

2.10 Electrical Requirements

1. Heaters operate on 120 volts, 60 Hz, single phase. The maximum amperage is 4.8 amps per heater. The running current is 1.1 amps.
2. Heaters must be grounded in accordance with the Canadian Electrical Code C22.1-latest edition when any external source is utilized.
3. The factory supplied line voltage thermostat must be installed on the hot side of a fused supply line. One 22 amp thermostat can operate a maximum of three heaters.

4. Observe proper electrical polarity. If polarity is incorrect heater will operate until glo-bar shuts the heater down in flame sensing mode.
5. Clearance-to combustibles must be maintained between electrical apparatus and wiring.
6. The factory supplied thermostat is designed to sense air temperature and should not be exposed to direct radiant output. A thermostat shield may be required.
7. Heaters are supplied with a standard 120 volt 3 prong plug that plugs into duplexed receptacle. Thermostat will control receptacle. (see Figure 2.10.1)

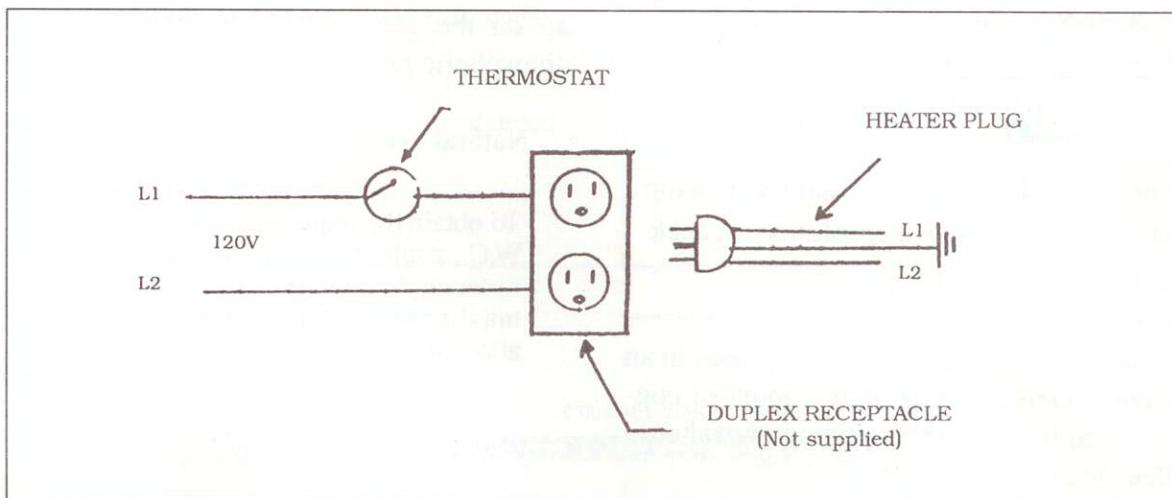


Figure 2.10.1

2.11 Gas Supply

CAUTION

CORRECT INLET PRESSURES ARE VITAL FOR EFFICIENT OPERATION OF HEATERS. REFER TO CGA 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. Test all main supply lines according to local codes. **(Isolate heater gas valve and supplied gas cock during test.)**

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 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 2.11.1)

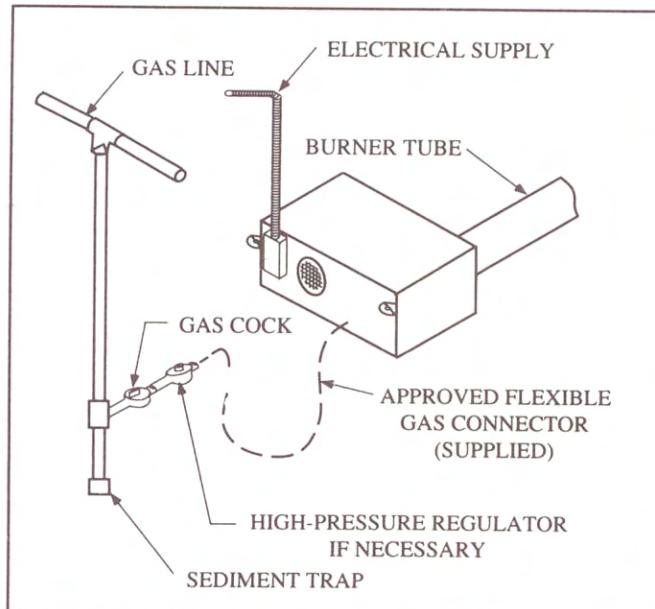


Figure 2.11.1

NOTE: For high-pressure gas above 14 in. W.C. (Water Column), 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 shutoff cock to avoid damage to regulator and gas valve.

A typical gas supply line connection is illustrated in Figure 2.11.2 The method shown will decrease the possibility of any loose scale or dirt in the supply line entering the heater's control system and causing a malfunction. Provide a 1/8 in. (3.2 mm) 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 (consult gas company) as follows:

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

- Natural Gas

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

- Propane Gas

To obtain the required manifold pressure of 10.0 in W.C., 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 W.C.

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

- Pressure Equivalents

1 in. W.C. equals 0.58 oz/sq. in.

- Allowance for Expansion

Allowances must be made for the heater to expand. The supplied stainless-steel, flexible gas connector is recommended. If local codes require rigid piping to the heater, use a rigid mounting for control box and provide allowance for heater expansion in opposite direction.

- Gas Line Connection

- 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.
- The connector shall be of adequate length.
- 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.
- Contact with foreign objects or substances shall be avoided.

- The connector shall not be kinked, twisted or torqued.
- Connectors are not designed for movement after installation. Bending, flexing or vibration must be avoided.
- Connectors are for use only on piping systems having fuel gas pressures not in excess of 1/2 pound per square inch.
- If wind conditions in the space are such that visible swaying of the heater is apparent, the control box must be rigidly mounted. See 2.3 Heater Mounting.

CAUTION

CONNECTOR NUTS MUST NOT BE CONNECTED DIRECTLY TO PIPE THREADS. THIS CONNECTOR MUST BE INSTALLED WITH ADAPTORS PROVIDED. DO NOT REUSE.

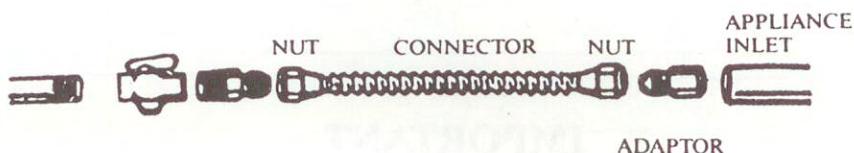


Figure 2.11.2

2.12 Lighting Instructions

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

INSTRUCTIONS POUR L'ALLUMAGE

1. PURGER LA CONDUITE D'ALIMENTATION EN GAZ PRINCIPALE.
2. TOURNER LE BOUTON DU ROBINET DE GAZ A COMMANDE MANUELLE JUSQU'A CE QU'IL SE TROUVE EN POSITION DE MARCHE ("ON").
3. FERMER LE CIRCUIT ELECTRIQUE.
4. SI L'APPAREIL DE CHAUFFAGE NE S'ALLUME PAS, ATTENDRE 5 MINUTES AVANT DE SUIVRE DE NOUVEAU LES INSTRUCTIONS CI-DESSUS.

2.13 Shutdown Instructions

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

POUR ETEINDRE L'APPAREIL

1. OUVRIR LE CIRCUIT ELECTRIQUE.
2. TOURNER LE BOUTON DU ROBINET DE GAZ A COMMANDE MANUELLE DE L'APPAREIL DE CHAUFFAGE JUSQU'A CE QU'IL SE TROUVE EN POSITION D'ARRET ("OFF").

IMPORTANT

This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **NOT** try to light the burner by hand.

Use only your hand to turn the manual shutoff. Never use tools. Turn shutoff clockwise to "**OFF**". Turn shutoff counterclockwise to "**ON**". If the knob will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

3 THEORY OF OPERATION

3.1 DBS Series

- **Starting Circuit (Figures 3.1.1 and 3.1.2)**

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 No. 1 to close. Another circuit is completed from L1 to the hot surface ignition control and back to L2. There is a five second delay and 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.

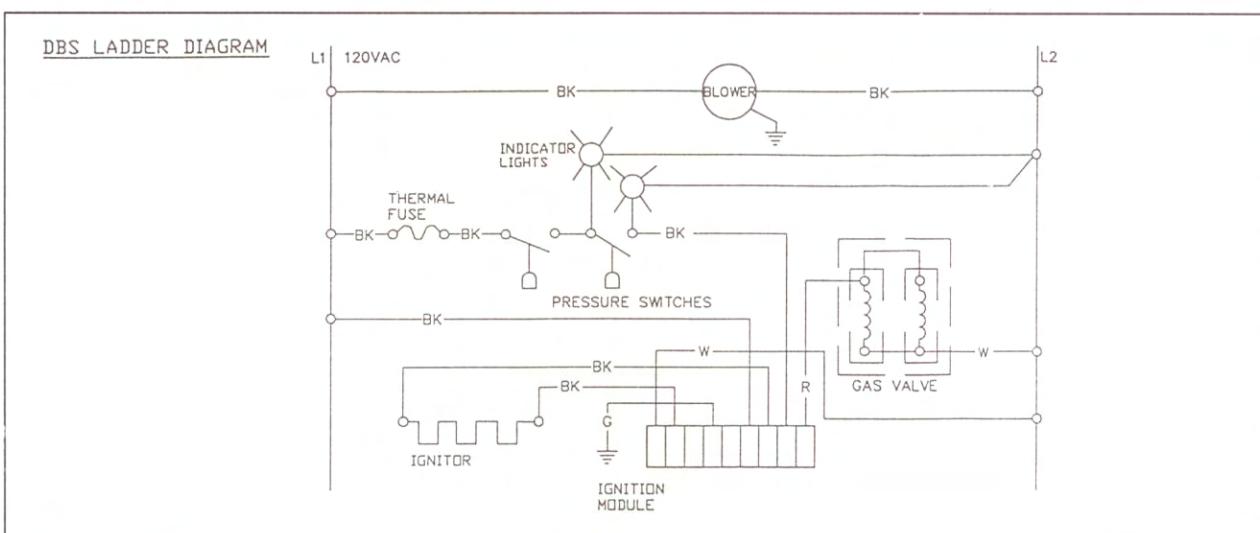


Figure 3.1.1

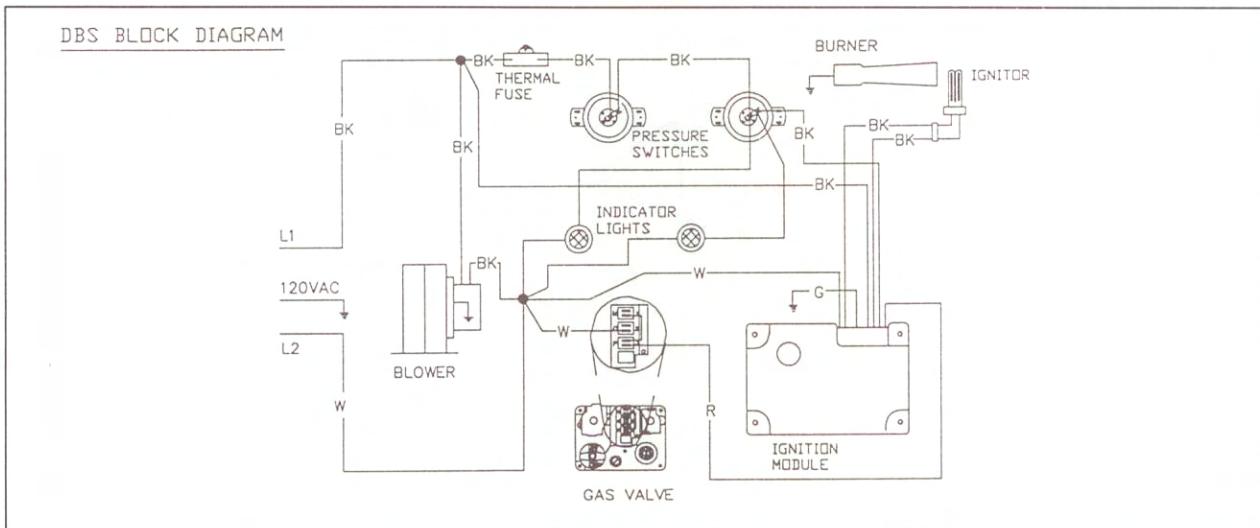


Figure 3.1.2

4.1 Maintenance

Re-Verber-Ray gas-fired, infrared heaters require a minimum of routine maintenance to maintain maximum efficiency.

WARNING

Use protective glasses when cleaning the heater.

1. Ensure that the heaters air inlet and blower is kept clean. If dirt becomes a problem, installation of outside air duct for combustion is recommended.

2. Combustion air inlets, grills or louvres must be inspected regularly to ensure they are clear and free of dust, dirt, snow, ice, frost and other foreign material so that air may freely enter.
3. Heaters exhaust vent must be inspected periodically to ensure it is free and clear of foreign material.
4. Vacuum or blow all dust and debris off the heater.

4.2 Access Panels

Turn gas supply off and disconnect electrical source before attempting to service.

Service access panels may be removed as required. (see Figure 4.2.1)

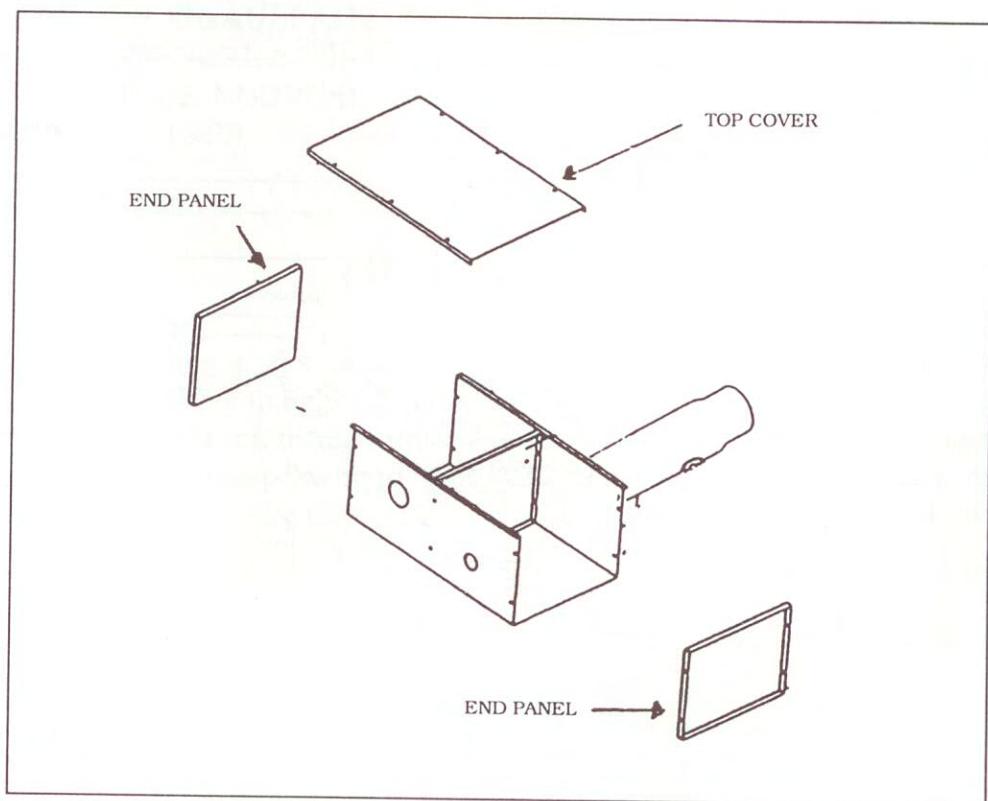


Figure 4.2.1

4.3 Glo-Bar Replacement

1. Shut off gas and electricity to unit if installed.
2. Remove cover from control box.
(see Figure 4.3.1)

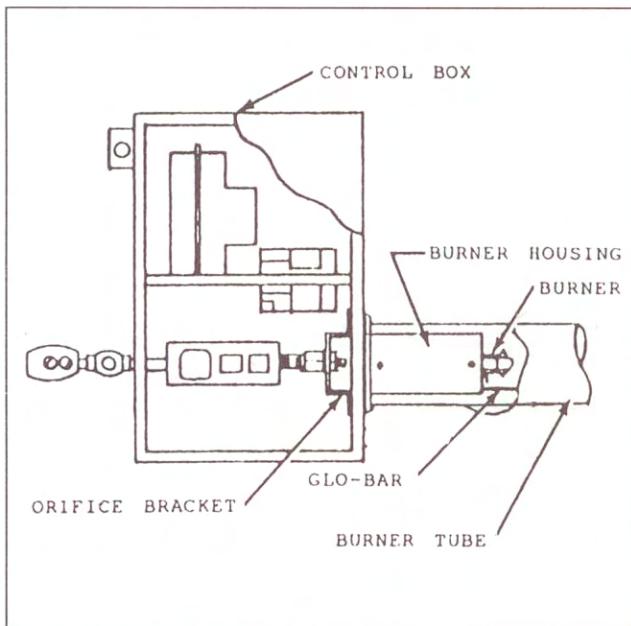


Figure 4.3.1

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 (see Figure 4.3.2). Pull burner housing off fixed bolts, rotate counterclockwise 1/4 turn and remove.

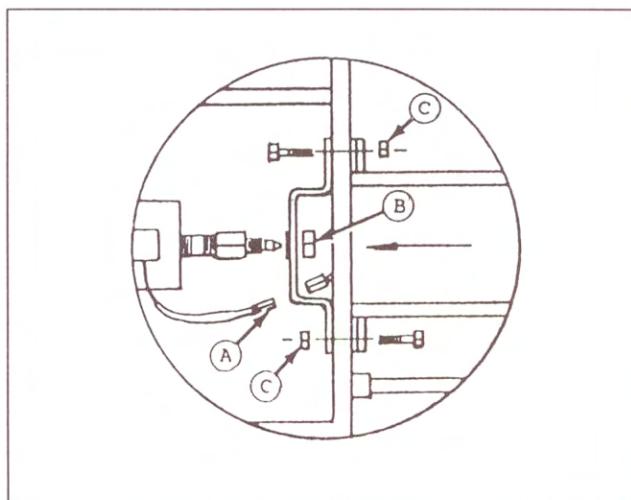


Figure 4.3.2

4. Remove screws (D) from top of burner housing and pull out burner. (see Figure 4.3.3)

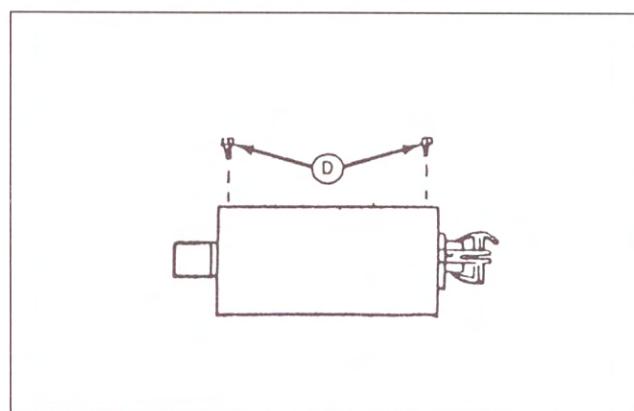


Figure 4.3.3

5. Remove screw (E) holding broken glo-bar to burner and replace glo-bar. (see Figure 4.3.4)

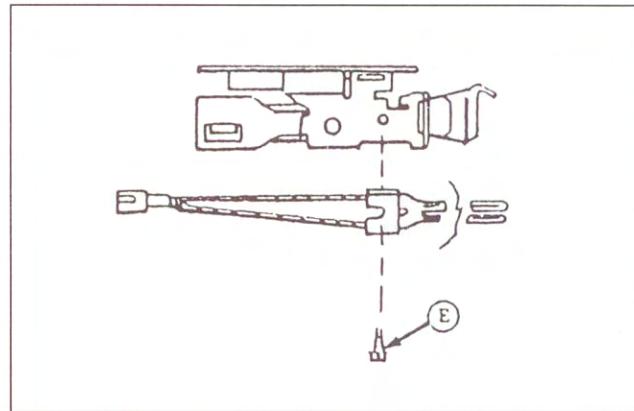


Figure 4.3.4

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

4.4 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 areas must be located and rectified before a safe operating condition exists. Listed below are possible causes and corrective action.

Possible Cause	Corrective Action
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.

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4.5 DBS Series General Troubleshooting Chart

SYMPTON	POSSIBLE CAUSE	CORRECTIVE ACTION
Thermostat closed. - NO FAN	1. Blown fuse. 2. Defective thermostat. 3. Disconnected wire. 4. Defective fan.	1. Replace. 2. Replace. 3. Repair. 4. Replace.
Fan Operates - NO INDICATOR LIGHTS - NO HEATER OPERATION	1. Blocked air intake. 2. Burner switch wire disconnected. 3. Burner switch defective. 4. Burner switch sensing tubes plugged. 5. Thermal fuse blown. 6. Control box lid loose or leaking.	1. Remove all foreign matter in intake air stream. 2. Repair. 3. Replace. 4. Remove, clean and install 5. Replace and check pressure switch operation. 6. Secure or reseal.
Fan Operates Burner Switch Light Operates - NO EXHAUST SWITCH LIGHT - NO HEATER OPERATION	1. Exhaust vent blocked. 2. Exhaust switch wire disconnected. 3. Exhaust switch defective. 4. Excessive wind pressure on vent cap. 5. Baffle location wrong.	1. Remove all foreign matter in vent. 2. Repair. 3. Replace. 4. Verify cap, extend or relocate (see Flue Venting) 5. Consult DBS Manual.
Fan Operates Indicator Lights Operate - NO GLOBAR	1. Glo-bar broken. 2. Circuit board defective. 3. Wiring harness disconnected.	1. Replace. 2. Replace. 3. Reconnect or replace.
Indicator Lights Operate Glo-Bar Operates - NO GAS VALVE	1. Circuit board defective. 2. Gas valve defective. 3. Wire disconnected.	1. Replace. 2. Replace. 3. Reconnect.
Glo-Bar Operates Gas Valve Operates - NO IGNITION	1. Blocked gas orifice. 2. Low gas pressure. 3. Low glo-bar surface temperature.	1. Remove and clean. 2. Provide required gas pressure. 3. Replace - ensure a clean air supply.
Gas Valve Operates Ignition Occurs - HEATER CYCLES OFF - GOES INTO LOCKOUT	1. Globar not sensing flame. 2. Heater not grounded. 3. Electrical supply service panel not grounded. 4. Gas valve defective. 5. Circuit board defective.	1. Replace. 2. Locate and repair. 3. Locate and repair. 4. Replace. 5. Replace.
Tube Bowing	1. Insufficient combustion air. 2. Overfired. 3. Ensure exchangers have room to expand. 4. Heater not supported properly. 5. Reflectors not positioned properly.	1. Check intake duct sizing and clean. 2. Check gas pressure and orifice size. 3. Re-install vent connections. 4. Re-position hangers or chains. 5. Re-position.
Vent Condensation	1. Stack length too long. 2. Light gauge flue pipe used. 3. Uninsulated vent pipe running through cold space. 4. Negative in building. 5. Common vented heaters installed with individual thermostats.	1. Shorten stack. 2. Minimum 26 Ga. required. 3. Insulate vent. 4. Install combustion air intake. 5. Operate both common vented heaters on one thermostat.
Odour or Fumes in the Space	1. Vaporized solvents decomposing when contacting radiant tubes. 2. Tow motors. 3. Loose tube connections	1. Install exhaust fan at ceiling. 2. Install exhaust fan and repair. 3. Tighten to 50-60 lb.-ft..

5.1 Basic Parts List

<i>Part No.</i>	<i>Description</i>	<i>Part No.</i>	<i>Description</i>
TP-1	Control Box Cover	DB-61C	Burner Pressure Switch
TP-2	Control Box Ends	TP-62	1/2 in. x 8 Machine Screw
TP-3	1/4 in. x 8 Sheet Metal Screw	DB-65G	Heat Diffuser (Baffle)
TP-4B	Control Box for DBS	TP-68A	Strain Relief
TP-5	Flange Gasket 4"	TP-70	Control Box Cover Gasket
TP-7	1/4-20 x1/2 in. Machine Screw	TP-75	Gas Valve 36E36A (State Gas)
TP-7A	1/4 x 20 Hex Nut	TP-76	Rubber Bushing
TP-13	1/2 in. x 8 Self-Drilling Screw	TP-78	Stabilizing Bracket
TP-14	Sight Glass Gasket	TP-78A	Mark 17X HSI Circuit Board
TP-15	Sight Glass Mica	DB-78B	Wiring Harness
TP-16	Sight Glass Washer	TP-80	Line Voltage Thermostat (optional)
TP-17	1.4-20 x 1/2 in. Thread-Cutting Screw	TP-101	1/2 in. Adaptor Fitting
TP-20C	Reflector 10"	TP-102	9/16 in. Nut
DB-21G	Butt Clamp	TP-103	3 in. x 1-1/2 in. Pipe Nipple
DB-26B	10' Exhaust Tube 3" dia.	TP-105	Reflector End Cap
TP-33B	Gas Cock	TP-105A	Reflector Clips
TP-33D	1/2 in. S.S. Flex hose 1/2M x 1/2M	DB-109	Fan Blower
TP-37	1/2 in. x 2 in. Pipe Nipple	DB-110A	Burner Tube c/w Flange
TP-42	Burner Casing	TP-111	Cord & Plug
TP-44	Inlet Air Orifice w/Screen	TP-219	Pick Up Tube Bracket
TP-46	Main Burner Orifice	DB-114	Thermal Limit Switch
TP-48	Main Burner	DB-HGR	Suspension Hanger 3"
TP-50	Globar Ignitor	DB-IH	Intermittent Hanger 3"
TP-51	Pressure Tube	TP-TB	Terminal Block
TP-52	3/4 in. x 6 Sheet Metal Screw w/Washer	TPL	Indicator Lights
TP-52A	Burner Spacer		
TP-54	Burner Box Divider		
TP-57A	1/4 in. Atmosphere Tube		
TP-59	#8 Hex Nut/Lockwasher		
DB-60S	Exhaust Pressure Switch		

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

For Customer Service
Call 1-800-387-4778

