turn up thermostat



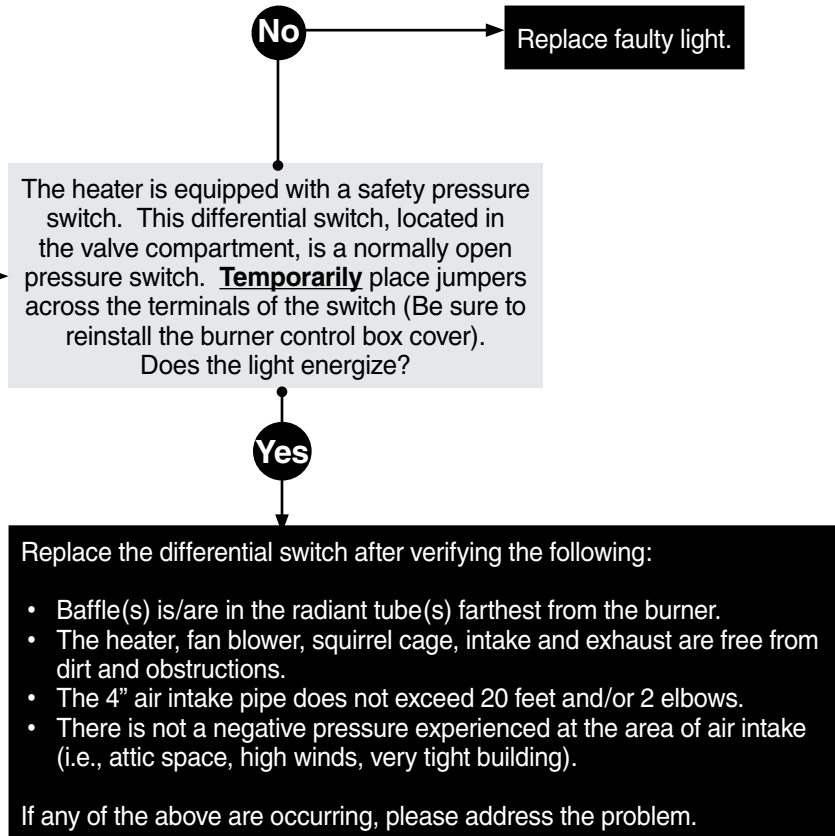
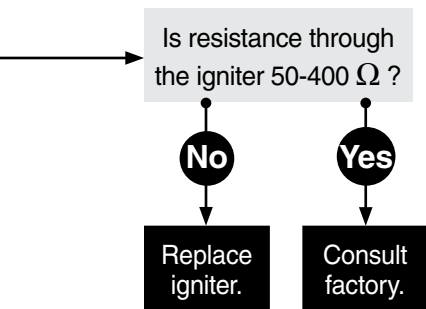
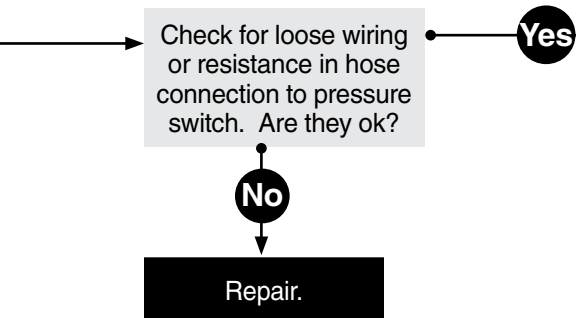
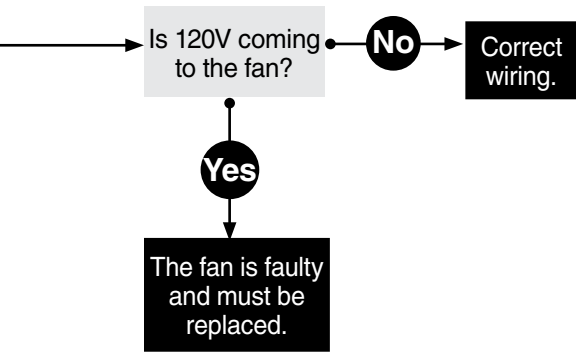
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NOTICE

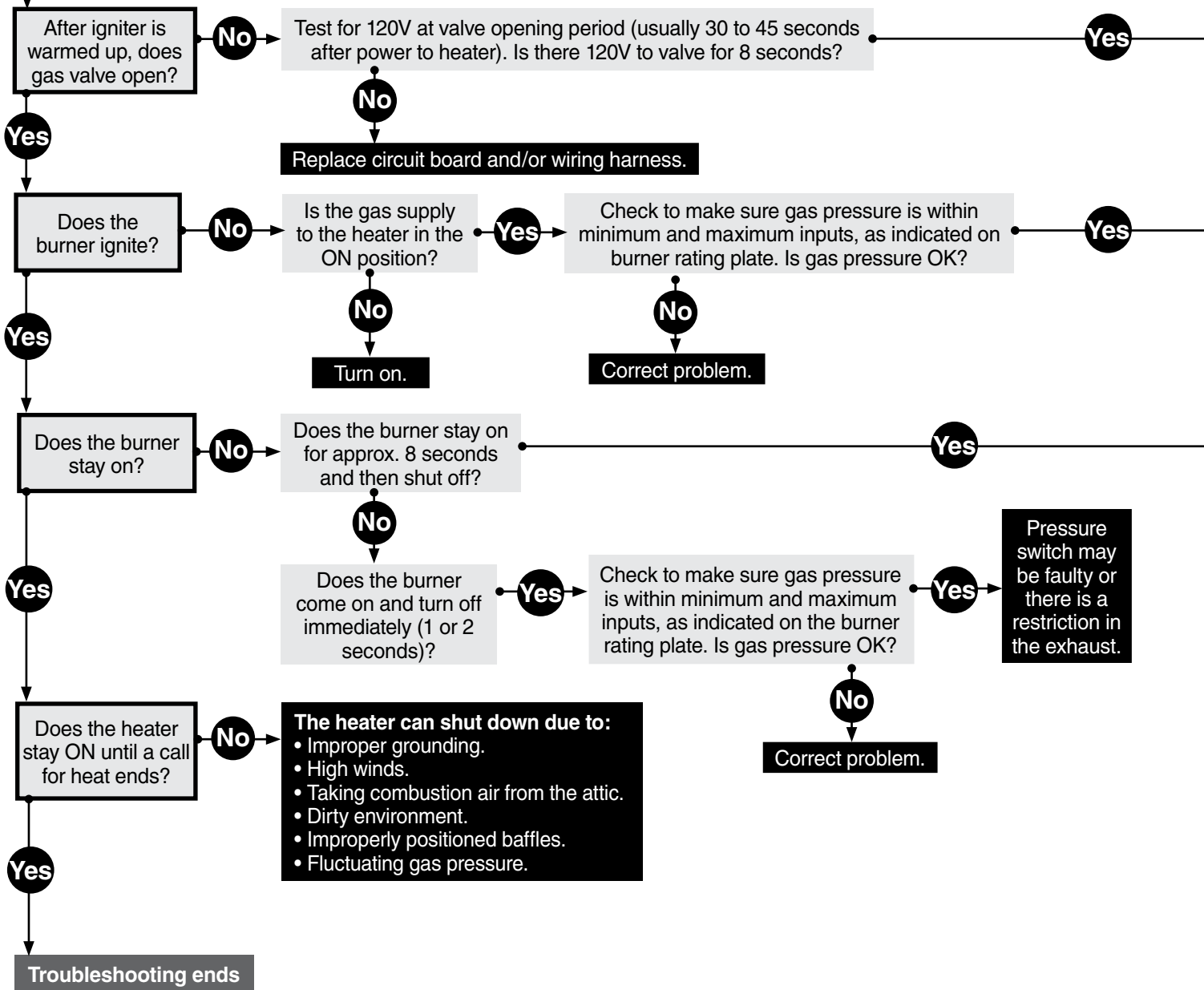
Bypassing any switch is intended for testing purposes only. Do not leave switch bypassed during normal operation or the heater's built-in safety mechanisms will be compromised.

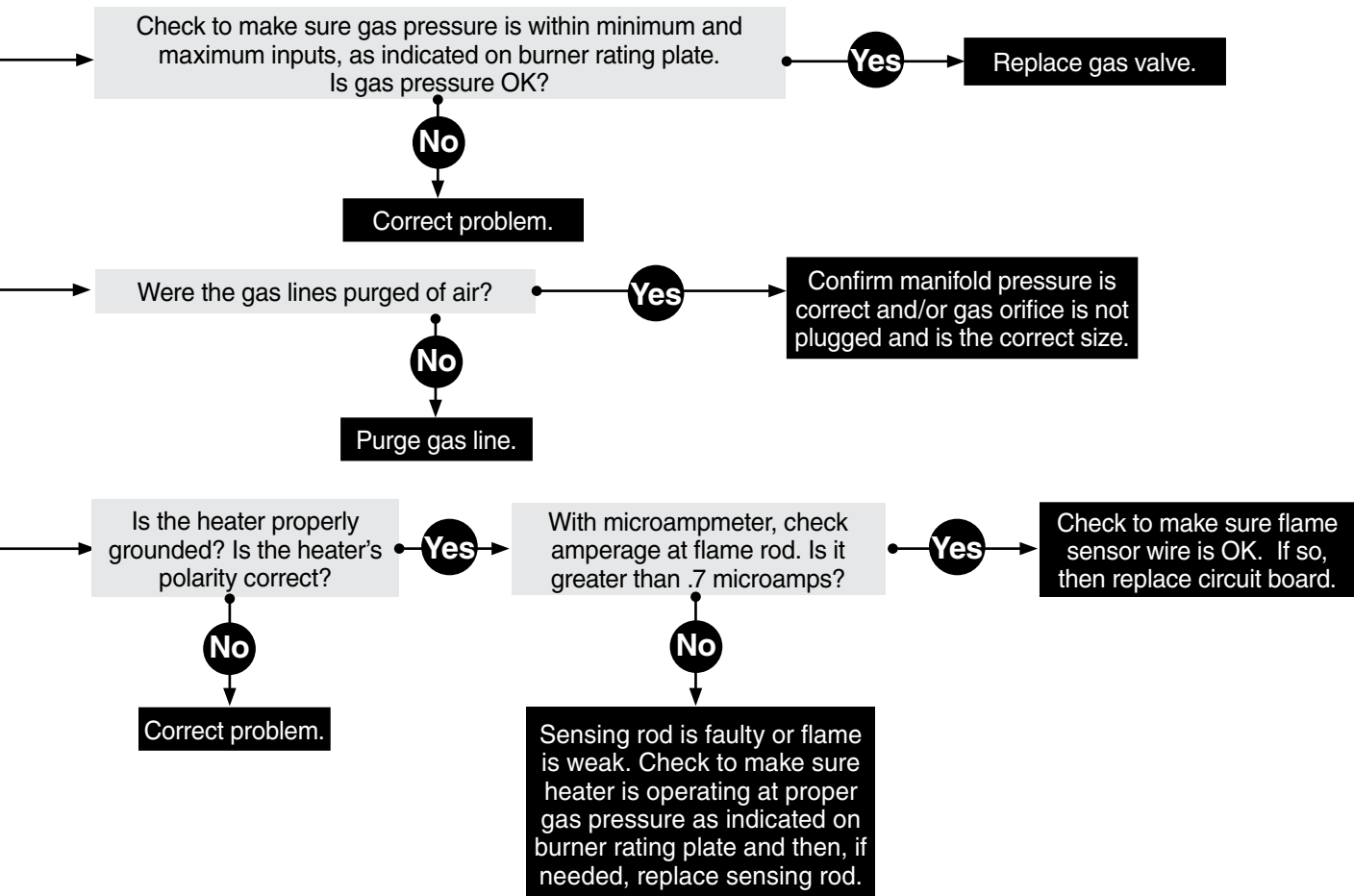
Key

- Start Question
- Process Question
- Corrective Action



Continued from page 14





5.0 Parts

Figure 5.1 • Burner Assembly Components

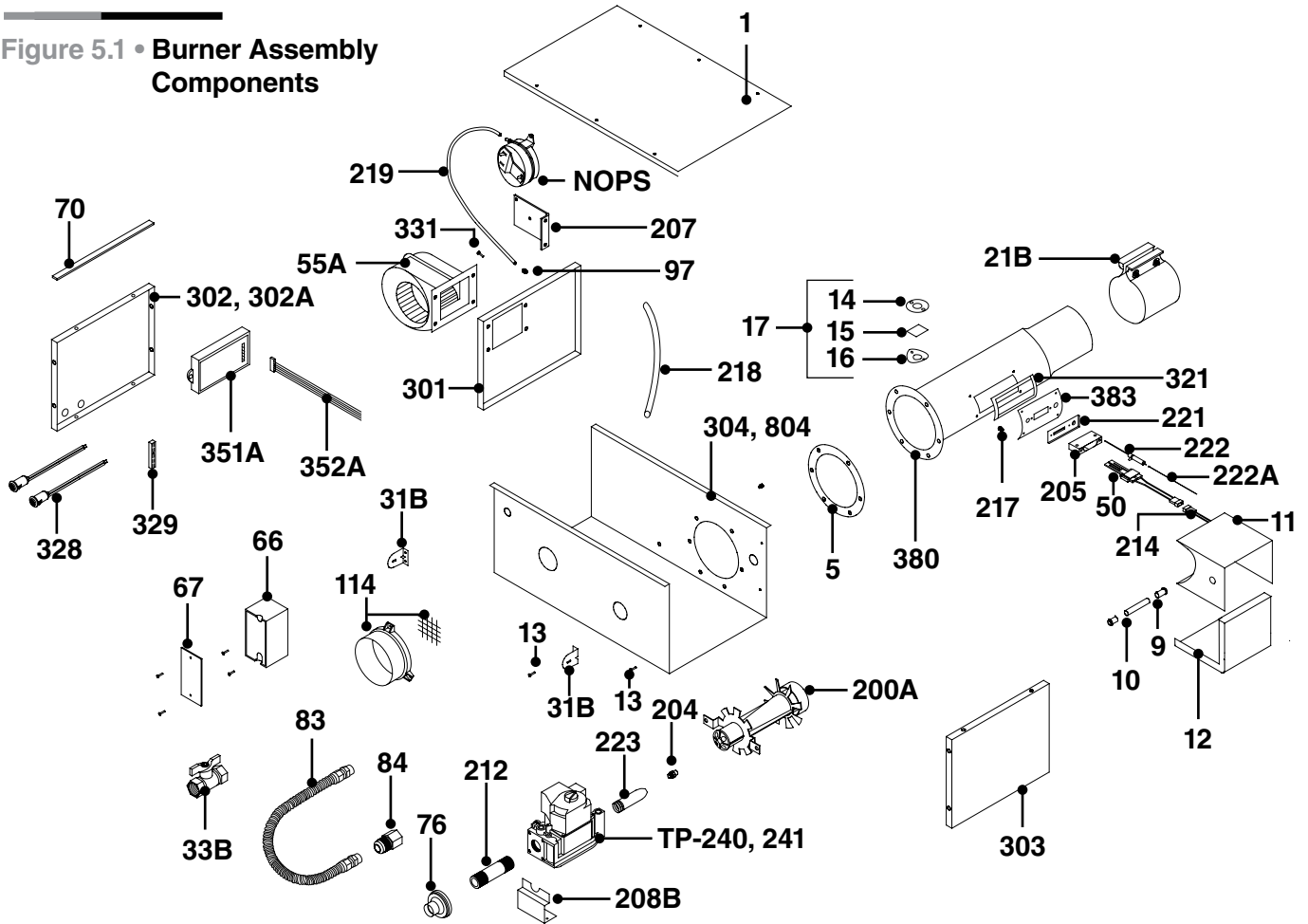


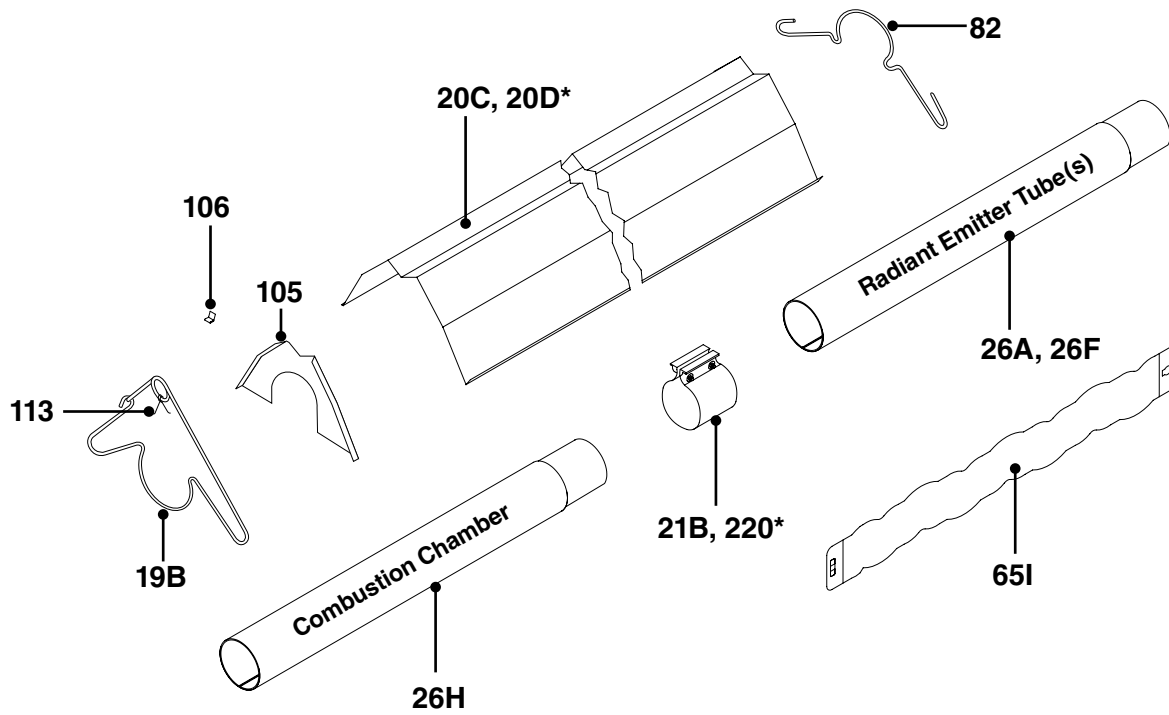
Chart 5.1 • Parts List

Part No.	Description	Part No.	Description
TP-1	Control Box Cover	TP-31B	Control Box Mounting Bracket
TP-5	Flange Gasket	TP-33B	1/2" Shut-Off Ball Valve / Inlet Tap
TP-9	Conduit Coupling	TP-50	Hot Surface Igniter
TP-10	Conduit 4" x 1/2"	TP-55A	Fan Blower
TP-11	Hot Surface Igniter Box	TP-65l	36" Interlocking Turbulator Baffle
TP-12	Hot Surface Igniter Box Cover	TP-66	2" x 4" Outlet Box
TP-13	8 x 1/2" Self-Drilling Screw	TP-67	2" x 4" Outlet Box Cover
TP-14	Sight Glass Gasket	TP-70	Control Box Cover Gasket (per foot**)
TP-15	Sight Glass	TP-76	Rubber Grommet
TP-16	Sight Glass Washer	TP-82	Reflector Center Support (RCS)
TP-17	Sight Glass Kit	TP-83	24" Stainless Steel Flexible Gas Connector
TP-19B	4" Wire Hanger with Tension Spring	TP-84	1/2" Female / Male Flare Fitting
TP-20C	120" Aluminum Reflector	TP-97	1/4" x 1/4" Brass Int./Ext. Atmos. Barb Fitting
TP-20D	120" Stainless Steel Reflector*	TP-105	Aluminum Reflector End Cap
TP-21B	4" Standard Tube Clamp	TP-106	Reflector End Cap Clips (8 pcs.)
TP-26A	10 ft. Black Coated Aluminized Radiant Tube	TP-113	Reflector Tension Spring
TP-26F	10 ft. Uncoated Aluminized Steel Radiant Tube	TP-114	Plastic Air Orifice with Screen (consult factory)
TP-26H	10 ft. 304 Stainless Steel Combustion Tube	TP-200A	Burner (50-100 MBH Models)

* May be used with stainless steel upgrades.

** 6 feet total required to cover edges of control housing.

Figure 5.2 • Tube & Reflector Components

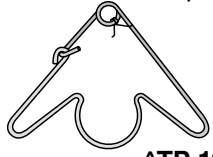

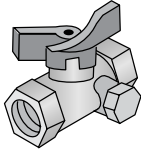

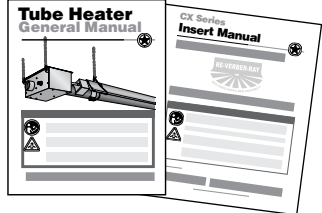
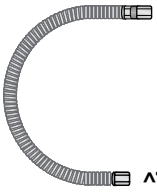
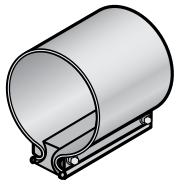
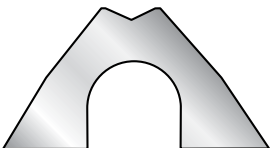


Part No.	Description	Part No.	Description
TP-204	Gas Orifice (consult factory)	TP-302	End Panel, Left
TP-205	Hot Surface Igniter Holder	TP-302A	End Panel, Left w/ 24VAO Option.
TP-207	Pressure Switch Mounting Bracket	TP-303	End Panel, Right
TP-208B	Gas Valve Mounting Bracket	TP-304	Burner Control Box Outer Shell (w/ powercord)
TP-212	1/2" x 3" Pipe Nipple	TP-321	Ignition Plate Gasket
TP-214	Hot Surface Igniter Wiring Harness	TP-328	120V Amber Operational Indicator Light
TP-217	Pressure Switch Barb	TP-329	1/4" Neutral Terminal Block
TP-218	Differential Switch Vinyl Sensing Tube (exhaust)	TP-331	Green Self Tap Ground Screw
TP-219	Differential Vinyl Sensing Tube (burner)	TP-351A	Potted Circuit Board
TP-220	Stainless Steel Tube Clamp*	TP-352A	Circuit Board Wiring Harness for TP-351A
TP-221	Hot Surface Igniter Holder Gasket	TP-380	16" Burner Tube with Flange (fittings included)
TP-222	Flame Rod	TP-383	Hot Surface Igniter Plate
TP-222A	Flame Rod Wire	TP-804	Burner Control Box Outer Shell (no powercord)
TP-223	Gas Manifold		
TP-240	VR4205M-1324 Gas Valve Assembly - Nat. Gas	TP-NOPS	Normally Open Pressure Switch (see below)
TP-241	VR4205M-1357 Gas Valve Assembly - LP Gas	TP-264B	Differential Pressure Switch, 50 to 65 MBH
TP-244	Plastic Gas Valve Vent	TP-264E	Differential Pressure Switch, 75 to 100 MBH
TP-301	Center Divider Panel		

*May be used with stainless steel upgrades.

Kit Contents Check List

Chart 5.2 • Kit Contents for CX Series - Reference the length column for your model.

CX Series Kit Contents				
<p>TP-19B 4" Hanger with Reflector Tension Spring</p>  <p>^TP-19C</p>	<p>TP-82 4" Reflector Center Support (RCS)</p>  <p>^TP-829</p>	<p>TP-33B 1/2" Shut-Off Valve (Ball Valve & Inlet Tap)</p> 	<p>TP-106 Reflector End Cap Clips</p> 	<p>Tube Heater General Manual and DX2 Series Insert Manual F/N: LIOGTa & LIOCXa</p> 
<p>TP-83 24" Stainless Steel Flexible Gas Connector</p>  <p>^TP-83A</p>	<p>TP-21B 4" Tube Clamp</p>  <p>^TP-220</p>	<p>TP-105 Reflector End Cap</p>  <p>^TP-105A</p>		
Part No.	Description	30 ft.	40 ft.	50 ft.
TP-19B	4" Hanger w/ Tension Spring	4	5	6
TP-21B	4" Tube Clamp	3	4	5
TP-33B	1/2" Shut-Off Valve w/ Inlet Tap	1	1	1
TP-82	4" Reflector Center Support	3	4	5
TP-83	24" Stainless Steel Flexible Gas Connector	1	1	1
TP-105	Reflector End Cap	2	2	2
TP-106	Reflector End Cap Clips	8	8	8
LIOGTa	General Tube Heater Manual	1	1	1
LIOCXa	CX Series Insert Manual	1	1	1
Additional kit contents as supplied when heater is configured with Add-On Options (if applicable)				
TP-25	1/4" Female Spade Terminal (24VAO)	2	2	2
Filled By:				

^ Part number for models upgraded with stainless steel options.

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.
- See page 36 of the General Tube Heater Manual for terms and conditions.

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