2.12 Allowance for Expansion

Allowances must be made for the system to expand as detailed in the Heater Expansion Chart on this page. The supplied stainless-steel, flexible gas connector is recommended. If, however, local codes require rigid piping to the heater, a swing joint can be used.

HEATER EXPANSION CHART				
Exchanger length and gas input will determine overall expansion. Heaters in a typical installation will expand towards both the burner and vent ends. Review for proper flexible gas connector installation.				
EXCHANGER LENGTH FEET / METERS		FIXED OR HIGH-FIRE GAS INPUT BTUh	EXPANSION LENGTH INCHES	MILLIMETERS
10	3.1	25,000	1/2	12.7
15	4.6	32,000	3/4	19.1
20	6.1	40,000	1	25.4
20	6.1	50,000	1 1/4	31.8
20	6.1	60,000	1 1/2	38.1
20	6.1	75,000	1 3/4	44.5
20	6.1	100,000	1 7/8	47.6
30	9.2	50,000	1 1/4	31.8
30	9.2	60,000	1 1/2	38.1
30	9.2	75,000	1 3/4	44.5
30	9.2	100,000	1 7/8	47.6
30	9.2	125,000	2	50.8
40	12.2	75,000	1 1/2	38.1
40	12.2	100,000	1 7/8	47.6
40	12.2	125,000	2 1/8	54.0
40	12.2	150,000	2 1/2	63.5
40	12.2	175,000	2 3/4	69.9
50	15.3	100,000	2	50.8
50	15.3	125,000	2 1/8	54.0
50	15.3	150,000	2 3/8	60.3
50	15.3	175,000	2 1/2	63.5
50	15.3	200,000	2 3/4	69.9
60	18.3	125,000	2 1/2	63.5
60	18.3	150,000	2 3/4	69.9
60	18.3	175,000	3	76.2
60	18.3	200,000	3 1/4	82.6
70	21.4	175,000	3 3/8	85.7
70	21.4	200,000	3 1/2	88.9
80	24.4	200,000	3 1/2	88.9

2.13 **Electrical Requirements**

1. Heaters operate on 120 volts, 60 Hz, single phase. The maximum amperage requirement (starting current) is 4.8 amps per heater. The running current is 1.1 amps.

2. Heater must be grounded in accordance with the Canadian Electrical Code C22.1 (latest edition).

3. Wiring must not be exposed to direct radiant output.

4. Observe proper electrical polarity.

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

2.14 **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.

2.15 **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").

3 THEORY OF OPERATION

3.1 CX 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 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 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.

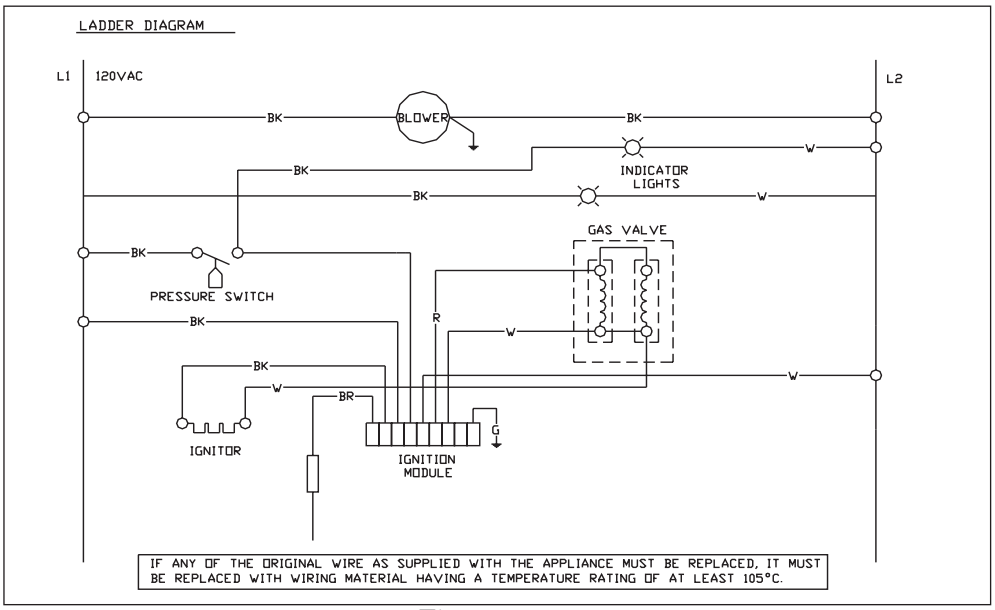


Figure 3.1.1

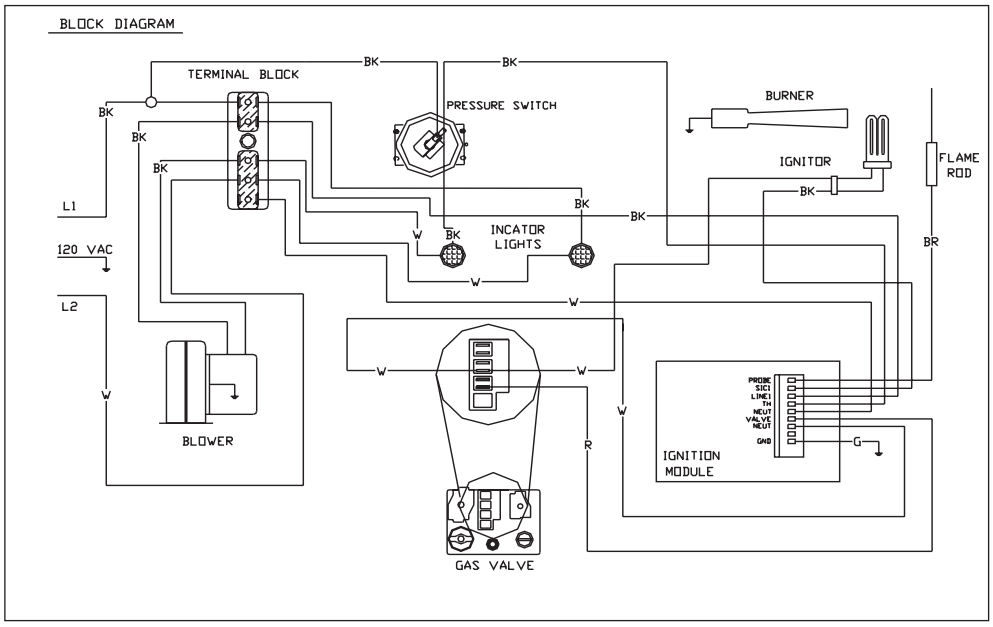


Figure 3.1.2

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 ducts 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 Gas Valve Testing

1. Disconnect the heaters power supply.

2. Disconnect all the wires from the valves terminals.

When testing the valves resistance they should read as follows:

Main (M) to Common (C) 355
Common (C) to Redundant (P) 1.89K

4.3 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

Part No.	*Description*
TP-1	Control Box Cover
TP 2	Control Box End - DX
TP-3	#8 x 1/4" Sheet Metal Screw
TP-4A	Control Box
TP-5	Flange Gasket
TP-7	1/4-20 x 1/2" Machine Screw
TP-7A	1/4-20 Hex Nut
TP-9	Conduit Coupling
TP-10	Conduit 1/2" x 4"
TP-11	Glo-Bar Box
TP-12	Glo-Bar Box Cover
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 3/8" Thread-Cutting Screw
TP-19B	Tube/Reflector Hanger (BR-4HGR)
TP-19C	Reflector Center Support (BR-4IH)
TP-20	Refector (120")
TP-21	Tube Clamp
TP-26	10 ft. Radiant Tube, Straight
TP-26S	1st 10 ft. Radiant Tube, Straight (Stainless)
TP-31B	Control Box Bracket
TP-41	1/4-20 Keps Nut
TP-44	Inlet Air Orifice w/Screen
TP-50	Globar Ignitor
TP-54	Burner Box Divider
TP-55A	Fan Blower

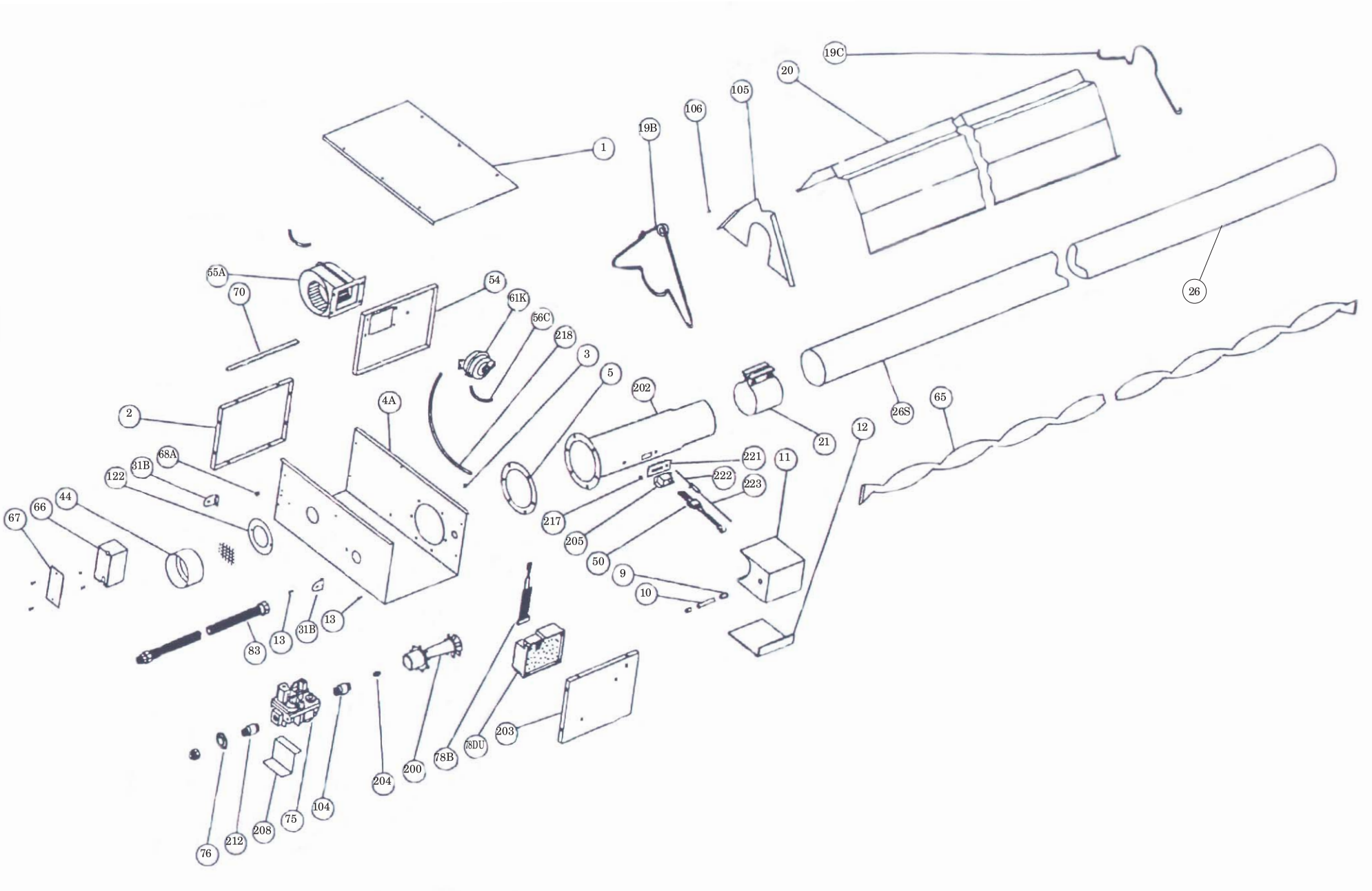
Part No.	*Description*
TP-56C	¼ " Atmosphere Tube (Vinyl)
TP-57A	¼ " Pressure Tube
TP-59	#8 Hex Nut/ Lock Washer
TP-61K	Safety Pressure Switch
TP-62	#8 x 1/2" Machine Screw
TP-65A	Heat Diffuser (Baffle)
TP-66	2" x 4" Outlet Box
TP-67	2" x 4" Outlet Box Cover
TP-68A	Strain Relief Bushing
TP-70	Control Box Gasket
TP-76	Rubber Grommet
TP-78DU	Mark 17DU-117 Circuit Board
TP-80	#6-32 x 1" Machine Screw
TP-81	#6-32 Hex Nut
TP-83	Flexible Gas Connector
TP-104	1/2" x 2" Manifold
TP-105	Reflector End Cap (BR-ECR)
TP-106	Reflector Clip (BR-ECRC)
TP-122	Air Inlet Gasket
TP-200	Burner (50,000 to 100,000 BTUH)
TP-202	16 " Burner Tube
TP-203	DX End Panel-Right
TP-204	Gas Orifice (TP-46)
TP-205	Glo-Bar Holder
TP-208	"Z" Bracket
DX-75	36E36A-246 Gas Valve (State N.G. or L.P.)
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

Part No.	*Description*
TP-217	Pressure Barb Fitting
TP-218	Exhaust Pressure Tube (Vinyl)

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

5.2 Optional Parts

Item No.	*Description*
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


19C
20
105
106
19B
1
55A
70
54
61K
56C
218
3
5
202
4A
2
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31B
122
44
66
67
221
222
223
217
205
50
9
10
11
12
21
26S
65
26
83
13
31B
13
104
75
208
212
76
204
200
78B
78DU
203