

DET Series - 4" Tube Heater Installation, Operation, Maintenance and Parts Manual*

▲ WARNING: This heater must be installed and serviced by trained gas installation and service personnel only! Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Protect yourself and others by observing all safety information. Retain instructions for future reference.

* For complete installation instructions, see Generic IOM this piece was inserted within. Also available at www.reverberray.com.

DET Series

Project: _____ Date: _____
 Location: _____
 City: _____ State: _____ Zip: _____
 Contractor: _____
 Engineer: _____
 Local Representative: _____
 Customer Name: _____
 Address: _____
 City: _____ State: _____ Zip: _____
 Phone #: _____ Serial #: _____
 Model #: _____ Date of Installation: _____
 Notes: _____

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Models

Qty.	Model #	Gas Type (circle one)	BTU/H High	BTU/H Low	Straight Length	U-Tube Length	Weight	Typical Mount Height	Combustion Chamber(s) (Black Coated)	Radiant Emitter Tube(s) (Uncoated)	"Type" Tube Pkg #1	"Type" Tube Pkg. #2	33" Baffle Pieces
	DET-20-65	N or LP	65,000	50,000	21'-7"	13'-0"	120 #	9' - 14'	Aluminized	4" Hot-rolled	20-4 Alum-HRT	N/A	5
	DET-20-75	N or LP	75,000	50,000	21'-7"	13'-0"	120 #	10' - 15'	Aluminized	4" Hot-rolled	20-4 Alum-HRT	N/A	5
	DET-30-65	N or LP	65,000	50,000	31'-3"	*17'-8"	160 #	10' - 15'	Aluminized	4" Hot-rolled	30-4 Alum-HRT	N/A	4
	DET-30-75	N or LP	75,000	50,000	31'-3"	*17'-8"	160 #	11' - 18'	Aluminized	4" Hot-rolled	30-4 Alum-HRT	N/A	4
	DET-30-100	N or LP	100,000	65,000	31'-3"	*17'-8"	160 #	12' - 20'	Aluminized	4" Hot-rolled	30-4 Alum-HRT	N/A	5
	DET-40-65	N or LP	65,000	50,000	40'-11"	22'-8"	190 #	11' - 18'	Aluminized	4" Hot-rolled	40-4 Alum-HRT	N/A	2
	DET-40-75	N or LP	75,000	50,000	40'-11"	22'-8"	190 #	11' - 18'	Aluminized	4" Hot-rolled	40-4 Alum-HRT	N/A	2
	DET-40-100	N or LP	100,000	65,000	40'-11"	22'-8"	190 #	12' - 20'	Aluminized	4" Hot-rolled	40-4 Alum-HRT	N/A	4
	DET-40-125	N or LP	125,000	95,000	40'-11"	22'-8"	190 #	13' - 23'	Aluminized	4" Hot-rolled	40-4 Alum-HRT	N/A	4
	DET-40-150	N or LP	150,000	100,000	40'-11"	22'-8"	190 #	14' - 25'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	N/A	4
	DET-50-125	N or LP	125,000	95,000	50'-7"	*27'-4"	235 #	15' - 27'	Aluminized	4" Hot-rolled	40-4 Alum-HRT	10-4-HRT	4
	DET-50-150	N or LP	150,000	100,000	50'-7"	*27'-4"	235 #	15' - 27'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	10-4-HRT	4
	DET-50-175	N or LP	175,000	125,000	50'-7"	*27'-4"	235 #	16' - 30'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	10-4-HRT	2
	DET-50-200	N or LP	200,000	145,000	50'-7"	*27'-4"	235 #	17' - 35'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	10-4-HRT	2
	DET-60-125	N or LP	125,000	95,000	60'-3"	32'-4"	265 #	16' - 30'	Aluminized	4" Hot-rolled	40-4 Titan-Alum-HRT	20-4-HRT	2
	DET-60-150	N or LP	150,000	100,000	60'-3"	32'-4"	265 #	16' - 30'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	20-4-HRT	2
	DET-60-175	N or LP	175,000	125,000	60'-3"	32'-4"	265 #	16' - 30'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	20-4-HRT	2
	DET-60-200	N or LP	200,000	145,000	60'-3"	32'-4"	265 #	17' - 35'	Titan/Alum	4" Hot-rolled	40-4 Titan-Alum-HRT	20-4-HRT	2

* Model requires 5EA-SUB accessory package.

Warranty registration options:

1. Register online at www.reverberray.com/warranty
2. Complete the information above and fax to Detroit Radiant Products Co.
3. Complete the information above and mail to Detroit Radiant Products Co.



DET Series

Warnings & Clearances to Combustibles

⚠ WARNING!
NOT FOR RESIDENTIAL USE!
 Do not use in the home, sleeping quarters, attached garages, etc.

⚠ WARNING!
 This heater must be installed and serviced by trained gas installation and service personnel only. Read and understand these instructions thoroughly before attempting to install, operate or service this heater. Failure to comply could result in personal injury, asphyxiation, death, fire, and/or property damage. Retain these instructions for future reference.

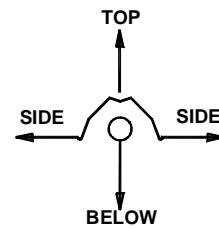
⚠ WARNING!
 This is not an explosion-proof heater. Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier and other authorities for approval of the proposed installation.

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

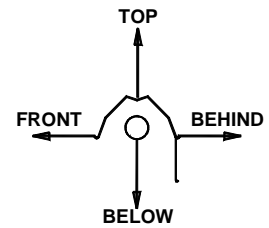
⚠ WARNING!
 In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats, in a conspicuous location.

⚠ WARNING!
 This heater should be installed so that the minimum clearances to vehicles, as marked on the heater, will be maintained. If vehicle lifts are present, ensure that these clearances will be maintained from the highest raised vehicle.

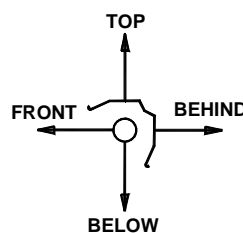
MODEL NO.	MOUNTING ANGLE	SIDE		TOP	BELOW
		FRONT	BEHIND		
		DET(20,30,40)-65 [N,P]	0°		
	45°	39	8	10	47
W/1 side shield	0°	29	8	6	47
W/2 side shields	0°	9	9	6	47
20 ft from burner	0°	7	7	6	30
DET(20,30,40)-75 [N,P]	0°	9	9	6	60
	45°	39	8	10	60
W/1 side shield	0°	29	8	6	60
W/2 side shields	0°	9	9	6	60
20 ft from burner	0°	7	7	6	30
DET(30,40)-100 [N,P]	0°	14	14	6	66
	45°	39	8	10	66
W/1 side shield	0°	29	8	6	66
W/2 side shields	0°	16	16	6	66
20 ft from burner	0°	7	7	6	30
DET(40,50,60)-125 [N,P]	0°	20	20	6	76
	45°	58	8	10	76
W/1 side shield	0°	42	8	6	76
W/2 side shields	0°	20	20	6	76
20 ft from burner	0°	7	7	6	30
DET(40,50,60)-150 [N,P]	0°	24	24	6	81
	45°	58	8	10	81
W/1 side shield	0°	42	8	6	81
W/2 side shields	0°	23	23	6	81
20 ft from burner	0°	11	11	6	44
DET(50,60)-175 [N,P]	0°	34	34	6	92
	45°	63	8	10	92
W/1 side shield	0°	50	8	6	92
W/2 side shields	0°	30	30	6	92
20 ft from burner	0°	11	11	6	44
DET(50,60)-200 [N,P]	0°	41	41	6	94
	45°	63	8	10	94
W/1 side shield	0°	54	8	6	94
W/2 side shields	0°	30	30	6	94
20 ft from burner	0°	11	11	6	44



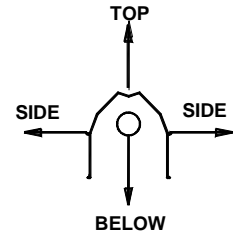
0° MOUNTING ANGLE



0° W/1 SIDE SHIELD



45° MOUNTING ANGLE



0° W/2 SIDE SHIELDS

DET Series Mechanical Instructions

This supplement is designed to address the specifics of the DET Series - See page 12 for specific product features.

Product Summary

DET Series heaters are available from 20 to 60 foot, 65,000 to 200,000 BTU's, natural or LP gas. DET Series are positive pressure, two stage heaters and feature hot-rolled steel for it's standard radiant pipes. DET Series heaters also feature a direct spark ignition system.

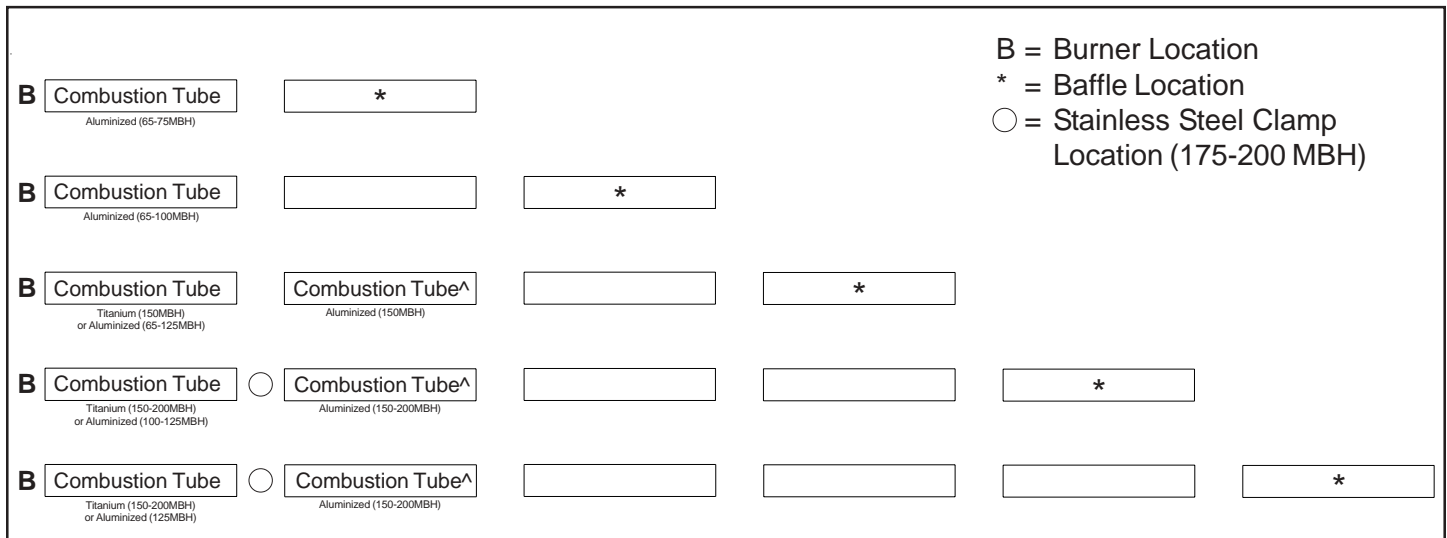
Specific Mechanical Instructions

Be sure to identify the aluminized (65 - 125 MBH) or titanium (150 -200 MBH) combustion chamber and place as the first tube section. On 150 - 200 MBH models only, be sure to identify the aluminized combustion chamber and place immediately following the first combustion tube section.

175,000 & 200,000 BTU/H models must be installed with a stainless steel tube clamp at the second joint of the exchanger between the first and second ten foot radiant tube.

Note baffle quantities for your model and place baffles in the last tubes (farthest from the burner) as shown on pages 13-14 of the general manual.

Tube Installation Sequence



[^] Models 150-200 MBH incorporate a second combustion chamber constructed of coated aluminized steel. This section of tube **must** be installed as the second tube downstream of the burner box.



DET Series

Electrical Requirements

- ◆ 120 Volt - 60 HZ, single phase, 3-wire.
- ◆ 25V thermostat connection.
- ◆ Starting Current 1.7 Amps.
- ◆ Running Current 1.1 Amps.
- ◆ 24V controls.
- ◆ Wiring must not run above or below the heater, nor exposed to the radiant output.
- ◆ Heaters must be grounded in accordance with the National Electrical Code ANSI/NFPA70 (latest edition).
- ◆ Observe proper electrical polarity.

Gas Requirements

- ◆ Manifold Pressure
 - Nat. 3.5" • LP. 10.0"
- ◆ Minimum Inlet Pressure
 - Nat. 5.0" • LP. 11.0"
- ◆ Maximum Inlet
 - Nat. 14.0" • LP. 14.0"

Ventilation Requirements

- ◆ Consult the general manual for venting instructions.
- ◆ For unvented operation, there must be a positive air displacement of at least 4.0 CFM per 1000 BTU/H for natural gas or 4.5 CFM per 1000 BTU/H for LP gas. WVE-4 termination cap must also be used.

Theory of Operation

- **Starting Circuit** (see internal wiring diagrams)

Two voltages (120V supply and 24V control) must be supplied to the DET Series burner box for proper operation. Upon closing of the thermostat the low fire relay is closed allowing L1 to complete the circuit to L2 via the blower motor beginning the sequence of operation.

Air pressure generated by the blower will cause the normally open differential pressure switch to close. Another circuit is completed from L1 to the spark ignition module and back to L2. After a seven second pre-purge, the spark electrode, transformer, and gas valve are all energized simultaneously. The trial for ignition is fifteen seconds.

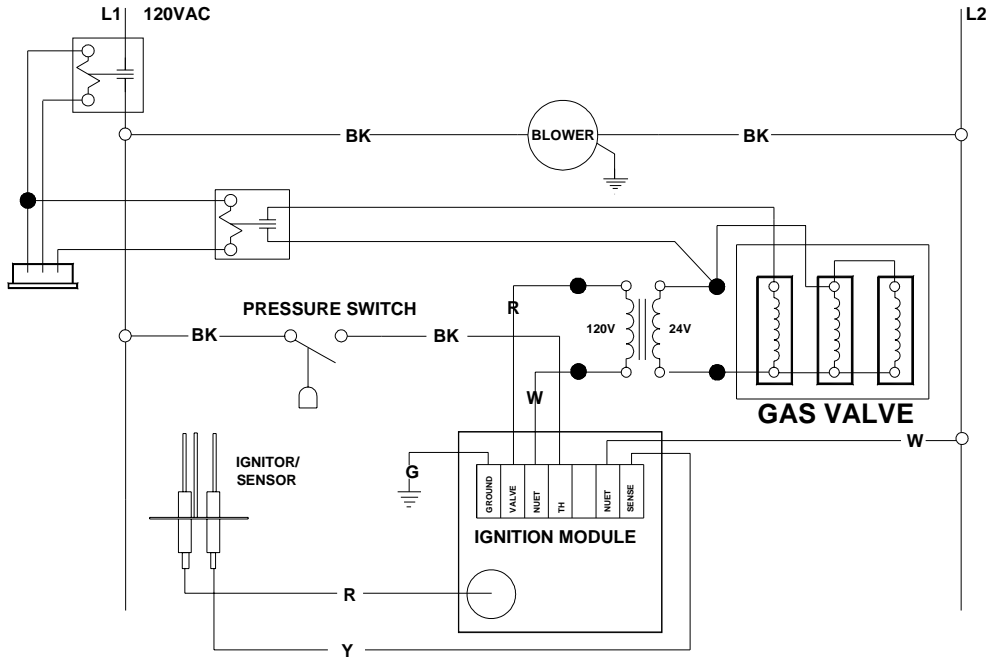
- **Running Circuit**

After ignition, the flame rod monitors the flame. As long as a flame is present, the valve is held open. If the flame is lost, the control acts to close the valve within one second, and a new trial sequence identical to that at start-up is initiated. If proof of flame is not established within the 15 second trial for ignition, the unit will retry two additional times before entering lockout mode. If lockout occurs, the control can be reset by briefly interrupting the power source.

Hi fire operation is actuated by the thermostat sending a 24V signal to the Hi Fire Relay. The energized coil of the relay is closed allowing 24V to continue onto the hi fire of the gas valve.

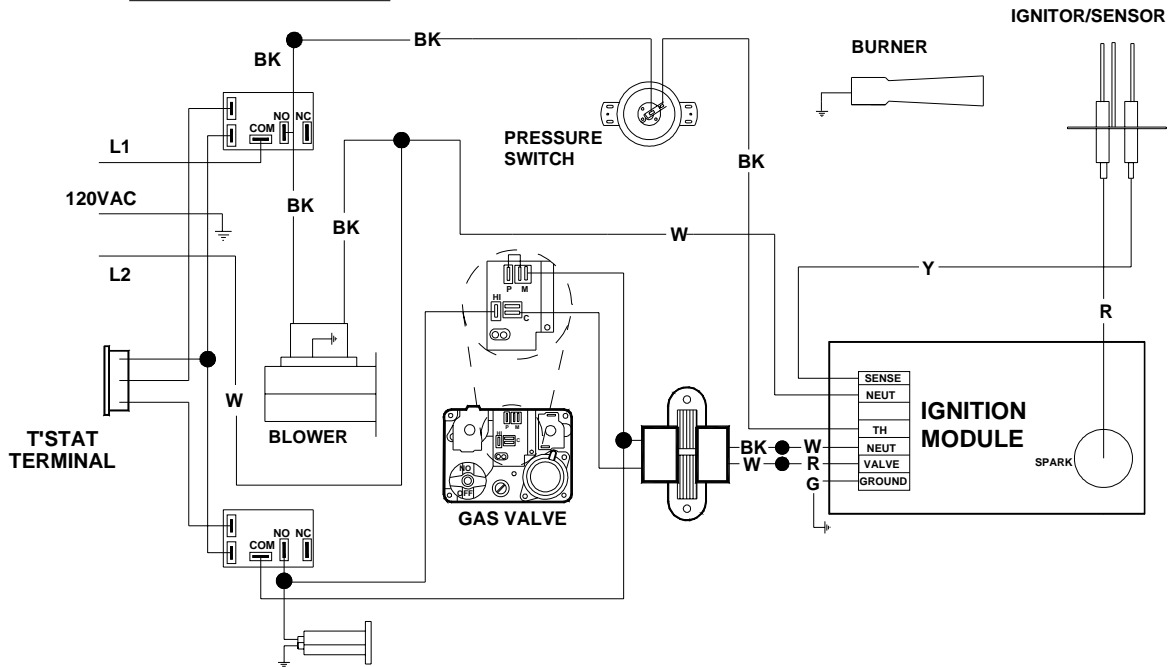
Internal Wiring Diagrams

DET LADDER DIAGRAM



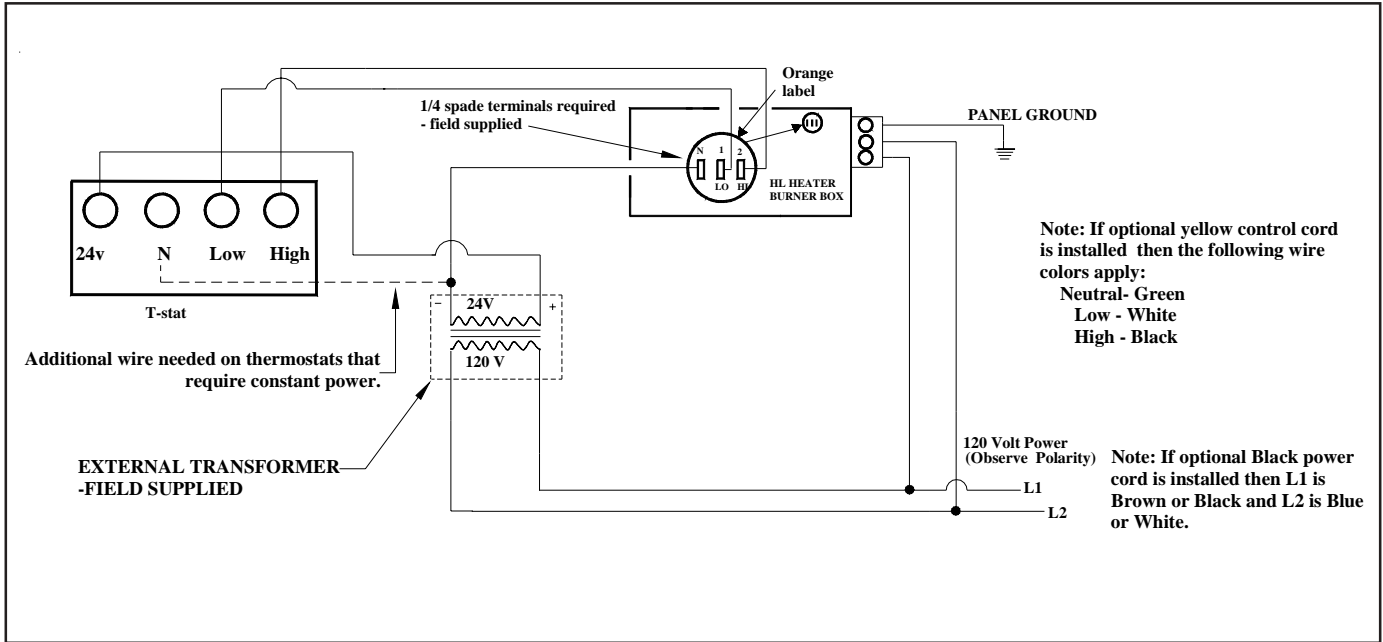
IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105 C.

DET BLOCK DIAGRAM

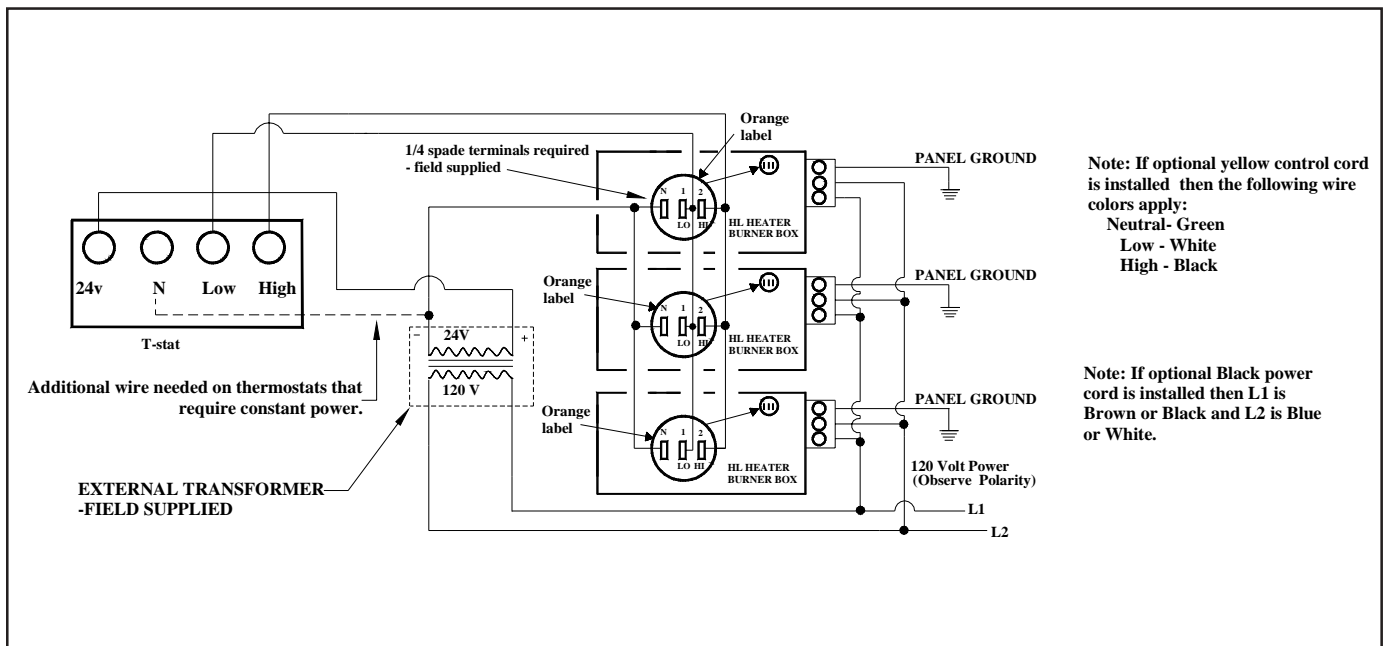


DET Series

Field Wiring Diagrams



Single heater, single thermostat (orange label).

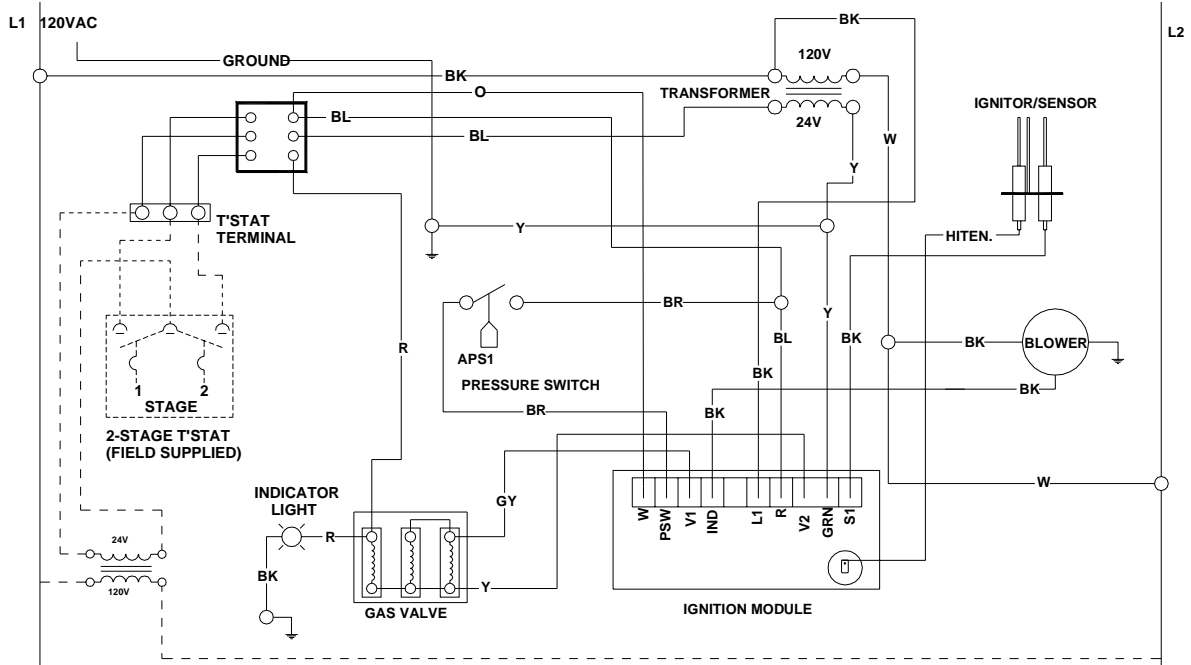


Multiple heaters, single thermostat (orange label).

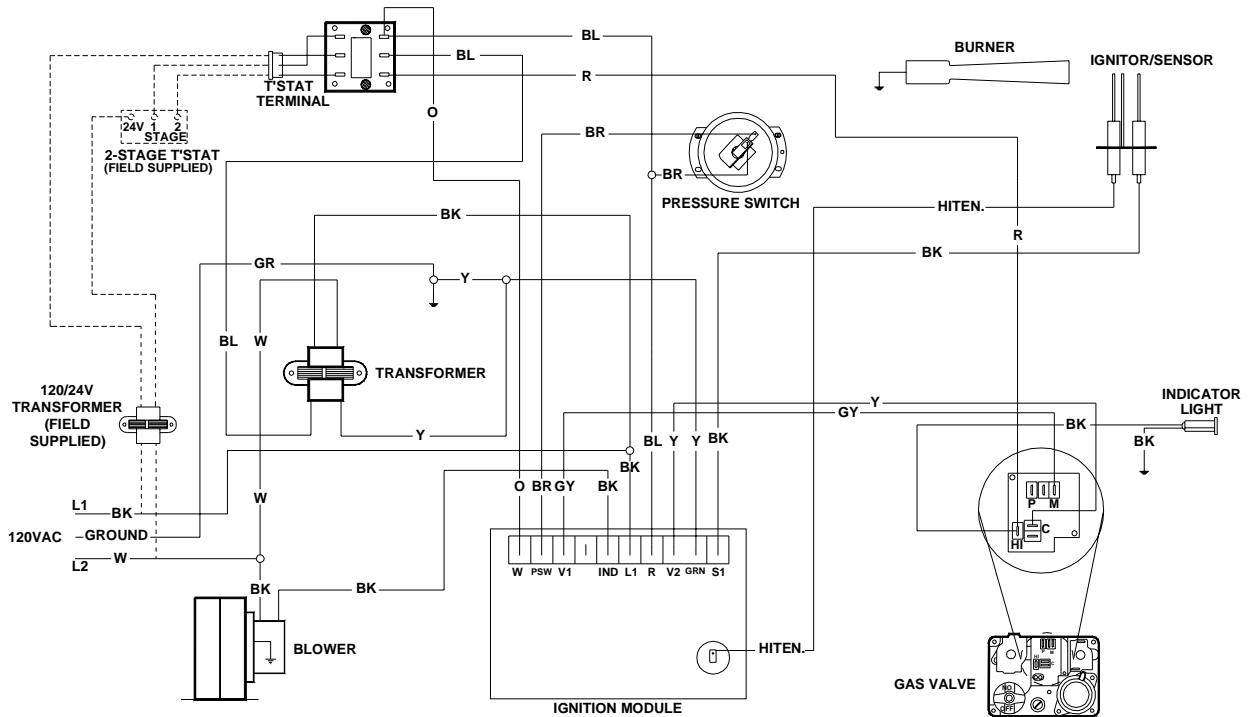
Alternative Wiring Diagrams

Post Purge Option

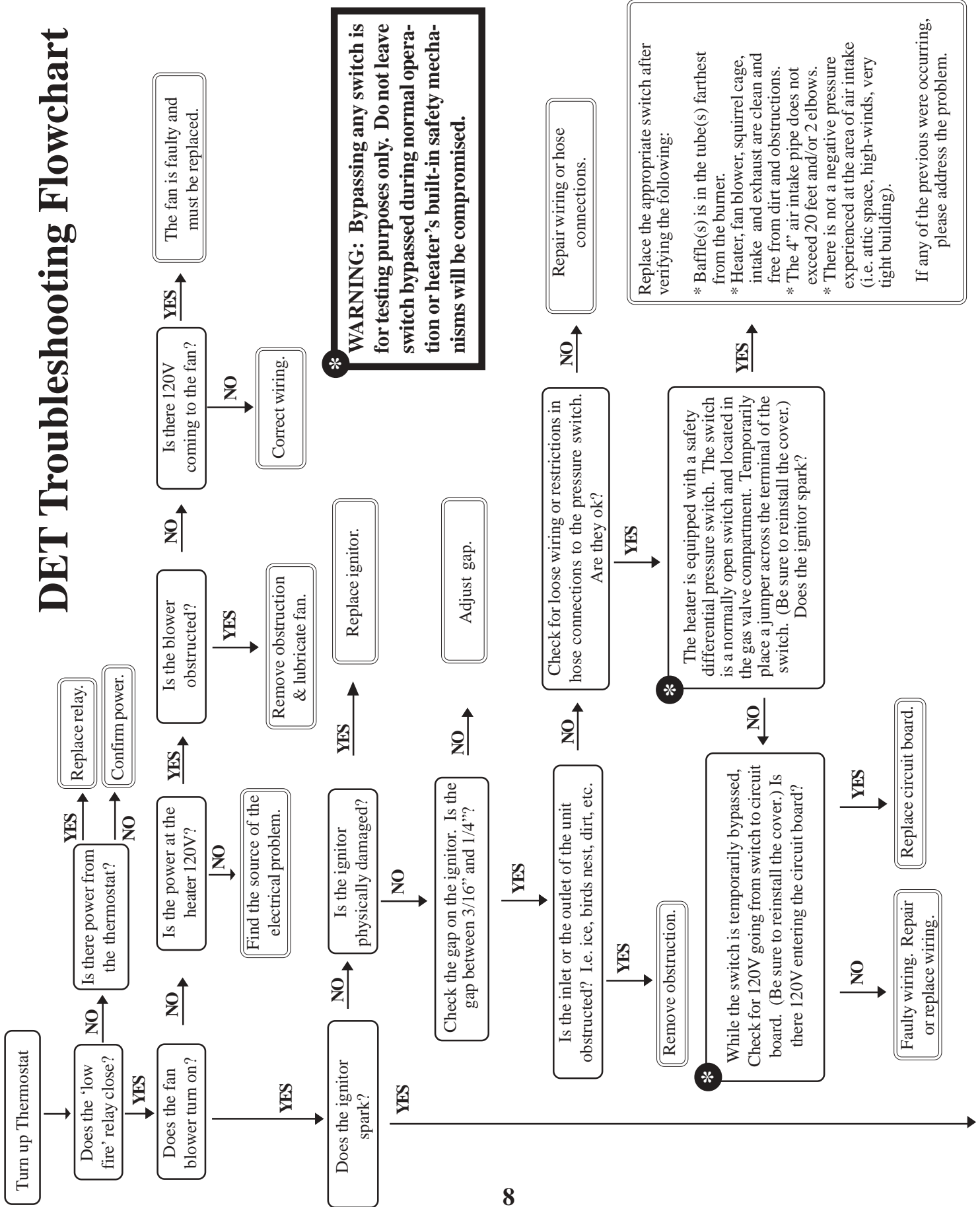
DET LADDER DIAGRAM - POST PURGE



DET BLOCK DIAGRAM - POST PURGE



DET Troubleshooting Flowchart



If heater does not go into high-fire mode, check the following.

On the outside of the heater, check for 24V across COM and HIGH on the TP-213-24V plug. Is there 24V?

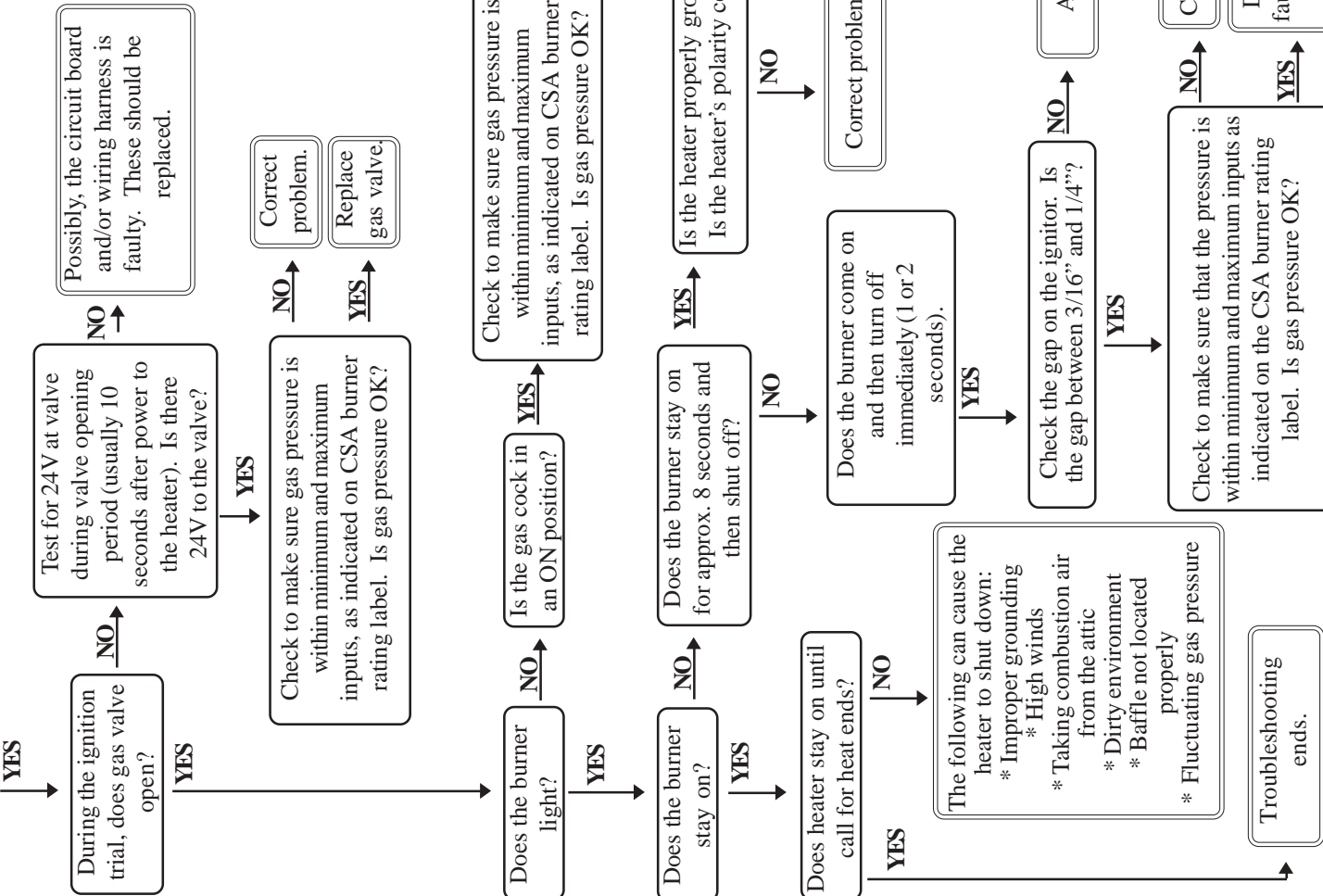
YES → Measure the voltage across the red wire on the relay board and GND on the circuit board. Is there 24V?

NO → Repair or replace faulty wiring or thermostat.

YES → The valve is faulty and must be replaced.

NO → The relay board is faulty and must be replaced.

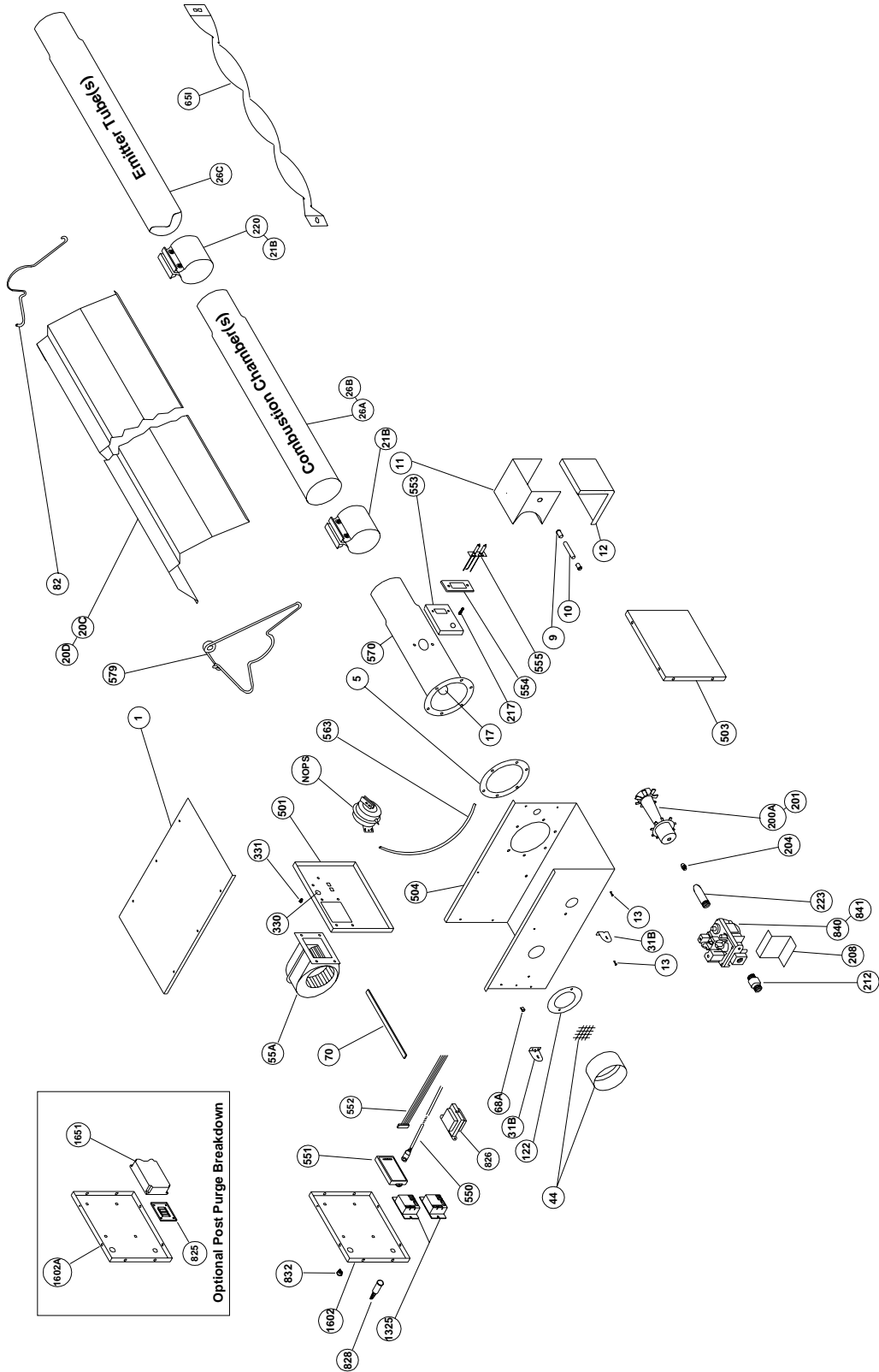
NOTE: To confirm the heater is not in high-fire mode, check the manifold pressure. If 3.5" natural or 10" propane, the light is faulty and should be replaced. If the manifold pressure ranges from 2.3" to 2.8" Natural (model dependent) and 6.0" to 7.5" Propane (model dependent), the heater is in low-fire mode and the troubleshooting steps described here should be followed.



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

DET Series

Parts Breakdown



Basic Parts List

DET SERIES PARTS LISTING

TP#	ITEM	TP#	ITEM
TP-1	CONTROL BOX COVER	TP-220	4" STAINLESS STEEL TUBE CLAMP
TP-5	FLANGE GASKET	TP-223	GAS MANIFOLD
TP-9	CONDUIT COUPLING	TP-330	DIVIDER GROMMET
TP-10	CONDUIT 4" X 1/2"	TP-331	GREEN SELF TAP GROUND SCREW
TP-11	IGNITOR BOX	TP-501	DIVIDER PANEL
TP-12	IGNITOR BOX COVER	TP-503	RIGHT END PANEL
TP-13	8 x 1/2" SELF-DRILLING SCREW	TP-504	CONTROL BOX
TP-17	SIGHT GLASS KIT	TP-550	SPARK TRANSFER WIRE - ORANGE
TP-20C	120" ALUMINUM REFLECTOR	TP-551	MARK 10DX-117-10 CIRCUIT BOARD W/ PRE-PURGE
TP-20D	120" STAINLESS STEEL REFLECTOR	TP-552	WIRING HARNESS
TP-21B	4" TUBE CLAMP	TP-553	IGNITOR MOUNTING BRACKET
TP-26A	10 FT. ALUMINIZED COMBUSTION TUBE	TP-554	SPARK IGNITOR GASKET
TP-26B	10 FT. TITANIUM COMBUSTION TUBE	TP-555	SPARK IGNITOR ELECTRODE
TP-26C	10FT. UNCOATED HOT ROLLED RADIANT TUBE	TP-563	1/4" PRESSURE TUBE (VINYL)
TP-31B	CONTROL BOX MOUNTING BRACKET	TP-570	16" DET BURNER TUBE WITH FLANGE
TP-44	AIR ORIFICE W/SCREEN - CONSULT FACTORY	TP-579	WIRE HANGER W/OUT SPRING CLIP
TP-55A	FAN BLOWER	TP-825	24V ISOLATION RELAY BOARD (POST PURGE OPTION)
TP-65I	INTERLOCKING 33" BAFFLE SECTION	TP-826	40VA TRANSFORMER
TP-68A	STRAIN RELIEF BUSHING	TP-828	YELLOW OPERATIONAL INDICATOR LIGHT
TP-70	CONTROL BOX COVER GASKET (PER FOOT**)	TP-832	THERMOSTAT TERMINAL STRIP
TP-82	REFLECTOR CENTER SUPPORT	TP-840	36E96-224 24V NAT. 2-STAGE GAS ASSEMBLY
TP-108	5' AL-TI TUBE, PAINTED WITH ONE CLAMP	TP-841	36E96-226 24V LP 2-STAGE GAS ASSEMBLY
TP-111	5' ALUM. TUBE, PAINTED WITH ONE CLAMP	TP-1325	RELAY BOARD (24V SWITCHING 120V) - Qty.2
TP-112	5' REFLECTOR	TP-1602	LEFT END PANEL
TP-122	GASKET FOR AIR ORIFICE & AIR COLLAR	TP-1602A	LEFT END PANEL (POST PURGE OPTION)
TP-200A	BURNER (50 TO 100 MBTU/H)	TP-1651	TRITON 2461D DIAGNOSTIC SPARK BOARD (POST PURGE)
TP-201	BURNER (125 TO 200 MBTU/H)	TP-NOPS	N.O. Pressure Switch (Select Switch Below, BTU Dependent)
TP-204	GAS ORIFICE - CONSULT FACTORY	(TP-264B)	DIFFERENTIAL PRESSURE SWITCH - 50 TO 100 MBTU/H
TP-208	"Z" MOUNTING BRACKET	(TP-264E)	DIFFERENTIAL PRESSURE SWITCH - 125 & 150 MBTU/H
TP-212	1/2" X 3" PIPE NIPPLE	(TP-264D)	DIFFERENTIAL PRESSURE SWITCH - 175 MBTU/H
TP-217	PRESSURE BARB FITTING	(TP-264F)	DIFFERENTIAL PRESSURE SWITCH - 200 MBTU/H

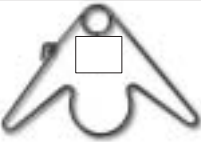



** 6" TOTAL NEEDED TO COVER OUTER EDGES OF A BURNER BOX



Kit Contents & Product Features

Kit contents for the DET Series are shown below. Reference the proper column for your particular models length.

FILLED BY:		DES SERIES KIT CONTENTS				
TP#	DESCRIPTION	20 FOOT	30 FOOT	40 FOOT	50 FOOT	60 FOOT
TP-19B	4" Hangers	3	4	5	6	7
TP-21B	4" Tube Clamps	2	3	4	5*	6*
TP-82	4" Refl. Cntr. Sprt.	1	1	1	1	1
TP-105	Reflector End Caps	2	2	2	2	2
IOM	Install / Op Manual	1	1	1	1	1

 4" Hanger TP-19B	 Generic IOM (LIOGT) and DET Series Insert (LIODET)	 4" Reflector Center Support - TP-82	 4" Butt Clamp TP-21B
Notes: *One 4" stainless steel butt clamp (TP-220) is provided for each 175,000-200,000 BTU models. Place as shown in IOM.			

Product Features

APPROVALS

- CSA/AGA.
- Commercial approval.

BURNER SIGHT GLASS

- For burner inspection.

COMBUSTION AIR INLET & VENT

- 4" Duct.

CONTROLS

- 100% Safety shut off.
- Differential pressure switch.
- Direct spark ignition.
- Flame rod sensing.
- Pre-purge controls.
- Potted circuit board.

ENAMELED CONTROL BOX

- Outside air collar (4") attached.
- Totally enclosed components.

EMITTER & COMBUSTION TUBES

- Titanium combustion chamber (first 10' section) 150-200 MBTU/H models.
- Aluminized combustion chamber (second 10' section) 150-200 MBTU/H models.
- Aluminized combustion chamber (first 10' section) 50-125 MBTU/H models.
- 16ga. 4" O.D. hot-rolled steel radiant tubes.
- Combustion chamber coated with high temperature, corrosion resistant black coating .95 emissivity. Slip fit connection.

GAS CONNECTION

- 1/2" Male pipe nipple.

MOUNTING ANGLE

- 0 to 45 degrees from horizontal.

MOUNTING HEIGHTS

MIN. MAX.

- 50,000 BTU 10' 15'
- 60,000 BTU 11' 18'
- 75,000 BTU 12' 20'
- 100,000 BTU 13' 23'
- 125,000 BTU 15' 25'
- 150,000 BTU 16' 30'
- 175,000 BTU 17' 35'
- 200,000 BTU 18' 40'

WARRANTY

- 1 year-Burner box components.
- 2 years-Combustion and radiant tubes.
- 3 years-Burner.

OTHER

- One reflector center support per heater.
- Turbulator baffle provided.
- Made in USA.
- Visit www.reverberray.com