XTS3 Series
Insert Manual

For complete installation instructions, see the General Manual that accompanies this insert.

RE-VERBER-RAY

The XTS3 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 XTS3 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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Replaces: LIOXTS3-2M-7/08(CDS)

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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.

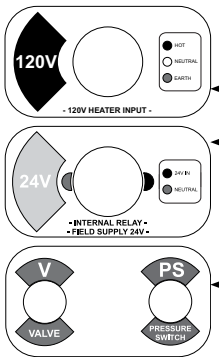
Safety Labels and Their Locations

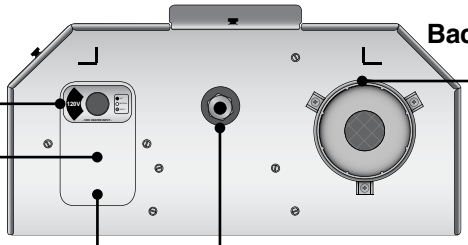
Product safety signs or labels should be replaced by the product user when they no longer are legible. Contact either your local distributor or the product manufacturer for obtaining replacement signs or labels.

F/N: LLV3EP1

F/N: LLV3EP5
(24VAO option only)
Thermostat Terminal Plug

F/N: LLV3EP6
(24VAO or IND-LT
option only)

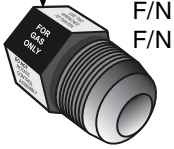




Back Panel

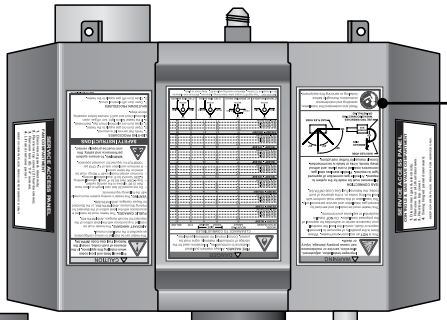


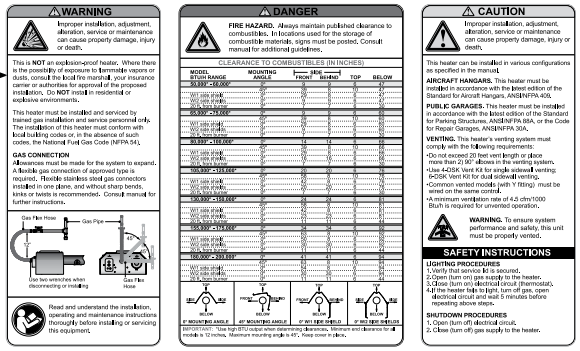
F/N: LLAC
Air Metering Orifice



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

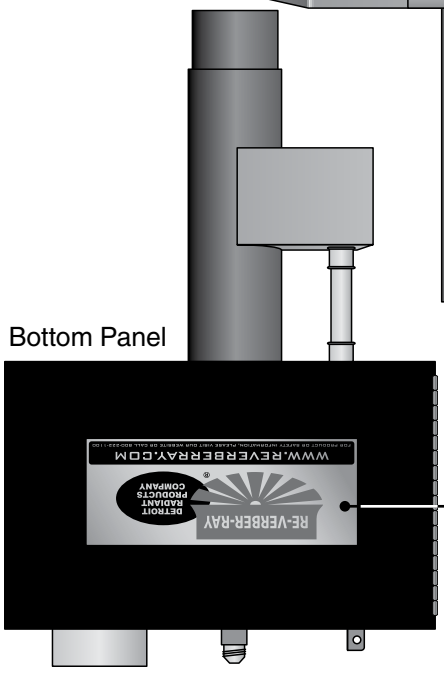
Top Panel

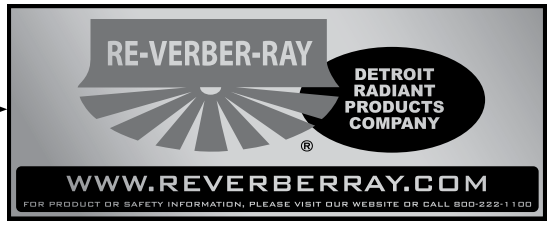




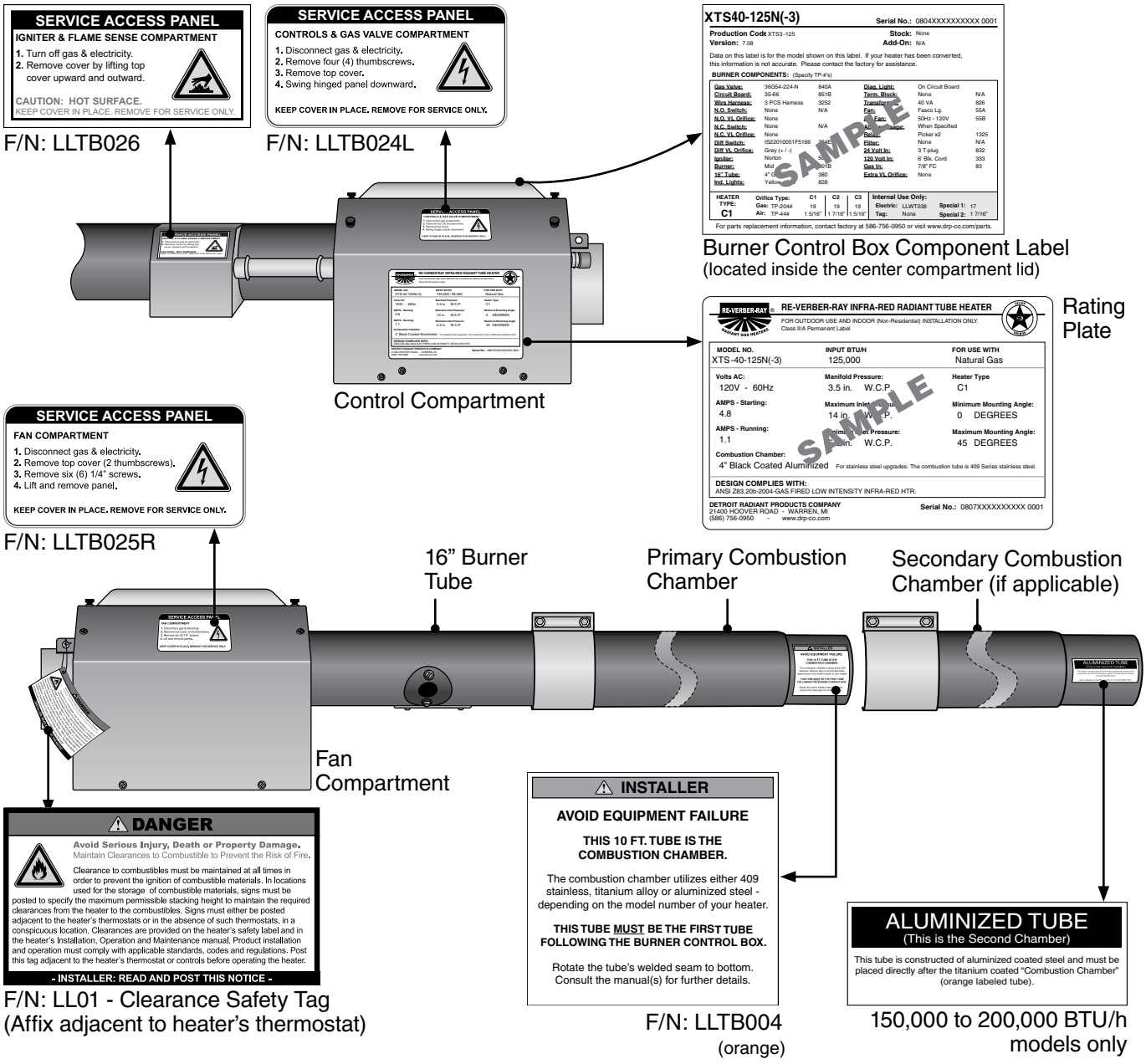
F/N: LLTCL001L, LLTCL001C, LLTCL001R
Clearance and Safety Labels.

Bottom Panel





F/N: LLLOGO1 Logo Label



Clearance to Combustibles

⚠ WARNING



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

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 the 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.

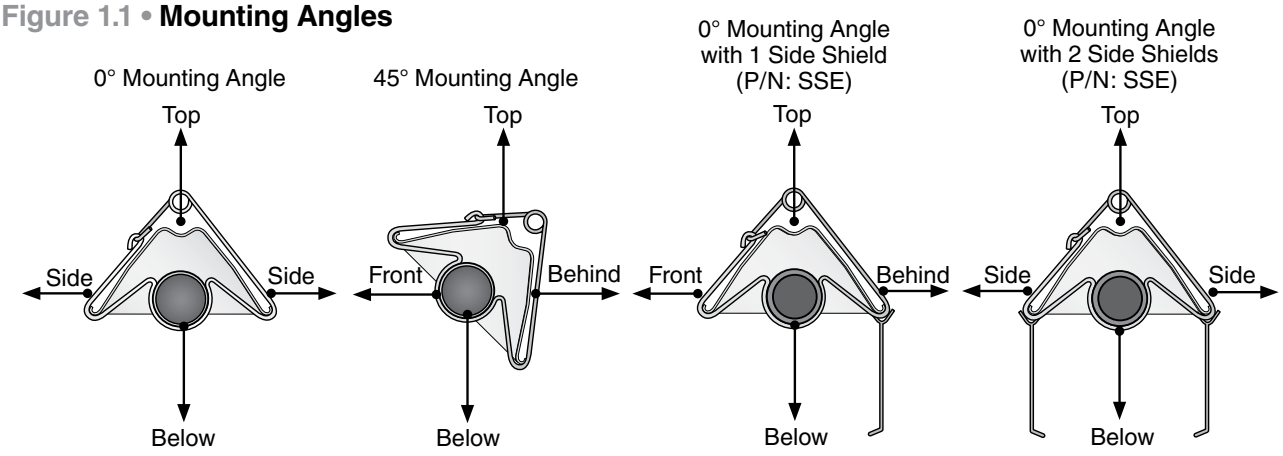
Chart 1.1 • Clearance to Combustibles in Inches (see Figure 1.1 for Mounting Angles)

Model Number	Mounting Angle*	Side		Top	Below
		Front	Behind		
XTS (20, 30, 40) **- (50, 60) [N, P] (-3)**	0°	9	9	6	47
	45°	39	8	10	47
with 1 side shield	0°	29	8	6	47
with 2 side shields	0°	9	9	6	47
20 ft. from burner	0°	7	7	6	30
XTS (20, 30, 40) **- 75 [N, P] (-3)**	0°	9	9	6	60
	45°	39	8	10	60
with 1 side shield	0°	29	8	6	60
with 2 side shields	0°	9	9	6	60
20 ft. from burner	0°	7	7	6	30
XTS (30, 40, 50) **- 100 [N, P] (-3)**	0°	14	14	6	66
	45°	39	8	10	66
with 1 side shield	0°	29	8	6	66
with 2 side shields	0°	16	16	6	66
20 ft. from burner	0°	7	7	6	30
XTS (40, 50, 60) **- 125 [N, P] (-3)**	0°	20	20	6	76
	45°	58	8	10	76
with 1 side shield	0°	42	8	6	76
with 2 side shields	0°	20	20	6	76
20 ft. from burner	0°	7	7	6	30
XTS (40, 50, 60) **- 150 [N, P] (-3)**	0°	24	24	6	81
	45°	58	8	10	81
with 1 side shield	0°	42	8	6	81
with 2 side shields	0°	23	23	6	81
20 ft. from burner	0°	11	11	6	44
XTS (50, 60) **- 175 [N, P] (-3)**	0°	34	34	6	92
	45°	63	8	10	92
with 1 side shield	0°	50	8	6	92
with 2 side shields	0°	30	30	6	92
20 ft. from burner	0°	11	11	6	44
XTS (50, 60) **- 200 [N, P] (-3)**	0°	41	41	6	94
	45°	63	8	10	94
with 1 side shield	0°	54	8	6	94
with 2 side shields	0°	30	30	6	94
20 ft. from burner	0°	11	11	6	44

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

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

Figure 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 for gas connection requirements.

Electrical Requirements

NOTICE

The XTS3 Series comes standard requiring a 120VAC thermostat connection. 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 required when using the 24VAO option.
NOTE: A relay transformer may be used in lieu of the factory installed 24VAO option.

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

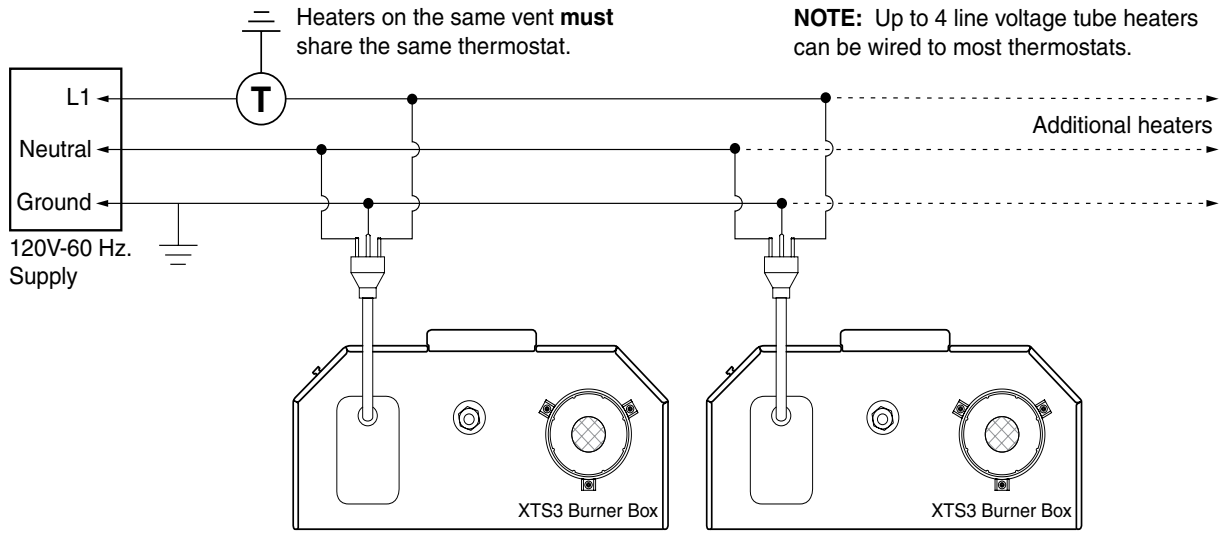
Wiring

⚠ WARNING

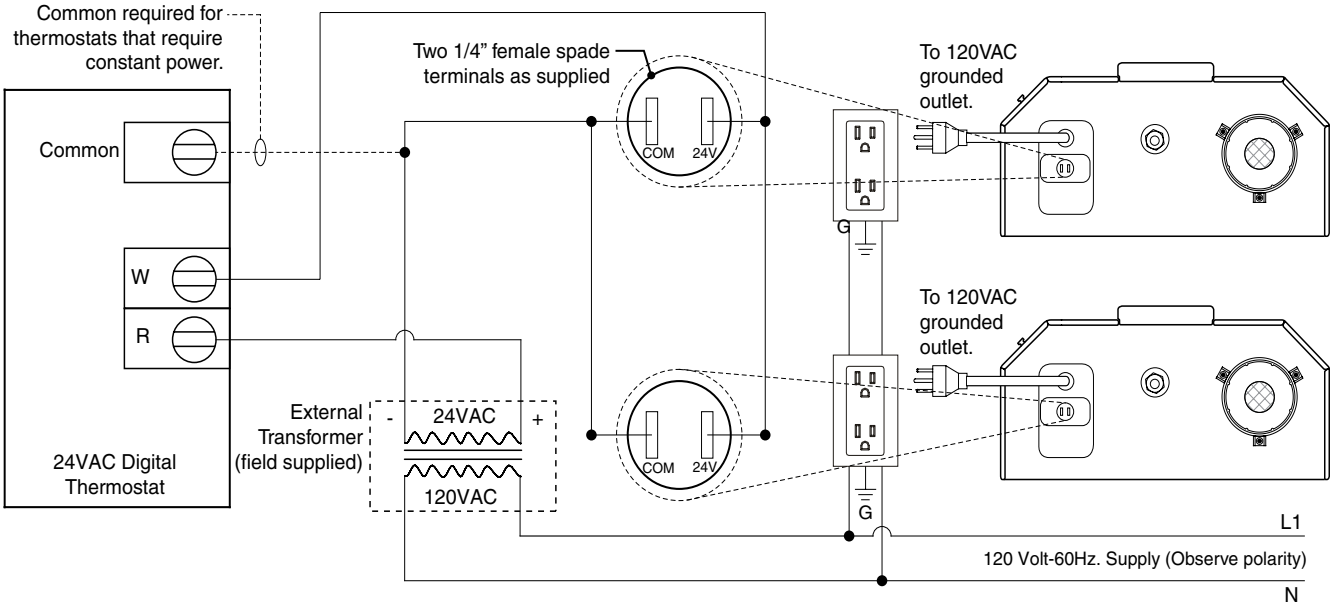
Electric Shock
Field wiring to the tube heater must be connected and grounded in accordance with national, state, provincial, local codes and to the guidelines in the Tube Heater General and Series Insert Manuals. In the United States refer to the most current revisions to the ANSI/NFPA 70 Standard,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

Figure 2.1 • Field Wiring Diagrams

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



B. 24VAO (Internal Relay Option)

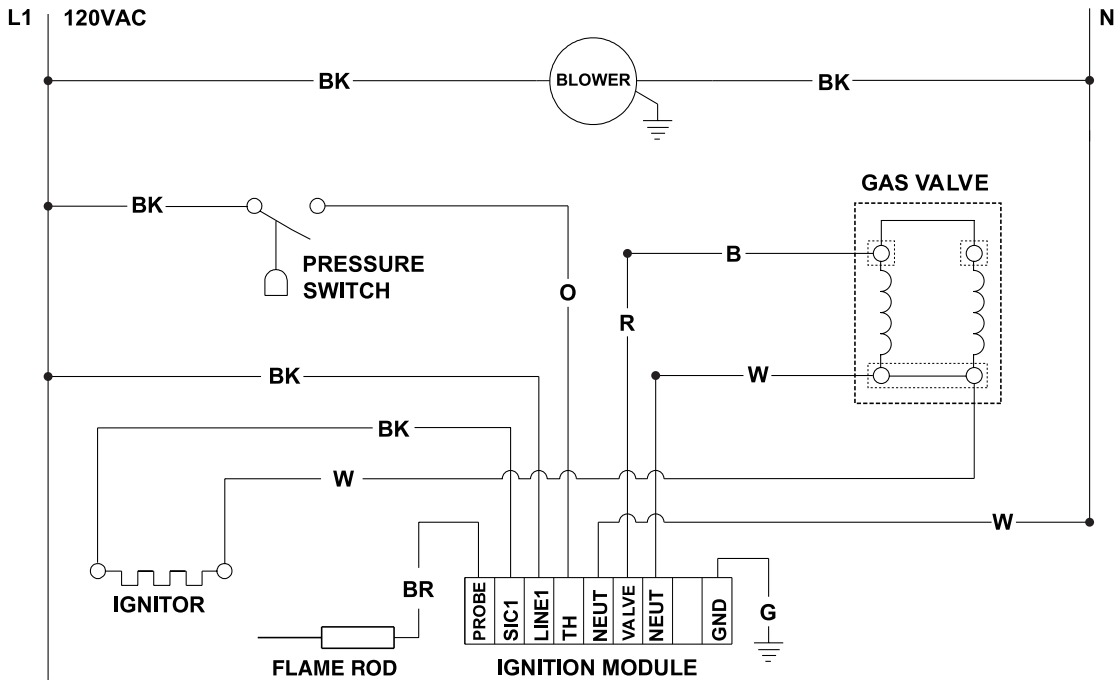


Before field wiring this appliance - Check existing wiring; replace if necessary.

NOTE: If any of the original wire as 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)

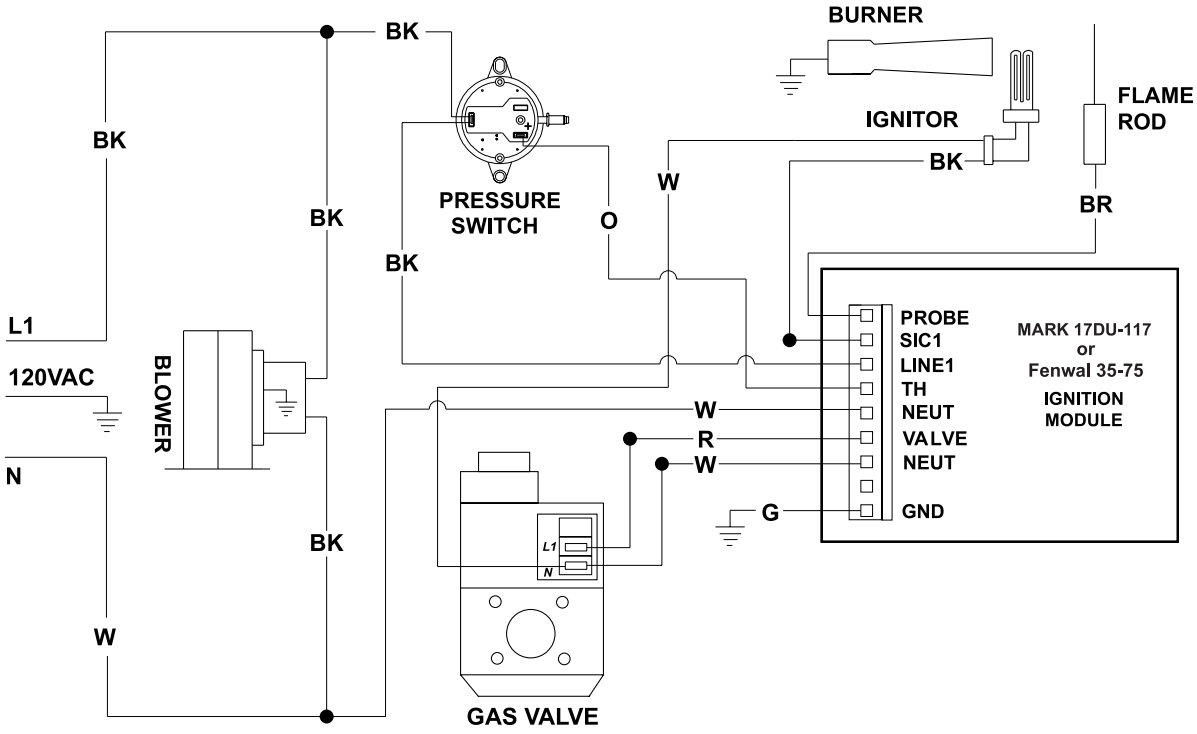
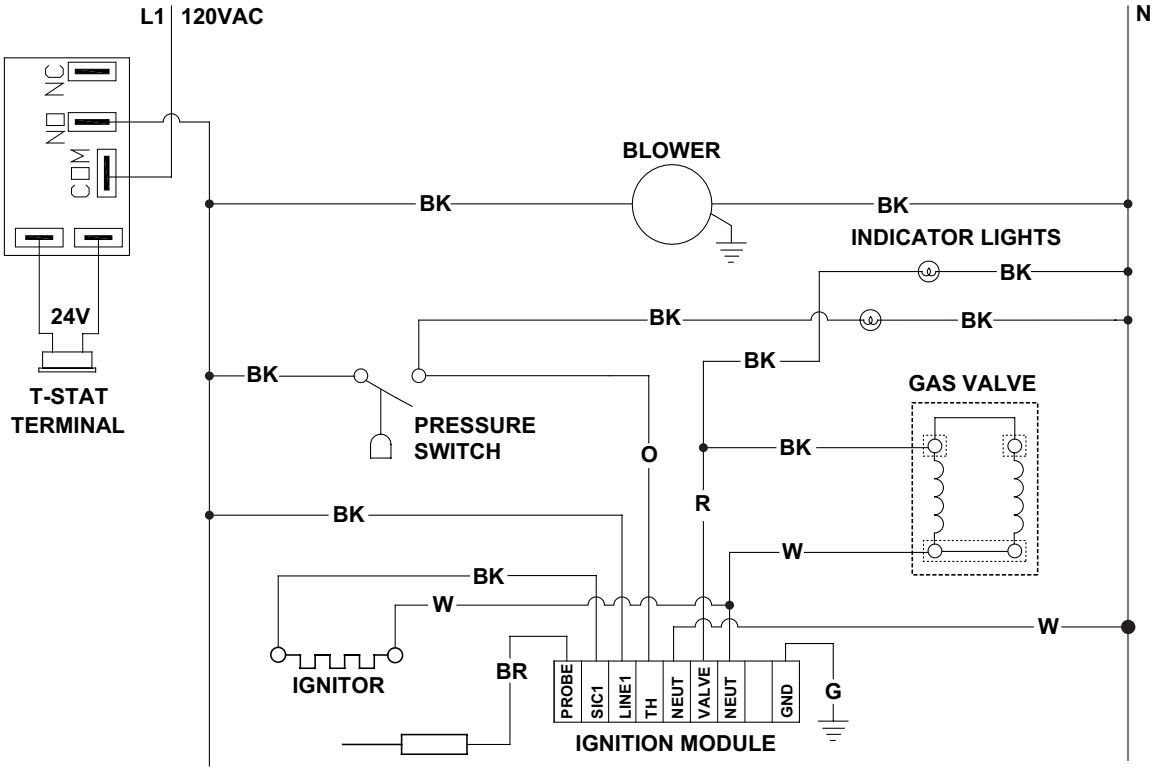
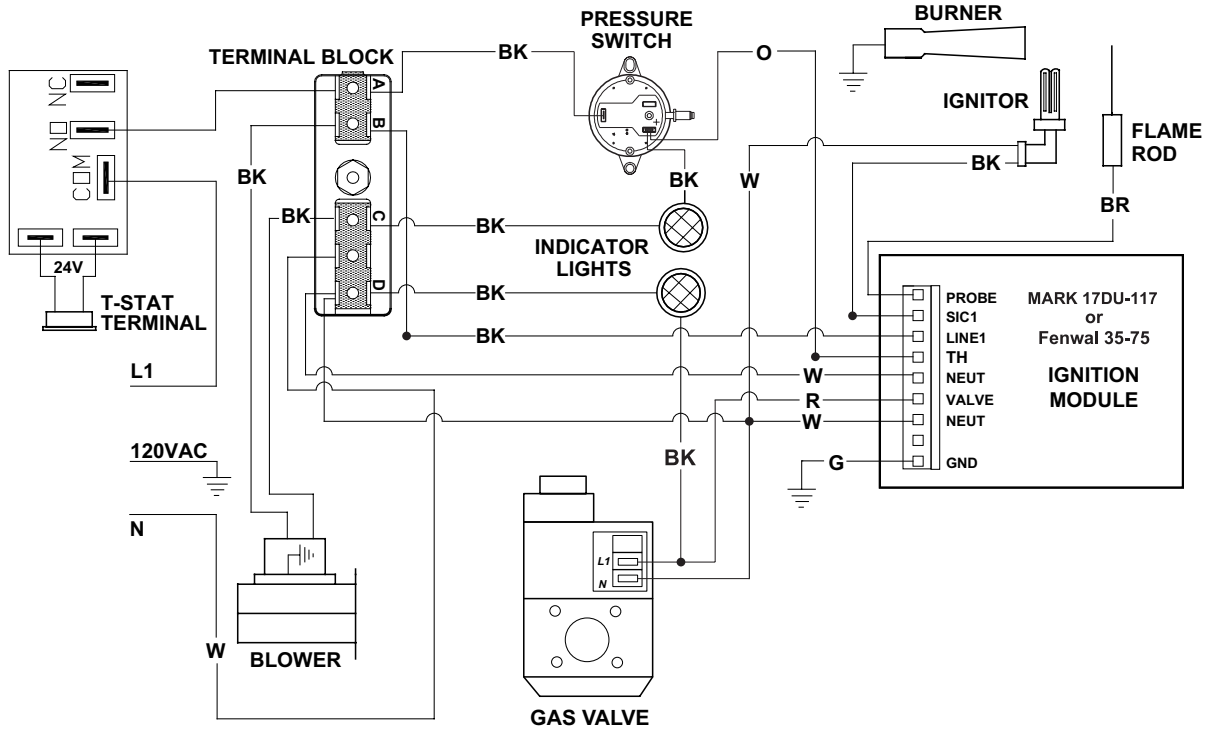


Figure 2.3 • Alternative Wiring Diagrams

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



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



Specifications

Chart 2.1 • Specifications

Model Number	Gas Type (Select One)	BTU/h	Straight Length (Dim A)	U-Tube Length (Dim. B)	Weight (lbs.)	Stainless Steel Weight (lbs.)	Recommend Mounting Height	Combustion Chamber(s) (Black Coated)	Radiant Emitter Tube(s)	Radiant Surface Area (sq. ft.)	36" Baffle Quantity
XTS3-20-50	N or LP	50,000	21'-9"	13'-1"	120	N/A	9' to 14'	Alum	Hot-rolled	20.2	5
XTS3-20-60	N or LP	60,000	21'-9"	13'-1"	120	N/A	10' to 15'	Alum	Hot-rolled	20.2	5
XTS3-20-75	N or LP	75,000	21'-9"	13'-1"	120	145	11' to 18'	Alum	Hot-rolled	20.2	5
XTS3-30-50	N or LP	50,000	31'-5"	**17'-9"	160	N/A	10' to 15'	Alum	Hot-rolled	30.4	5
XTS3-30-60	N or LP	60,000	31'-5"	**17'-9"	160	N/A	11' to 18'	Alum	Hot-rolled	30.4	5
XTS3-30-75	N or LP	75,000	31'-5"	**17'-9"	160	195	12' to 20'	Alum	Hot-rolled	30.4	5
XTS3-30-100	N or LP	100,000	31'-5"	**17'-9"	160	195	13' to 23'	Alum	Hot-rolled	30.4	5
XTS3-30-125	N or LP	125,000	31'-5"	**17'-9"	160	195	14' to 25'	Alum	Hot-rolled	30.4	6
XTS3-40-50	N or LP	50,000	41'-1"	22'-9"	190	N/A	11' to 18'	Alum	Hot-rolled	40.5	5
XTS3-40-60	N or LP	60,000	41'-1"	22'-9"	190	N/A	11' to 18'	Alum	Hot-rolled	40.5	5
XTS3-40-75	N or LP	75,000	41'-1"	22'-9"	190	235	12' to 20'	Alum	Hot-rolled	40.5	4
XTS3-40-100	N or LP	100,000	41'-1"	22'-9"	190	235	13' to 23'	Alum	Hot-rolled	40.5	4
XTS3-40-125	N or LP	125,000	41'-1"	22'-9"	190	235	14' to 25'	Alum	Hot-rolled	40.5	5
XTS3-40-150	N or LP	150,000	41'-1"	22'-9"	190	235	15' to 27'	Titan/Alum	Hot-rolled	40.5	5
XTS3-40-175	N or LP	*175,000	41'-1"	22'-9"	190	235	16' to 30'	Titan/Alum	Hot-rolled	40.5	5
XTS3-50-100	N or LP	100,000	50'-9"	**27'-5"	235	290	15' to 27'	Alum	Hot-rolled	50.6	2
XTS3-50-125	N or LP	125,000	50'-9"	**27'-5"	235	290	15' to 27'	Alum	Hot-rolled	50.6	3
XTS3-50-150	N or LP	150,000	50'-9"	**27'-5"	235	290	16' to 30'	Titan/Alum	Hot-rolled	50.6	3
XTS3-50-175	N or LP	*175,000	50'-9"	**27'-5"	235	N/A	17' to 35'	Titan/Alum	Hot-rolled	50.6	3
XTS3-50-200	N or LP	*200,000	50'-9"	**27'-5"	235	N/A	18' to 40'	Titan/Alum	Hot-rolled	50.6	2
XTS3-60-125	N or LP	125,000	60'-5"	32'-5"	265	330	16' to 30'	Alum	Hot-rolled	60.7	2
XTS3-60-150	N or LP	150,000	60'-5"	32'-5"	265	330	17' to 35'	Titan/Alum	Hot-rolled	60.7	2
XTS3-60-175	N or LP	*175,000	60'-5"	32'-5"	265	N/A	17' to 35'	Titan/Alum	Hot-rolled	60.7	2
XTS3-60-200	N or LP	*200,000	60'-5"	32'-5"	265	N/A	18' to 40'	Titan/Alum	Hot-rolled	60.7	2

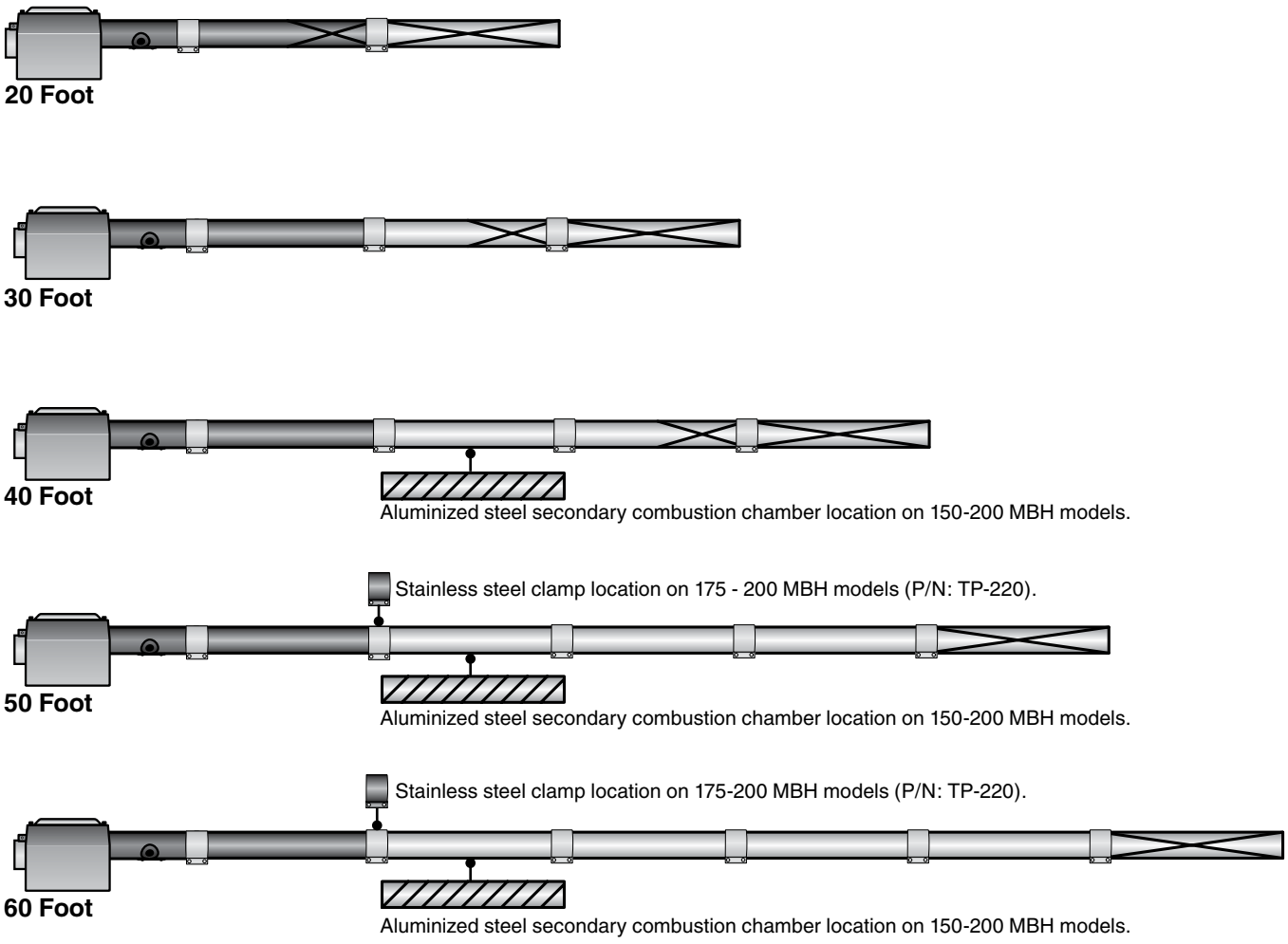
* Model requires stainless steel tube clamp (P/N: TP-220) to be located at the seam between the primary combustion chamber and the secondary combustion tube downstream of the burner control box.
** Model requires 5EA-SUB accessory package when installing in a 'U' configuration (P/N: TF1B).

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

Hot-rolled = Uncoated hot-rolled steel
Titan = Black coated titanium stabilized aluminized steel.
Alum = Black coated aluminized treated steel.

Figure 2.4 • Tube Installation Sequence

Important! The combustion chamber(s) & radiant tube section(s) must be installed in the following order.



Key

- Burner Control Box with 16” Burner Tube
- Primary Combustion Chamber Tube
- Secondary Aluminized Steel Combustion Chamber (150-200 MBH models only)
- Hot-rolled Steel Radiant Emitter Tube
- Standard Tube Clamp
- Stainless Steel Tube Clamp (P/N: TP-220)
  175-200 MBH models only - Located between 1st and 2nd 10 ft. tube sections.
- Baffle Location

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 glo-bar 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

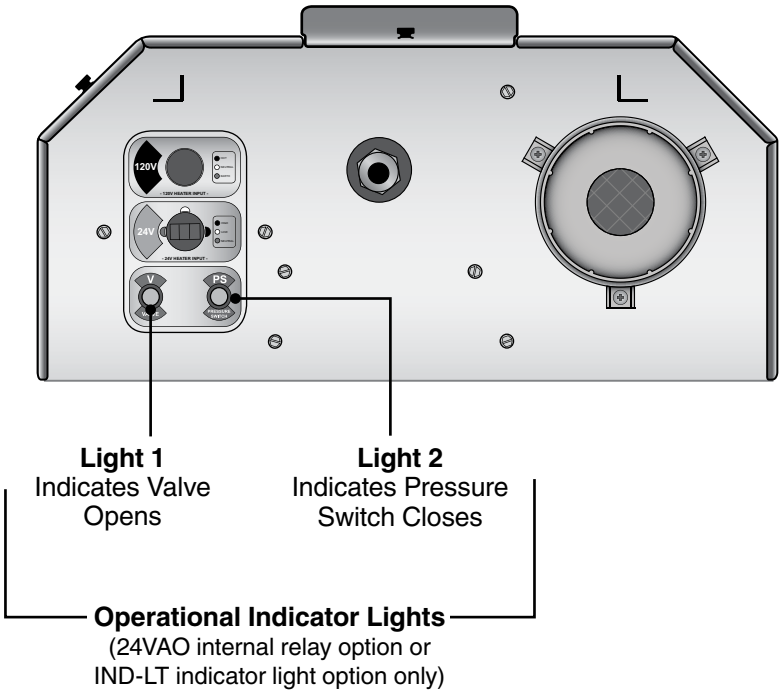
NOTE: Different thermostats operate according to their particular features. Refer to thermostat specifications for details. Refer to Figure 2.1 for field wiring diagrams.

XTS3 Series heaters with 24VAO option require a 24V, single-stage thermostat to operate. The burner control box is equipped with a round terminal strip that accepts two (2) 1/4" female spade terminals. Do not supply 120V to the 24V connection.

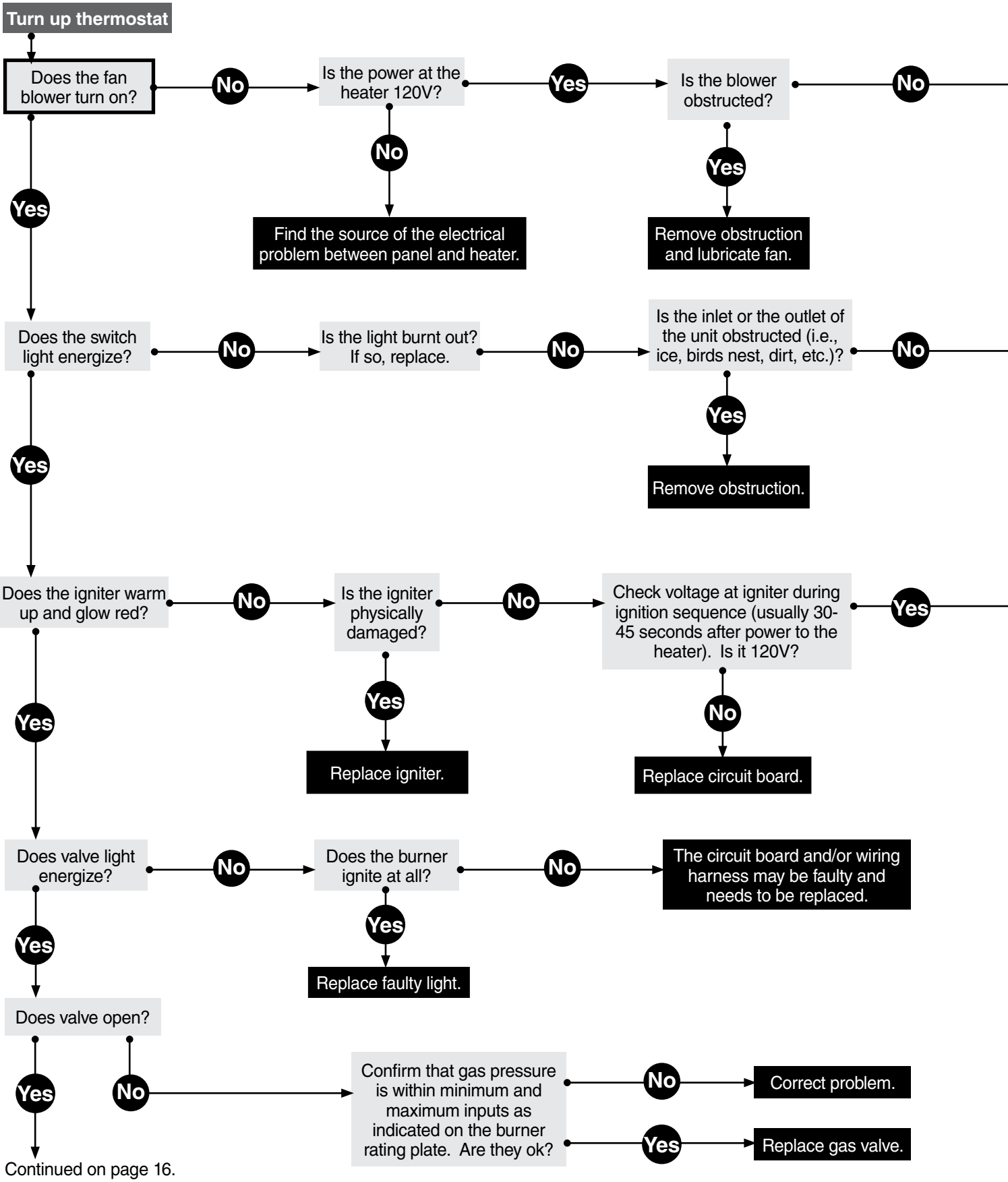
Operational Indicator Lights (if applicable)

The externally located operational indicator lights (models with 24VAO or IND-LT option) are provided to assist in troubleshooting the heater. Refer to the following pages for additional troubleshooting information.

Figure 3.1 • Operational Indicator Lights (24VAO or IND-LT option only).

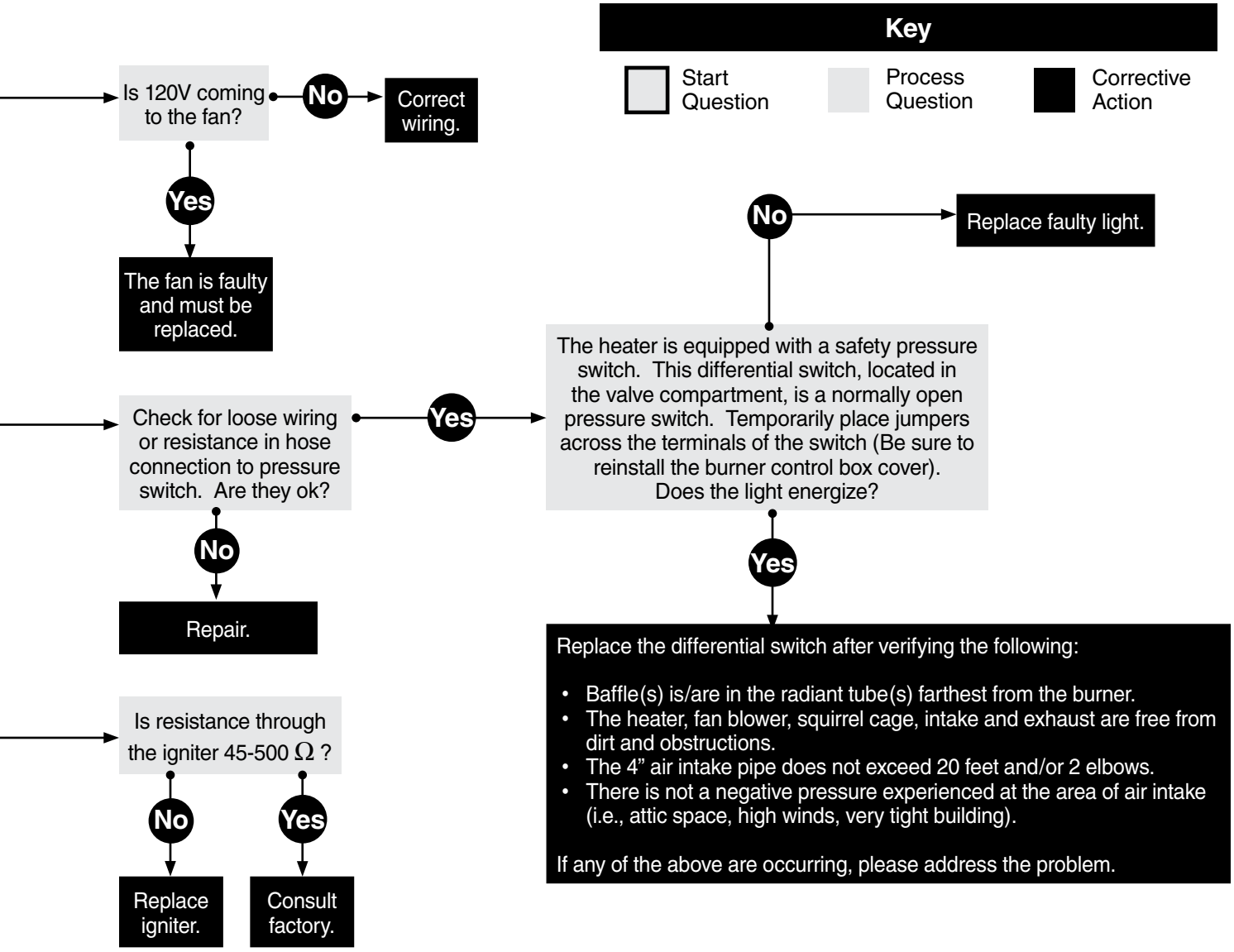


4.0 Troubleshooting Guide

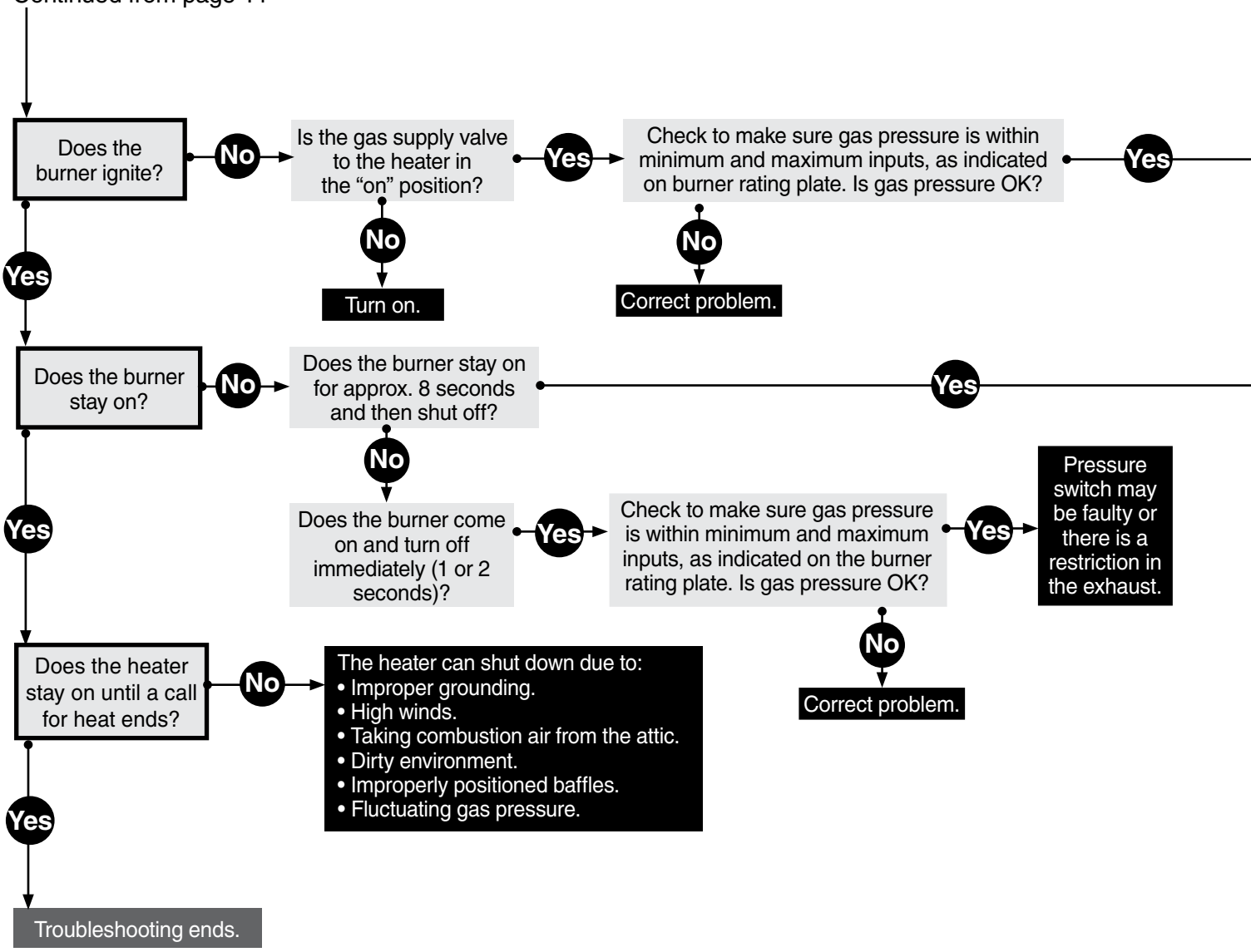


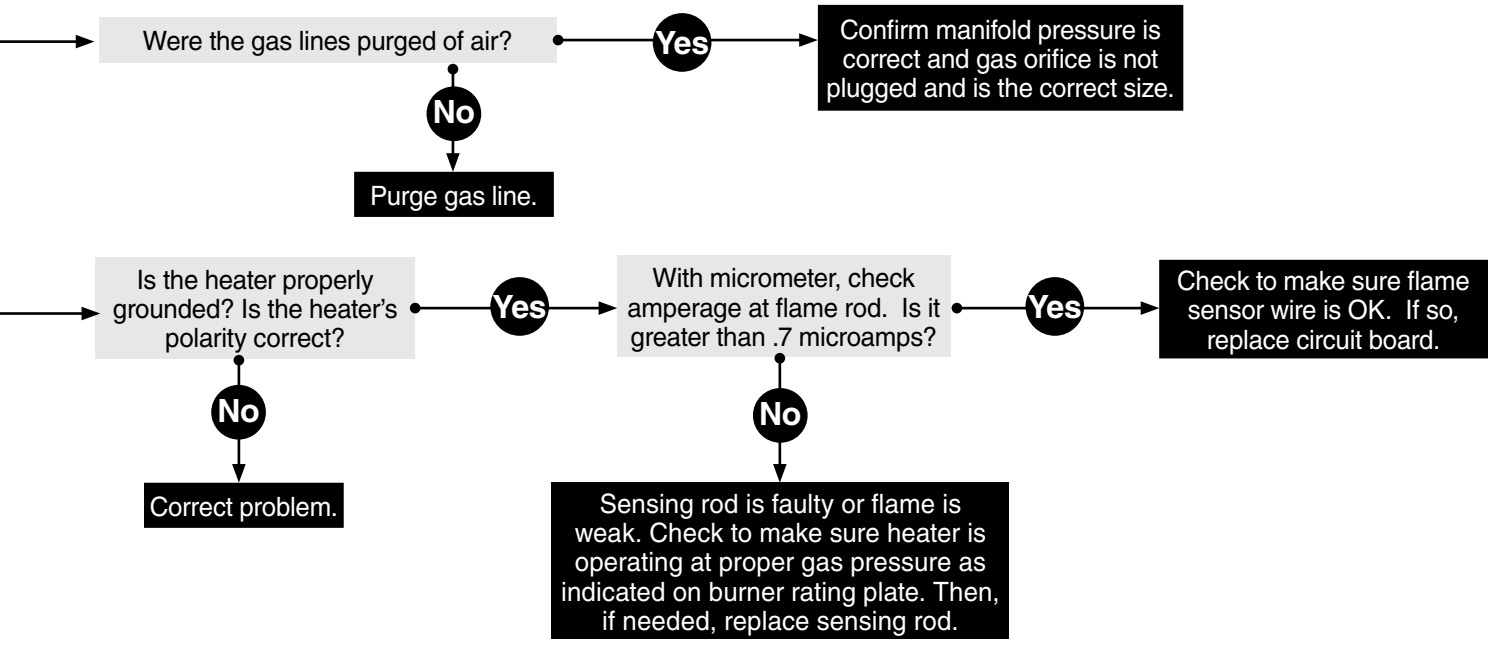
Continued on page 16.

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.



Continued from page 14




Were the gas lines purged of air?
Yes
Confirm manifold pressure is correct and gas orifice is not plugged and is the correct size.
No
Purge gas line.
Is the heater properly grounded? Is the heater's polarity correct?
Yes
With micrometer, check amperage at flame rod. Is it greater than .7 microamps?
Yes
Check to make sure flame sensor wire is OK. If so, replace circuit board.
No
Correct problem.
No
Sensing rod is faulty or flame is weak. Check to make sure heater is operating at proper gas pressure as indicated on burner rating plate. Then, if needed, replace sensing rod.

5.0 Parts

Figure 5.1 • Burner Assembly Components

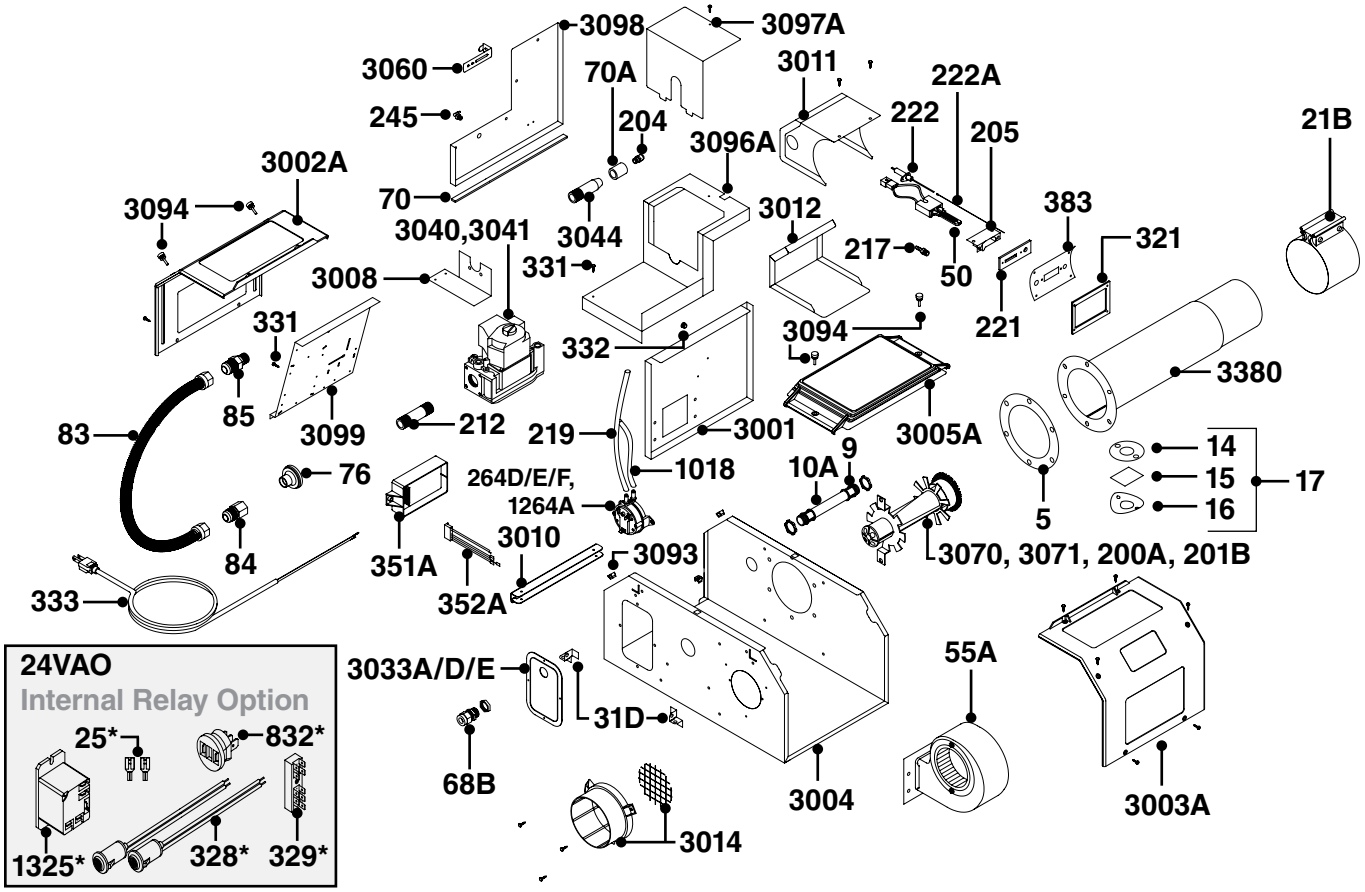
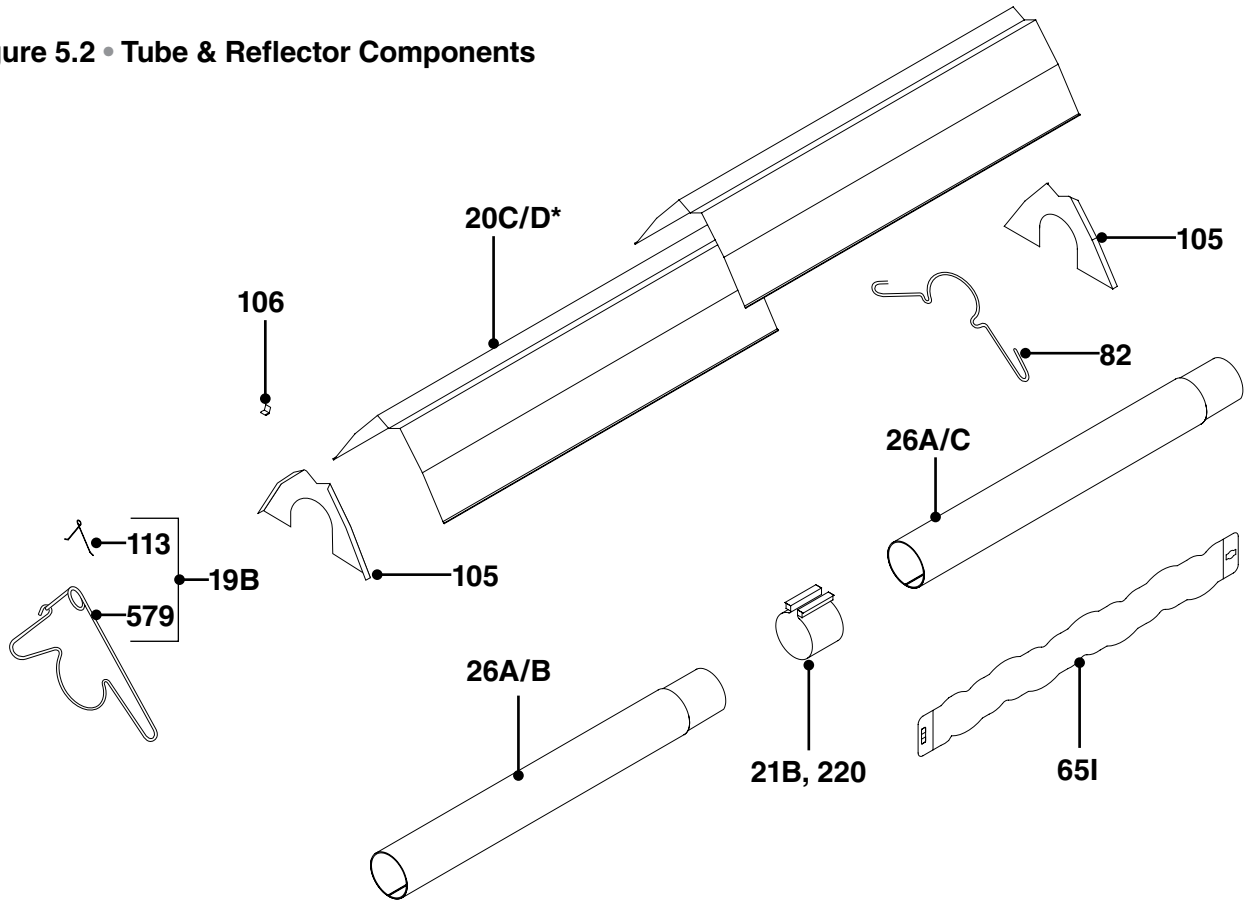


Chart 5.1 • Parts List

Part #	Description	Part #	Description
TP-5	Flange Gasket	TP-70A	1 in. Control Box Gasket (6 inches)
TP-9	Conduit Coupling	TP-76	Rubber Grommet
TP-10A	Conduit 4” x 3/4”	TP-82	Reflector Center Support
TP-14	Sight Glass Gasket	TP-83	Stainless Steel Flexible Gas Connector
TP-15	Sight Glass	TP-84	1/2 in. Female / Male Flare Fitting
TP-16	Sight Glass Washer	TP-85	1/2 in. Male / Male Flare Fitting
TP-17	Sight Glass Kit	TP-105	Reflector End Cap
TP-19B	4 in. Wire Hanger with Tension Spring	TP-106	Reflector End Cap Clips (8 pcs.)
TP-20C	10 Ft. Aluminum Reflector	TP-113	Reflector Tension Spring
TP-20D	10 Ft. 304 Stainless Steel Reflector	TP-200A	V.3 Low SS Burner (Blue) - consult factory
TP-21B	4 in. Tube Clamp	TP-201B	V.3 Mid SS Burner (Tan) - consult factory
TP-25*	1/4” Female Spade Terminal (24VAO Option) (Qty. 2)	TP-204	Gas Orifice - Consult Factory
TP-26A	10 Ft. Aluminized Combustion/Radiant Tube	TP-205	Glo-Bar™ Holder
TP-26B	10 Ft. Titanium Treated Combustion Tube	TP-212	1/2” x 3” Pipe Nipple
TP-26C	10 Ft. Uncoated Hot Rolled Radiant Tube	TP-217	Brass Pressure Switch Barb Fitting
TP-31D	Interlocking Mounting Bracket (Qty. 2)	TP-219	Differential Vinyl Sensing Tube
TP-50	Glo-Bar™ Hot Surface Igniter	TP-220	4 in. Stainless Steel Tube Clamp
TP-55A	Fan Blower	TP-221	Glo-Bar™ Holder Gasket
TP-65I	Interlocking 36 in. Turbulator Baffle Section	TP-222	Flame Rod
TP-68B	Large Strain Relief Bushing	TP-222A	Flame Rod Wire
TP-70	1/2 in. Control Box Gasket (10.3 inches)	TP-245	3/16” X 1/8” Plastic Gas Valve 90° Vent

* Optional upgrade or add-on item.

Figure 5.2 • Tube & Reflector Components

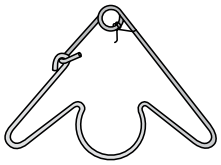
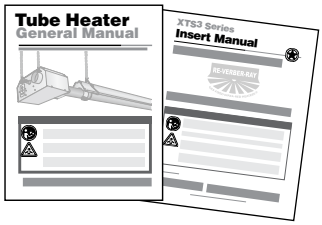
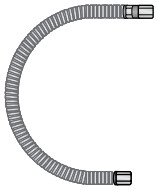
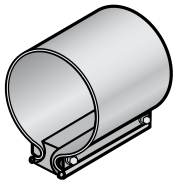
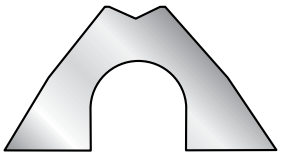


Part #	Description	Part #	Description
TP-264D	Differential Pressure Switch, 60 to 75 MBH	TP-3008	Gas Valve Mounting Bracket
TP-264E	Differential Pressure Switch, 50 MBH	TP-3010	Service Panel Hinge
TP-264F	Differential Pressure Switch, 150 to 200 MBH	TP-3011	Spark Igniter Box
TP-321	Ignition Plate Gasket	TP-3012	Spark Igniter Box Cover
TP-328*	120V Indicator Lights (24VAO Option) (Qty. 2)	TP-3014	Black Plastic Air Orifice with Screen
TP-329*	1/4 in. Neutral Terminal Block (24VAO Option)	TP-3033A	XTS 120V Power Entry Plate
TP-331	Green Self-Tap Ground Screw (Qty. 2)	TP-3033D*	XTS Power Entry Plate (Heaters with 24VAO option)
TP-332	Divider Grommet	TP-3033E*	XTS Power Entry Plate (Heaters with IND-LT option)
TP-333	72 in. Black 120V Power Cord	TP-3040	VR4205M-1324 Gas Valve - Natural Gas
TP-351A	Potted Circuit Board	TP-3041	VR4205M-1357 Gas Valve - LP Gas
TP-352A	Long Wiring Harness for TP-351A	TP-3044	Gas Manifold
TP-383	HSI Igniter Plate	TP-3060	Pressure Switch Mounting Bracket
TP-579	4 in. Wire Hanger w/o Tension Spring	TP-3070	Low BTU SS Burner (Red) - consult factory
TP-832*	Thermostat Terminal Strip (24VAO Option)	TP-3071	High BTU SS Burner (Purple) - consult factory
TP-1018	APS 1/4 in. Silicone Sensing Tube	TP-3093	#8-32 Cage Nut (Qty. 4)
TP-1264A	Differential Pressure Switch, 100 to 125 MBH	TP-3094	#8-32x1/2" Black Nylon Shoulder Screw (Qty. 4)
TP-1325*	24V Switching Relay Board (24VAO Option)	TP-3096A	Valve Compartment Bottom Panel
TP-3001	Divider Panel	TP-3097A	Valve Compartment Top Panel
TP-3002A	Plastic Control Compartment End Panel	TP-3098	Valve Compartment Side Panel
TP-3003A	Plastic Fan Compartment End Panel	TP-3099	Controls Mounting Panel
TP-3004	Main Control Box Panel	TP-3380	V.3 16" HSI Burner Tube with Fittings
TP-3005A	Plastic Valve Compartment Lid		

* Optional upgrade or add-on item.

Kit Contents Check List

Chart 5.2 • **Kit Contents for XTS3 Series -** Reference the length column for your model.

XTS3 Series Kit Contents			
TP-19B 4" Hanger with Reflector Tension Spring 	**TP-82** 4" Reflector Center Support (RCS) 	**TP-106** Reflector End Cap Clips 	Tube Heater General Manual and XTS3 Series Insert Manual F/N: LIOGT3 & LIOXTS3 
TP-83 24" Stainless Steel Flexible Gas Connector 	**TP-21B** 4" Tube Clamp 	**TP-105** Reflector End Cap 	

Part No.	Description	20 Ft.	30 ft.	40 ft.	50 ft.	60 ft.
TP-19B	4" Hanger w/ Tension Spring	3	4	5	6	7
TP-21B	4" Tube Clamp	2	3	4	5*	6*
TP-82	4" Reflector Center Support	1	1	1	1	1
TP-83	24" S.S. Flexible Gas Connector	1	1	1	1	1
TP-105	Reflector End Cap	2	2	2	2	2
TP-106	Reflector End Cap Clips	8	8	8	8	8
LIOGT3	General Tube Heater Manual	1	1	1	1	1
LIOXTS3	XTS3 Series Insert Manual	1	1	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	2	**2**
Filled By:						

*One 4" stainless steel tube clamp (P/N: TP-220) is provided for each 175,000 - 200,000 BTU model. Place as shown on page 11.

Approvals

- CSA.
- Commercial approval.
- Industrial approval.

Limited Warranty

- 1 year - Burner box components.
- 3 years - Combustion and radiant tubes.
- 5 years - Stainless steel burner.
- See page 36 of the Tube Heater General Manual for terms and conditions.

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21400 Hoover Road • Warren, MI 48089
Phone: (586) 756-0950 Fax: (586) 756-2626
www.detroitradiant.com • sales@drp-co.com