DTHS SERIES

TUBE HEATER

Operation, Installation, Maintenance

and Parts Manual

RE-VERBER-RAY

DETROIT RADIANT PRODUCTS COMPANY

Form # STIOM-107
5M 1-88

FOREWORD

WARNING

READ INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THE DETROIT RADIANT PRODUCTS HEATER. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE. RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

Approval Standards and Certifications

These units come with the following compliances and certifications:

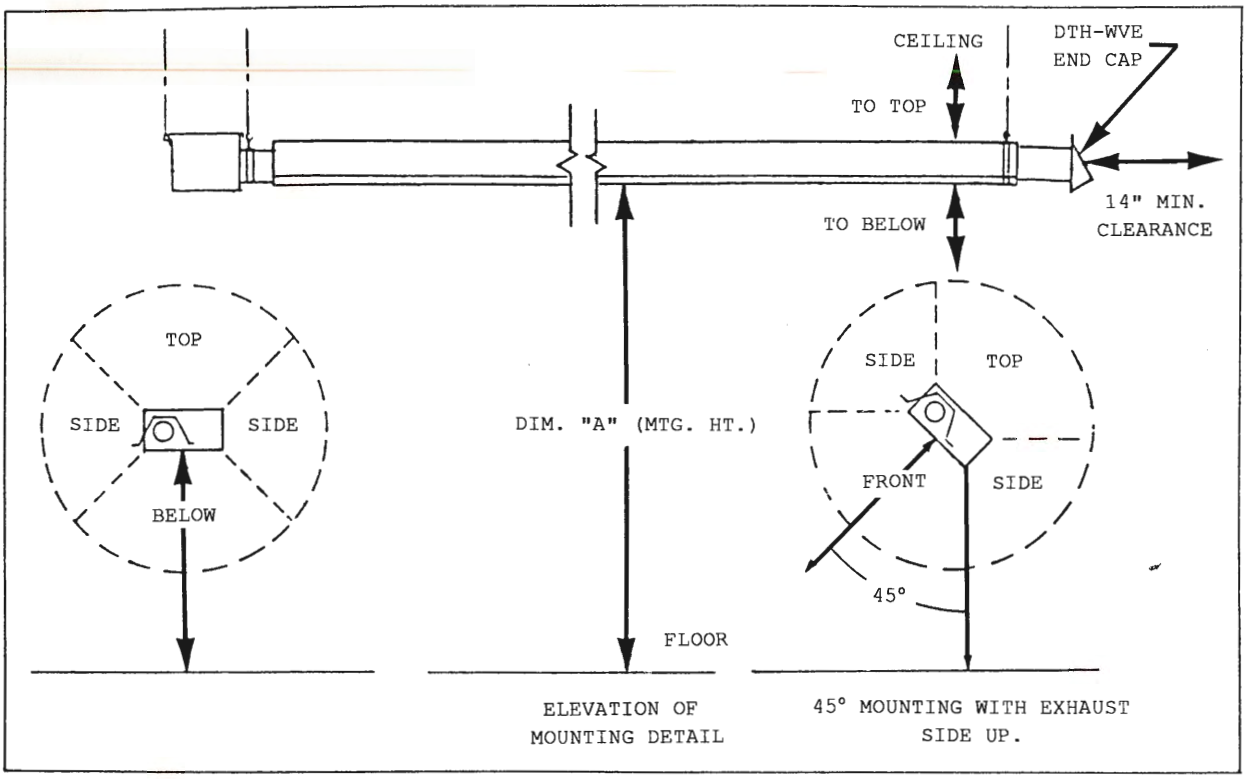
— American National Standards (ANSI Z83.6-1987)
— Occupational Safety & Health Act (OSHA) compliance
— American Gas Association (A.G.A.) design certification

Detroit Radiant Products Company
21400 Hoover Road • Warren, MI 48089 • (313) 756-0950

SAFETY CLEARANCE INFORMATION

WARNING

FAILURE TO COMPLY WITH STATED CLEARANCES TO COMBUSTIBLES COULD RESULT IN PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.



CLEARANCES TO COMBUSTIBLE TABLE

MODEL	DIM A TYP. MTG. HT.	CLEARANCE TO COMBUSTIBLES		
		TOP	BELOW & FRONT	SIDE
DTHS 20-40N-2 OR P-2	9-15 FT.	9"	40"	15" *
DTHS 20-50N-2 OR P-2	10-16 FT.	9"	52"	15" *
DTHS 20-60N-2 OR P-2	11-18 FT.	9"	62"	24" *
DTHS 20-75N-2 OR P-2	13-20 FT.	9"	70"	24" *
DTHS 40-50N-2 OR P-2	9-16 FT.	9"	36"	10"
DTHS 40-60N-2 OR P-2	10-18 FT.	9"	40"	10"
DTHS 40-75N-2 OR P-2	11-20 FT.	9"	54"	24"
DTHS 40-100N-2 OR P-2	13-25 FT.	9"	72"	24"
DTHS 40-125N-2 OR P-2	15-30 FT.	18"	74"	30"
DTHS 40-150N-2 OR P-2	15-35 FT.	18"	74"	30"
DTHS 60-125N-2 OR P-2	15-30 FT.	18"	74"	30"
DTHS 60-150N-2 OR P-2	15-35 FT.	18"	74"	30"

* Clearances for these models when mounted at 45° is 12".

NOTE: MOUNTING HEIGHTS SHOWN ARE SUGGESTED HEIGHTS ONLY.

Table of Contents

1 INTRODUCTION

The Detroit Radiant Products' vented or unvented radiant tube heaters become highly efficient generators of infrared radiation by heating a black coated aluminized steel tube.

The principle of operation is to propel pressurized hot gases through a special 4-inch diameter tube, 20, 40 or 60 feet in length. As the tube gets hot, it radiates heat which is directed to the floor in a soft uniform pattern, by an aluminum reflector.

The radiant tube principle of simulating the direct rays of the sun results in substantial fuel savings of up to 50%. Radiant heat energy is directed downward, heating the occupants, floor, and objects in the building without wasting energy heating the surrounding air. Heating of the surroundings does occur by convection air currents given off by the warmed objects.

2 INSTALLATION

Installation must be in accordance with all local codes, as well as the National Electrical Code (NEC) and the National Fire Protection Association Inc. (NFPA).

In public garages, the heaters must be installed in accordance with NFPA 88B — most recent edition. Repair garage heaters shall not be installed at heights less than eight feet from the floor.

In aircraft hangars, the heater must be installed in accordance with NFPA No. 409 standards — most recent edition. The heaters must be installed at least ten feet above the upper surface of the wings or engine enclosures of the highest aircraft which may be stored in the hangar. In areas adjoining the aircraft storage, the heaters must not be installed less than eight feet above the floor. Also, the heaters must be located in a way that prevents damage from sections of the aircraft, crane, scaffolding or other movable objects.

Installation must conform with local building codes, or, in absence of local codes, with National Fuel Gas Code, ANSI Z223.1 — most recent edition.

Refer specifically to the Clearance To Combustible figure and table shown in the Foreword, before installing the heater. Also, refer to Figures 2-1 through 2-4 for additional information.

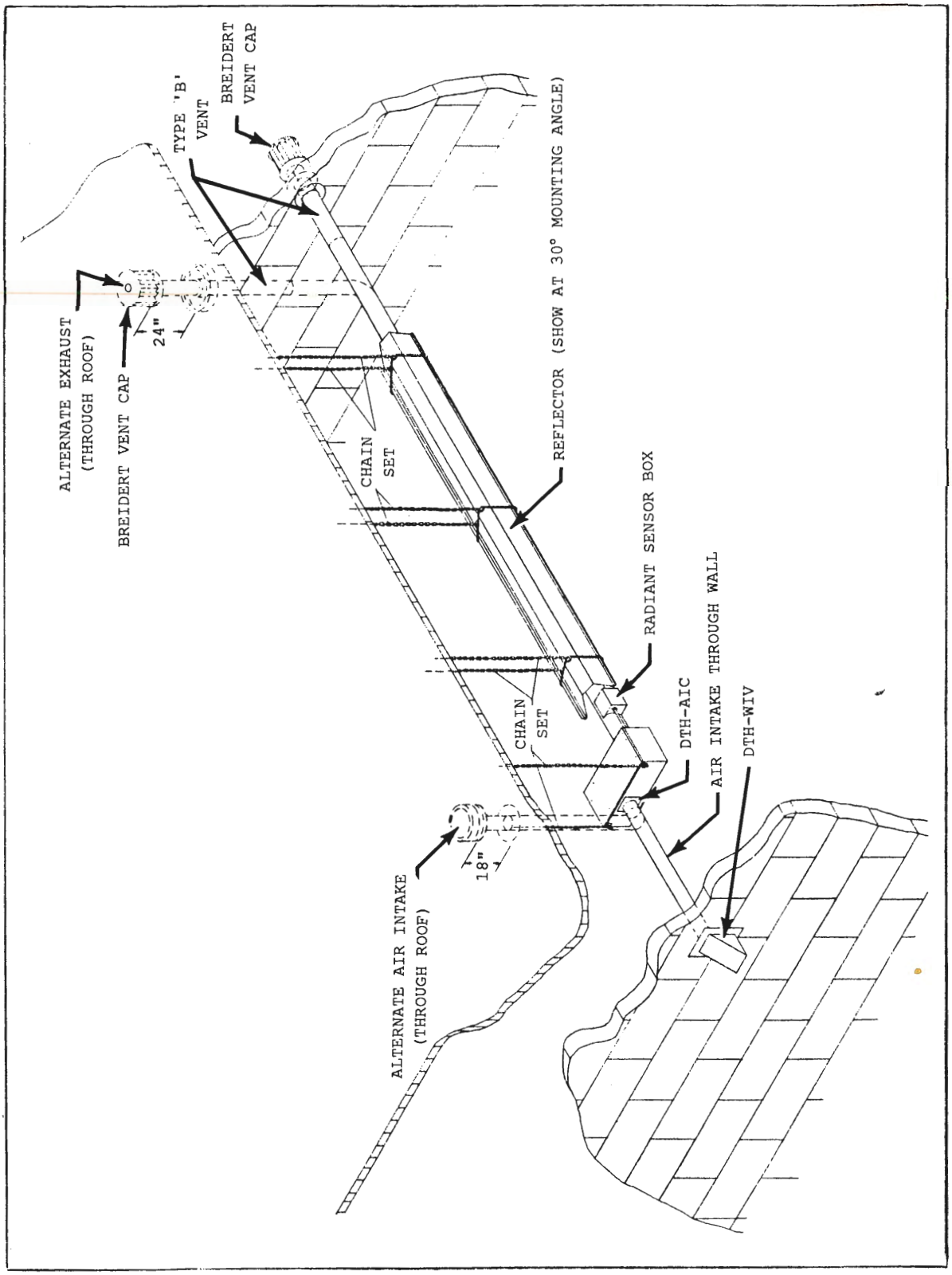

TYPE 'B' VENT
BREIDERT VENT CAP
ALTERNATE EXHAUST (THROUGH ROOF)
BREIDERT VENT CAP
24"
CHAIN SET
REFLECTOR (SHOW AT 30° MOUNTING ANGLE)
RADIANT SENSOR BOX
CHAIN SET
DTH-AIC
AIR INTAKE THROUGH WALL
DTH-WIV
18"
ALTERNATE AIR INTAKE (THROUGH ROOF)

Figure 2-1

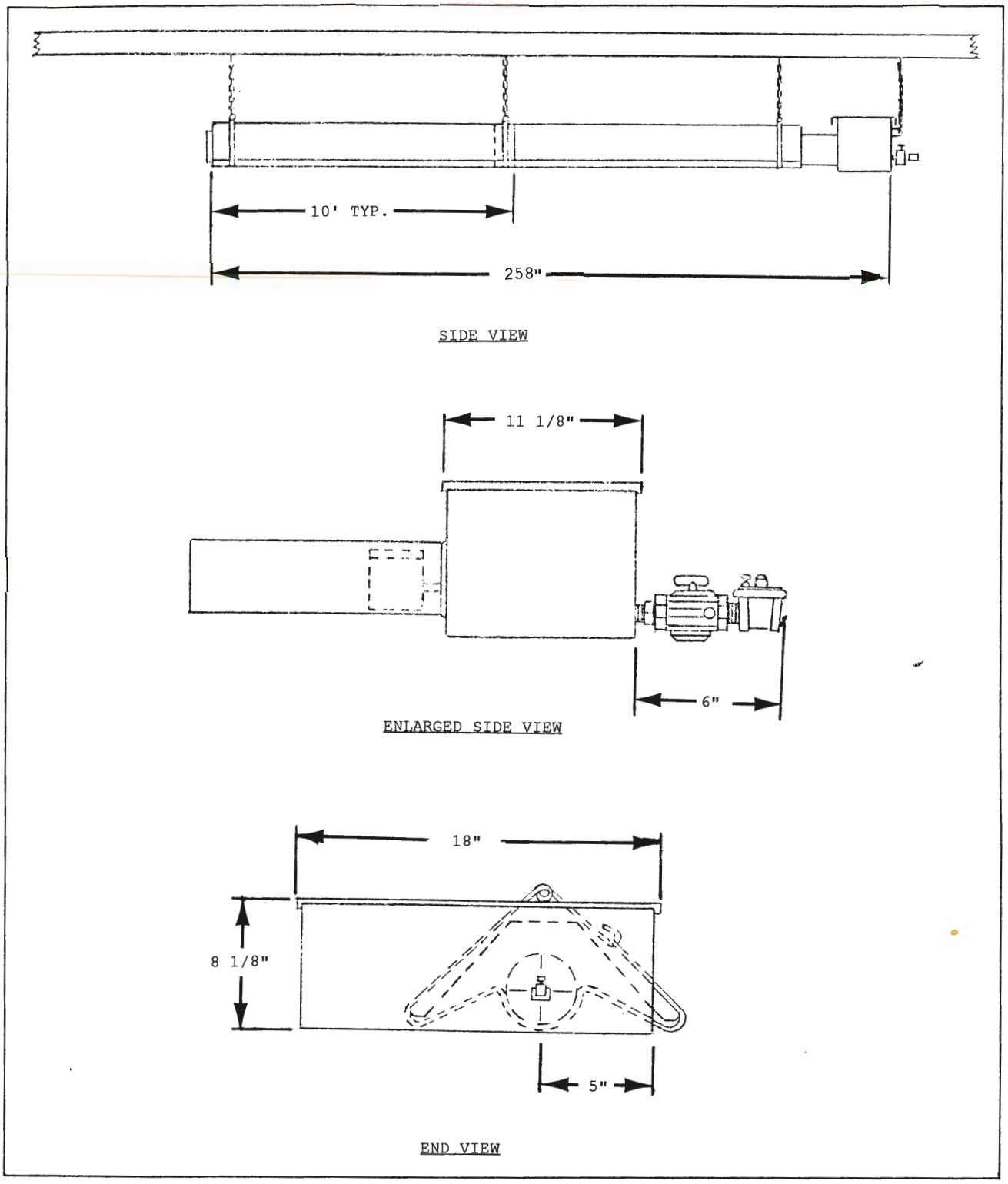
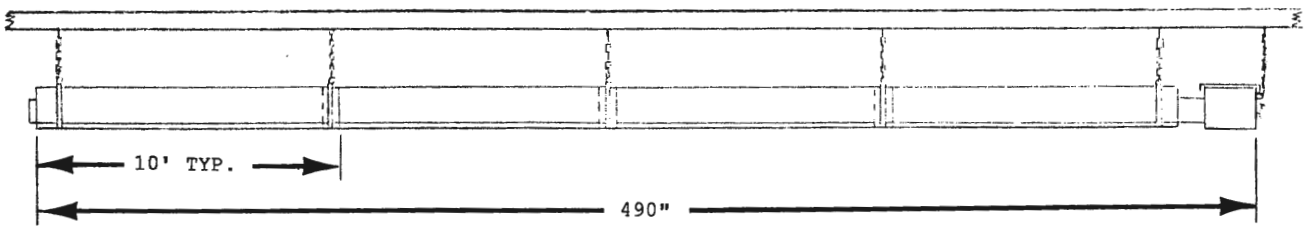
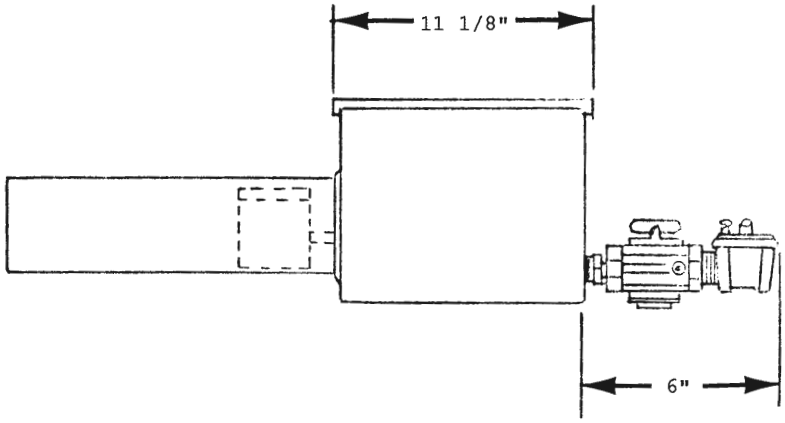


Figure 2-2

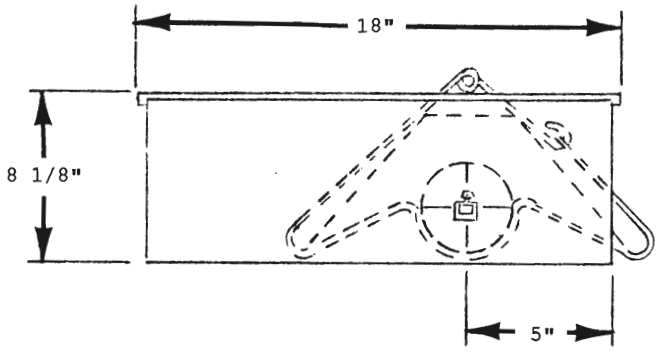
DIMENSIONS FOR MODEL DTHS20 INFRARED TUBE HEATER



SIDE VIEW



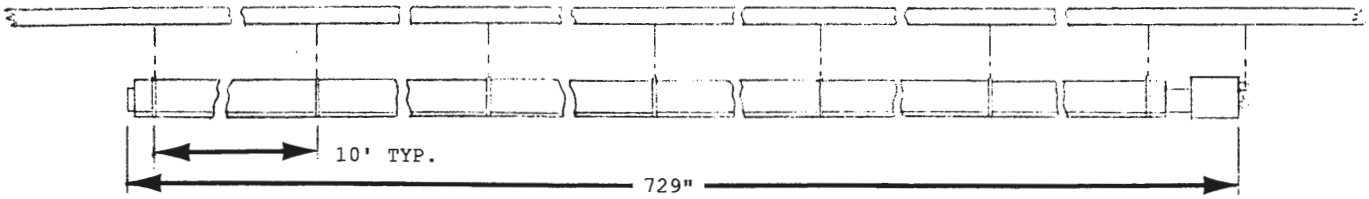
ENLARGED SIDE VIEW



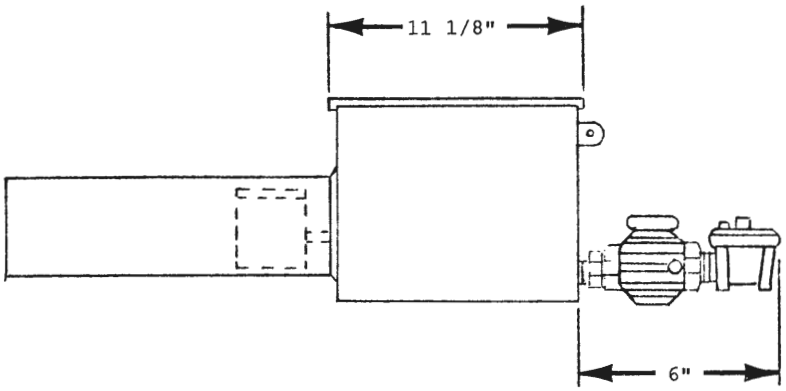
END VIEW

Figure 2-3

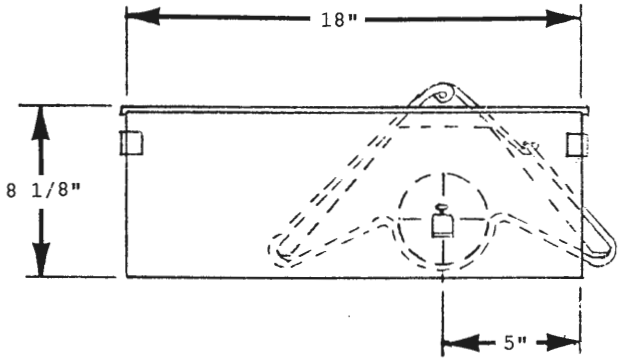
DIMENSIONS FOR MODEL DTHS40 INFRARED TUBE HEATER



SIDE VIEW



ENLARGED SIDE VIEW



END VIEW

Figure 2-4

DIMENSIONS FOR MODEL DTHS60 INFRARED TUBE HEATER

The installation must also conform with the National Electrical Code (NEC), latest edition, and must be electrically grounded when an external electrical source is utilized.

2.1 Heater Mounting and Clearances

NOTE: While heater is still on the ground, connect 120V to heater, and check glo-bar operation. If the glo-bar does not light, see Section 5 Troubleshooting for instruction and replacement.

1. Each heater comes equipped with the necessary hangers (Figure 2-5) for heater hanging. The DTHS20 requires three hangers, the DTHS40 requires five hangers, and the DTHS60 requires seven hangers. Each heater also comes with one reflector center support (Figure 2-6) and one DTHS Installation Kit.

2. Number 3 double-loop chain is recommended for heater hanging (DTHS accessory No. DTH-CS).

   Turnbuckles in combination with chains are recommended to assure heater leveling. When using a turnbuckle use a locking nut and/or safety chain loop (See Figure 2-7). If rods or other rigid means are used, provide sufficient lengths or swing joints to allow for heater expansion.

   IMPORTANT: The first 10-ft. tube on DTHS100P (propane), DTHS125, and DTHS150 models must be a titanium alloy, aluminized steel tube.

3. Mount hangers on approximately 10-ft. centers. Slide tubes through hangers with weld seam downward (see Figure 2-8) and fasten with butt clamps. See Figure 2-9. Tighten to approximately 50-70 ft.-lbs. The DTHS20 and DTHS40 models utilize a single baffle which must be installed in the last radiant tube. The DTHS60 models are shipped with the baffles already installed in two of the radiant tubes. These two tubes must be installed last (See Figure 2-11). All baffles must be in a vertical position (See Figure 2-10). The position of the baffles within the tubes is preset, and should NOT be changed.

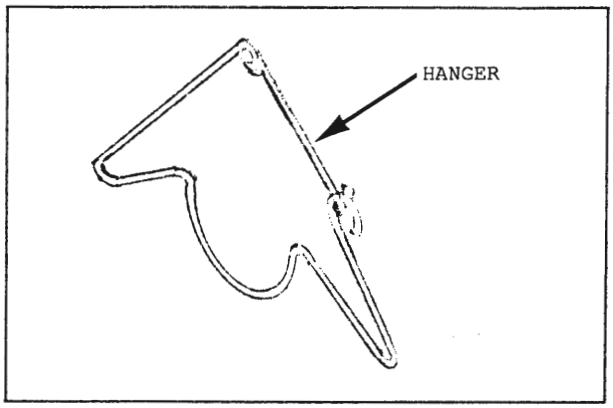


Figure 2-5

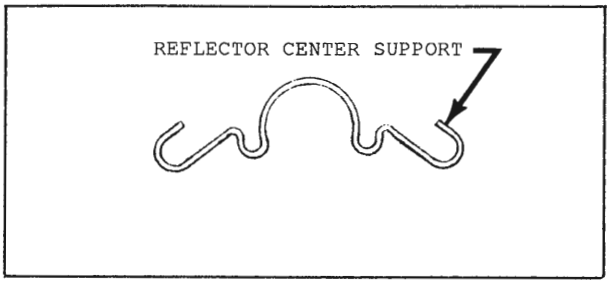


Figure 2-6

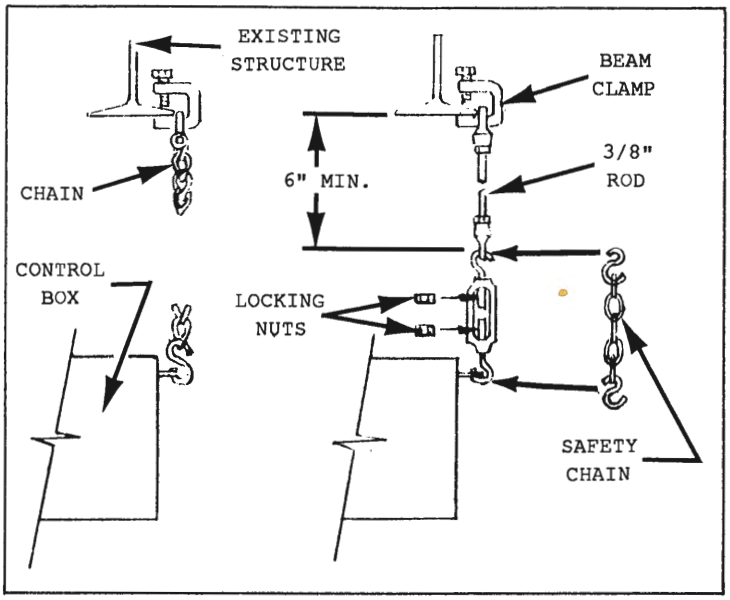


Figure 2-7

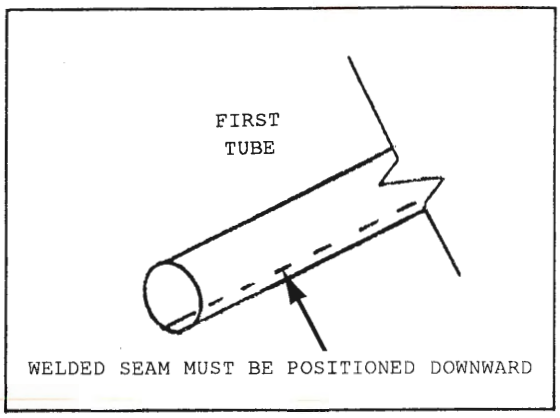


Figure 2-8

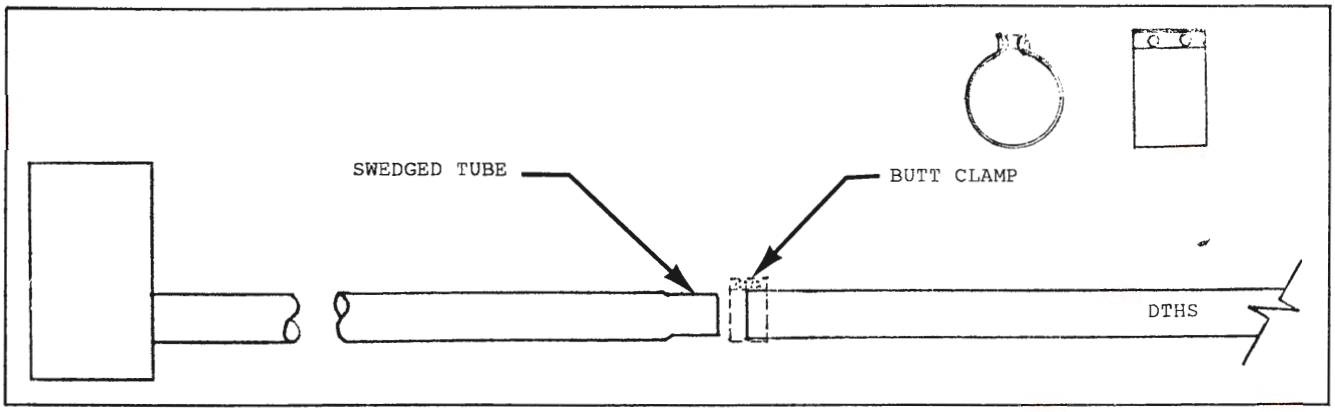


Figure 2-9

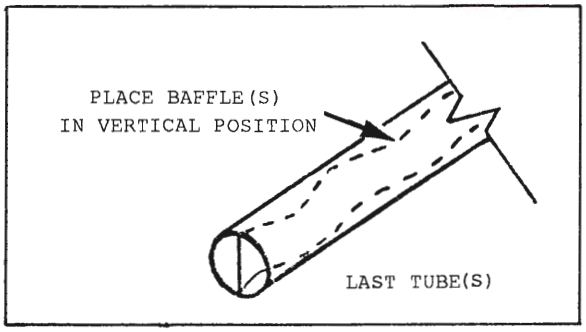


Figure 2-10

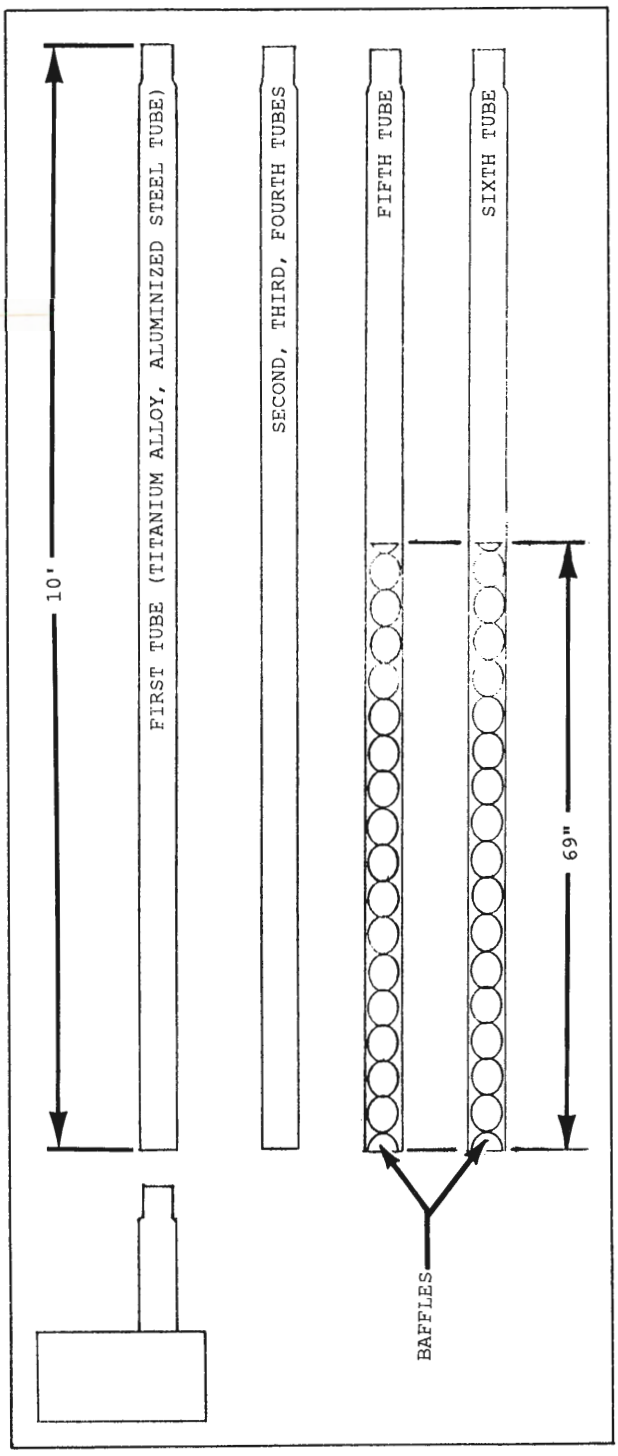

10'
FIRST TUBE (TITANIUM ALLOY, ALUMINIZED STEEL TUBE)
SECOND, THIRD, FOURTH TUBES
FIFTH TUBE
SIXTH TUBE
69"
BAFFLES

Figure 2-11

4. Mount heaters in conformance with standard approvals referenced in the Foreword.

5. Chains must be perpendicular to the heater.

6. Heater must be independently supported and not rely on the gas or electrical line for any of its support.

7. Mount heater so that burner sight glass is visible from the floor.

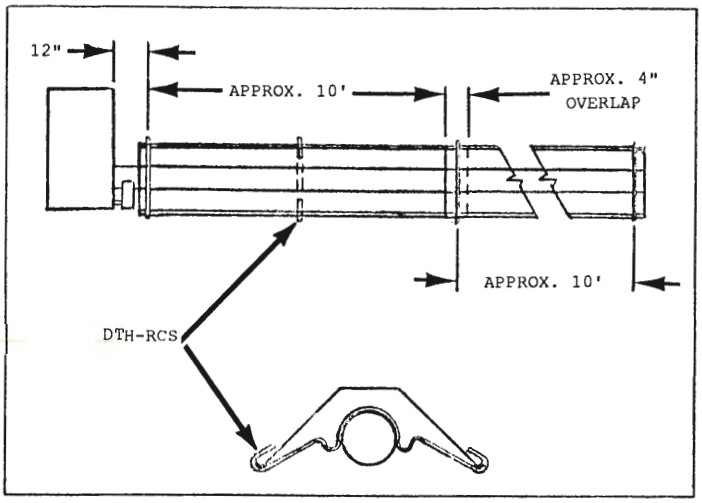


Figure 2-12

2.2 Reflector Assembly

Option A: Using Wire Hangers

1. Slide reflector through wire hangers and overlap 4 in. for support (See Figure 2-12).

NOTE: DO NOT screw sheet metal reflectors together.

2. Install reflector center support DTH-RCS as shown in Figure 2-12, only on the first 10 ft. after the burner.

Option B: Using Clamps

1. Assemble bolt with washers and clamps to the reflector (See Figure 2-13), slide clamps in slot towards center of reflector (See Figure 2-14). This will allow radiant tube to expand at a rate greater than that of the reflector.

2. Attach reflector with clamp attachment to the heater tube.

3. Install shorter reflector 2 in. away from radiant sensor box (See Figure 2-14).

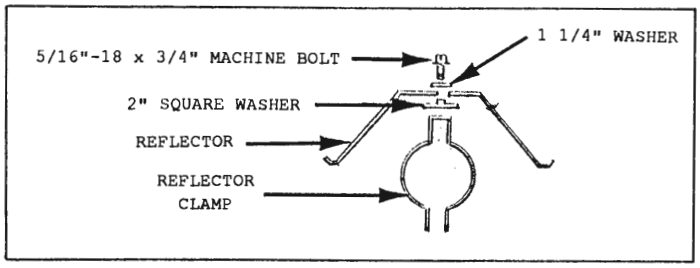


Figure 2-13

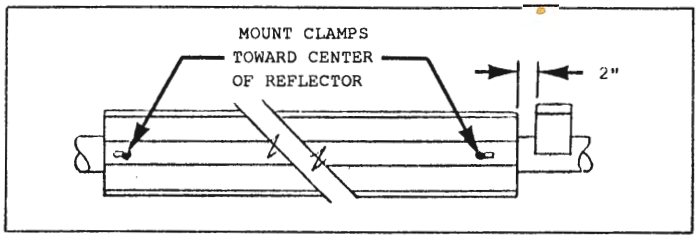


Figure 2-14

2.3 Flue Venting

1. Check all applicable codes prior to installing any flue stacks. Local codes may vary. In absence of local codes see national fuel code ANSIZ223.1 (latest edition).

2. Heater exhaust end is designed to receive a 4-in. diameter stack.

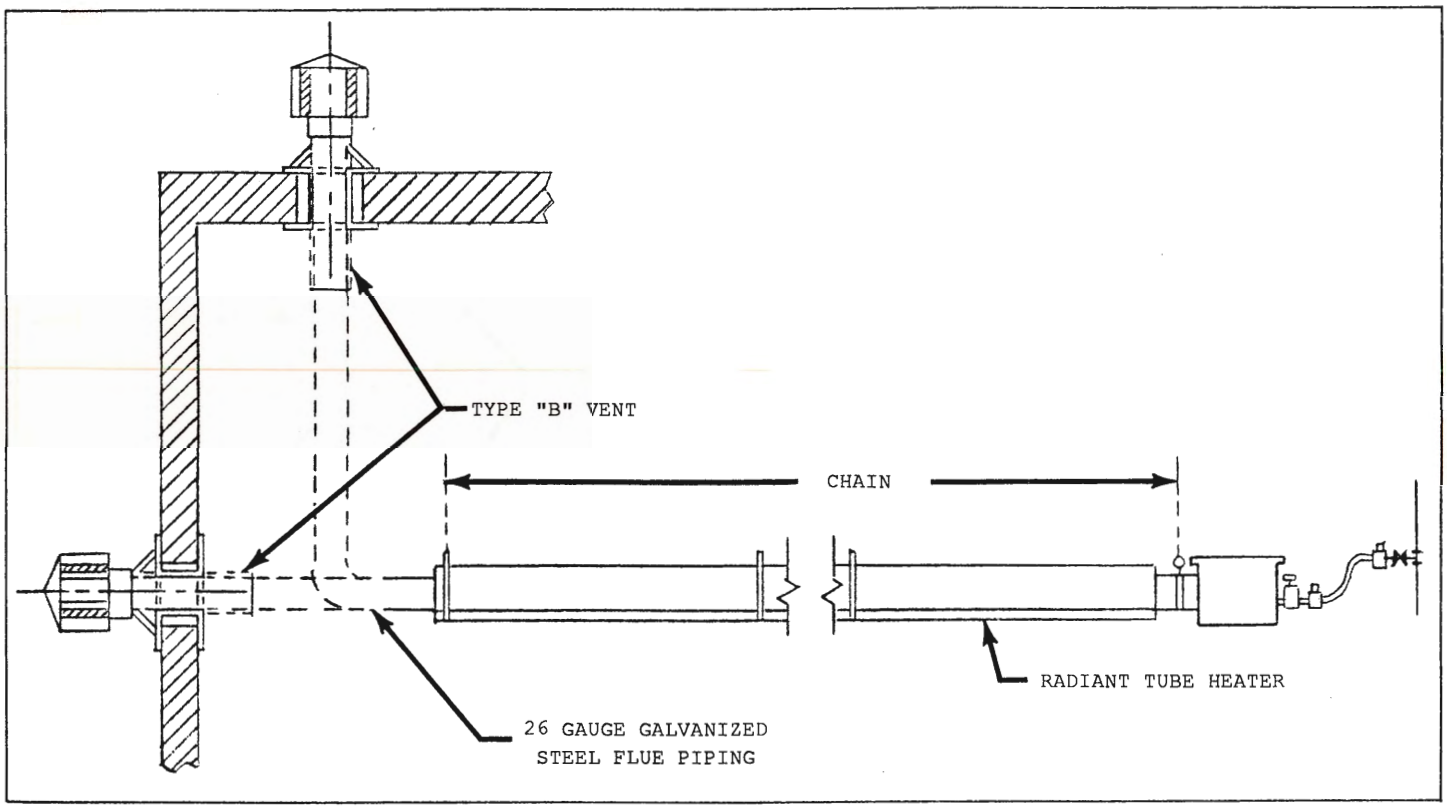


Figure 2-15

DETAIL FOR FLUE VENTING FOR MODELS DTHS-2

Table 2-1

DTHS MODEL	MBTUH INPUT	MAXIMUM STACK LENGTH OPT. EXTENSION INCL.
20-2	40	35'
	50	35'
	60	35'
	75	35'
40-2	50	20'
	60	20'
	75	20'
	100	20'
	125	40'
	150	40'
60-2	125	20'
	150	20'
	MAXIMUM OF (2) 90° ELBOWS	

3. Stacks may consist of a 10-ft. section of radiant tubing if desired. A minimum of 26 GA. galvanized steel pipe is required. Total stack length from the heater to the exit should not exceed 35 ft. on the DTHS20 models; 20 ft. on the DTHS40 and DTHS60 models. Total stack length for DTHS40-125 and DTHS40-150 models is 40 ft. The portion of the stack that passes through combustible material of the building wall or roof must be dual-insulated flue pipe (See Figure 2-15 and Table 2-1).

4. Stacks may exit the building either horizontally or vertically. Vertical venting exiting the roof should be 2 ft. above the eave of the roof. For horizontal venting, flue should be 2 in. from the sidewall. Care should be exercised to assure that vent opening is beyond any combustible overhang (See Figure 2-16).

5. A common flue of 6 in. diameter may be used for double-venting of units. Allow one thermostat to control both units. When common venting is used, flues should be connected so that the by-products **of one heater cannot flow into the adjoining flue of the other heater.** A dual-exhaust assembly is available from the manufacturer; P/N DTH-Y or DTH-RT (See Figures 2-17 through 2-19).

6. Do not use more than two 90° elbows for all models.

7. A Breidert or Mastervent vent cap must be used for sidewall venting. A Breidert or Mastervent vent cap is recommended for roof venting.

8. All vent pipes must be sealed to prevent leakage of flue gas into building. Aluminum or Teflon tape suitable for 250°F is recommended.

9. Single-wall vent pipe exposed to cold air must be insulated to prevent condensation.

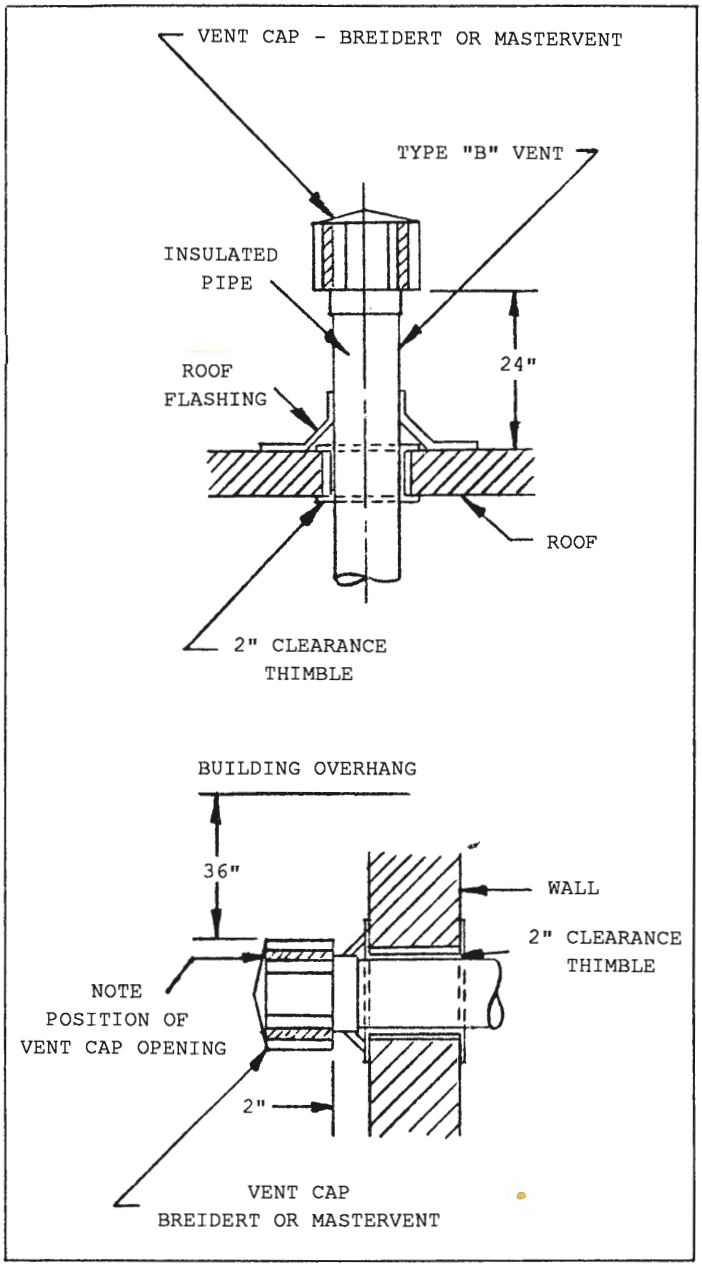


Figure 2-16

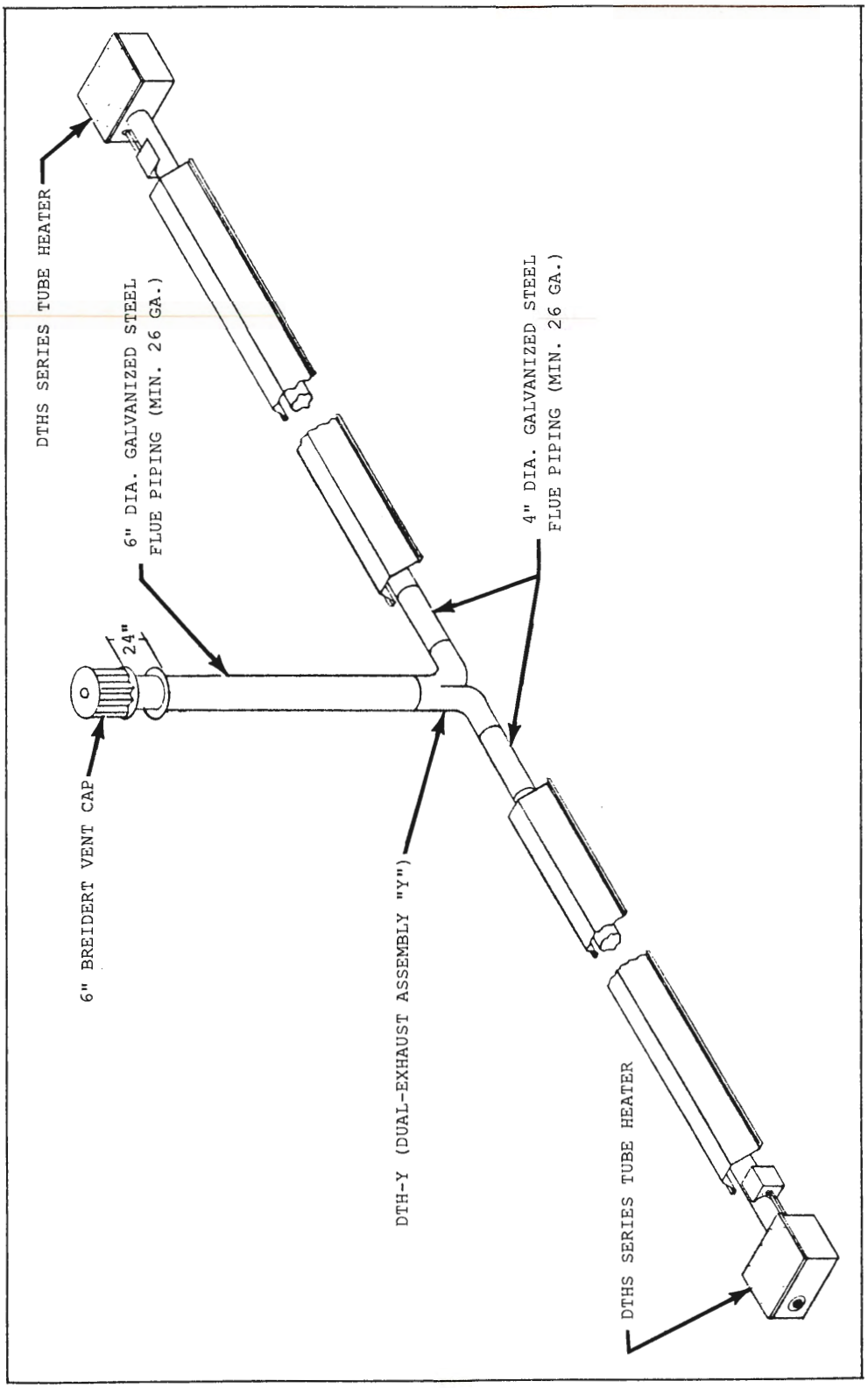


Figure 2-17

DUAL-EXHAUST ASSEMBLY (THROUGH ROOF)

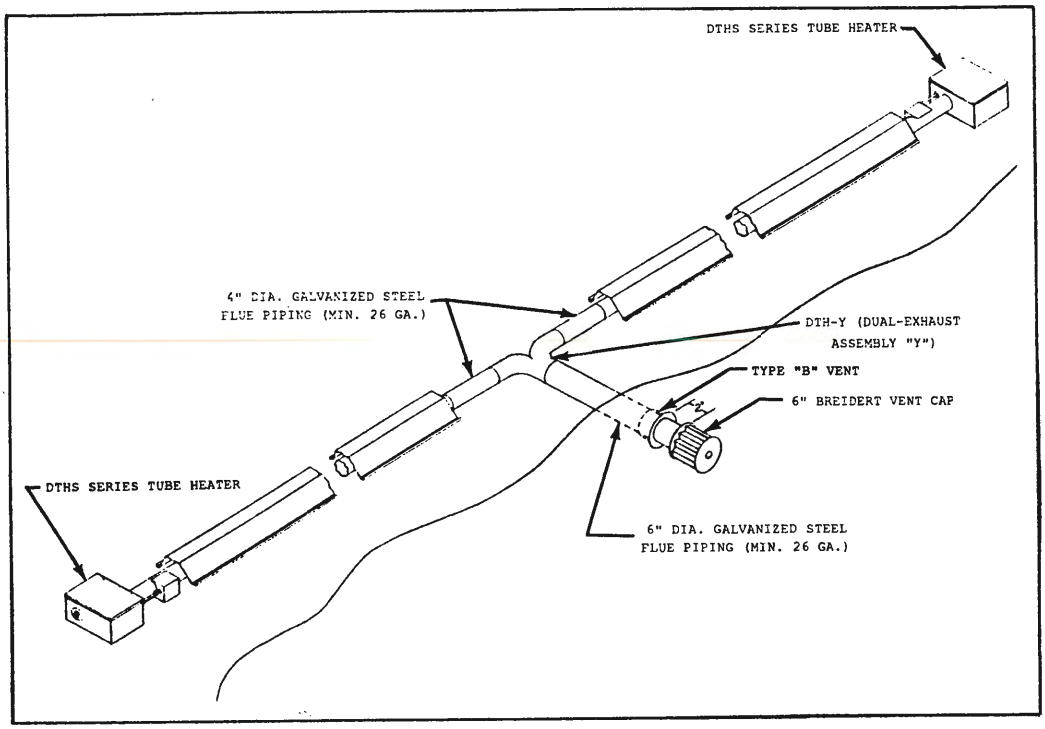


Figure 2-18

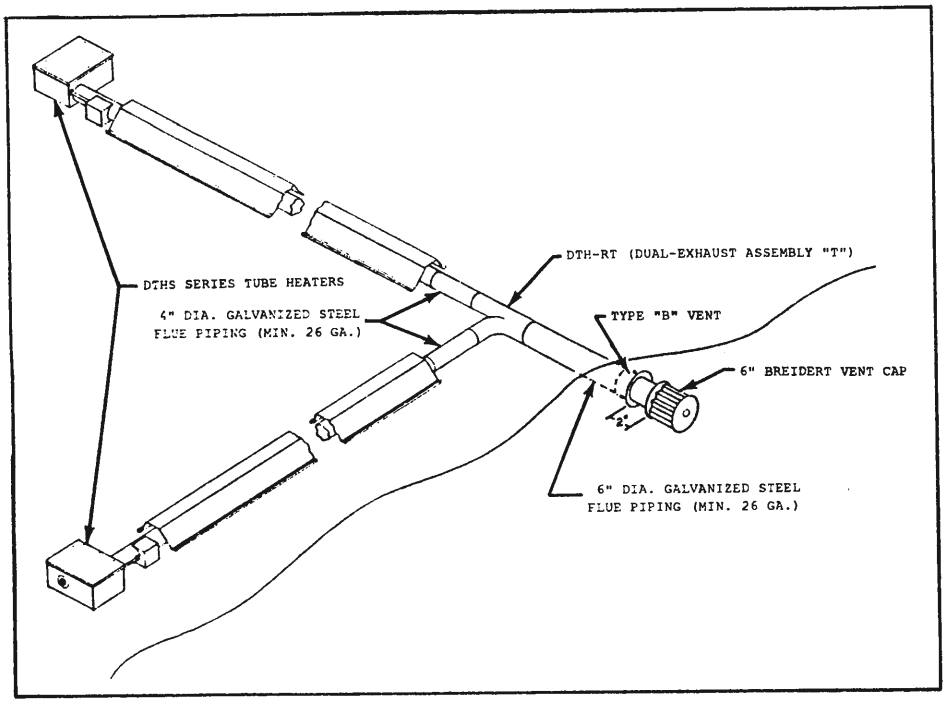


Figure 2-19

DUAL-EXHAUST ASSEMBLY (THROUGH WALL)

2.4 Installation for Unvented Operation (Optional)

The DTHS model units are approved for unvented operation when equipped with a factory-supplied end cap/diffuser, Part No. DTH-WVE (See Figure in Foreword). This allows the products of combustion to discharge from the units into the space being heated.

Ventilation of the space is required to dilute those products of combustion sufficiently. For proper ventilation, it is recommended that a positive air displacement of at least 3.8 CFM per 1000 BTUH of natural gas input be provided.

If propane is used, 4.5 CFM per 1000 BTUH of gas is recommended. This air displacement may be accomplished by either gravity or mechanical means. Provisions must be made for a sufficiently large fresh-air intake area and exhaust air outlet area, to accomplish the 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.

2.5 Combustion Air Intake (Optional)

Combustion air intake has a factory-preset air orifice. If indoor combustion air is to be supplied for a tightly closed room, one square inch of free air opening should be provided for each 5,000 BTUH of heater input.

If the building has a negative pressure or if contaminants such as solvents, foreign particles, or corrosive vapors are in the air, then outside combustion air must be supplied directly to the heater. Outside combustion air may be provided by an accessory 4-in. air duct and directly attached over the air orifice. A 4-in. air intake collar is available from the manufacturer, P/N DTH-AIC (See Figures 2-20 and 2-21).

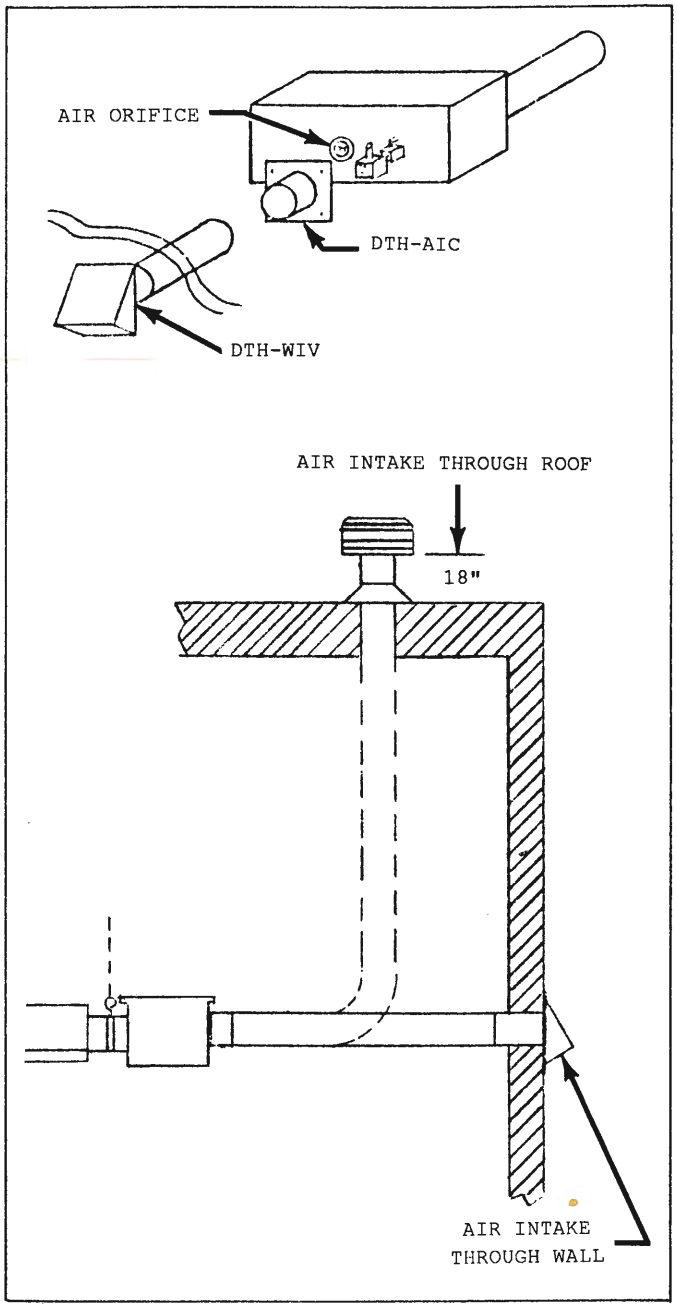


Figure 2-20

WARNING

THIS IS NOT AN EXPLOSION-PROOF HEATER.

Hazardous locations: Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier or other authorities for approval of the proposed installation.

NOTE: Use insulated duct or schedule-40 PVC pipe to prevent condensation on outer surface. Keep intake opening at least 3 ft. from any exhaust vent openings. For limitations of length and size, see Table 2-2.

Table 2-2

DTHS MODEL	AIR INTAKE DUCT SIZE	MAXIMUM DUCT LENGTH
ALL MODELS	4"	20'
	5"	30'

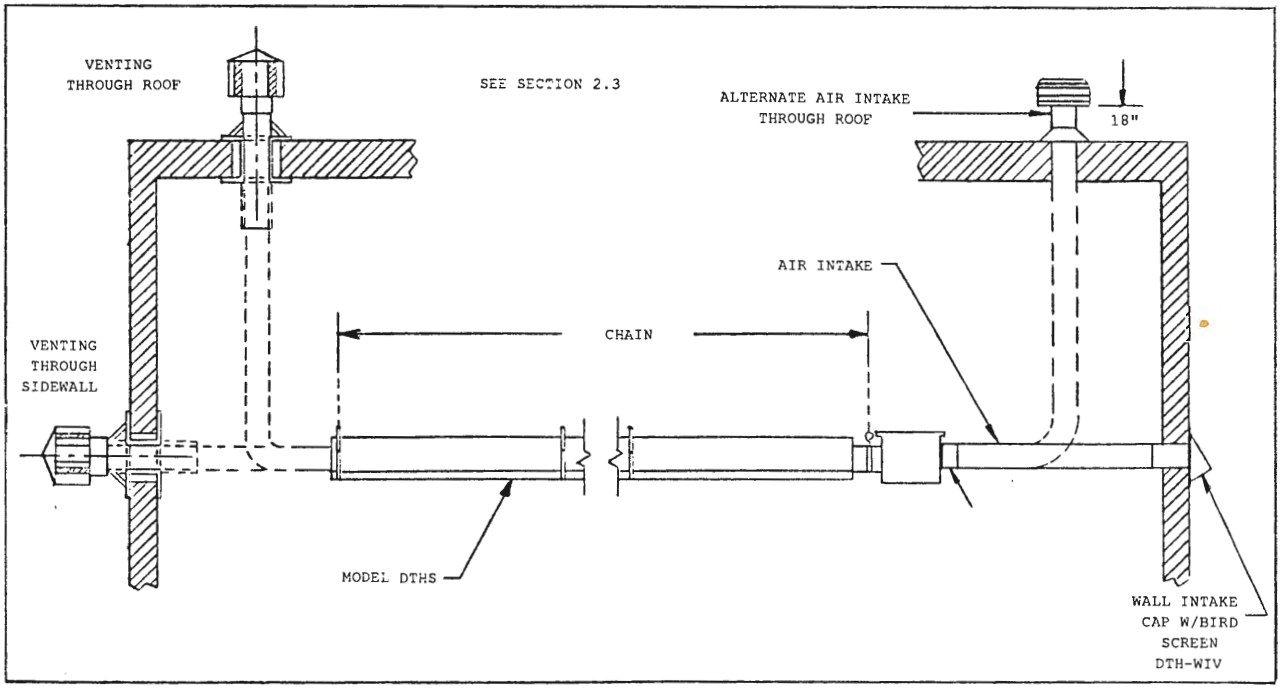


Figure 2-21

OUTSIDE COMBUSTION AIR FOR MODELS DTHS-2

2.6 Gas Supply

CAUTION

CORRECT INLET PRESSURES ARE VITAL TO EFFICIENT OPERATION OF HEATERS. REFER TO AGA RATING PLATE AND IF NECESSARY CONSULT GAS COMPANY.

If all or a portion of the gas supply line consists of used pipe, it must be cleaned and then inspected to determine its equivalency to new pipe. Excessive torque on manifold may misalign orifice. Always use two wrenches when tightening mating pipe connections.

Never use a match or lighted flame to test for gas leaks. Use soap-and-water solution to check for leaks. If any portion of the gas supply line is located in an area that could cause an abnormal amount of condensate to occur in the pipe, a sediment trap should be installed (See Figure 2-22).

NOTE: For high pressure gas above 14" W.C. a high pressure regulator and gas cock must be used. If compressed air is used to detect leaks in the gas supply line, disconnect and cap at shut-off cock to avoid damage to regulator and gas valve.

Test all main supply lines at 1.5 times working pressure. **(Isolate heater gas valve and supplied gas cock during test.)**

A typical gas supply line connection is illustrated in Figure 2-22. This method will decrease the possibility of any loose scale or dirt in the supply line entering the heater's control system, causing a malfunction. Provide a 1/8 in. NPT plugged tapping accessible for test gauge connection immediately upstream of gas connection to heater. The gas supply line must be of sufficient size to provide the required capacity and inlet pressure to the heater as follows:

- Natural Gas

  To obtain the required manifold pressure of 3.8 in. W.C. (Water Column), a minimum of 4.8 in. inlet pressure is required for purposes of input adjustment. The 150,000 BTUH unit requires a 6.0 in. W.C. manifold pressure and a minimum inlet pressure of 7.0 in. W.C. A maximum pressure of 14.0 in. W.C. is allowed for all units.

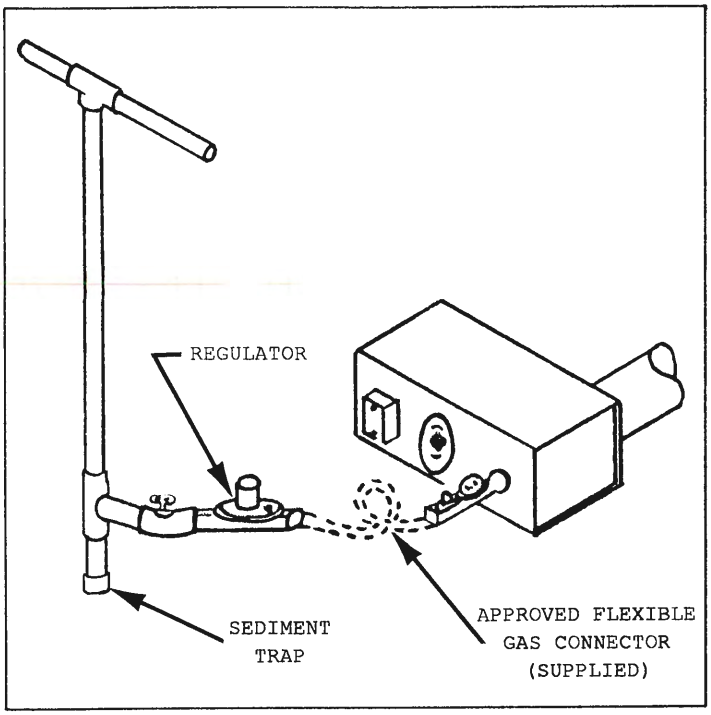


Figure 2-22

- Propane Gas

  To obtain the required manifold pressure of 10.0 in. W.C. (Water Column), a minimum of 11.0 in. W.C. for purposes of input adjustment, to a maximum of 14.0 in. W.C. must be provided ahead of the control system on each heater. Do not exceed a manifold operating pressure of 10.0 in. W.C.

  Use only a pipe joint compound that is resistant to liquefied petroleum gases.

- Pressure Equivalents

1 in.	Water column equal	0.58 oz. sq. in.
4.8 in.	Water column equal	2.78 oz. sq. in.
6 in.	Water column equal	3.48 oz. sq. in.
11 in.	Water column equal	6.36 oz. sq. in.
14 in.	Water column equal	0.50 lb. sq. in.

- Allowance for Heater Expansion

  Allowances must be made for the heater to expand. Use of the stainless-steel, flexible gas connector is recommended. If local codes insist on rigid piping to the heater, then a swing joint can be used, or use a rigid mounting for the control box and provide for expansion in the opposite direction.

2.7 Electrical

1. Heaters operate on 120 volts, 60 Hz. The ignition requires a current of 4.8 amps. The running current is 1.1 amps.

2. Heater must be grounded in accordance with the National Electrical Code NFPA 70.1984 when an external source is utilized.

3. It is recommended that the thermostat be installed on the hot side of a fused supply line and have a sufficient ampere rating for the heater(s) it controls.

4. Wiring must not be run above or below the heater nor exposed to the radiant output.

5. Observe proper electrical polarity.

2.8 Lighting Instructions

1. Purge main gas supply line.
2. Rotate heater's manual gas valve knob to "ON" position.
3. Close electrical circuit.
4. If heater fails to light, turn off gas and wait five minutes before repeating the above procedure.

2.9 Shutdown Instructions

1. Rotate heater's manual gas valve to the "OFF" position.
2. Open electrical circuit.

3 THEORY OF OPERATION

3.1 Models DTHS 20 and 40 (40,000 BTU and 100,000 BTU)

- **Starting Circuit (Figures 3-1 and 3-2)**

When voltage is applied to L1 and L2 a circuit is completed from L1 via the blower motor to L2. The blower fan is mounted in the control box and rated to supply sufficient air for combustion.

Air pressure generated by the blower will cause the normally open burner pressure switch 1 to close. The burner pressure switch is factory-preset to ensure that a minimum of 2/3 the normal rate of combustion air is passed into the combustion chamber. Any air flow restriction resulting in less than 2/3 normal rate will cause the pressure switch to open and shut down the entire system.

Current will pass through the burner pressure switch to the normally closed exhaust pressure switch 2. The exhaust pressure switch is factory-preset to ensure that a minimum of 1/2 normal rate of exhaust air is expelled from the heater. Any air flow restriction resulting in less than 1/2 normal rate will cause the pressure switch to open and shut down the entire system.

NOTE: Pressure switches are non-adjustable.

Another circuit is completed from L1 to the radiant sensor and glo-bar back to L2. Simultaneously, the safety and booster coils of the first of two redundant valves are energized through the contact of the radiant sensor. This causes the valve to open and the glo-bar to heat up. No gas flows, however, until the second redundant valve is energized and opened.

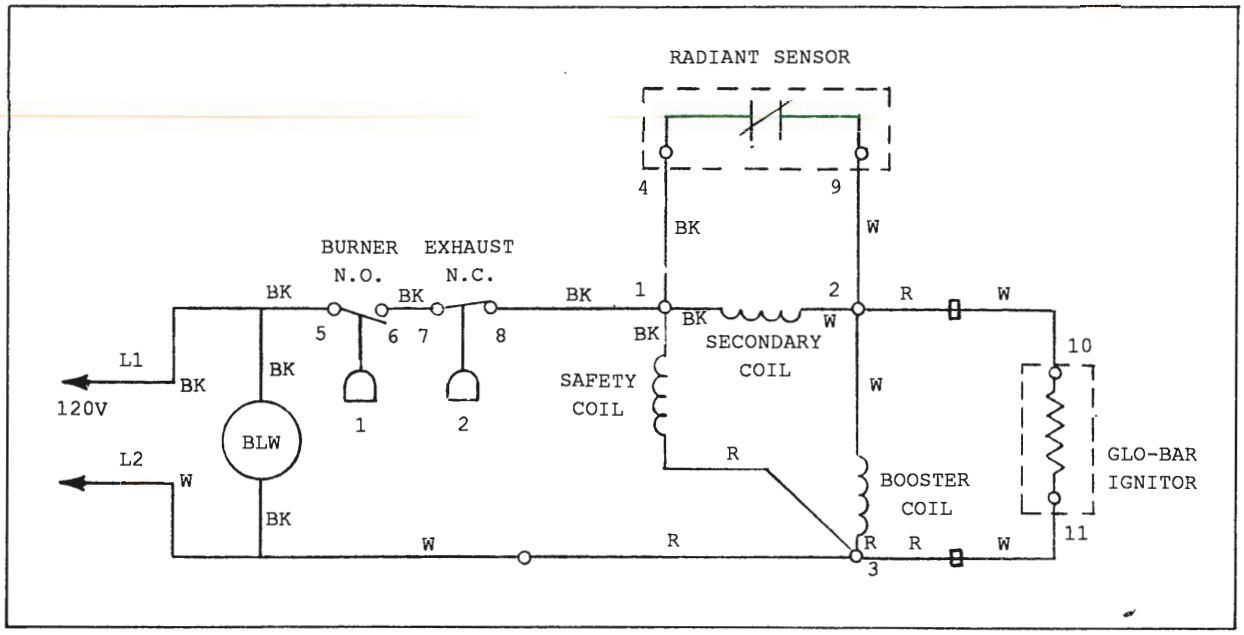


Figure 3-1

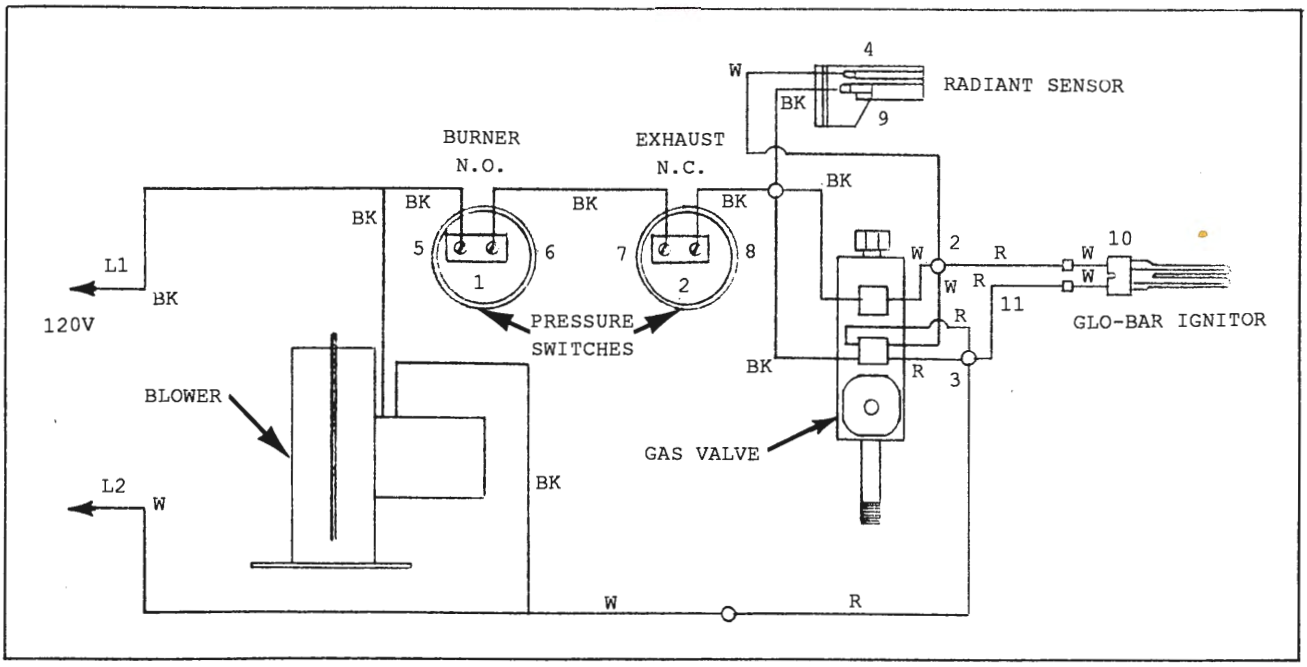


Figure 3-2

- **Running Circuit**

When the glo-bar reaches ignition temperature, the radiant sensor is heated and opens (maximum 60 seconds). The radiant sensor is a heat-sensitive bi-metal switch with a single-throw contact that is normally in the closed position and calibrated to open when the glo-bar has attained ignition temperature.

The second redundant valve, now in series with the glo-bar, is energized and opened. Gas flow results at the burner and is ignited by the glo-bar.

The second coil remaining in series with the glo-bar causes the glo-bar to cool down. However, the radiant sensor is held open by radiant heat emitted from the gas flame. The booster coil of the first valve is now placed in series with the secondary coil, and very low current flows through the coil. The safety coil is only sufficient to hold the first valve open. If a momentary power failure occurs, the first valve will shut down the gas supply to the burner. When power is restored, the safety coil alone is not sufficient to pull the valve open. Therefore, the radiant sensor cools down, the contacts close and the unit cycles (maximum 60 seconds).

3.2 Models DTHS 40 and 60 (125,000 BTU and 150,000 BTU)

- **Starting Circuit (Figures 3-3 and 3-4)**

When voltage is applied to L1 and L2, a circuit is completed from L1 via the blower motor to L2. The blower fan is mounted in the control box and rated to supply sufficient air for combustion.

Air pressure generated by the blower will cause the normally open burner pressure switch 1 to close.

The burner pressure switch is factory-preset to ensure that a minimum of 2/3 the normal rate of combustion air is passed into the combustion chamber. Any air flow restriction resulting in less than 2/3 normal rate will cause the pressure switch to open and shut down the entire system.

Current will pass through the burner pressure switch to the normally closed exhaust pressure switch 2. The exhaust pressure switch is factory-preset to ensure that a minimum of 1/2 normal rate of exhaust air is expelled from the heater.

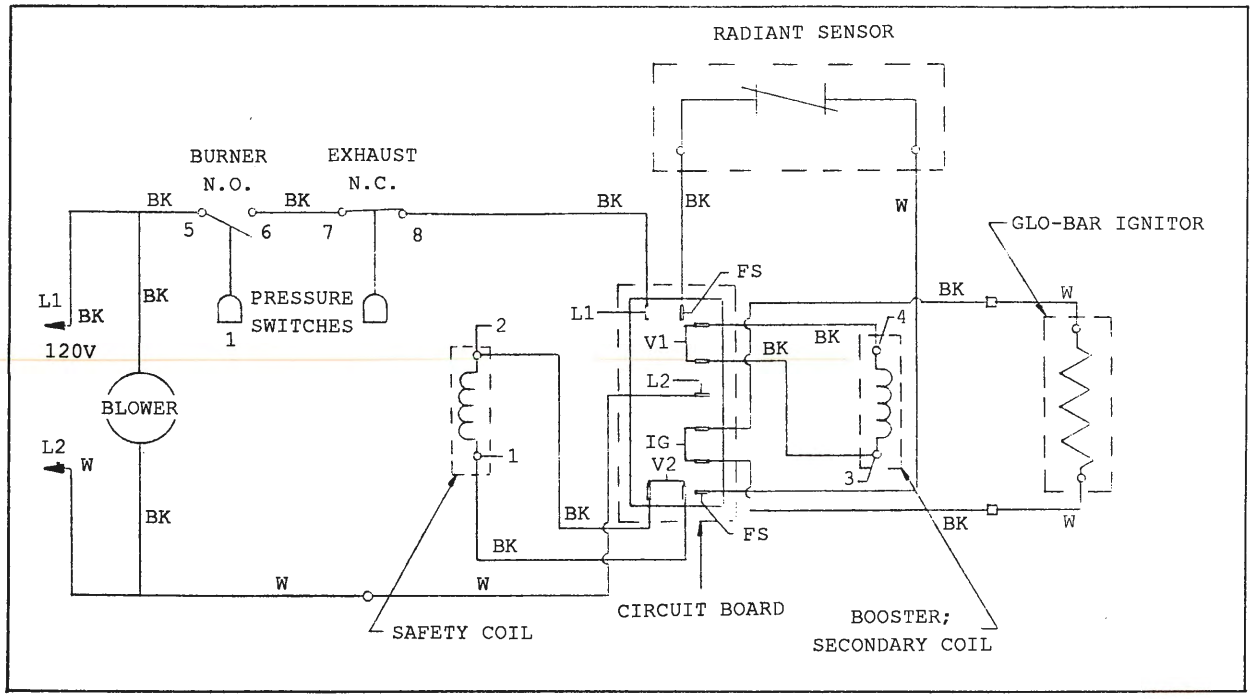


Figure 3-3

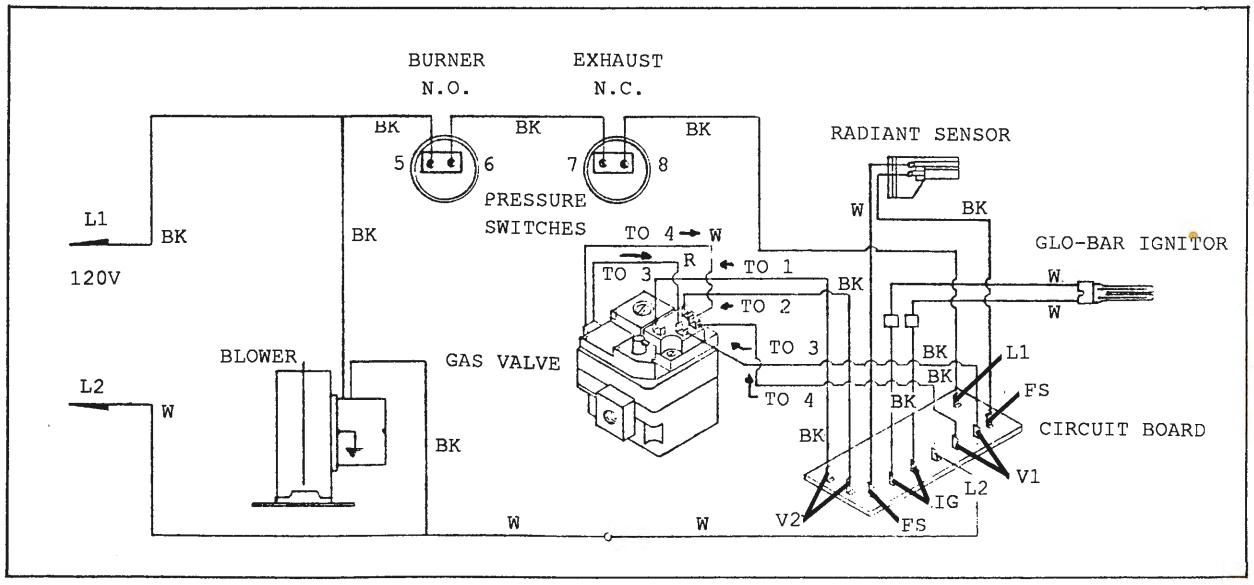


Figure 3-4

Any air flow restriction resulting in less than 1/2 normal rate will cause the pressure switch to open and shut down the entire system.

NOTE: Pressure switches are non-adjustable.

Another circuit is completed from L1 to the radiant sensor and glo-bar back to L2. Simultaneously, the first of two redundant valves is energized through the contact of the radiant sensor. This causes the valve to open and the glo-bar to heat up. No gas flows, however, until the second redundant valve is energized and opened.

- **Running Circuit**

When the glo-bar reaches ignition temperature, the radiant sensor is heated and opens (maximum 60 seconds). The radiant sensor is a heat-sensitive, bi-metal switch with a single-throw contact that is normally in the closed position and calibrated to open when the glo-bar has attained ignition temperature.

The second redundant valve, now in series with the glo-bar, is energized and opened. Gas flow results at the burner and is ignited by the glo-bar.

The second coil remaining in series with the glo-bar causes the glo-bar to cool down. However, the radiant sensor is held open by radiant heat emitted from the gas flame. The coil of the first valve is now placed in series with the resistor in the circuit board, and a very low current flows through the coil. The low current is sufficient to hold the first valve open. If a momentary power failure occurs, the first valve will shut down gas supply to the burner. When power is restored the first coil will not have sufficient current to pull the valve open. Therefore, the radiant sensor cools down, the contacts close and the unit cycles (maximum 60 seconds).

4 MAINTENANCE

DTHS Model gas-fired, infrared heaters require a minimum of routine maintenance to keep them operating at peak performance.

1. The blower motor must be oiled periodically (every 3 to 6 months depending on the amount of dirt in the incoming combustion air), with five drops of SAE 20W oil in each oiling hole (see Figure 4-1). Also make sure 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.

2. Keep the aluminum reflectors clean.

3. If the radiant sensor is removed or replaced while the heater is being serviced, care must be taken when re-installing the sensor. Any misalignment between the radiant sensor and the radiant tube "window" will cause the system to go into nuisance shutdown. To prevent this, install as shown in Figure 4-2.

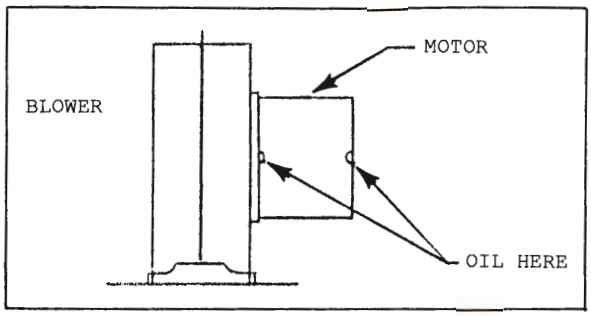


Figure 4-1

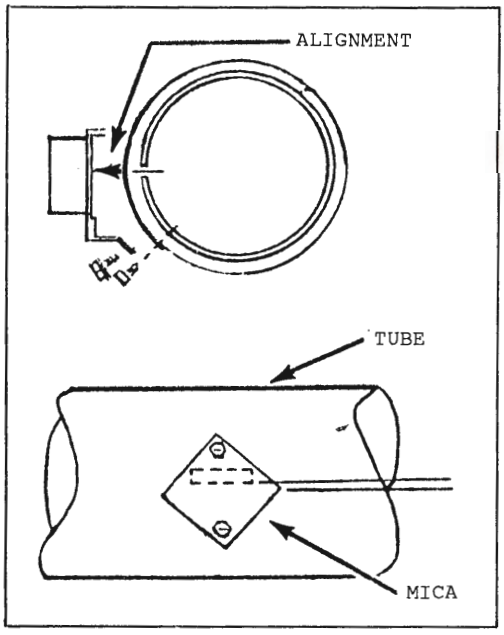


Figure 4-2

5 TROUBLESHOOTING

5.1 Glo-Bar Replacement

1. Shut off gas and electricity to unit.

2. Remove cover (A) from control box (See Figure 5-1).

3. (See Figure 5-2.) Unplug wire (A) at the glo-bar. Disconnect 3-piece union (B) and slide control assembly back. Unscrew bolts (C) fastening the orifice bracket to the control box and pull out burner housing from tube.

4. Remove screws (D) from top of burner housing and pull out burner (See Figure 5-3).

5. Remove screw (E) holding broken glo-bar to burner and replace glo-bar (See Figure 5-4).

6. Install new glo-bar by reversing the above steps.

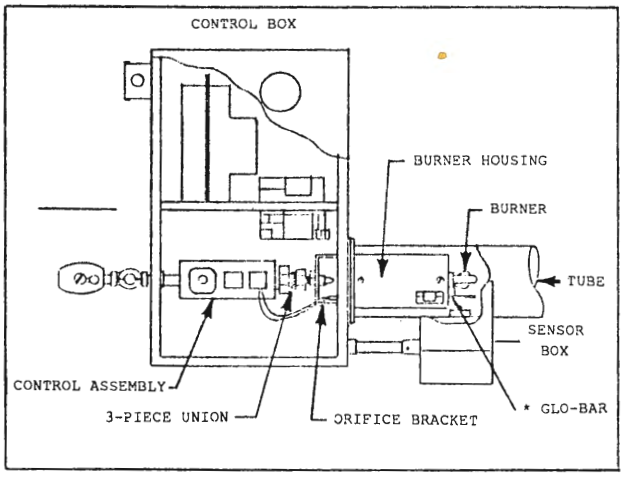


Figure 5-1

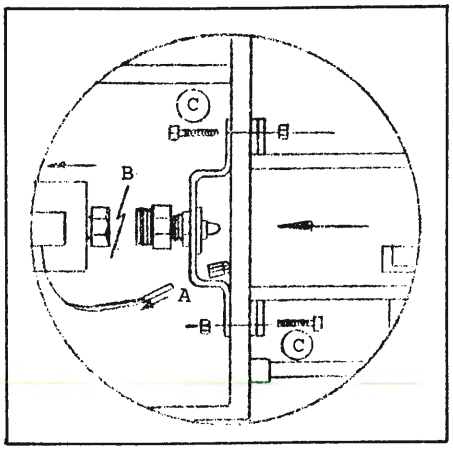


Figure 5-2

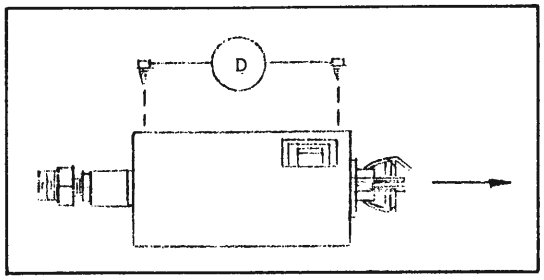


Figure 5-3

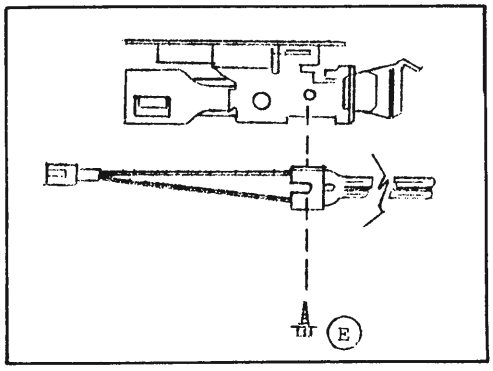


Figure 5-4

5.2 Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Thermostat closed but nothing happens.	1. Blown fuse. 2. Defective thermostat. 3. Loose or disconnected wire. 4. Defective Fan.	1. Replace. 2. Replace. 3. Repair as required. 4. Lubricate, repair or replace.
Thermostat closed. Fan operates. No Glo-Bar energization.	1. Loose or disconnected wire. 2. Plugged or restricted exhaust vent. 3. Plugged pressure switch lines. 4. Defective pressure switches. 5. Defective Glo-Bar. 6. Defective radiant sensor. 7. Box lid or gasket not in place.	1. Repair as required. 2. Remove foreign matter. 3. Clean as required. 4. Replace only. Do not adjust. 5. Replace. 6. Replace radiant sensor. 7. Put in place.
Thermostat closed. Fan and Glo-Bar operate. After 45 seconds Glo-Bar shuts off. Nc ignition.	1. Closed gas supply. 2. Dirty or restricted orifice. 3. Defective valve, disconnected valve wire.	1. Open all gas connections. 2. Remove and clean with a soft object. 3. Replace or repair.
Thermostat closed, fan and Glo-Bar operate. After 1 minute, Glo-Bar stays on. No ignition.	1. Dirty or sooted radiant sensor window, or Mica. 2. Misaligned radiant sensor window, fails to "see" Glo-Bar operation. 3. Defective radiant sensor.	1. Clean as necessary. 2. Adjust radiant sensor to radiant tube using prepunched mounting holes. 3. Replace radiant sensor.
Thermostat closed, fan and Glo-Bar operate. Ignition occurs. Burner cycles off after a minimum of 1 minute.	1. Dirty or sooted radiant sensor window. 2. Misaligned radiant sensor. 3. Low gas pressure. 4. Dirty or restricted orifice. 5. Defective radiant sensor.	1. Clean as necessary. 2. Adjust radiant sensor to radiant tube using prepunched mounting holes. 3. Provide required gas pressure. 4. Remove and clean with a soft object. 5. Replace.
Loss of heater efficiency.	1. Low gas pressure. 2. Dirty or restricted orifice. 3. Foreign matter inside burner assembly. 4. Unit cycles on and off. 5. Reflector is sooted and lost its reflective ability. 6. Reflector not in place. 7. Clogged fan blower.	1. Provide required gas pressure. 2. Remove and clean with a soft object. 3. Clean as necessary. 4. Check previous symptom. 5. Clean with aluminum cleaner and soft wiping cloth. 6. Put in place. 7. Clean.
Visual inspection of burner operation not possible.	1. Dirty or sooted sight glass. 2. Unit mounted upside down.	1. Remove, clean or replace. 2. Mount correctly.
Radiant tubes leaking burnt gasses.	1. Loose tube connections. 2. Holes or cracks in radiant tubes.	1. Assure that tube is fully inserted into flared end and properly clamped. 2. Replace.
Condensation.	1. Stack length too long. 2. Light gauge flue stack used.	1. Shorten stack. 2. **Minimum of 26GA vent pipe is required.**
Tube bowing.	1. Insufficient combustion air. 2. Over fired.	1. Provide 1 sq. inch of free air for every 5000 BTUH of input. 2. Check gas pressure and orifice size.
Stack sooting.	1. Insufficient combustion air. 2. Improper gas.	1. Provide 1 sq. inch of free air for every 5000 BTUH of input. 2. Correct.
Tube corroding.	Contaminated combustion air.	Provide fresh air inlet duct.

NOTE: Do not adjust any pressure switch.

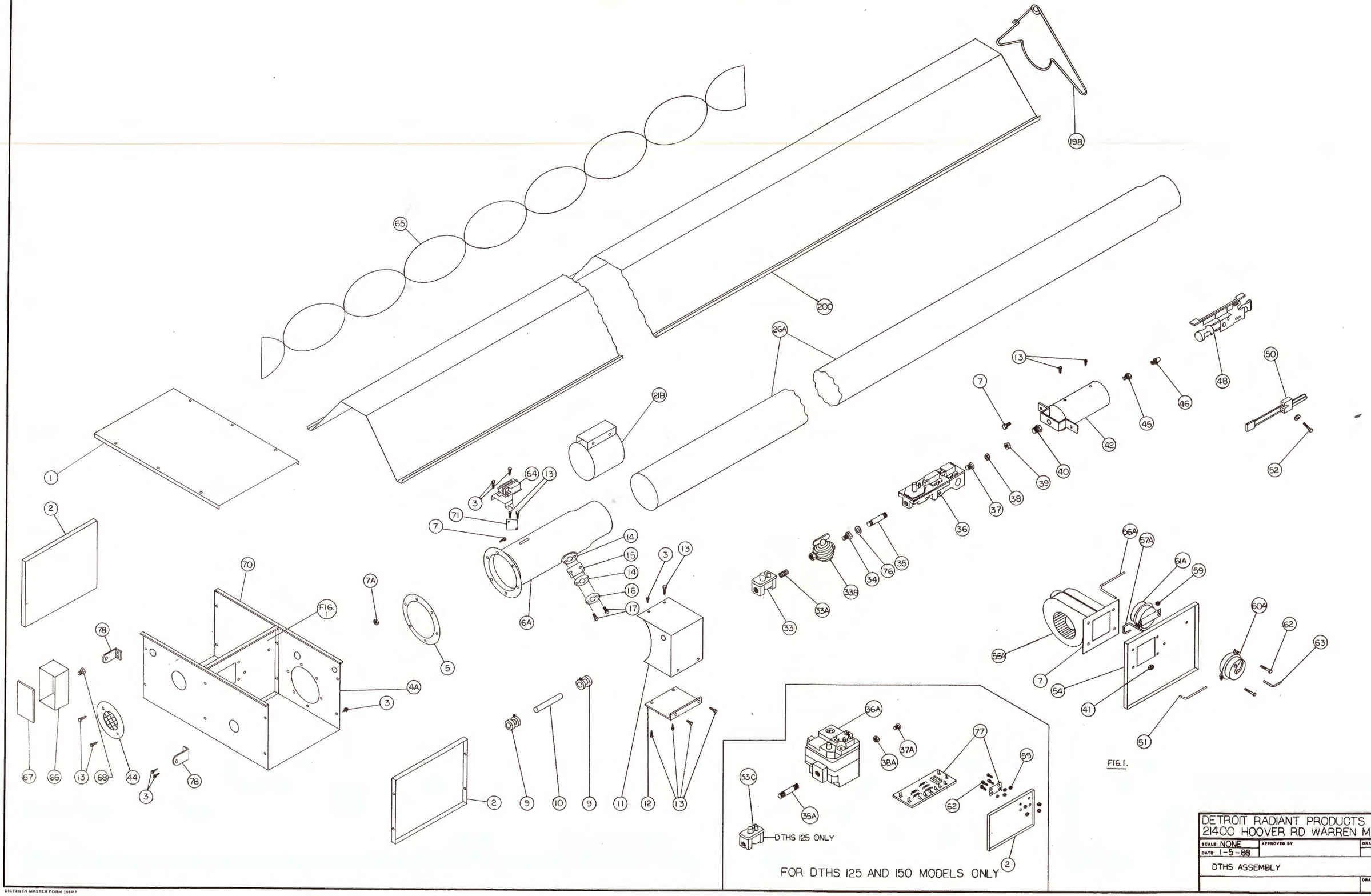
6 PARTS LIST

Item No.	Description
TP 1.	Control Box Cover
TP 2.	Outside Control Box End
TP 3.	# 8 Sheet Metal Screw 1/4
TP 4A.	Control Box for DTHS
TP 5.	Gasket
TP 6A.	16" Burner Tube with Flange
TP 7.	1/4"-20 x 1/2" Machine Screw
TP 7A.	1/4"-20 Hex Nut
TP 9.	Conduit Coupling
TP 10.	Conduit 4" x 1/2"
TP 11.	Radiant Sensor Box
TP 12.	Radiant Sensor Lid
TP 13.	# 8 x 1/2" Self Drilling Screw
TP 14.	Sight Glass Gasket
TP 15.	Sight Glass
TP 16.	Sight Glass Washer
TP 17.	1/4"-20 x 1/2" Thread Cutting Screw
TP 19 B.	Wire Hanger
TP 20 C.	Reflector (120")
TP 21 B.	Butt Clamp
TP 26 A.	10' Exhaust Tube Straight
TP 33.	RV35AL Natural Gas
TP 33 P.	R400 Propane Gas (not shown)
TP 33 A.	1/2" x Close Nipple
TP 33 B.	Gas Cock
TP 33 C.	RV43 Natural Gas (DTH 125 only)
TP 34.	3/8" x 1/2" Bushing
TP 35.	Pipe Nipple 2 1/2 x 3/8
TP 35 A.	4" x 1/2" Pipe Nipple (DTH 125/150 only)
TP 36.	3/8" Gas Valve
TP 36 A.	1/2" Gas Valve (DTH 125/150 only)

Item No.	Description
TP 37.	3/8" Union Fitting
TP 37 A.	1/2" Union (DTH 125/150 only)
TP 38.	Union Nut
TP 39.	1/2" Union Fitting
TP 40.	1/2" x 1/4" Bushing
TP 42.	Burner Casing
TP 44.	Inlet Air Orifice with Screen
TP 45.	1/4" x 1/8" Bushing
TP 46.	Orifice
TP 48.	Main Burner
TP 50.	Glo-Bar Ignitor
TP 51.	Pressure Tube
TP 52.	#6 x 3/4" Sheet Metal Screw & Washer
TP 54.	Burner Box Divider
TP 55 A.	Fan Blower
TP 56 A.	1/4" Pressure Tube
TP 57 A.	1/4" Atmosphere Tube
TP 59.	#8 Hex Nut/Lock Washer
TP 60 A.	Exhaust Pressure Switch
TP 61 A.	Burner Pressure Switch
TP 62.	#8 x 1/2" Machine Screw
TP 63.	Pressure Tube
TP 64.	Radiant Sensor
TP 65.	Heat Diffuser (Baffle)
TP 66.	2" x 4" Outlet Box
TP 67.	2" x 4" Outlet Box Cover
TP 68.	Conduit Nipple
TP 70.	Control Box Cover Gasket
TP 71.	Radiant Sensor Mica
TP 76.	Rubber Bushing
TP 77.	Circuit Board (DTH 125/150 only)

NOTE

When ordering heater parts, please state the model and serial number of the heater.



DETROIT RADIANT PRODUCTS CO.
21400 HOOVER RD WARREN MI 48089

SCALE: NONE	APPROVED BY	DRAWN BY KB
DATE: 1-5-88		

DTHS ASSEMBLY

DRAWING NUMBER