

# **DBS SERIES**

## **RESIDENTIAL RADIANT TUBE HEATER**

**INSTALLATION, OPERATION  
MAINTENANCE  
AND PARTS MANUAL**



**Detroit Radiant Products Company**

**FOR YOUR SAFETY!**

**IF YOU SMELL GAS:**

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

**Do not store or use gasoline or other  
flammable vapors and liquids in the vicinity of  
this or any other appliance.**

## **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 THE DETROIT RADIANT PRODUCTS COMPANY HEATER. FAILURE TO COMPLY WITH THESE WARNINGS AND INSTRUCTIONS, AND THOSE ON THE HEATER COULD RESULT IN PERSONAL INJURY, DEATH, FIRE, ASPHYXIATION, AND/OR PROPERTY DAMAGE. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

### Approval Standards and Certifications

Detroit Radiant Products Company units comply with or are certified by the following Organizations or Standards:

- ❖ American National Standards (ANSI Z83.6)
- ❖ Occupational Safety and Health Act (OSHA)
- ❖ American Gas Association (AGA) Requirement for Residential Radiant Tube Heaters No. 7-89
- ❖ International Approval Services (IAS)

#### **FOR YOUR SAFETY!**

##### WHAT TO DO IF YOU SMELL GAS

- DO NOT TRY TO LIGHT ANY APPLIANCE.
- DO NOT TOUCH ANY ELECTRICAL SWITCHES AND DO NOT USE ANY PHONE IN YOUR BUILDING.
- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBORS PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
- IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

#### **FOR YOUR SAFETY!**

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCES.

### **IMPORTANT**

**Any** alteration of the system or of the factory authorized components specified either in this manual or by Detroit Radiant Products Company voids all certification and warranties.

### **Detroit Radiant Products Company**

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## SAFETY INFORMATION!

- The DBS series infrared heater has been designed and certified for residential use such as garages, solariums, swimming pools, etc.
- Detroit Radiant Products cannot anticipate every use which may be made of their heaters. Check with your local fire safety authority/insurance carrier if you have questions about local regulations.
- The following information must be read and understood before installing this heater. If additional information is required, call customer service at 1-800-222-1100 or 810-756-0950.

### WARNING!

This is not an explosion proof heater. When there is the possibility of exposure to flammable vapors, consult the local fire marshal or other authorities for approval of the proposed installation.

### CAUTION!

- Check AGA rating label on the heater to verify the minimum clearance to combustibles and the proper gas to be used. Check other labels on the heater to verify proper mounting.
- Minimum clearances to combustibles must be measured from the heater's radiant surface to nearest combustible surface or vehicle parked below. It is essential that the position and angle of the installation maintain clearances and avoid any contact with curtains, draperies, tarpaulins, etc.
- In all space heating applications, the minimum required mounting height above the floor is 8 ft.
- The installation of this heater must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI-Z223.1 (NFPA54-latest edition) and to the National Electrical Code ANSI/NFPA70 (latest edition).
- The heater's radiant pipes and optional protective grill will reach high temperatures during operation. Stay away from heater to avoid burns or clothing ignition.
- Young children should be carefully supervised when in the same room as the heater.
- Under no circumstances is either the gas supply line or the electrical supply line to the heater to provide any assistance in the suspension of the heater.
- The weight of the heater must be entirely suspended from a permanent part of the building structure having adequate load characteristics.
- Never store a propane gas cylinder inside a building or in the vicinity of any gas burning apparatus.
- Any guard or other protective device removed for servicing a heater must be replaced prior to operating the heater.
- Installation and repair of this heater should be done by a qualified service person. The heater should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required as necessary. It is imperative that the control compartment, burners and circulating air passageways of the heater be kept clean.
- If chlorinated or fluorinated contaminants are present in an area where the heater is installed, then non-contaminated air must be ducted to the heater. Sources of contaminants are refrigerants, solvents, adhesives, paints degreasers, paint removers, lubricants, pesticides, etc.
- If vaporized solvents are present in the area around the heater, noxious fumes may result due to contact with the HOT tube (exchanger). Chemicals must be properly stored per manufactured instructions. Ventilation requirements as outlined by local codes must be maintained.

**SAFETY CLEARANCE INFORMATION!**

**WARNING!**

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

**WARNING!**

Materials and/or items stored under the heater will be subjected to radiant heat and could be seriously damaged.

CLEARANCES TO COMBUSTIBLES (IN.) AND VEHICLES PARKED BELOW					
MODEL NO.	MOUNTING ANGLE	SIDE		TOP	BELOW
		BEHIND	IN FRONT		
DBS 10-25	0	6		4	26
	0-45	4	18	9	20
DBS 20-40	0	15		4	40
	0-45	12	24	9	36

DBS 10-25    End Clearance - 6 in.  
 DBS 20-40    End clearance - 15 in.  
 DBS 20-40    Unshielded DB-E6 elbow or DB-TF1B "U" assembly - top clearance is 18 in.

All models require 20" clearance on control box end.  
 All clearances are measured from radiant surface.

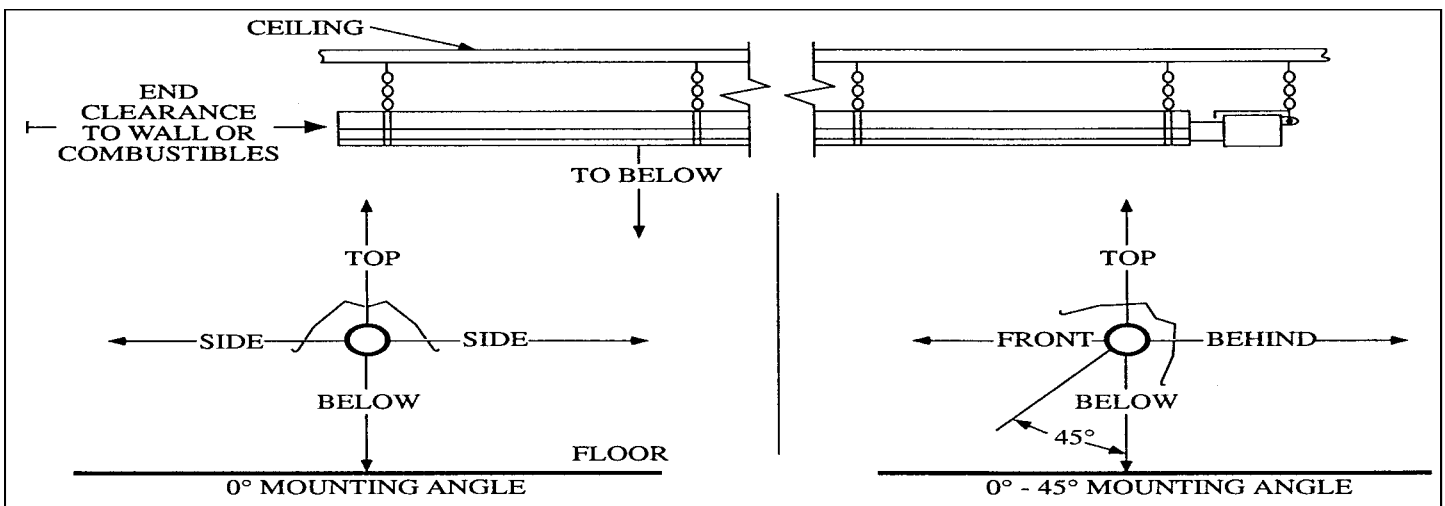


Figure 1: Clearance-to-Combustibles Diagram

# 1. INSTALLATION

## 1.1 Design Criteria

The heater's radiant energy should be directed to a specific work area or the area with the highest heat loss or cold mass introduction. Windows or glazed areas will not contain infrared radiant energy, therefore, position reflectors or heaters accordingly.

When positioning heaters, keep in mind the clearance to combustible materials, vehicles parked below, lights, overhead doors, storage areas with stacked materials, sprinkler heads, gas and electrical lines, curtains, draperies, tarpaulins, and any possible obstructions or hazards. Also maintain adequate clearance for servicing and proper operation. Refer to the Warning, Cautions and the Clearance to Combustibles chart in the Safety Clearance Information Section and on the heater to verify that a safe installation condition exists.

Once all of the safety precautions and design criteria are met, the actual installation of the heater may begin.

The following guidelines must also be met to ensure a good installation and proper heater performance:

- The heater **must not** be mounted lower than 8 ft. above the finished floor.
- The heater **must** be installed with factory supplied vent cap. See Section 1.8, Flue Venting.
- **Do not** exceed the maximum duct length for fresh air intake. See Section 1.6, Combustion Air Requirements.
- **Do not** draw fresh air to the heater from an attic space. There is no guarantee that adequate air will be supplied.
- All heaters require air to operate. Heaters utilizing indoor air for combustion must have adequate infiltration of air supply, one square inch of free air opening for each 5000 BTU/H of heater input is required.
- Heater must be grounded.

## 1.1 Prechecks

1. Verify that all parts have been received by checking them against the packing list. If anything is missing, notify the Re-Verber-Ray Representative or Detroit Radiant Products.
2. Check the AGA rating label on the heater to verify the model number, the gas to be used and that the clearance to combustibles will be met.
3. Make sure the finished installation will conform to the design requirements listed in the Clearance to Combustibles Chart and the limits shown in Figures 1-1 and 1-2.
4. While heater is still on the ground, connect a 120V line to the heater, and check glo-bar operation. If the glo-bar does not light, see Section 4.2, Glo-Bar Replacement, for re-placement instructions.

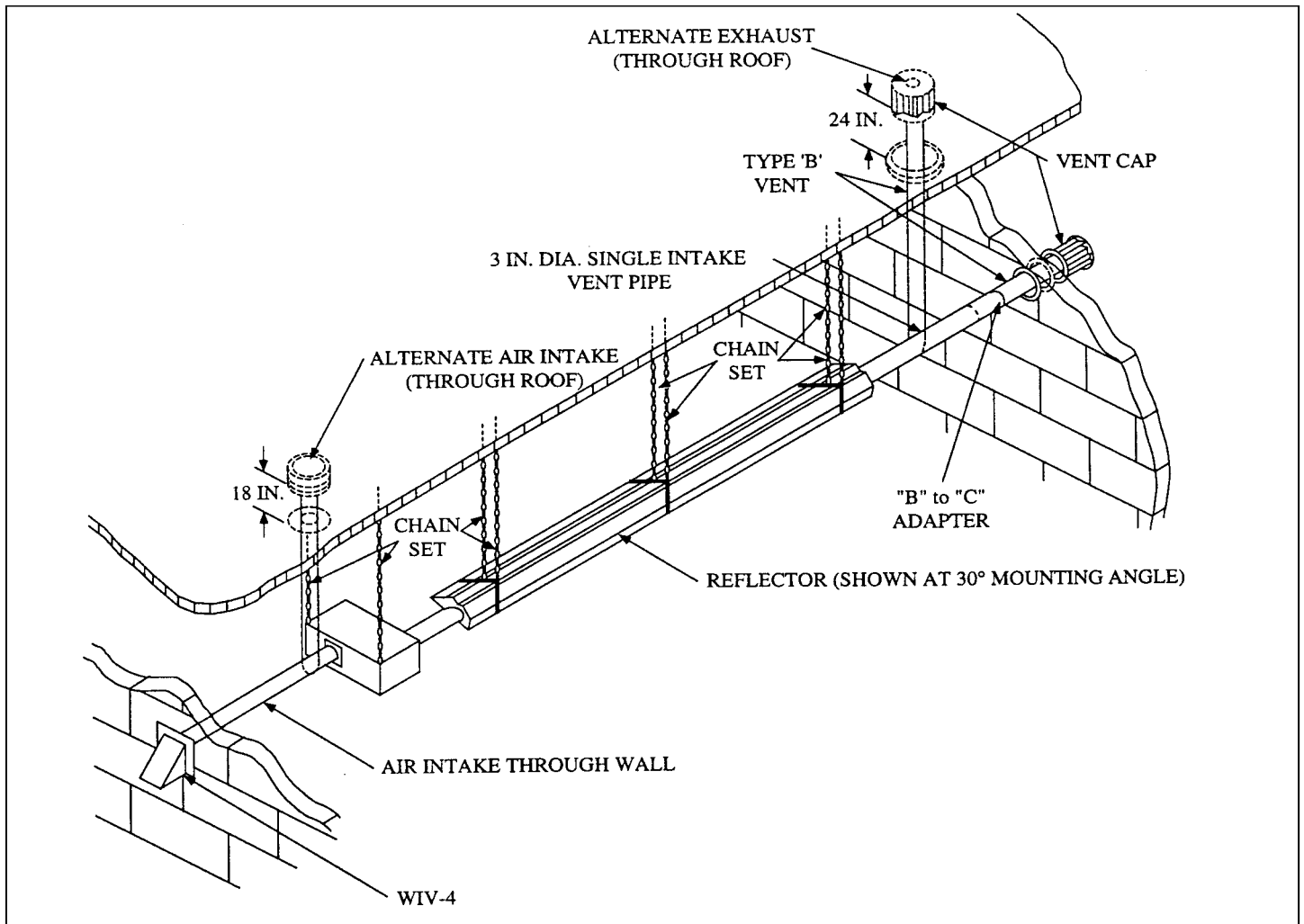


Figure 1-1: Typical Installation Drawing

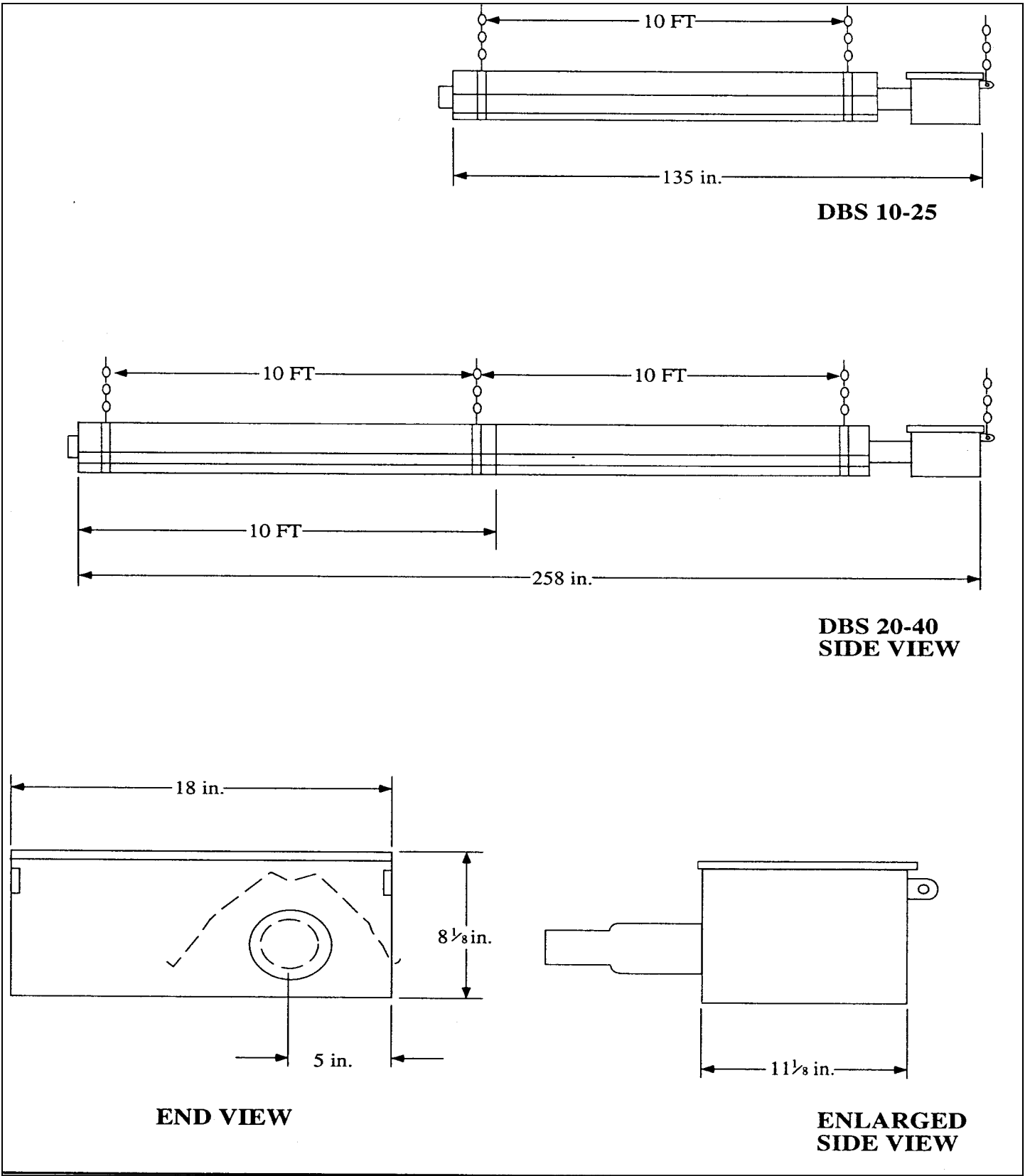


Figure 1-2: Dimensions for Side View and End View of Model DBS 10-25 and DBS 20-40



### 1.3 Heater Mounting and Reflector Assembly

1. The DBS 10 tube heater requires four hanging points; and the DBS 20 tube heater requires five hanging points.
2. All models require use of number 1 double-loop chain, complete with “S” hooks, for heater hanging.

**NOTE:** All “S” hooks must be closed. (Figure 1-3). An accessory THCS chain set is available that includes a 5 foot length of chain and two “S” hooks.

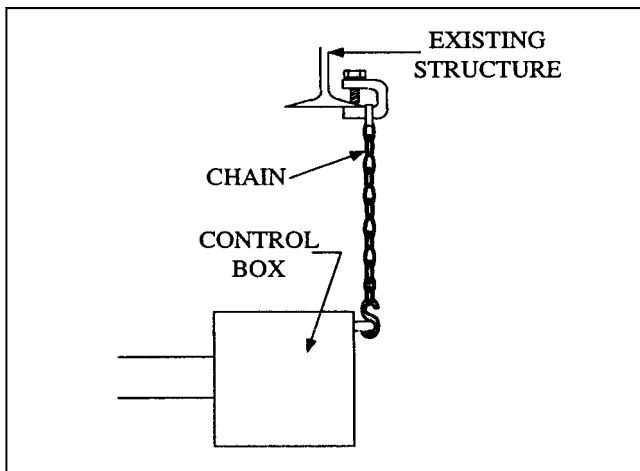


Figure 1-3

3. If windy conditions exist in the space around the heater, it may be necessary to mount the heater rigidly to prevent swaying. It is recommended that threaded rod be used for two hanging points at the burner control box (Figure 1-4). Chains should be used at the remaining points to allow for heater expansion.

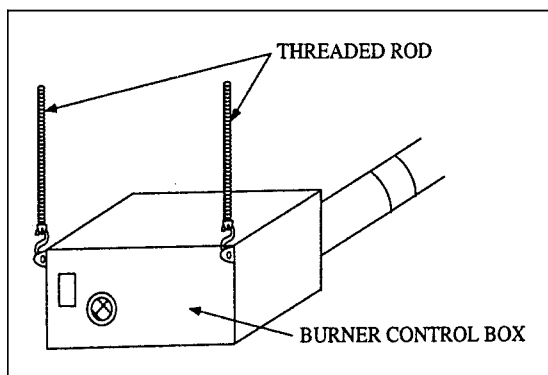


Figure 1-4

4. Mount hangers on approximately 10 ft. centers with the first hanger located as close to the burner control box four/three inch reducer as possible (Figure 1-2).
5. Slide radiant tube with baffle through wire suspension hanger and mate with burner pipe.

**NOTE:** The baffle has been installed at the factory and should be in the vertical position (Figure 1-5). Install the tube clamps over the radiant pipe seam joint and tighten to 50 ft./lb. torque (Figure 1-6). Do **not** alter baffle length.

6. Mount heaters in conformance with Approval Standards referenced in the Safety Clearance Information Section.
7. Install chains perpendicular to the heater.
8. Install heater so that it is independently supported and need not rely on the gas or electrical line for support.
9. Mount heater so that the burner sightglass is visible from the floor.
10. Slide reflectors through the wire hangers and overlap approximately two inches for support (Figure 1-7).
11. Install reflector end caps at exposed ends of the reflector runs (Figure 1-8).
12. The reflector may be mounted at 0° to 45° (Figure 1). Do not rotate control box assembly as it must be mounted level.

**NOTE:** The tube clamps provided with the heater are pre-assembled at the factory. If a clamp is dismantled, it is important that upon reassembly the spacer is properly inserted (see Figure 1-6). The spacer's concave surface must face the radiant tube. Incorrect spacer placement will result in shearing of the bolt when torqued to the recommended specifications (50-70 lb./ft.).

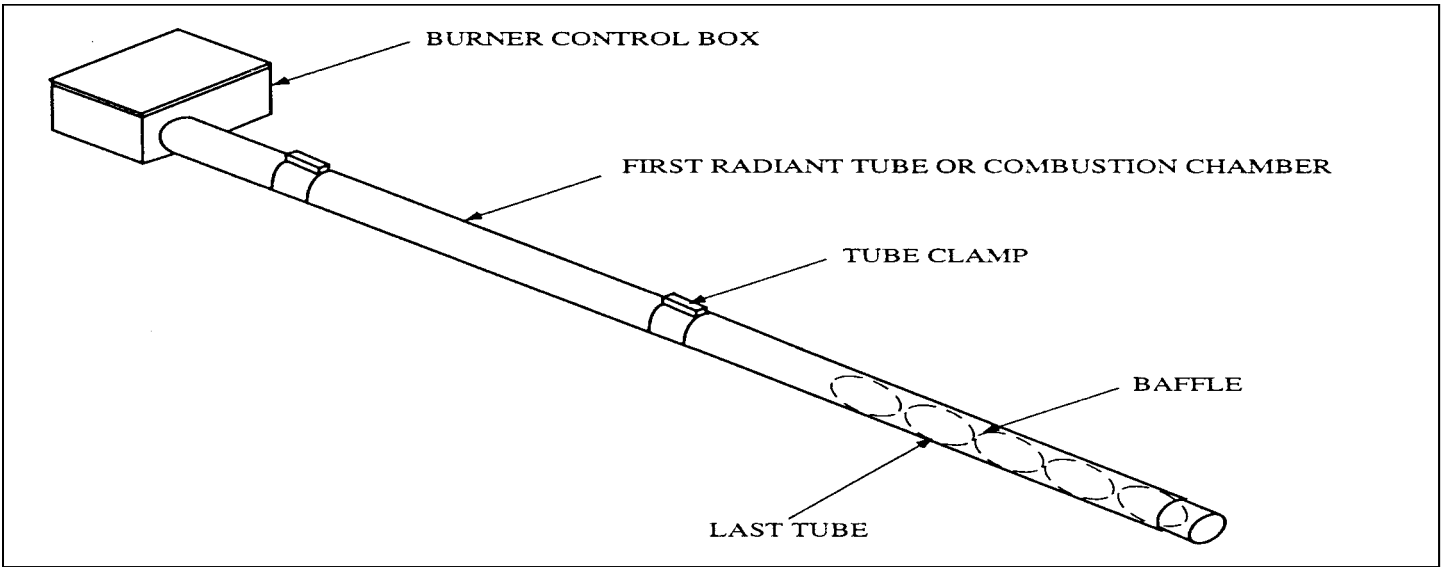


Figure 1-5

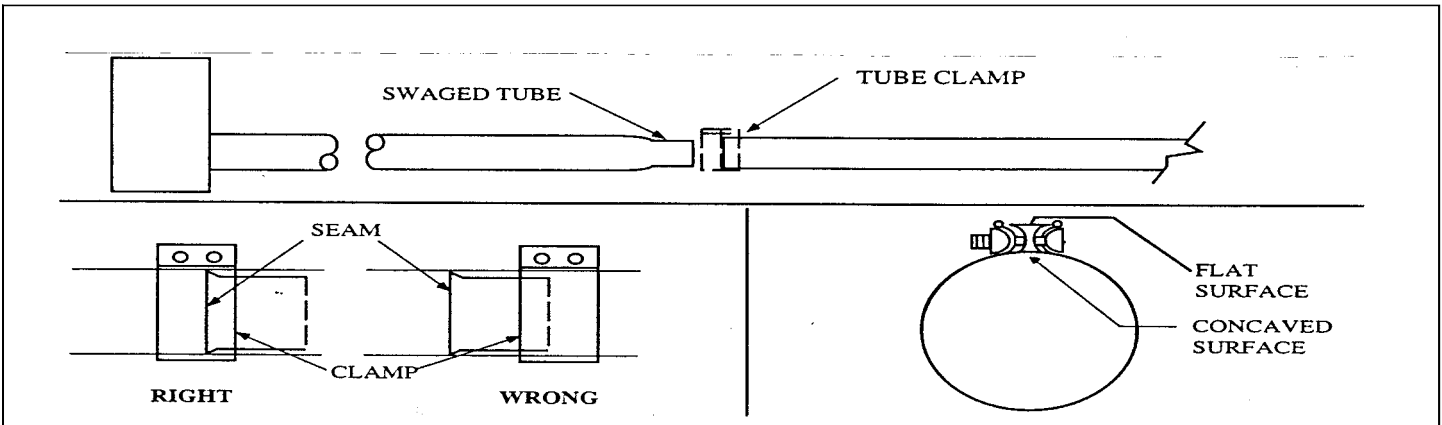


Figure 1-6

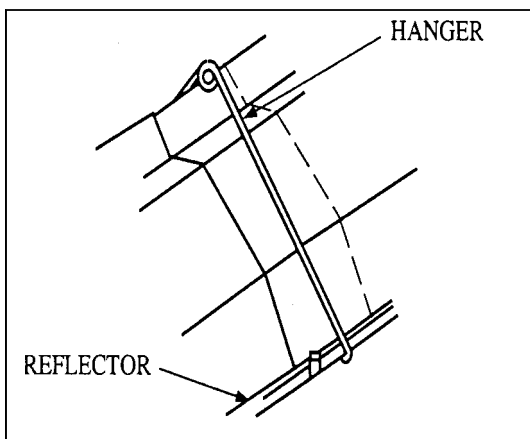


Figure 1-7

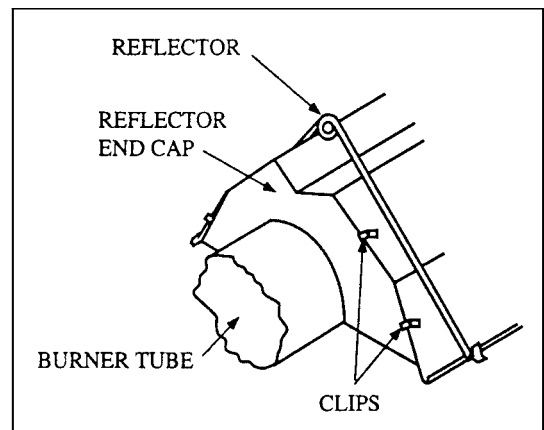


Figure 1-8

### 1.4 Optional “L” or “U” Configuration

A maximum of two 45°, 90° elbows or one 180° U may be installed in the exchanger to alter the standard configuration of the heater.

See chart below for the minimum distance required between the burner control box and an elbow or “U”.

CONFIGURATION	PART NO.
45°	DB-45-E
90°	DB-E6
180°	DB-TF1B

- A 90° elbow may be used for DBS 20-40 models. One 90° elbow (factory supplied DB-E6 only) may be installed 10 ft. downstream from the burner control box.
- A shielded or reflector covered elbow must maintain the Clearance to Combustible Chart in the Safety Clearance Information Section.
- Flue vent requirements do not change when an elbow is installed.

Please see heater accessory list (LPACC-11/98, page 5) for further information

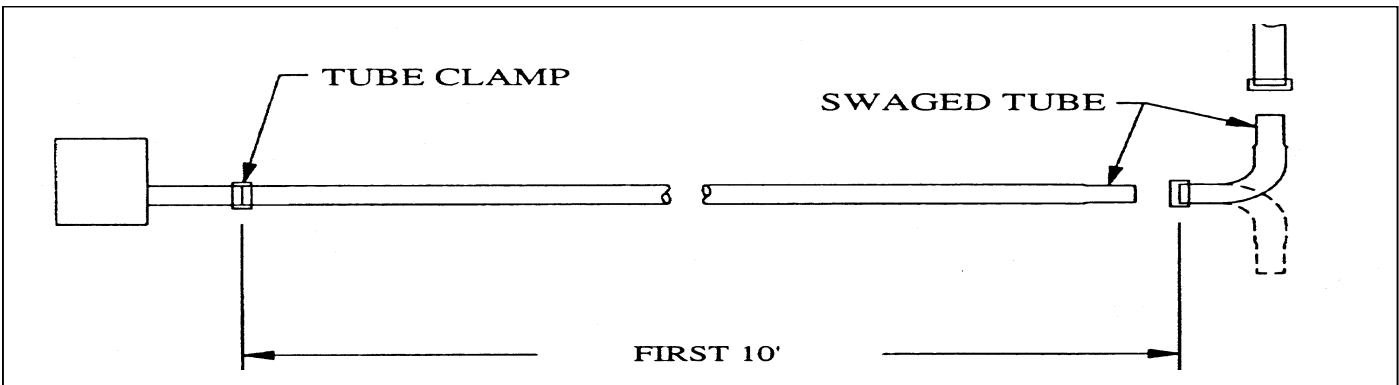


Figure 1-9

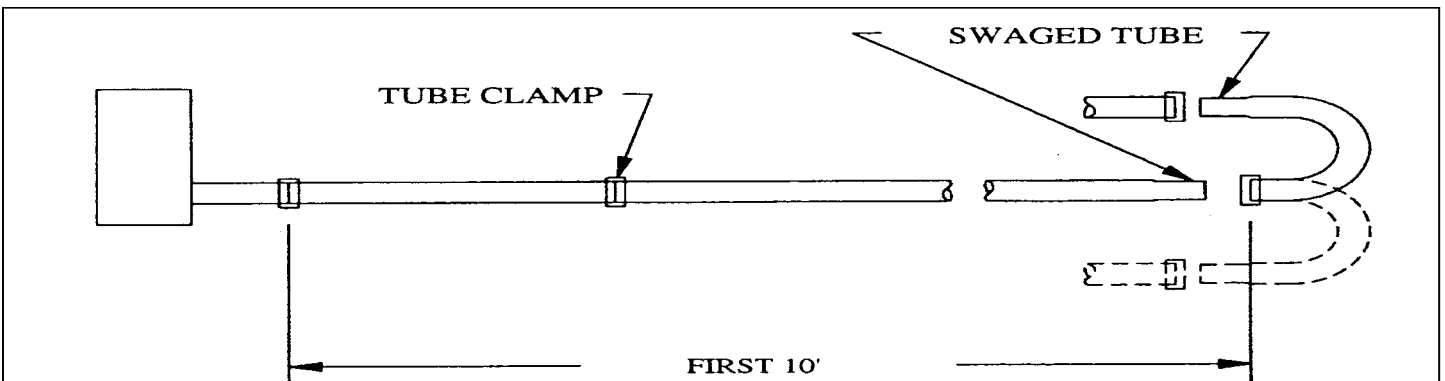


Figure 1-10

## 1.5 Protective Grill (OPTIONAL)

The DBS model may be installed with a protective grill, part #PS (Protective Screen) as shown in Figure 1-11.

Observe the following to ensure that the grill is used safely:

- Do not touch grill when heater is operating.
- Do not hang clothes or any other combustible material from the protective grill or heater.

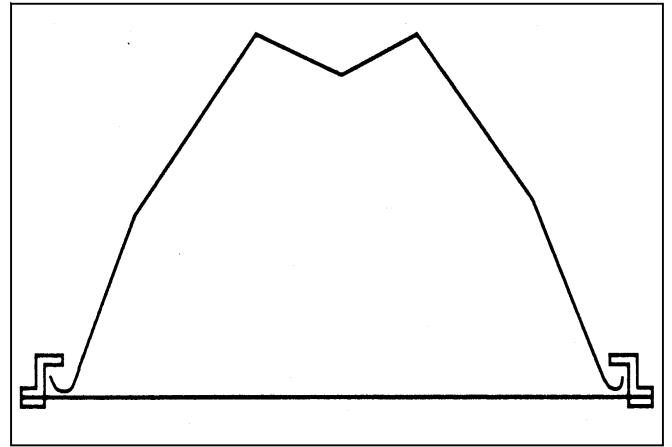


Figure 1-11

## 1.6 Combustion Air Requirements

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 5000 BTU/H of heater input.

If the building has a negative air 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 air duct, and directly attached over the air orifice (Figure 1-12). A WIV-4 wall inlet vent must be used with outside air intake ducts.

**NOTE:** Use insulated duct or PVC pipe to prevent condensation on outer surfaces.

The following guidelines must be observed to ensure proper system performance and safety:

- All heaters have a maximum inlet duct length of 20 ft. Do not extend the inlet duct length beyond 20 ft.
- Do not use more than two elbows in inlet duct.
- Do not use exhaust vent cap on combustion intake
- Do not install filters on combustion air intake.

**NOTE:** When venting through a roof or sidewall, keep the intake opening at least 5 ft. away from any exhaust vent opening. When ducting combustion air from the roof, position the vent cap a minimum 3' higher than the combustion air intake cap.

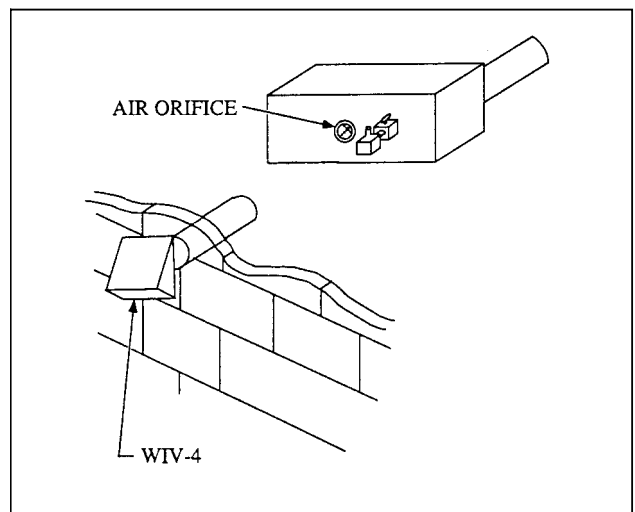


Figure 1-12

## 1.7 Electrical Requirements

- This heater operates on 120 V, 60 Hz, single phase, line voltage. The maximum amperage requirement (starting current) is 4.8 amps per heater. The running current is 1.1 amps.
- Heater must be grounded in accordance with the National Electrical Code ANSI/NFPA70 when any external source is utilized.
- 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.
- Clearance to Combustibles, as shown in the Safety Clearance Information Section must be maintained between electrical apparatus and wiring.

- Thermostats should not be exposed to direct radiant output.
- Observe proper electrical polarity.

Heaters are supplied with a three-prong plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do **not** cut or remove the grounding prong from this plug

## 1.8 Flue Venting

The following guidelines must be observed to ensure proper system performance and safety:

- Check all applicable codes prior to installing flue stacks. Local codes may vary. In the absence of local codes see the National Fuel Code ANSI-Z223.1 (NFPA54) (latest edition).
- The heater must not be connected to a separate chimney, but must be installed using factory approved vent cap (See Accessory Guide).
- The heater vent may exit the building either horizontally or vertically. Vertical venting exiting the roof should terminate 2 ft. above the roof (Figure 1-13). For horizontal venting, the vent termination should be a minimum of 3 in. from the sidewall (Figure 1-14). Care should be exercised to ensure that the vent opening is beyond any combustible overhang.

- Vent accessories are available from Detroit Radiant Products. Please consult the Tube Heater Accessory List for further information.
- The maximum allowable vent length is 20 ft. Do **not** add vent pipe to extend length beyond 20 ft.
- The maximum number of elbows allowed in the venting system is two. Do **not** use more than two elbows in the venting system.
- All vent pipes must be sealed to prevent leak-age of flue gas into the building. Apply the supplied high temperature sealant to mating surfaces of vent pipes and install sheet metal screws to secure parts.
- Horizontal vents should be pitched down to-ward outlet,  $\frac{1}{4}$  in. per ft. of the vent length, to prevent rain from entering the heater (Figure 1-15). Do **not** pitch heater.

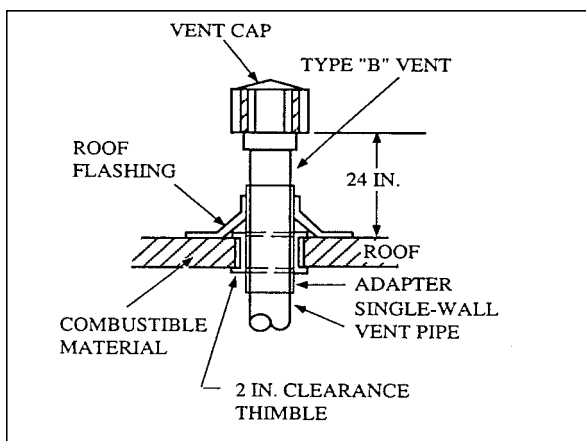


Figure 1-13

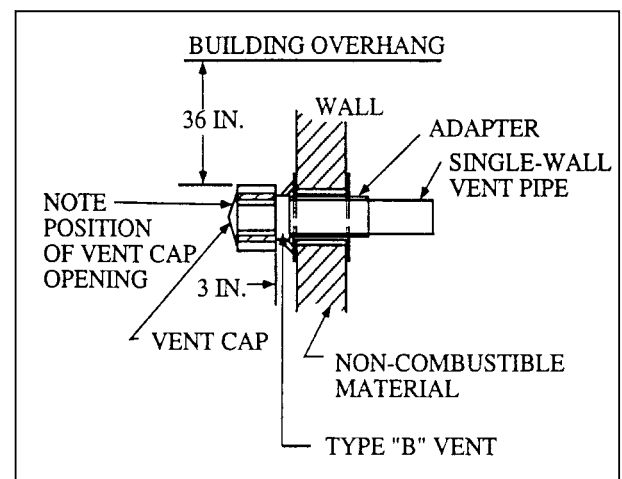


Figure 1-14

- Single wall vent tube that is exposed to cold air must be insulated to prevent condensation.
- Vent passing through combustible wall must use a wall thimble (#DB-210) (Figure 1-13, 14, 15).
- If two heaters are to be vented together a dual-exhaust assembly (#DB-YSM) and a 4 in. vent cap (4-DSK) must be used (Figure 1-16). These parts are available from Detroit Radiant Products (Optional Parts in DRP Accessory Guide). Two heaters commonly vented must share the same thermostat.

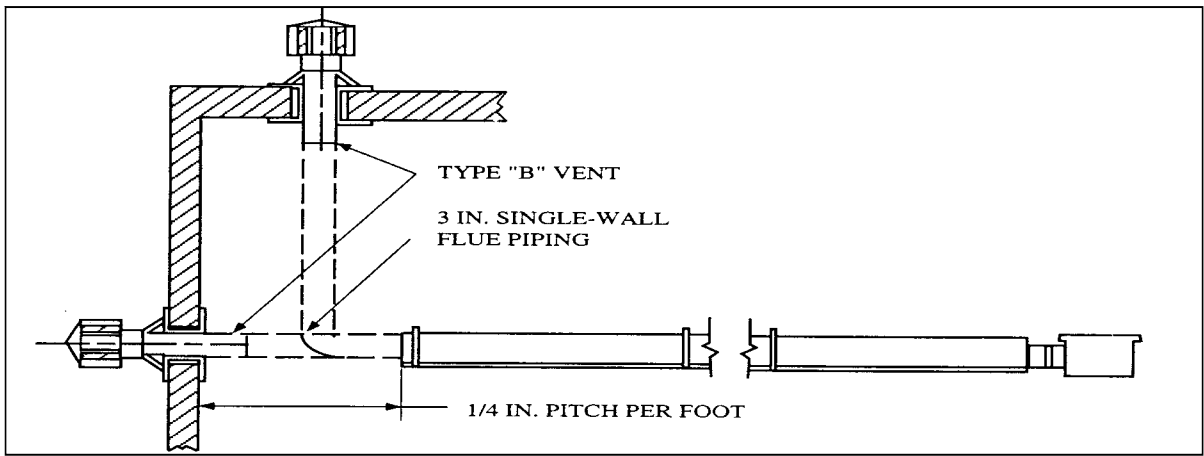


Figure 1-15

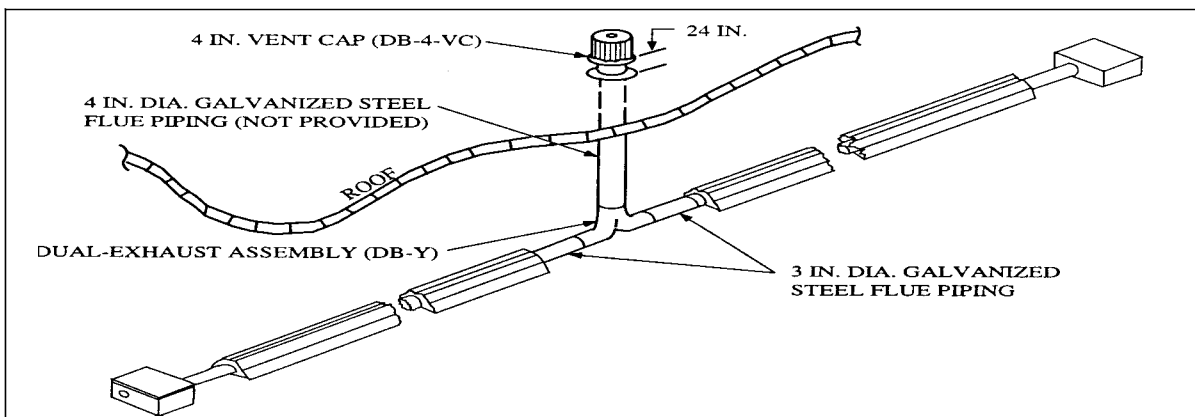


Figure 1-16



## 1.9 Gas Supply

### CAUTION!

CORRECT INLET PRESSURES ARE VITAL FOR EFFICIENT OPERATION OF HEATERS. REFER TO AGA RATING LABEL 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. Installation must be in accordance with codes.

The heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig. The heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig.

Excessive torque on manifold may misalign orifice. Always use two wrenches when tightening mating pipe connections.

### WARNING!

Never use a match or any other flame to test for 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 (Figure 1-17).

**NOTE:** For high pressure gas above 14 in. W.C.P. (Water Column Pressure), a high-pressure regulator (e.g. 325-3) and gas cock must be used.

A typical gas supply line connection is illustrated in Figure 1-17. The method shown will decrease the possibility of any loose scale or dirt in the supply line from entering the heater's control system and 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 burner (consult gas company) as follows:

**NOTE:** Manifold pressure should be checked at the tap on the gas valve. Reading will be above atmospheric pressure.

#### • Natural Gas

To obtain the required manifold pressure of 3.8 in. W.C.P., a minimum inlet pressure of 4.8 in. W.C.P. is necessary for purposes of input adjustment. A maximum inlet pressure of 14.0 in. W.C.P. is allowed for all units.

#### • Propane Gas

To obtain the required manifold pressure of 10.0 in. W.C.P., a minimum of 11.0 in. W.C.P. is necessary for purpose of input adjustment. A maximum of 14.0 in. W.C. is allowed for all units. 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.

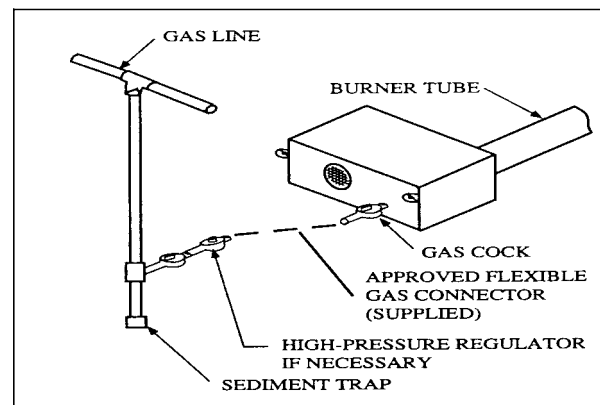


Figure 1-17

- **Pressure Equivalentents**

- 1in. W.C. equals 0.58 oz/sq.in.
- 4.8in. W.C. equals 2.78 oz/sq.in.
- 11in. W.C. equals 6.38 oz/sq.in.
- 14in. W.C. equals 8.12 oz/sq.in

- **Allowance for Heater Expansion**

Allowance must be made for the heater to expand. Use of the provided stainless steel, flexible gas connector is recommended. If local codes require rigid piping to the heater, use a rigid mounting for the control box and provide for expansion in the opposite direction.

- **Gas Line Connection**

- a. The gas outlet shall be in the same room as the appliance and the connector must not be concealed within or run through any wall, floor or partition.
- b. The connector shall be of adequate length.
- c. The final assembly shall be tested for leaks. **CAUTION:** Matches, candles, open flame or other sources of ignition shall not be used for this purpose. Leak test solutions may cause corrosion-water rinse after test.

- d. Contact with foreign objects or substances shall be avoided.
- e. The connector shall not be kinked, twisted or torqued.
- f. Connectors are not designed for movement after installation. Bending, flexing or vibration must be avoided.
- g. Connectors are for use only on piping systems having fuel gas pressures not in excess of ½ lb. per square inch.
- h. If wind conditions in the space are such that visible swaying of the heater is apparent, the control box must be rigidly mounted. See 1.3, Heater Mounting.

**CAUTION!**

CONNECTOR NUTS MUST NOT BE CONNECTED DIRECTLY TO PIPE THREADS. THIS CONNECTOR MUST BE INSTALLED WITH ADAPTERS PROVIDED. DO NOT RE-USE.

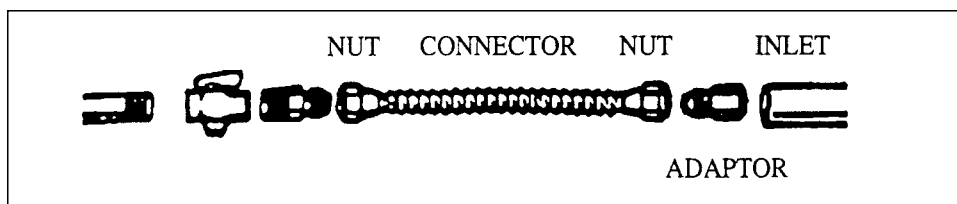


Figure 1-18

## 1.10 Lighting/Shutdown Instructions

### FOR YOUR SAFETY READ BEFORE OPERATING

#### WARNING!

If you do not follow these instructions exactly, a fire or explosion may result causing personal injury, death and/or property damage.

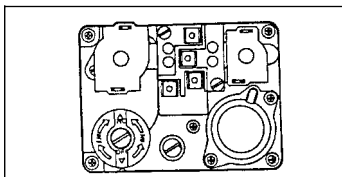
The following guidelines must be observed to ensure proper system performance and safety:

- This appliance does not have a pilot. It is equipped with an ignition device that auto-matically lights the burner. Do **not** try to light the burner by hand.
  - **Before operating**, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
  - 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.
  - Use only your hand to turn the manual shutoff. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.
  - Do not use this heater if any part of it has been under water. Immediately call a qualified service technician to inspect the appliance and replace any part of the control system that has been under water.
- WHAT TO DO IF YOU SMELL GAS:
- Do not try to light any appliance.
  - Do not touch any electrical switches and do not use any phone in your home.

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#### Lighting Instructions

- **STOP!** Read the above safety information.
- Set the thermostat to lowest setting.
- Turn off all electrical power to the heater.
- This heater is equipped with an ignition device that automatically lights the burner. Do **not** try to light the burner by hand.
- Turn manual shutoff knob clockwise to OFF.
- Wait five minutes to clear out any gas. If you then smell gas, **STOP!** Follow the safety information. If you don't smell gas, proceed to the next step.
- Turn manual shutoff knob counter-clockwise to ON.
- Turn on all electric power to the heater.
- Set thermostat to the desired setting.
- If the heater will not operate, follow the shutdown instructions "To Turn Off Gas" and call your service technician or gas supplier.



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#### Shutdown Instructions

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the heater if service is to be performed.
3. Turn manual shutoff knob clockwise to OFF. Do **not** force.

## 2. THEORY OF OPERATION

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

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 pressure switches to close. The burner switch closes with positive pressure, the exhaust switch with negative. Another circuit is completed from L1 to the hot surface ignition control and back to L2.

There is a five second delay, then the glo-bar is powered. After the glo-bar has been powered for 45 seconds, the control causes the gas valve to open and initiates the ignition trial. Power to the glo-bar is shut off during the last two or three seconds of the ignition trial.

- **Running Circuit**

When power is removed from the glo-bar, the glo-bar is utilized as a flame probe. 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 8.5 seconds, the unit will lock out. If lock out occurs, the control can be reset by briefly interrupting the power source. This can be accomplished by cycling the thermostat.

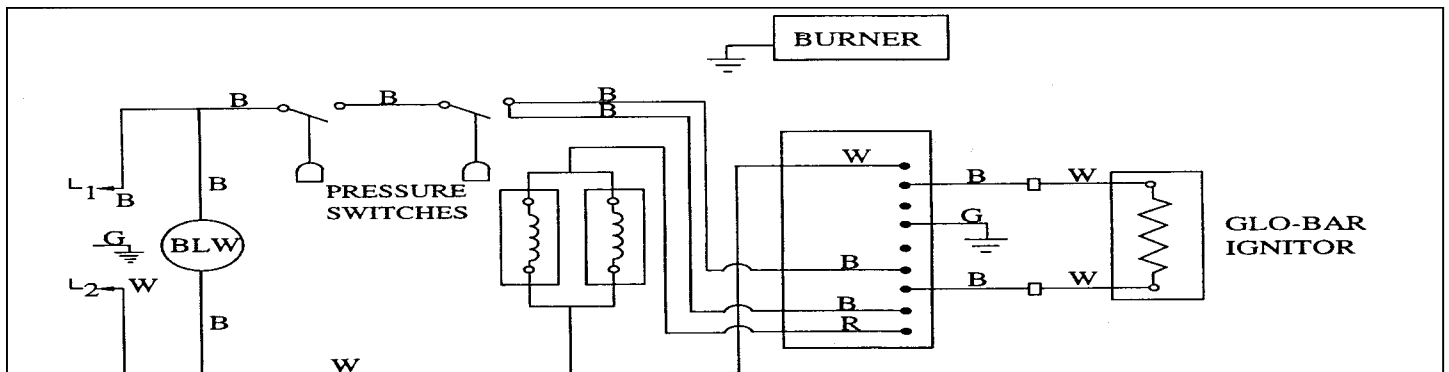


Figure 2-1: WIRING SCHEMATIC

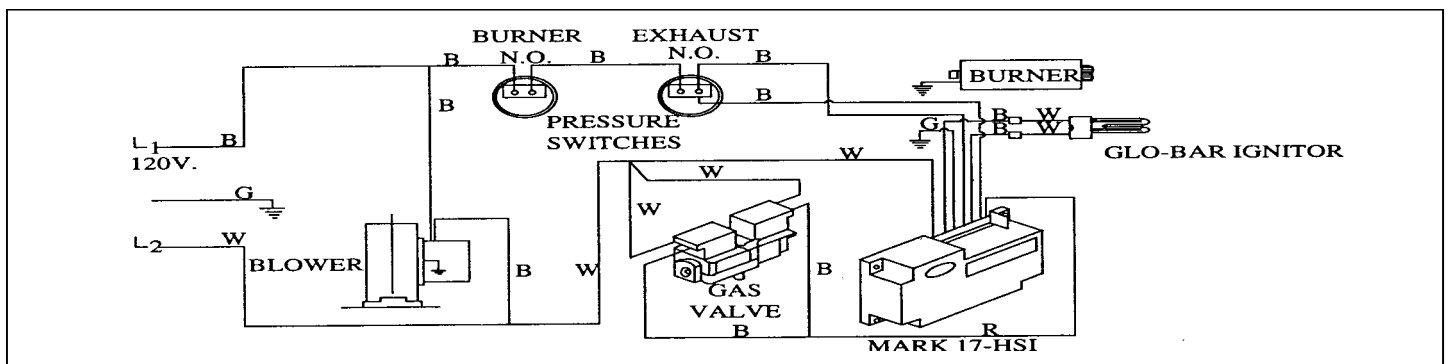


Figure 2-2: BLOCK WIRING DIAGRAM

### 3. MAINTENANCE

DBS Series heaters require periodic maintenance to maintain maximum efficiency and safe operation. Maintenance should be performed at the start of each heating season and every six months of usage thereafter.

#### **WARNING!**

Use protective glasses when cleaning the heater.

- The heater area must be kept clear and free of combustible materials, gasoline and other flammable vapors and liquids.
- Ensure that the heater's air inlet and blower are kept clean. If dirt becomes a problem, installation of an outside air duct for combustion is recommended.
- Combustion air inlet, grills or louvers must be inspected periodically to ensure that they are clear and free of dust, dirt, snow, ice, frost and other foreign material so that air may freely enter.
- Remove all dust and debris off the heater.
- Periodically check burner flame through sight glass on burner tube-it should be blue.
- Periodically check the venting system to make sure it is clear and not leaking.

### 4 TROUBLESHOOTING

#### 4.1 Access Panels

Turn off gas supply and disconnect electrical source before attempting to service. Service panels may be removed as required (Fig. 4-1).

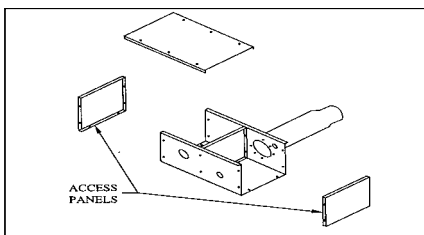


Figure 4-1

#### 4.2 Thermo Limit Switch

The thermo limit switch is a safety device designed to discontinue heater operation if the control box temperature exceeds its operational limit.

To test: **DISCONNECT ELECTRICAL POWER SUPPLY** and check switch for continuity. If the thermo limit switch circuit is "open", remove and replace.

#### **CAUTION!**

THE FAILURE OF A THERMAL LIMIT SWITCH INDICATES A PROBLEM WITHIN THE HEATER, OR ITS VENTING SYSTEMS. PROBLEM AREA MUST BE LOCATED AND RECTIFIED BEFORE A SAFE OPERATING CONDITION EXISTS. LISTED BELOW ARE POSSIBLE CAUSES AND CORRECTIVE ACTION.

<u>Possible Cause</u>	<u>Corrective Action</u>
1. Restricted outside air duct.	Clean.
2. Restricted air inlet orifice.	Clean.
3. Dirty fan blower wheel.	Clean.
4. Faulty pressure switches.	Replace.
5. Restricted vent.	Clean.
6. Restriction in radiant pipes.	Clean.
7. Gas leak in valve train.	Repair or replace.
8. Negative pressure in building	Install outside air duct.

Customer service toll free no. 1-800-222-1100 or 810-756-0950.

### 4.3 Glo-Bar Replacement

1. Shut off gas and electricity to unit if installed.
2. Remove cover from control box (see Figure 4-2).

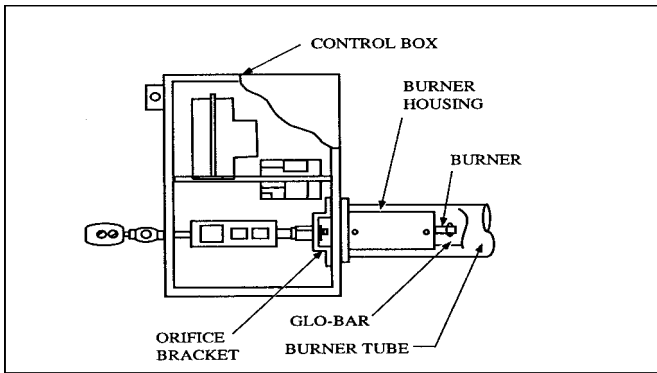


Figure 4-2

3. Unplug wire (A) at the glo-bar. Remove nut (B) and slide control assembly back. Unscrew bolts (C) fastening the orifice bracket to the control box, and pull out burner housing from tube off (Figure 4-3). Pull burner housing off fixed bolts, rotate counterclockwise ¼ turn and remove.

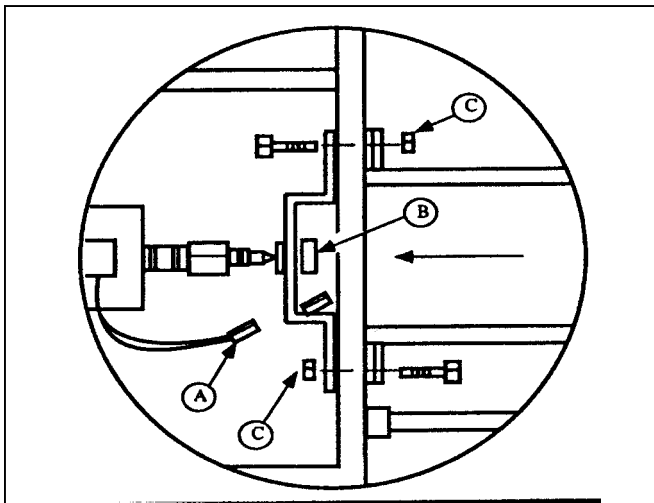


Figure 4-3

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

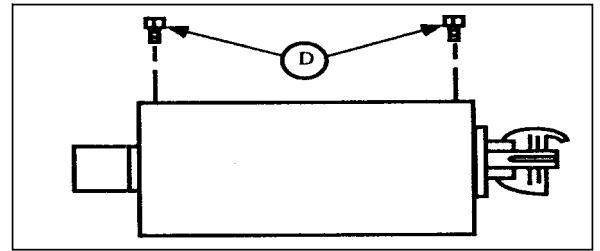


Figure 4-4

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

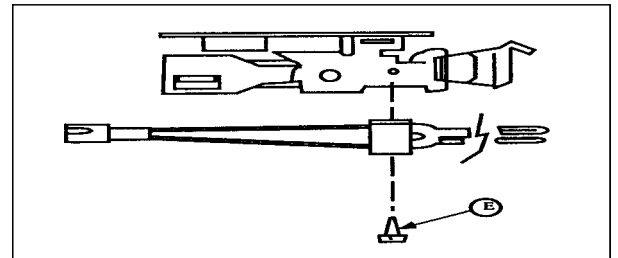


Figure 4-5

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

## 4.4 Troubleshooting Chart

DBS SERIES GENERAL TROUBLESHOOTING CHART		
SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Thermostat closed but nothing happens.	<ol style="list-style-type: none"> <li>1. Blown fuse.</li> <li>2. Defective thermostat.</li> <li>3. Loose or disconnected wire.</li> <li>4. Defective fan.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace.</li> <li>2. Replace.</li> <li>3. Repair as required.</li> <li>4. Lubricate, repair or replace.</li> </ol>
Thermostat closed. Fan operates. No glo-bar energization.	<ol style="list-style-type: none"> <li>1. Loose or disconnected wire.</li> <li>2. Plugged or restricted exhaust vent.</li> <li>3. Plugged pressure switch.</li> <li>4. Defective pressure switch lines.</li> <li>5. Defective glo-bar.</li> <li>6. Defective radiant sensor.</li> <li>7. Box lid or gasket not in place.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair as required.</li> <li>2. Remove foreign matter.</li> <li>3. Clean as necessary.</li> <li>4. Replace only. Do not adjust.</li> <li>5. Replace.</li> <li>6. Replace radiant sensor.</li> <li>7. Put in place.</li> </ol>
Thermostat closed. Fan and glo-bar operate. After 45 seconds glo-bar shuts off. No reignition.	<ol style="list-style-type: none"> <li>1. Closed gas supply.</li> <li>2. Dirty or restricted orifice.</li> <li>3. Defective valve. Disconnected valve wire.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open all gas connections.</li> <li>2. Remove and clean with a soft object.</li> <li>3. Clean as necessary.</li> </ol>
Loss of heater efficiency.	<ol style="list-style-type: none"> <li>1. Low gas pressure.</li> <li>2. Dirty or restricted orifice.</li> <li>3. Foreign matter inside burner assembly.</li> <li>4. Unit cycles on and off.</li> <li>5. Reflector is sooted and has lost its reflective ability.</li> <li>6. Reflector not in place.</li> <li>7. Clogged fan blower.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide required gas pressure.</li> <li>2. Remove and clean with a soft object.</li> <li>3. Clean as necessary.</li> <li>4. Check previous symptom.</li> <li>5. Clean with aluminum cleaner and soft wiping cloth.</li> <li>6. Put in place.</li> <li>7. Clean.</li> </ol>
Radiant tube leaking burnt gases.	<ol style="list-style-type: none"> <li>1. Loose tube connections.</li> <li>2. Holes or cracks in radiant tubes.</li> </ol>	<ol style="list-style-type: none"> <li>1. Assure that tube is fully inserted into flared end and properly clamped.</li> <li>2. Replace.</li> </ol>
Condensation.	<ol style="list-style-type: none"> <li>1. Stack length too long.</li> <li>2. Light gauge flue stack used.</li> </ol>	<ol style="list-style-type: none"> <li>1. Shorten stack.</li> <li>2. Minimum of 26 gauge vent pipe is required.</li> </ol>
Tube bowing.	<ol style="list-style-type: none"> <li>1. Insufficient combustion air.</li> <li>2. Overfired.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide 2 sq. in. of free air per 5000 BTU/H of input.</li> <li>2. Check gas pressure and orifice size.</li> </ol>
Tube corroding.	<ol style="list-style-type: none"> <li>1. Contaminated combustion air.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide fresh air inlet duct.</li> </ol>
Visual inspection of burner operation not possible.	<ol style="list-style-type: none"> <li>1. Dirty or sooted sight glass.</li> <li>2. Unit mounted upside down.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove, clean or replace.</li> <li>2. Mount correctly.</li> </ol>
Stack sooting.	<ol style="list-style-type: none"> <li>1. Insufficient combustion air.</li> <li>2. Improper gas.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide 1 sq. in. of free air for every 5000 BTU/H of input.</li> <li>2. Correct with proper gas input.</li> </ol>
Thermostat closed. Fan and glo-bar operate. Ignition occurs. Burner cycles off and will not recycle.	<ol style="list-style-type: none"> <li>1. No electrical ground.</li> <li>2. Defective circuit control.</li> <li>3. Low gas pressure.</li> <li>4. Circuit control connection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect electrical ground to junction box.</li> <li>2. Replace.</li> <li>3. Provide required gas pressure.</li> <li>4. Repair or replace.</li> </ol>
Thermostat closed. Fan and glo-bar operate. Ignition occurs. Burner cycles off. Burner cycles on.	<ol style="list-style-type: none"> <li>1. Low gas pressure.</li> <li>2. Baffle improperly positioned.</li> <li>3. Defective exhaust pressure switch.</li> <li>4. Restricted flue vent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide required gas pressure.</li> <li>2. Reposition baffle (Figure 1-5).</li> <li>3. Replace.</li> <li>4. Remove foreign matter.</li> </ol>





## 5. PARTS LIST

### 5.1 Basic Parts Lists

#### DBS SERIES PARTS LISTING

KEY	PART#	ITEM	KEY	PART#	ITEM
B	TP-1	CONTROL BOX COVER (OLD# DB-1)	B	TP-101	1/2" ADAPTOR FITTING (OLD# DB-101)
B	DB-2	OUTSIDE CONTROL BOX END	B	TP-102	3/8" - EX NUT
B	DB-4A	CONTROL BOX FOR DBS	B	TP-104	1/2" X 2" PIPE NIPPLE (OLD# DB-104)
B	TP-5	FLANGE GASKET (OLD# DB-5)	T & R	TP-105	REFLECTOR END CAP (OLD# DB-105)
B	TP-14	SIGHT GLASS GASKET (OLD# DB-14)	T & R	TP-106	REFLECTOR END CAP CLIP (OLD# DB-106)
B	TP-15	SIGHT GLASS (OLD# DB-15)	B	TP-107	1/2" NAT GAS VALVE (OLD# DB-107)
B	TP-16	SIGHT GLASS WASHER (OLD# DB-16)	B	TP-107P	1/2" LP GAS VALVE (OLD# DB-107P)
T & R	TP-19B	4" HANGER	T & R	DB-111	5 FT - 3" DIA. RADIANT TUBE W/CLAMP
T & R	TP-20C	120" REFLECTOR (OLD# DB-20C)	B	DB-120	BUSHING
B	TP-31B	CONTROL BOX BRACKET (OLD# DB-31B)	B	TP-122	AIR INLET GASKET (OLD# DB-122)
B	TP-35A	1/2" X 2" PIPE NIPPLE (OLD# DB-35A)	B	DB-123	TAP PLUG
B	TP-42	BURNER CASING W/O CRIF BRKT (OLD# DB-42)	B	DB-124	5/8" PLUG
B	DB-44	AIR CRIFICE W/SCREEN-CONSULT FACTORY	B	DB-200	THERMAL FUSE
B	DB-45	BURNER CRIFICE -CONSULT FACTORY	B	DB-201	1/2" BURNER TUBE W/FLANGE
B	TP-48	MAIN BURNER (OLD# DB-48)	B	DB-203	CORD W/THREE PRONG PLUG
B	TP-50	GLO-BAR IGNITOR (OLD# DB-50)	T & R	DB-204	3" WIRE HANGER
B	TP-56C	1/2" EXHT PRESS. TUBE (OLD# DB-56C)	T & R	DB-205	3" TUBE CLAMP
B	DB-613	BURNER PRESSURE SWITCH	T & R	DB-206	HEAT DIFFUSER (BAFFLE) 98" STAINLESS
B	TP-66C	DBS STRAIN RELIEF BUSHING (OLD# DB-202)	T & R	DB-207	10 FT - 3" DIA RADIANT TUBE
B	TP-70	CNTRL BOX COVER GASKET (OLD# DB-70)	B	DB-215	FAN BLOWER
B	TP-75	RUBBER BUSHING (OLD# DB-75)	B	DB-216	BURNER BOX DIVIDER
B	TP-78A	MARK 17 HSI CIRCUIT BRD (OLD# DB-78A)	B	DB-217	1/4" BURNER PRESSURE TUBE
B	TP-78B	MOLEX CONNECTOR (OLD# DB-78B)	B	DB-218	EXHAUST PRESSURE SWITCH
T & R	DB-82A	3" REFLECTOR CENTER SUPPORT	B	DB-219	PRESSURE TUBE BRACKET
B	TP-83	FLEXIBLE GAS CONNECTOR (OLD# DB-83)	B	DB-220	1/4" ERNR ATMOSPHERIC TUBE - VINYL
B	TP-97	BA-38 FITTING (OLD# DB-97)			

PARTS WITHOUT SYMBOLS ARE COMMON TO ALL DT-S HEATERS

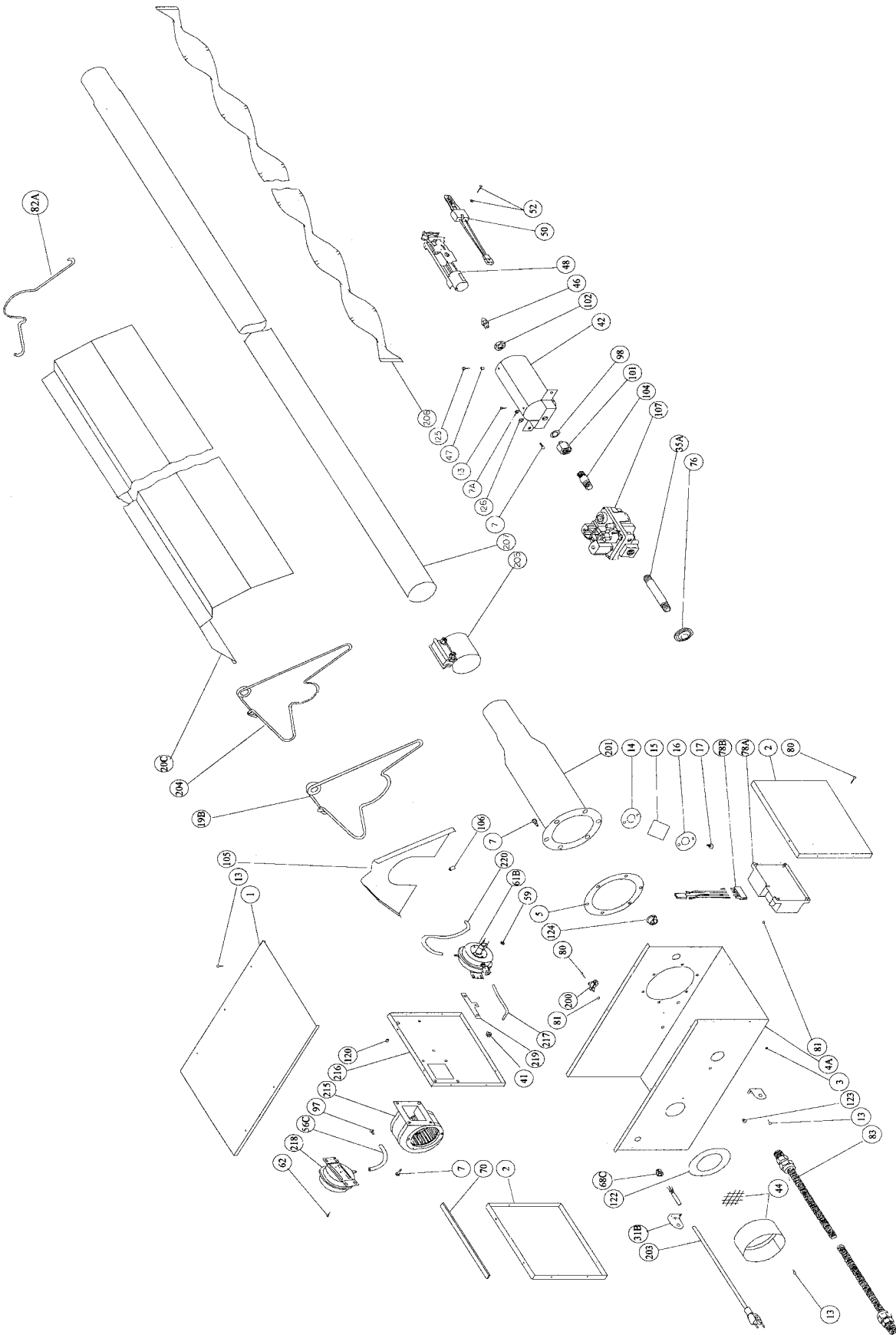
NOTE: IN ORDER TO PLACE ORDERS CORRECTLY, YOU MUST REFER TO THE KEY AREA OF THIS LIST. ORDERS MUST BE PLACED USING THE APPROPRIATE TP STOCK NUMBER.

TP-CPA = CENTER PANEL EXHT & ERNR PRESS. SWIT., BLOWER AND FITTINGS

KEY:

B = BURNER ASSEMBLY

T & R = TUBE & REFLECTOR ASSEMBLY



N:RADIANTSALES0-1PRICEL-11988PR-198PART-198DBSS-1DESPPAR-1.VCD 8/26/1988