240 Series

Horizontal or Vertical Mounting
Industrial / Commercial Electric Unit Heater

Owner's Manual

This manual covers installation, maintenance and repair parts. Read carefully before attempting to install, operate or service the 240 Series Unit Heater.

IMPORTANT INSTRUCTIONS

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

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IMPORTANT INSTRUCTIONS

Installation and maintenance personnel should familiarize themselves with this manual and all the **IMPORTANT INSTRUCTIONS** before installing or working on this heater to avoid potential unsafe conditions, severe property damage, personal injury or death.

1. Read all instructions before using this heater.
2. Verify that the supply voltage and phase to the heater matches the nameplate rating before energizing.
3. Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the OFF position and tag the circuit “Out for Maintenance” before working on this equipment.
4. Keep electrical enclosure cover tightly closed while in operation.
5. Hazard of Electric Shock. Heater must be grounded in accordance with both local and national codes.
6. This heater should be installed by a licensed electrician familiar with all applicable national and local codes having jurisdiction. It is the responsibility of the installer to verify the safety and suitability of the installation.
7. Disassembly of the unit for installation is not required or authorized.
8. Replacement electrical components must be obtained from the factory in order to maintain any applicable Agency Listings.
9. Use this heater only as described in this manual. Any other use is not recommended by the manufacturer and may result in fire, electric shock or personal injury.
10. The heater and discharge air are hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
11. To prevent a possible fire, do not block or allow foreign objects to enter air intakes or exhaust in any manner.
12. Risk of fire due to high temperatures. Keep electrical cords, drapery, furnishings, insulation and other combustibles at least 3 feet (0.9m) from the front of the heater and away from the sides, rear and top.
13. Installation minimum mounting clearances specified both on heater nameplate and in this owner’s manual must be maintained.
14. Use copper wire rated 75°C min. for supply connections according to size specified on heater nameplate.
15. Do not attempt to override louver stops. Do not operate unit with louvers turned above level of unit.
16. This heater should not be used in potentially explosive atmospheres. Do not use in areas where gasoline, paint, or flammable liquids are used or stored.
17. This heater should not be used in outdoor, wet and/or corrosive locations.
18. Risk of fire. Do not use as a residential or household heater.
19. Do not operate heater after it malfunctions. Disconnect power at service panel and have heater inspected by a reputable electrician before reusing.
20. **SAVE THESE INSTRUCTIONS.**

WARRANTY WILL BE VOID IF INSTRUCTIONS ARE NOT FOLLOWED

INSTALLATION INSTRUCTIONS

RISK OF FIRE / EXPLOSION

- This heater should not be used in potentially explosive atmospheres. Do not use in areas where gasoline, paint or flammable liquids are used or stored.
- Keep electrical cords, drapery, furnishings, insulation and other combustibles at least 3 feet (0.9m) from the front of the heater and away from the sides, rear and top.
- Installation minimum clearances specified both on the heater nameplate and in the owner's manual must be maintained.
- Do not use as a residential or household heater.

The air heaters are designed for comfort heating and should not be used in ambient temperatures exceeding 104ºF (40ºC). They are to be permanently mounted to the wall or ceiling for either horizontal or vertical discharge. The unit is designed to give years of safe, trouble-free operation when properly installed and maintained.

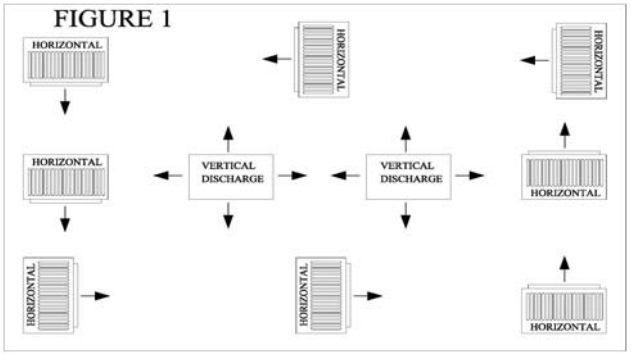
A. Site Selection:

The Heaters should not be mounted close to insulation, drapery or similar materials which could come in contact with the cabinet, or block the inlet or outlet of the heater. The heaters are intended for elevated mounting locations so that they blow warm air down to the floor area. A mounting height should be selected so that the heater is out of the way of possible moving equipment or personnel, yet low enough to deliver warm air to the selected area. See the mechanical installation section for recommended installation heights.

Heater airflow should be directed to areas of greatest heat loss. In general, greater numbers of small heaters will provide more uniform and even heat distributions than a few large ones. In order to help move heated air around the room, multiple heaters should be spaced out and direct air in a circular pattern around the room perimeter such that each heater supports the next heater's airstreams. Additional vertical discharge heaters with appropriate diffusers can be located to direct heated air to the room center and offset any ceiling heat losses. See the figures below for some typical airflow pattern arrangements:

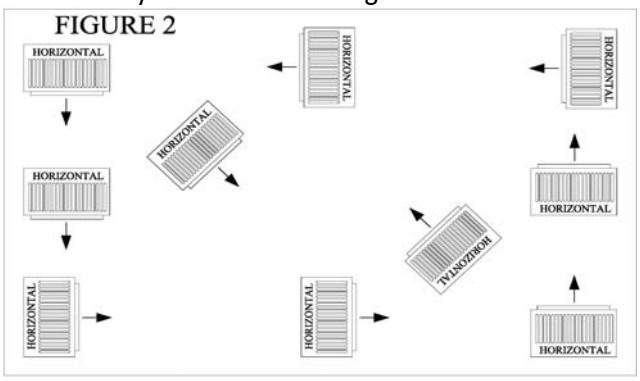
Large room with exposed walls and roof – both horizontal and vertical discharge heaters:

FIGURE 1



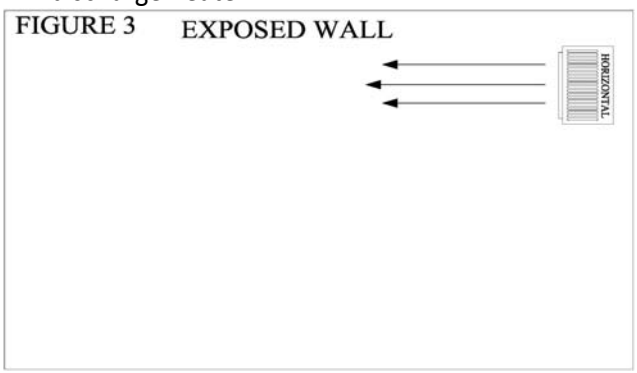
Large room with exposed walls and roof - only horizontal discharge heaters:

FIGURE 2



Small room with one exposed wall – horizontal discharge heater:

FIGURE 3 EXPOSED WALL



INSTALLATION INSTRUCTIONS – Continued

B. Mechanical Installation:

These heaters may be mounted for either horizontal or vertical discharge by means of threaded rods (supplied by others). The heaters may also be mounted by means of an optional mounting kit which includes a bracket and cantilever arm which allows horizontal pivoting of the heater. Lock washers should be used on all mounting nuts and bolts to ensure they don't vibrate or work loose due to fan vibration or other vibration transmitted to the heater.

The supporting structure that the heater is attached to must have adequate strength to safely support the heater. The heater dimensions and maximum unit weights are:

TABLE 1:

Max. KW	Cabinet Size	W	H	Depth	Weight
5	1	12.875" (327mm)	17.750" (450mm)	7.625" (194mm)	25 lbs (11.3 kg)
10	2	16.875" (429mm)	24.250" (616mm)	7.625" (194mm)	40 lbs (18.2 kg)
20	3	16.875" (429mm)	24.250" (616mm)	11.375" (289mm)	55 lbs (25.0 kg)
50	4	26.937" (684mm)	35.500" (902mm)	15.625" (397mm)	155 lbs (70.3 kg)

These heaters are provided with either directional louvers, a radial diffuser or an anemostat diffuser. Select an installation location such that the outlet air is not directed at an adjacent wall.
Once an acceptable location has been determined, see the following instructions to complete the mechanical installation:

Horizontal Discharge:

1. To ensure proper heating of floor surfaces, observe the following recommended mounting height limitations (to bottom of heater):

TABLE 2:

Maximum Mounting Height from Floor, feet (m)			
Cabinet Size 1	Cabinet Size 2	Cabinet Size 3	Cabinet Size 4
10' (3m)	15' (4.6m)	20' (6.1m)	25' (7.6m)

The minimum mounting distance from the floor to the bottom of the heater is 8 feet (2.4m).

2. Remove the four bolts located in the top of the heater and install four threaded rods (not supplied by HEATREX) using locknuts to secure. Do not remove the four bolts from the back of the heater case.
3. Secure the four threaded rods to the ceiling using locknuts to complete the installation.
4. Refer to table 3 and figure 4 below for minimum mounting clearances to the walls and ceiling:

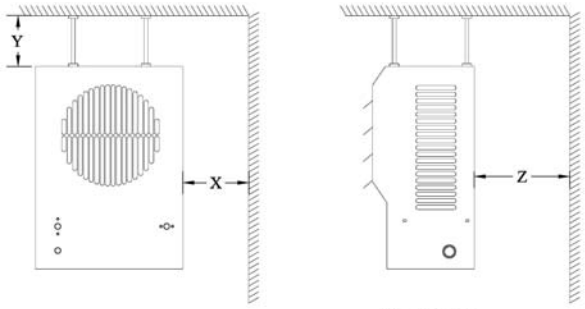


FIGURE 4

TABLE 3:

Minimum Clearances – Horizontal Discharge, inches (mm)			
Cabinet Size	X	Y	Z
1	6 (152)	10 (254)	6 (152)
2	6 (152)	10 (254)	6 (152)
3	6 (152)	12 (305)	6 (152)
4	6 (152)	12 (305)	6 (152)

5. Refer to the table and figure below for mounting point size and locations:

FIGURE 5

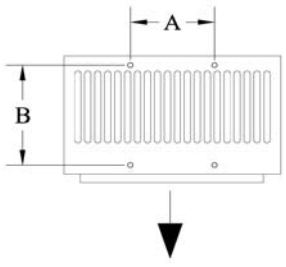


TABLE 4:

Cabinet Size	Thread Size	A, in (mm)	B, in (mm)
1	3/8 – 16	5 (127)	6.44 (164)
2	3/8 – 16	5 (127)	6.44 (164)
3	3/8 – 16	5 (127)	10.13 (257)
4	3/8 – 16	7 (178)	12.92 (328)

6. Adjustable louvers should be set to achieve the desired airflow direction.

Vertical Discharge:

1. When mounting for vertical discharge, ensure there is enough clearance to the wall to fully open the access cover to the wiring compartment.
2. To ensure proper heating of floor surfaces, observe the following recommended mounting height limitations (to bottom of heater):

TABLE 5:

Maximum Mounting Height from Floor, feet (m)				
Cabinet Size	No Louvers	Standard Louvers	Anemostat Diffuser	Radial Diffuser
1	10' (3.0m)	10' (3.0m)	9' (2.7m)	10' (3.0m)
2	15' (4.6m)	15' (4.6m)	13' (4.0m)	15' (4.6m)
3	20' (6.1m)	20' (6.1m)	17' (5.2m)	20' (6.1m)
4	25' (7.6m)	25' (7.6m)	21' (6.4m)	25' (7.6m)

The minimum mounting distance from the floor to the bottom of the heater is 8 feet (2.4m).

3. Remove the four bolts from back of heater cabinet and install four threaded rods (not supplied by HEATREX) using locknuts to secure. Do not remove the four bolts from the top of the heater cabinet.
4. Secure the four threaded rods to the ceiling using locknuts to complete the installation.
5. Refer to the table and figures below for minimum mounting clearances to the walls and ceiling:

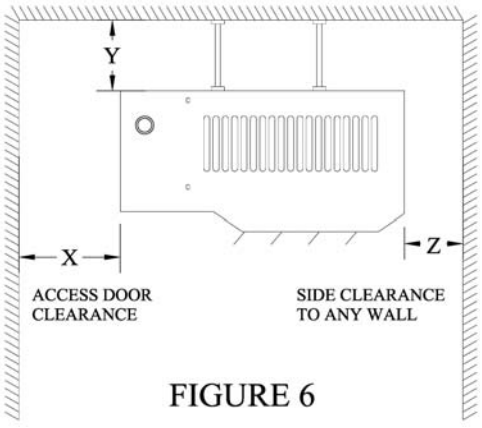


FIGURE 6

TABLE 6:

Minimum Clearances – Vertical Discharge, inches (mm)			
Cabinet Size	X	Y	Z
1	8 (203)	6 (152)	16 (406)
2	8 (203)	6 (152)	16 (406)
3	12 (305)	6 (152)	32 (813)
4	16 (406)	6 (152)	32 (813)

6. Refer to the table and figure below for threaded mounting point size and locations:

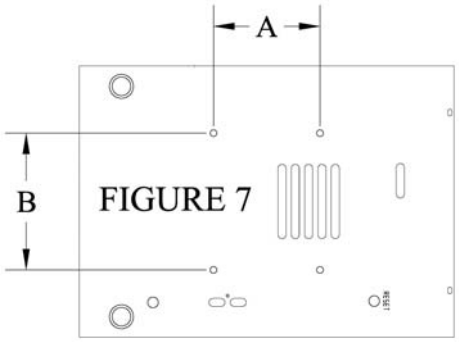


FIGURE 7

TABLE 7:

Cabinet Size	Thread Size	A, in (mm)	B, in (mm)
1	3/8 – 16	5 (127)	6.44 (164)
2	3/8 – 16	5 (127)	6.44 (164)
3	3/8 – 16	10.13 (527)	5 (127)
4	3/8 – 16	12.92 (328)	7 (178)

C. Electrical Installation:

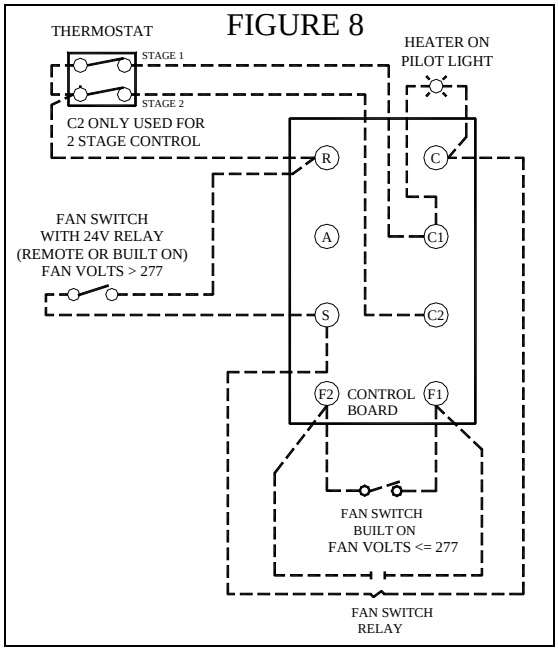
Follow these instructions to complete the electrical installation:

1. External branch circuit protection is required. See nameplate ratings and follow Code recommendations.
2. Follow the NEC and/or CEC and any local electrical and building codes related to the installation and intended use of the heater.
3. When doing any work on a heater, including the initial electrical connection, disconnect the electrical supply at the main branch circuit switch, and lock the switch in the off (open) position. Tag the circuit "Out for Maintenance" to prevent potential lethal shock hazards.
4. Confirm that the electrical power supply matches the nameplate voltage, phase, amperage and frequency rating of the heater to be connected.

INSTALLATION INSTRUCTIONS – Continued

5. Ensure conductors are of appropriate gauge size as specified on the heater nameplate. Use copper conductors rated 75°C minimum.
6. Proper installation of the heater requires that an adequate grounding conductor be connected to the ground terminal. This terminal marked with the letter “G” and is located on the inside of the control enclosure.
7. A wiring diagram is supplied with each heater. Optional electrical controls, either kits or factory installed, are connected to the control wiring board and are shown as dashed lines. The figure below shows control wiring board connections for field wired options:

FIGURE 8



8. Install any electrical option kits according to the instructions provided.
9. Use min. 600 volts, NEC Class 1 insulated wire for all control circuit wiring.
10. Check and confirm all connections are securely tightened. Remove any foreign objects from the control box and close access door.
11. On single phase heaters rated less than 5 KW that do not contain a contactor and transformer, any remote thermostat used must be rated for the full load of the heater as shown on the heater nameplate.
12. See section titled “operation” before energizing the heater.

OPERATING INSTRUCTIONS

RISK OF FIRE / EXPLOSION

- This heater should not be used in potentially explosive atmospheres. Do not use in areas where gasoline, paint or flammable liquids are used or stored.
- Keep electrical cords, drapery, furnishings, insulation and other combustibles at least 3 feet (0.9m) from the front of the heater and away from the sides, rear and top.
- To prevent a possible fire, do not block or allow foreign objects to enter air intakes or exhaust in any manner.

ELECTRIC SHOCK HAZARD

- Keep electrical enclosure cover tightly closed while in operation.
- Do not operate heater after a malfunction. Disconnect power at service panel and have heater inspected by a reputable electrician before reusing.
- Use this heater only as described in this manual. Any other use is not recommended by the manufacturer and may result in fire, electric shock or personal injury.

RISK OF INJURY / BURN

- The heater and discharge air are hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
- Do not attempt to service or clean heater while unit is operating as there is a hazard from electric shock, injury from operating fan blade and burns from hot heating elements.

The unit heater may be operated normally at ambient temperatures of 104°F (40°C) or less. Each heater contains a normally open bimetal cutout which delays the fan motor until the heating elements have warmed up and also keeps the fan running after shutdown until the heating elements have cooled down.

A. Initial Operation:

Confirm proper mechanical and electrical installation before operation of the heater.

1.) Heaters without built on or remotely mounted fan switch:
   a.) Set the temperature control thermostat to a setting above the current room temperature.
   b.) Energize the heater electrical supply circuit.
   c.) The heater should come on and the fan should start within approximately 1 to 2 minutes.
   d.) During normal operation the limit controls are not supposed to cycle the heater ON and OFF. If frequent cycling of the limit occurs, verify the minimum mounting clearances are maintained, verify proper orientation of the room thermostat and there is no visible obstruction to the heater inlet or outlet. If this does not eliminate the limit control cycling then the heater must be examined by qualified service personnel before further operation to determine the cause.
   e.) Heaters may be provided with a manual reset limit control (Optional with order code M for heaters less than 10KW). This limit control disables the electrical function of the heater whenever excessive temperatures are present. If the manual reset limit control is suspected of causing heater non-function then the heater must be disconnected from the heater electrical

OPERATING INSTRUCTIONS - Continued

supply and examined by qualified service personnel. The personnel must determine the cause of the excessive temperatures, verify the minimum mounting clearances, verify proper orientation of the heater, verify proper orientation of room thermostat, or determine if there are any obstructions or damage to the heater or heater inlet or heater outlet. The manual reset limit control may then be reset as described in the "Repair and Replacement Instructions".

f.) Check out and report any unusual or questionable operating characteristics, such as noise, vibration, etc.

g.) Set the temperature control thermostat to the desired room temperature setting.

h.) De-energize the heater electrical supply circuit until heater operation is required.

i.) Set the temperature control thermostat to a setting above the current room temperature.

j.) The heater should come on and the fan should energize in approximately 1 to 2 minutes. If the room ambient temperature is high or the heater is mounted too close to the ceiling or walls, the unit may cycle on the thermal high limits of the motor and/or the heater.

k.) Check out and report any unusual or questionable operating characteristics, such as noise, vibration, etc.

l.) Set the fan switch and temperature control thermostat to the desired operating positions.

2.) Heater with fan switch:

a.) Place the fan switch in the "ON" position.

b.) Set the temperature control thermostat to a setting below the current room temperature.

c.) Energize the heater electrical supply circuit.

d.) The heater fan should come on but the heater should remain off.

e.) Place the fan switch in the "OFF" position.

f.) The fan should go off.

B. Normal Operation:

Prior to the start of the heating season, perform the electrical and mechanical steps outlined in the section titled "MAINTENANCE INSTRUCTIONS".

a.) Perform the operation steps for the applicable temperature control option.

b.) Place all switches in their normal operating position and place the unit heater in service.

MAINTENANCE INSTRUCTIONS

ELECTRIC SHOCK HAZARD

- Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the OFF position and tag the circuit “Out for Maintenance” before working on this equipment.

RISK OF INJURY / BURN

- Do not attempt to service or clean heater while unit is operating as there is a hazard from electric shock, injury from operating fan blade and burns from hot heating elements.
- Maintenance and repair must be performed by qualified personnel only.

A. Electrical:

1. Inspect all terminal connections, contactor and conductor insulation for damage, looseness, fraying, etc., as applicable. Tighten any loose terminals and replace or repair wire with damaged or deteriorated insulation. If contactor contacts are badly pitted, welded together, or burned, replace the contactor.
2. If reduced heat output is suspected, perform the mechanical checks. If low heat output is still suspected after completing the mechanical checks, verify the condition of the heating elements by visual inspection and by using an amperage meter to check the current draw of each input line. Adjust the room thermostat to its highest temperature to ensure all stages of heat are energized. All input lines should draw approximately equal current which should agree with the nameplate rating. If they do not, one or more of the heating elements could be burned out and should be replaced.

B. Mechanical:

1. Annually check the tightness of all visible bolts and nuts, in particular the support structure bolts and nuts. Similarly check the motor mounting bolts located in the top and back of the heater case.
2. Periodically, check the motor, fan, discharge openings, intake openings, heating elements and control compartment for cleanliness. If necessary, clean by using a vacuum or compressed air. Be careful not to bend the fan blade propeller.
3. Check motor and fan for smooth running operation. Any unusual noise or vibration must be investigated and rectified.
4. The electric motors are permanently lubricated and thermally protected. Check for smooth and quiet running at all inspections. Replace motor if excessive bearing play is detected.

REPAIR AND REPLACEMENT INSTRUCTIONS

RISK OF INJURY / BURN

- Maintenance and repair must be performed by qualified personnel only.

A. Replacing the High-Limit or Fan Delay Cutouts:

1. Disconnect the heater electrical power supply.
2. For horizontal discharge heaters, the heater will need to be disconnected and lowered.
3. For heaters with an optional “Heater On” pilot light, built on fan switch or built on room thermostat, mark wiring at control board and disconnect.
4. Remove any adjustable louvers and the front cabinet section to expose the fan motor and heating elements.
5. Remove the fan blade, careful not to bend.
6. The temperature high limit and fan delay are located on a stepped sheet metal bracket directly below the back heating element. The fan delay is the cutout directly against the heating element fin; the temperature high limit is approximately 5/8” below.
7. Mark and disconnect the appropriate wires.
8. Lower the cutout bracket by removing the side sheet metal screws.
9. Replace the appropriate cutout.
10. Reattach the sheet metal bracket and wiring.
11. Reinstall & verify the fan blade rotates freely.
12. Reassemble, remount and connect heater.
13. Reconnect any wires disconnected in step 3.
14. Perform steps in section titled “OPERATION” to verify heater performance.

B. Resetting the Optional Manual Cutout:

1. Disconnect the heater electrical power supply.
2. Determine the reason for the manual reset thermal cutout actuating and rectify the situation. See section titled “maintenance”.
3. Reset the manual reset thermal cutout by pressing on the red button located in the back of the heater marked “RESET”. It may be necessary to wait for the cutout to cool.
4. Energize the heater electrical supply circuit.
5. Perform the steps outlined in the section “OPERATION” to verify heater performance.
6. Check out and report any unusual or questionable operating characteristics, such as noise, vibration, etc.
7. If heater operation appears normal, place the unit into normal operation.

C. Replacing the Fan Motor and Blade:

The fan motor is permanently lubricated and does not require any maintenance. If the fan motor is defective, a replacement must be obtained from the factory.

1. Disconnect the electrical power supply.
2. For horizontal discharge heaters, the heater will need to be disconnected and lowered.
3. For heaters with an optional “Heater On” pilot light, built on fan switch or built on room thermostat, mark wiring at control board and disconnect.
4. Remove any louvers and the front cabinet section to expose the motor and blade.
5. Remove the fan blade, careful not to bend. If motor is not being replaced, skip to step 11.
6. Disconnect the motor supply wires, noting their location.
7. Remove motor mounting screws and lift motor out of heater assembly.
8. Install new motor to heater using existing motor mounting hardware.
9. Feed motor wires through snap bushing and into wiring compartment.
10. Reconnect motor wires.
11. Reinstall & verify the fan blade rotates freely.
12. Reassemble, remount and connect heater.
13. Reconnect any wires disconnected in step 3.
14. Perform steps in section titled OPERATION to verify heater performance.

REPLACEMENT PARTS

1. All replacements must be factory supplied to ensure safe heater operation.
2. Mark wires and refer to wiring diagram to ensure proper electrical connections.

Reference heater model number and the bubble number from the figures below when contacting factory for replacement parts. Contact factory for items not shown.

FIGURE 9 - CABINET, MOTOR AND HEATING ELEMENTS:

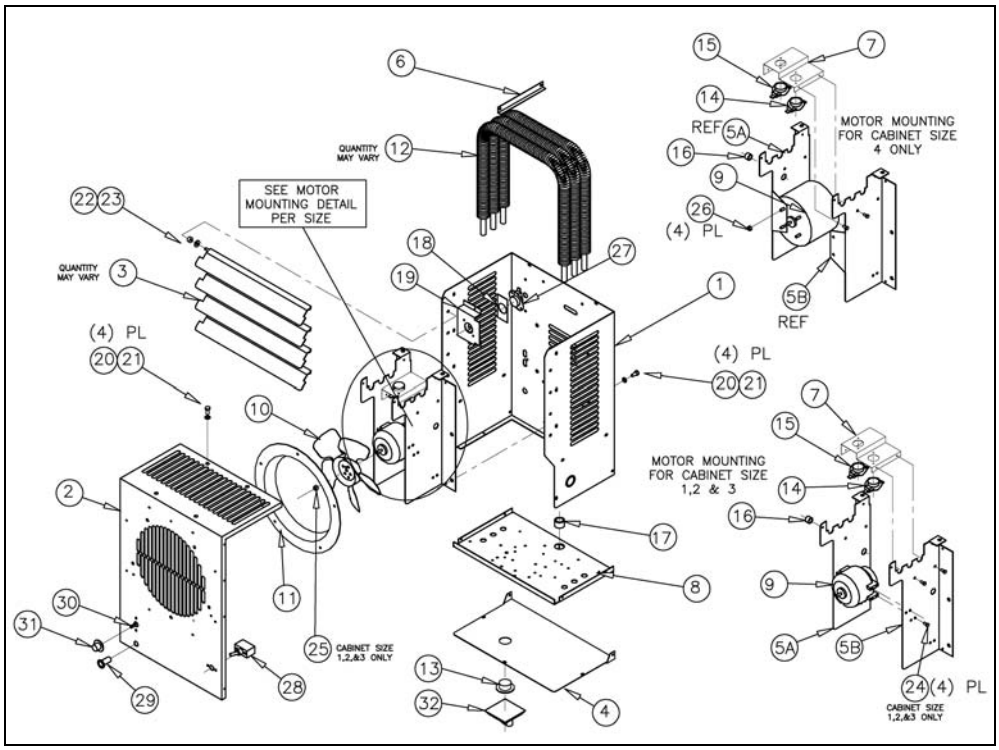


TABLE 8

BUBBLE	DESCRIPTION	Qty
01	Cabinet Back	1
02	Cabinet Front	1
03	Louver	A/R
04	Terminal Box Cover	1
5A	Element Support – Left	1
5B	Element Support – Right	1
06	Element Anchor	1
07	Thermal Cutout Bracket	1
08	Component Bridge	1
09	Motor	1
10	Fan Blade	1
11	Fan Ring	1
12	Heating Element	A/R
13	Plug	1
14	Automatic Reset Cutout	1
15	Fan Delay Cutout	1
16	Manual Wire Grommet	1

BUBBLE	DESCRIPTION	Qty
17	Wiring Grommet	1
18	Manual Cutout Barrier	1
19	Manual Reset Cutout Bracket	1
20	Bolt	8
21	Split Lockwasher	8
22	Neoprene Spacer	A/R
23	#10 Flat Washer	A/R
24	#8-36x1/2 Bolt	4
25	1/4-20 Keps Nut	1
26	10-32 Nut	4
27	Manual Reset Cutout – Optional	1
28	Fan Switch – Optional	1
29	Pilot Light – Optional	1
30	Built On Thermostat – Optional	1
31	Thermostat Knob – Optional	1
32	Disconnect Handle – Optional	1

REPLACEMENT PARTS - Continued

FIGURE 10 - ELECTRICAL COMPONENTS:

The figure below shows a typical layout of the heater electrical components for reference only. Locations and quantity of parts will vary.

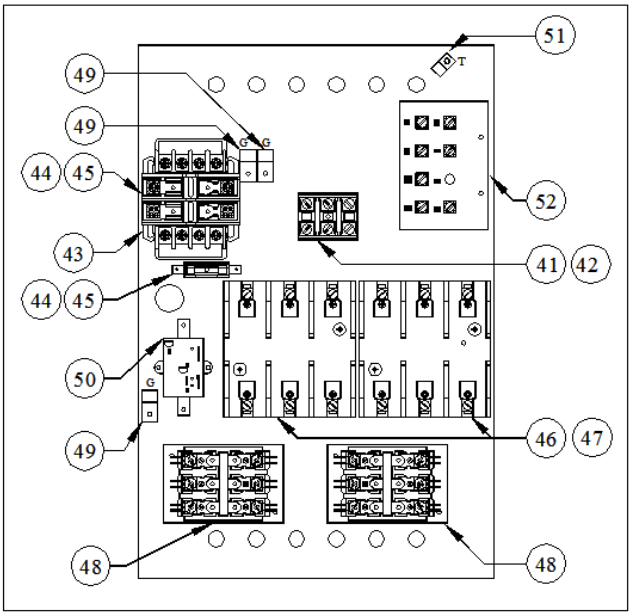


TABLE 9:

BUBBLE	DESCRIPTION
41	Disconnect Switch (not shown)
42	Power Terminal Block
43	Control Transformer
44	Secondary Transformer Fuse Block
45	Secondary Transformer Fuse
46	Power Fuse Block
47	Power Fuse
48	Control Contactor
49	Ground Lug
50	Fan Switch Relay
51	Thermostat Capillary Clamp
52	Motor Capacitor (not shown)

FIELD INSTALLABLE ACCESSORIES

The following items are available from the factory for field installation:

TABLE 11: Mechanical Accessories:

Item	Description
1024149	Universal wall & ceiling mounting bracket kit; Cabinet Sizes 1 & 2
1024150	Universal wall & ceiling mounting bracket kit; Cabinet Size 3
1024151	Universal wall & ceiling mounting bracket kit; Cabinet Size 4
1024155	Anemostat (Cone) Diffuser; Cabinet Size 1
1024156	Anemostat (Cone) Diffuser; Cabinet Sizes 2 & 3
1024157	Anemostat (Cone) Diffuser; Cabinet Size 4
1024152	Radial Diffuser; Cabinet Size 1
1024153	Radial Diffuser; Cabinet Sizes 2 & 3
1024154	Radial Diffuser; Cabinet Size 4
1023941	Horizontal Dust Shield; Cabinet Sizes 1 & 2
1024059	Horizontal Dust Shield; Cabinet Size 3
1024060	Horizontal Dust Shield; Cabinet Size 4

TABLE 12: Electrical Accessories:

Item	Description	Ratings
1024162	Disconnect Switch 32A	32 Amps, 600V, 3 Pole
1024163	Disconnect Switch 64A	64 Amps, 600V, 3 Pole
1024164	Disconnect Switch 80A	80 Amps, 600V, 3 Pole
1024166	Built On Thermostat Kit – 1 Stage	25A @ 240V, 22A @ 277V ; 125VA Pilot Duty
1024167	Built On Thermostat Kit – 2 Stage	25A @ 240V, 22A @ 277V ; 125VA Pilot Duty
1024168	“Heater On” Pilot Light – 24V	24 Vac Control Voltage
1024169	“Heater On” Pilot Light – 120V	120 Vac Control Voltage
1024170	Summer Fan Switch – Built On	Heater Voltage<= 277V
1024171	Summer Fan Switch with 24V Relay – Built On	24Vac Control, Heater Supply Voltage > 277V
1024172	Summer Fan Switch with 24V Relay – Remote	24Vac Control