

### 3 THEORY OF OPERATION

#### 3.1 AG1 Models

##### STARTING CIRCUIT (FIGURES 3.1.1 & 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 ignitor 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 ignition trial.

##### RUNNING CIRCUIT

After ignition the flame rod monitors the main burner flame. As long as a flame is present, the valve is held open. If the flame is lost, the control acts to close the valve within one second, and a new trial sequence identical to that at start-up is initiated. If proof of flame is not established within 8.5 seconds, the unit will lock out. If lockout occurs, the control can be reset by briefly interrupting the power source.

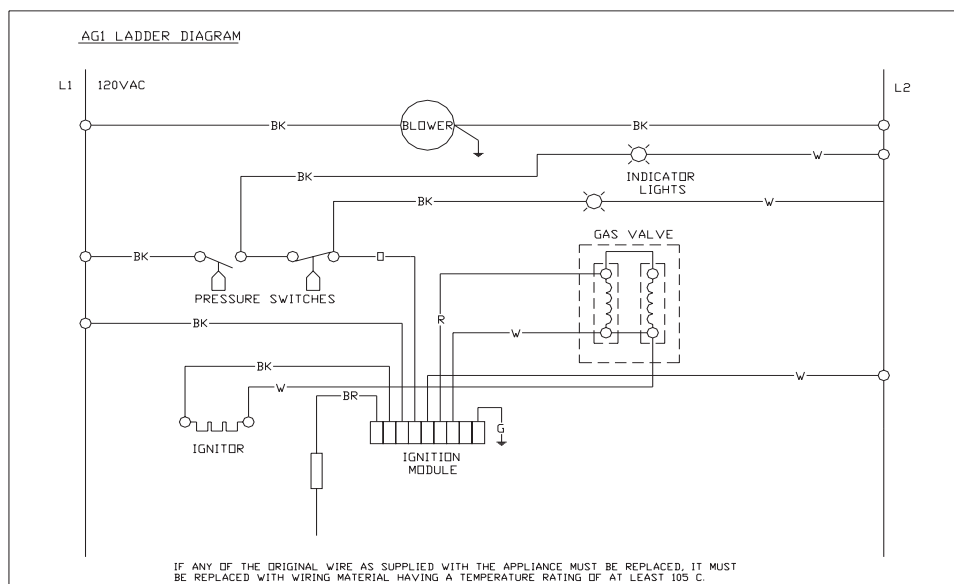


Figure 3.1.1

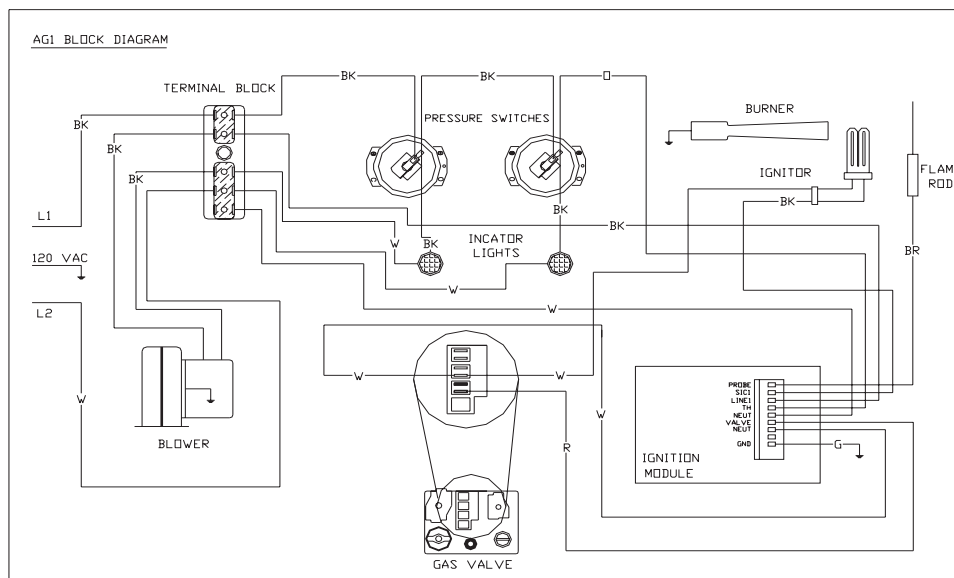


Figure 3.1.2

## 4 SERVICE

### 4.1 Maintenance

The gas fired infra-red heaters require a minimum of routine maintenance to keep them operating at peak performance.

1. Prior to the heating season heater operation must be verified by qualified service personnel.
2. Ensure that the blower impeller is kept clean. If dirt becomes a problem, installation of outside air intake duct for combustion is recommended. Oiling the blower motor will extend bearing life beyond the 30,000 hour minimum.
3. Keep the aluminum reflectors from accumulating deposited material.



#### WARNING

Use protective glasses when cleaning the heater.

### 4.2 Wash-down

During the wash-down of an animal confinement installation observe the following recommendations -



#### WARNING - ELECTRICAL HAZARD

1. Unplug the heater's 120 Volt cord & plug from the ceiling receptacle before power washing room.
2. Avoid direct contact of power-washer with heater control box.
3. Reflectors, radiant tubes and intake ducts can be thoroughly cleaned.
4. Allow heaters to dry thoroughly, reinstall cord & plug, start heater and operate for minimum of 15 minutes.
5. DO NOT allow heaters to sit for extended time periods (days) after wash-down before starting.

## 4.2 GENERAL TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Thermostat closed. - NO FAN	1. Blown fuse. 2. Faulty thermostat. 3. Disconnected wire. 4. Faulty 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 faulty. 4. Burner switch sensing tubes plugged. 5. 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. 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 faulty. 4. Excessive wind pressure on vent cap.  5. Wrong baffle installed.	1. Remove all foreign matter in vent. 2. Repair. 3. Replace. 4. Verify cap, extend or relocate. (See Flue Venting 2.8) 5. Consult tube assembly baffle chart for proper lengths. (See page 14)
Fan Operates Indicator Lights Operates - NO GLOBAR	1. Glo-bar broken. 2. Circuit board faulty. 3. Wiring harness disconnected.	1. Replace. 2. Replace. 3. Reconnect or replace.
Indicator Lights Operate Glo-Bar Operates - NO GAS VALVE	1. Circuit board faulty. 2. Gas valve faulty. 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 & 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. Flame sensor faulty. 2. Heater not grounded. 3. Electrical supply service panel not grounded. 4. Gas valve faulty. 5. Circuit board faulty. 6. Electrical polarity incorrect.	1. Replace. 2. Locate and repair. 3. Locate and repair. 4. Replace. 5. Replace. 6. Reconnect.
Heater Operating - 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. 6. Baffle installed wrong.	1. Check intake duct for blockage and sizing. 2. Check gas pressure. 3. Re-install vent connection. 4. Re-position hangers or chains. 5. Re-position. 6. Re-position.
Heater Operating - VENT CONDENSING	1. Stack length too long. 2. Light gauge flue pipe used. 3. Uninsulated vent pipe running through cold space. 4. Negative pressure 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. Install one thermostat.
Odor or fumes in space.	1. Vaporized solvents decomposing when contacting radiant tubes. 2. Lift trucks. 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>	<i>Part No.</i>	<i>Description</i>
TP-1	Control Box Cover	TP-56C	¼ " Atmosphere Tube (Vinyl)	TP-217	Pressure Barb Fitting
TP-2	Control Box End	TP-57A	¼ " Pressure Tube	TP-218	Exhaust Pressure Tube (Vinyl)
TP-3	#8 x 1/4" Sheet Metal Screw	TP-59	#8 Hex Nut/ Lock Washer		
TP-4A	Control Box	TP-60H	Exhaust Pressure Switch		
TP-5	Flange Gasket	TP-61D	Burner Pressure Switch		
TP-7	1/4-20 x 1/2" Machine Screw	TP-62	#8 x 1/2" Machine Screw		
TP-7A	1/4-20 Hex Nut	TP-65A	Heat Diffuser (Baffle)		
TP-9	Conduit Coupling	TP-66	2" x 4" Outlet Box		
TP-10	Conduit 1/2" x 4"	TP-67	2" x 4" Outlet Box Cover		
TP-11	Glo-Bar Box	TP-68A	Strain Relief Bushing		
TP-12	Glo-Bar Box Cover	TP-70	Control Box Gasket		
TP-13	#8 x 1/2" Self-Drilling Screw	TP-76	Rubber Grommet		
TP-14	Sight Glass Gasket	TP-78DU	Mark 17DU-117 Circuit Board		
TP-15	Sight Glass	TP-80	#6-32 x 1" Machine Screw		
TP-16	Sight Glass Washer	TP-81	#6-32 Hex Nut		
TP-17	1/4-20 x 3/8" Thread-Cutting Screw	TP-83	Flexible Gas Connector		
TP-19B	Tube/Reflector Hanger (BR-4HGR)	TP-104	1/2" x 2" Manifold		
TP-19C	Reflector Center Support (BR-4IH)	TP-105	Reflector End Cap (BR-ECR)		
TP-20	Refector (120")	TP-106	Reflector Clip (BR-ECRC)		
TP-21	Tube Clamp	TP-200	Burner (50,000 to 100,000 BTUH)		
TP-26	10 ft. Radiant Tube, Straight	TP-201	Burner (125,000 to 200,000 BTUH)		
TP-26T	10 ft. Radiant Tube, Straight (AL-TI)	TP-202	16 " Burner Tube		
TP-31B	Control Box Bracket	TP-203	End Panel-Right		
TP-41	1/4-20 Keps Nut	TP-204	Gas Orifice (TP-46)		
TP-44	Inlet Air Orifice w/Screen	TP-205	Glo-Bar Holder		
TP-50	GloBar Ignitor	TP-208	"Z" Bracket		
TP-54	Burner Box Divider	DX-75	36E36A-246 Gas Valve (State N.G. or L.P.)		
TP-55A	Fan Blower	DU-78B	Wiring Harness (DU Board)		
		TP-221	(TP-GG) Glo-bar Gasket		
		TP-222	(DX-FR) Flame Rod		
		TP-223	(DX-FRW) Flame Rod Wire		

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

### 5.2 Optional Parts

<i>Item No.</i>	<i>Description</i>
SK-4VC	Vent Cap (Required For Sidewall Venting on 200,000 BTU)
BR-VCF	Exhaust Vent w/Flapper (Required on Unvented Models)
BR-VC	Wall Inlet Vent w/Screen
BR-4-VK	Side Wall Venting Kit (also SK4-VK)
TF-9	Truck Exhaust Terminal for Side Wall Venting
SK-6VC	Vent Cap (Required for Dual Side Wall Vents)
BR-NIR	Side Shield Extension
BR-UA	180° 4" Radiant Pipe
BR-EA	90° 4" Elbow
TP-33B	Gas Cock

