

Electric Heat Accessory

Installation Instructions

EBP, EBX, EBV, EBW
FVM, FEM, FSM, FSU

WARNING

Electrical shock hazard.

Installation or repairs made by unqualified persons can result in hazards to you and others. Installation must conform with local building codes or, in the absence of local codes, with National Electrical Code ANSI/NFPA 70-1996 or current edition.

The information contained in this manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments.

Shut OFF electric power at unit disconnect and/or service panel before beginning the following procedures.

Failure to carefully read and follow all instructions in this manual can result in malfunction, property damage, personal injury, and/or death.

INSTALLATION

PROCEDURE 1 -INSTALL ELECTRIC HEATER ASSEMBLY

NOTE: Ensure heater coils are not deformed or damaged during heater installation.

1. Make sure power to unit is off.
2. Remove blower access panel of fan coil unit.

CAUTION: Before installation of heater, the black and yellow pigtail leads must be removed from the fan coil board or wire harness to prevent possible damage to the product. Electrical power will be provided to the board through the heater circuit plug.

3. Disconnect 2 power wires (black and yellow pigtail leads) from fan board or wire harness (if applicable) and discard. Wires may be part of a plug assembly or attached to terminals L1 and L2. Remove cooling control plate from fan coil (if equipped). For 18-, 24-, and 30-kw heaters, remove adapter plate. (See Fig. 1.)

4. Insert heater assembly into front of fan coil so that element rods engage holes in rear heat shield.

5. Attach heater control plate to fan coil using 2 screws provided. For 18-, 24-, and 30-kw heater models, attach front of heater to fan deck using third screw. (See Fig. 1.)

Figure 1 Installing The Electric Heat Accessory

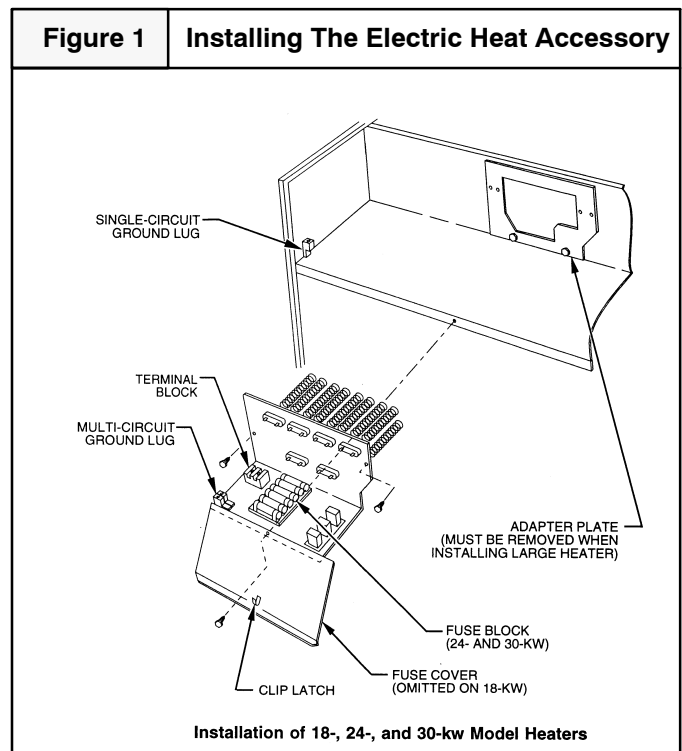


Table 1 – Accessory Heater Usage

Model	Description	Use With
EHK05AKN1	5 Kw Single Phase	All
EHK07AKN1	8 Kw Single Phase	All
EHK07AKB1	8 Kw Single Phase	All
EHK09AKCN1	9 Kw / Single Phase (Field convertible to 3 phase)	2-5 Ton
EHK10AKN1	10 Kw Single Phase	All
EHK10AKB1	10 Kw Single Phase	All
EHK15AKF1	15 Kw Single Phase	2-5 Ton
EHK15AKB1	15 Kw Single Phase	2-5 Ton
EHK15AHN1	15 Kw 3 Phase	3-5 Ton
EHK18AHN1	18 Kw 3 Phase	3 1/2 – 5 Ton
EHK20AKF1	20 Kw Single Phase	2 1/2 – 5 Ton
EHK20AKB1	20 Kw Single Phase	2 1/2 – 5 Ton
EHK25AHCF1	24 Kw / 3 Phase (Field convertible to single phase)	4 – 5 Ton
EHK30AHCF1	30 Kw / 3 Phase (Field convertible to single phase)	4 – 5 Ton

All AKB Models are Circuit Breaker Models

Table 2 – Minimum CFM and Motor Speed Selection

Fan Coil Sizes	HEATER KW								
	5	8	9	10	15	18	20	24	30
1800	525	525	–	600*	–	–	–	–	–
2400	700	700	700	700	775*	–	–	–	–
3000	875	875	–	875	875	–	1060*	–	–
3500/3600	1050	970	970	970	920	–	1040	–	–
4200	–	1225	1225	1225	1225	1225	1225	–	–
4800	–	1400	1400	1400	1400	1400	1400	1400	1400
6000	–	1750	1750	1750	1750	1750	1750	1750	1750

* Indicates medium speed (blue). All other motor speeds at low tap.

PROCEDURE 2 –ATTACH FUSE BOX OR CIRCUIT BREAKER BOX

1. For 15- and 20-kw fused models:

After installing heater assembly, attach fuse assembly to side of fan coil unit by inserting fuse box tab between insulation and to left side of unit and fan deck. Mount front of assembly to side flange with 2 screws provided. On fan coil units size 042 and larger, remove wire tie that shortens wire length between heater and fuses. Fuse cover is closed by engaging dimples in fuse box. (See Fig. 2.)

2. For 24- and 30-kw fused models:

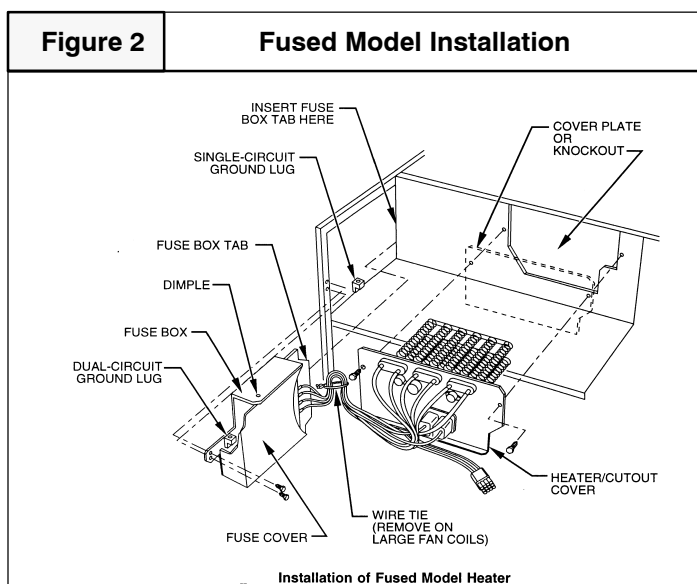
Fuse assembly is mounted on heater. Be sure fuse cover is closed by engaging clip latch on unit top panel. (See Fig. 1.)

WARNING: Ensure fuse box is closed before power is turned to ON position. Electrical shock may cause personal injury or death.

3. For 5- through 20-kw circuit breaker models:

After installing heater assembly, attach circuit breaker assembly to unit with screws provided. (See Fig. 3.) On fan coil units size 4200 and larger, remove wire tie that shortens wire length between heater and circuit breaker assembly to allow mounting of circuit breaker assembly. (See Fig. 3.)

4. Circuit breaker models require installing a bezel in unit door to provide safe access to circuit breakers. Bezel mounts on inside of blower door. (See Fig. 4.)



a. Cut insulation away from access hole in blower access panel. Slide bezel flanges under insulation. Lip on bezel must protrude inward toward unit.

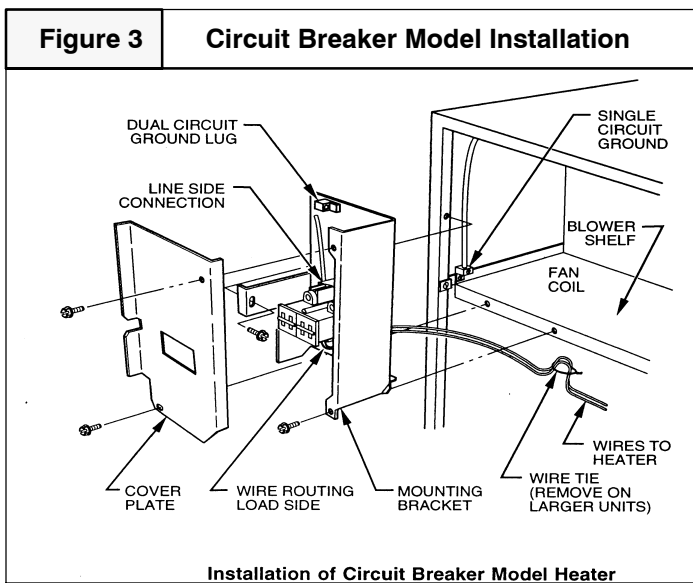
b. Secure bezel to panel with 2 No. 6 hex head screws. Insert screws through original cover plate holes on access panel and drive into engagement holes on bezel flanges.

PROCEDURE 3 -ELECTRICAL CONNECTIONS

Refer to unit instructions for recommended wiring procedures. Install wiring in accordance with all applicable local and national codes.

Connect heater wiring harness plug to receptacle on fan board or wire harness. A positive connection must be made between plug and receptacle. Plug will interlock with receptacle when properly seated. Harness contains both 24-v control and high-voltage wiring. Blower power is provided through heater harness.

NOTE: Units with or without electric heaters require a minimum CFM. Refer to unit wiring label to ensure the fan speed selected with electric heaters is equal to or greater than the minimum fan speed indicated. The minimum CFM for cooling is determined by the outdoor unit requirements. Use the higher of the 2 for year-round operation.



A. Wire 24-v Control Systems

1. Connections to unit

Use No. 18 AWG color-coded, insulated (35 Deg. C minimum) wire to make low-voltage connections between thermostat, fan coil unit, and outdoor unit. If thermostat is located more than 100 ft. from unit (as measured along the low-voltage wire), use No. 16 AWG color-coded, insulated (35 Deg. C minimum) wire. All wiring must be separated from line voltage power leads. Refer to outdoor unit wiring instructions for additional wiring procedure recommendations.

2. Transformer

Transformer is factory wired for 230-v operation. For 208-v applications, disconnect black wire on transformer 230-v terminal and reconnect it to 208-v terminal. (See Fig. 5.) The secondary circuit of transformer is protected by a 5-amp fuse mounted on fan board.

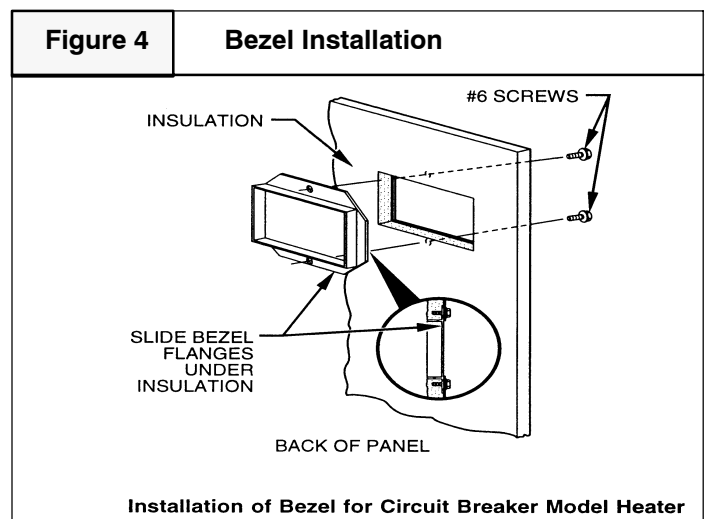
3. Heater staging

The units are shipped circuited for single-stage operation. The heat can be staged either through an indoor thermostat or by using an outdoor thermostat. When 2-stages are desired, cut W3 at the W2 wire nut, strip and reconnect per wiring staging layout in Installation Instructions for fan coils.

- a. The 3-, 5-, 8-, and 10-kw heaters are single stage only.
- b. The 9- and 15-kw heaters are adaptable for 2-stage operation.
- c. The 18-, 20-, 24-, and 30-kw heaters are adaptable for 3-stage operation.

4. Rectifier and Time Delay Boards

Each heater element is controlled by a relay mounted on the heater panel. The relay has a 24v DC coil. Each relay has a small rectifier board attached directly to relay coil terminals. The rectifier board converts incoming 24v AC control signal to DC. Some heaters may have up to three relays. The second and/or third relay rectifier board also has a time delay feature and a small jumper wire built into it. With the jumper uncut, the time delay allows the second stage heat to be energized approximately 5 seconds after the first stage. On 18, 24, and 30kw heaters, the third stage relay board jumper is cut at factory. This provides an 8 second delay after first stage relay closes.



B. Power Connections

NOTE: Heater supply circuit wire size and overcurrent protection must comply with National Electrical Code (NEC) and UL branch circuit requirements. (See Table 3) Wires and overcurrent protection, integral to the heater, are not required to meet branch circuit requirements. **Internal circuit protection of 60 amps (maximum) is acceptable.**

1. Unprotected heaters: (See Figs. 6, 10, and 11.)
 - a. The 5– through 10–kw single–phase and 15– and 18–kw 3–phase heaters can be wired for single–supply circuit only. Supply circuit connects to heater pigtail leads (terminal block on 18–kw heaters).
 - b. The 3– through 10–kw single–phase heaters can use a separate field–installed, factory–authorized disconnect kit which installs in fan coil.

NOTE: Refer to wiring label for component locations.

- c. The 9–kw heater is factory wired for single supply circuit, single phase. To convert heater to single supply circuit, 3 phase:
 - (1.) Disconnect blue wire from limit switch (LS3). Cut, strip, and connect to field wire L3.
 - (2.) Disconnect yellow wire from LS1 and connect to LS3.
 - (3.) Disconnect blue wire from relay 2 terminal 2 and connect to LS1.

2. Circuit breaker heaters: (See Figs. 7 and 9.)

- a. The 3– through 10–kw heaters can be wired for single–supply circuit only.
- b. The 15– and 20–kw heaters can be wired for dual–supply circuits only.

3. Fused heaters: (See Figs. 8, 12, 13, and 14.)

- a. The 15– and 20–kw heaters can be wired for single– or dual–supply circuits. Single–supply circuit wiring requires a factory–authorized, single–point adapter kit.
- b. The 24– and 30–kw heaters can be wired for single– or multiple–supply circuits. Heaters are factory wired for single circuit 3 phase. To convert heaters to single circuit single phase, disconnect yellow lead from L3 and connect to L1. Disconnect black lead from L3 and connect to L2. To convert heaters to multiple–supply circuit single phase, remove and discard leads between single–circuit terminal block and fuse block. Remove and discard single–circuit terminal block. Attach L1 through L6 power leads as indicated on label next to fuse block.

C. Ground Connections

WARNING: According to NEC, ANSI/NFPA 70, and local codes, cabinet must have an uninterrupted or unbroken ground to minimize personal injury if an electrical fault should occur. The ground may consist of electrical wire or metal conduit when installed in accordance with existing electrical codes. (See Ground/Conduit Note below.) Failure to follow this warning could result in an electric shock, fire, or death.

NOTE: Use UL–listed conduit and conduit connector for connecting supply wire(s) to unit to obtain proper grounding. If conduit connection uses reducing washers, a separate ground wire must be used. Grounding may also be accomplished by using grounding lugs provided in control box.

1. For unprotected or single–circuit heaters, 1 equipment ground connection is provided on fan coil unit. (See Fig. 1 or 2.)
2. For 15– and 20–kw circuit breaker heaters, an additional ground lug is provided on circuit breaker mounting bracket for dual–circuit grounding. (See Fig. 3.)
3. For 15– and 20–kw fused heaters, an additional ground lug is provided on fuse mounting bracket for dual–circuit grounding. (See Fig. 2.)
4. For 24– and 30–kw fused heaters, 2 additional ground lugs are provided for single–phase, multi–circuit wiring. (See Fig. 1.)

D. Fan Speeds

1. Speed tap selection is done at fan relay. To change motor speeds, disconnect fan lead on relay and replace with motor speed tap desired. Save insulating cap and place on motor lead that was removed from relay. (See Fig. 15.) Refer to table below for further clarification of speed tap selections.

Motor Speed Tap	Wire Color
Common	Yellow
High	Black
Medium	Blue (Factory Selected)
Low	Red (Blue on 2 speed models)

PROCEDURE 4 –CONVERSION OF CIRCUIT BREAKER FOR DOWNFLOW APPLICATIONS

1. Tag and disconnect factory wiring from terminals on circuit breaker(s).
2. Pull white plastic release tab on the bottom of circuit breaker straight out to release circuit breaker from bracket. (See Fig. 16.)
3. Remove quick connect adapters from factory side of breaker(s). Reinstall adapters on other end of breakers(s). Be sure adapter is located between lug screw and plate. Torque lug screw to 30–in–lb.
4. Rotate breaker 180 degrees from its original position and reinstall in bracket. Slide breaker slot into sheet metal tab and snap breaker into place. Make sure both tabs engage breaker. Reconnect wiring on opposite end. Make sure wires are positioned as before.
5. Remount circuit breaker bracket into unit so that the switch will be in UP position when ON.

PROCEDURE 5 –ATTACH WIRING DIAGRAM AND RATING LABEL

Attach heater rating label included with kit over existing electrical information label located on front access panel of fan coil. (See Fig. 17.) If kit contains multiple rating labels, ensure correct label is applied (check phase and supply circuits).

PROCEDURE 6 –VERIFY INSTALLATION

After completion of heater installation, check wiring to ensure tightness and that proper connections and routings have been made. Ensure all electrical covers are in place and proper labels have been applied. Reinstall blower access panel before turning unit power on.

Table 3 – Electric Heater Electrical Data

Heater Model	Kw		Phase	Internal Circuit Protection	Heater Amps 208 / 230v		
	230v	208v			Single Circuit	Dual Circuit	
						L1,L2	L3,L4
EHK05AKN1 ₁	5	3.8	1	None	18.1 / 20.0	-	-
EHK05AKN1 ₂	5	3.8	1	None	18.1 / 20.0	-	-
EHK07AKN1	8	6.0	1	None	28.9 / 32.0	-	-
EHK07AKB2	8	6.0	1	Ckt Bkr	28.9 / 32.0	-	-
EHK09AKCN1	9	6.8	1	None	32.8 / 36.0	-	-
EHK09AKCN1 †	9	6.8	3	None	18.8 / 20.8	-	-
EHK10AKN1	10	7.5	1	None	36.2 / 40.0	-	-
EHK10AKB2	10	7.5	1	Ckt Bkr	36.2 / 40.0	-	-
EHK15AKF1	15	11.3	1	Fuse	54.2 / 59.9	36.2/40.0	18.1/20.0
EHK15AKB2	15	11.3	1	Ckt Bkr	-	36.2/40.0	18.1/20.0
EHK15AHN1	15	11.3	3	None	31.3 / 34.6	-	-
EHK20AHN1	18	13.5	3	None	37.6 / 41.5	-	-
EHK20AKF1	20	15.0	1	Fuse	72.3 / 79.9	36.2/40.0	36.2/40.0
EHK20AKB2	20	15.0	1	Ckt Bkr	-	36.2/40.0	36.2/40.0
EHK25AHCF1 ‡	24	18.0	3	Fuse	50.1 / 55.4	-	-
	24	18.0	1	Fuse	86.7 / 95.5	-	-
EHK30AHCF1 ‡	30	22.5	3	Fuse	62.6 / 69.2	-	-
	30	22.5	1	Fuse	109 / 120	-	-

Table 3 – Electric Heater Electrical Data (Cont.)

Heater Model	Branch Circuit														
	Min. Ampacity 208 / 230v**			Min. Wire Size (AWG) 208 / 230v☆☆			Min. Grnd. Wire Size 208 / 230v			Max Fuse/Ckt Bkr Amps			Max Wire Length 208 / 230v(ft.) ††		
	Single Circuit	Dual Circuit		Single Circuit	Dual Circuit		Single Circuit	Dual Circuit		Single Circuit	Dual Circuit		Single Circuit	Dual Circuit	
		L1,L2	L3,L4		L1,L2	L3,L4		L1,L2	L3,L4		L1,L2	L3,L4		L1,L2	L3,L4
EHK05AKN1 ₁	26.0 / 28.4	-	-	10 / 10	-	-	10 / 10	-	-	30 / 30	-	-	66 / 66	-	-
EHK05AKN1 ₂	31.2 / 33.5	-	-	8 / 8	-	-	10 / 10	-	-	35 / 35	-	-	85 / 88	-	-
EHK05AKB2 ₁	26.0 / 28.4	-	-	10 / 10	-	-	10 / 10	-	-	30 / 30	-	-	66 / 66	-	-
EHK05AKB2 ₂	31.2 / 33.5	-	-	8 / 8	-	-	10 / 10	-	-	35 / 35	-	-	85 / 88	-	-
EHK07AKN1	44.7 / 48.5	-	-	8 / 8	-	-	10 / 10	-	-	45 / 50	-	-	59 / 60	-	-
EHK07AKB2	44.7 / 48.5	-	-	8 / 8	-	-	10 / 10	-	-	45 / 50	-	-	59 / 60	-	-
EHK09AKCN1	49.5 / 53.5	-	-	8 / 6	-	-	10 / 10	-	-	50 / 60	-	-	54 / 87	-	-
EHK09AKCN1 †	32.0 / 34.5	-	-	8 / 8	-	-	10 / 10	-	-	35 / 35	-	-	83 / 85	-	-
EHK10AKN1	53.8 / 58.5	-	-	6 / 6	-	-	10 / 10	-	-	60 / 60	-	-	78 / 80	-	-
EHK10AKB2	53.8 / 58.5	-	-	6 / 6	-	-	10 / 10	-	-	60 / 60	-	-	78 / 80	-	-
EHK15AKF1	76.3 / 83.4	53.8/58.5	22.7/25.0	4 / 4	6 / 6	10 / 10	8 / 8	10 / 10	10 / 10	80 / 90	60 / 60	25 / 25	88 / 89	78 / 80	75 / 76
EHK15AKB2	-	53.8/58.5	22.7/25.0	-	6 / 6	10 / 10	-	10 / 10	10 / 10	-	60 / 60	25 / 25	-	78 / 80	75 / 76
EHK15AHN1	47.7 / 51.8	-	-	8 / 6	-	-	10 / 10	-	-	50 / 60	-	-	56 / 90	-	-
EHK18AHN1	55.5 / 60.4	-	-	6 / 6	-	-	10 / 8	-	-	60 / 70	-	-	76 / 77	-	-
EHK20AKF1	98.9/108.4	53.8/58.5	45.3/50.0	3 / 2	6 / 6	8 / 8	8 / 6	10 / 10	10 / 10	100 / 110	60 / 60	50 / 50	85 / 109	78 / 80	59 / 59
EHK20AKB2	-	53.8/58.5	45.3/50.0	-	6 / 6	8 / 8	-	10 / 10	10 / 10	-	60 / 60	50 / 50	-	78 / 80	59 / 59
EHK25AHCF1 ‡	71.2 / 77.8	-	-	4 / 4	-	-	8 / 8	-	-	80 / 80	-	-	94 / 95	-	-
	116.9/127.9	-	-	1 / 1	-	-	6 / 6	-	-	125 / 150	-	-	115 / 116	-	-
EHK30AHCF1 ‡	86.8 / 95.0	-	-	3 / 3	-	-	8 / 8	-	-	90 / 100	-	-	97 / 98	-	-
	144.8/158.5	-	-	0 / 00	-	-	6 / 6	-	-	150 / 175	-	-	117 / 150	-	-

‡ Field convertible to 1 phase, single or multiple supply circuit.

† Field convertible to 3 phase.

** Includes blower motor amps of largest fan coil used with heater.

☆☆ Copper wire must be used. If other than uncoated (non-plated), 75 Degrees C ambient, copper wire (solid wire for 10 AWG and smaller, stranded wire for larger than 10 AWG) is used, consult applicable tables of the National Electric Code (ANSI/ NFPA 70).

†† Length shown is as measured 1 way along wire path between unit and service panel for a voltage drop not to exceed 2%.

NOTES:

1. For fan coil sizes 1800– 3600.
2. For fan coil sizes 4200– 6000.

Figure 5 Connection of Transformer

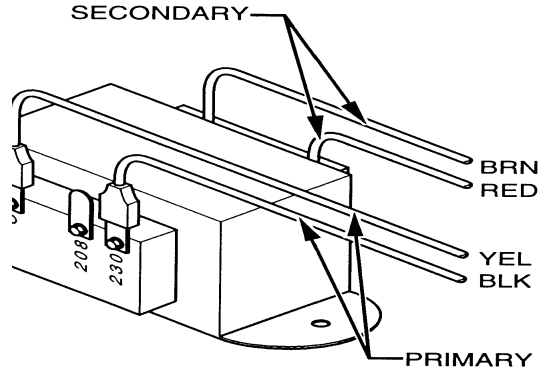


Figure 7 5, 8 and 10 Kw Circuit Breaker and Disconnect Heaters

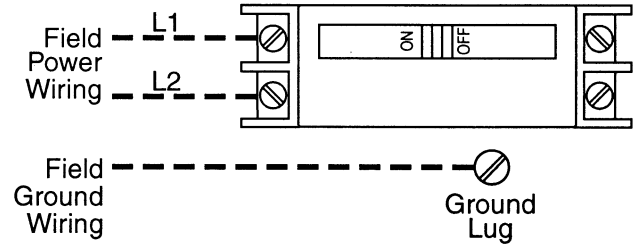
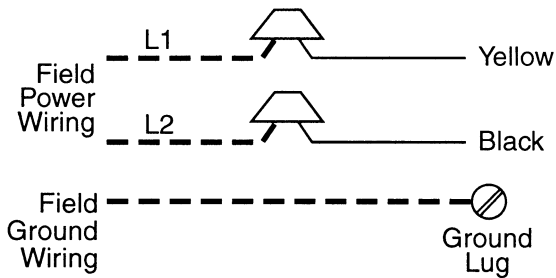


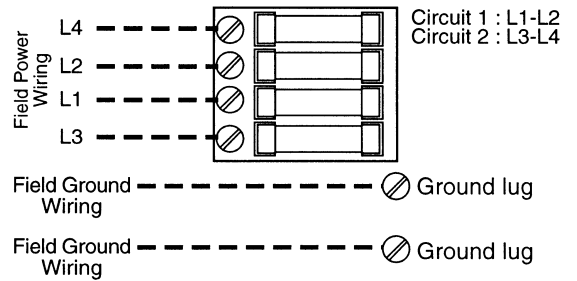
Figure 6 5, 8, 9, and 10 Kw Non-fused Heaters



(9kw is field convertible to 3-phase.
See Procedure 3. B. 1. c.)

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Figure 8 15 and 20 Kw Fused Heaters



(15 and 20kw fused heaters are factory wired for dual supply circuits. Single supply circuit is possible with approved single point wiring kit.)

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Figure 9 15 and 20 Kw Circuit Breakers

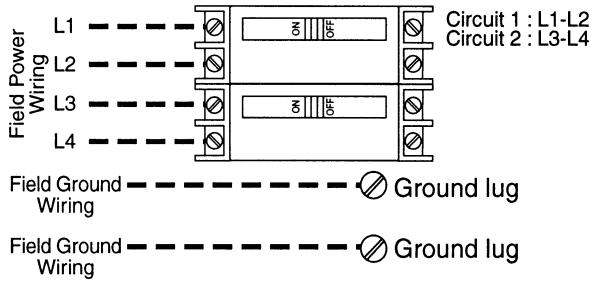
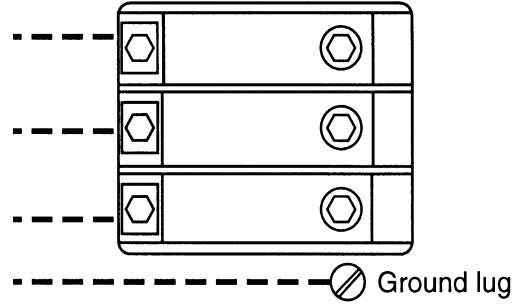
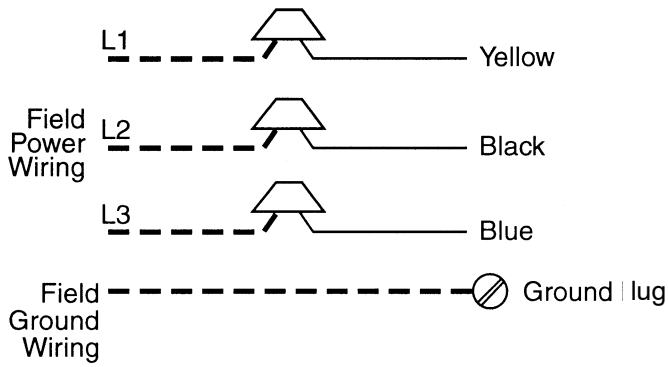


Figure 11 18 Kw 3-Phase Heater



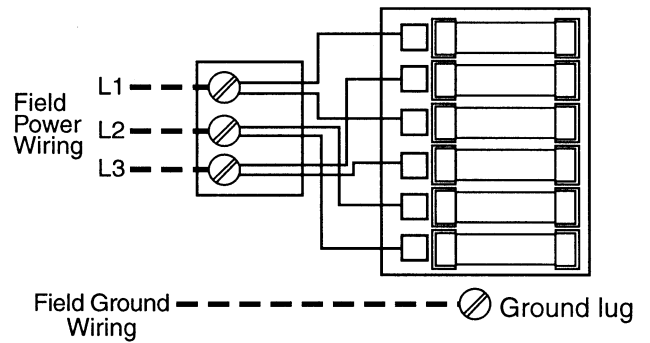
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Figure 10 15 Kw 3-Phase Heater



A00080

Figure 12 24 and 30 Kw Heaters



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Figure 13 24 and 30 Kw Heaters

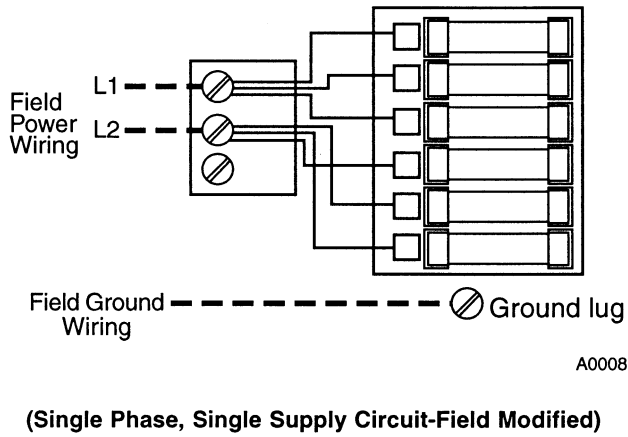


Figure 14 24 and 30 Kw Heaters

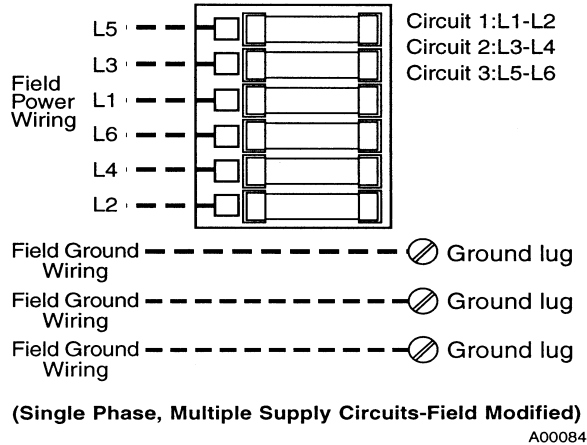


Figure 15 Motor Speed Tap and Fan Relay

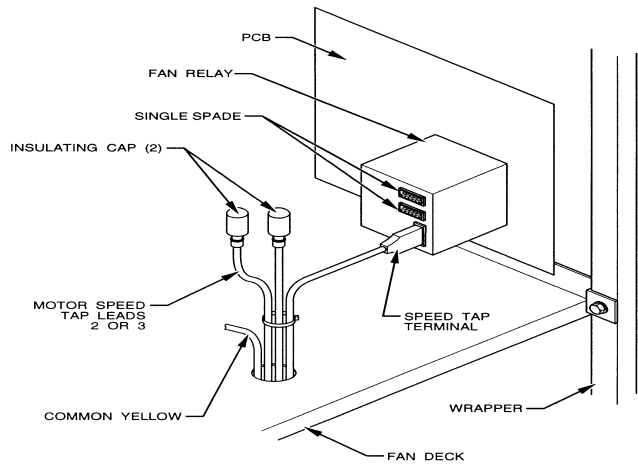


Figure 16 Conversion of Circuit Breaker

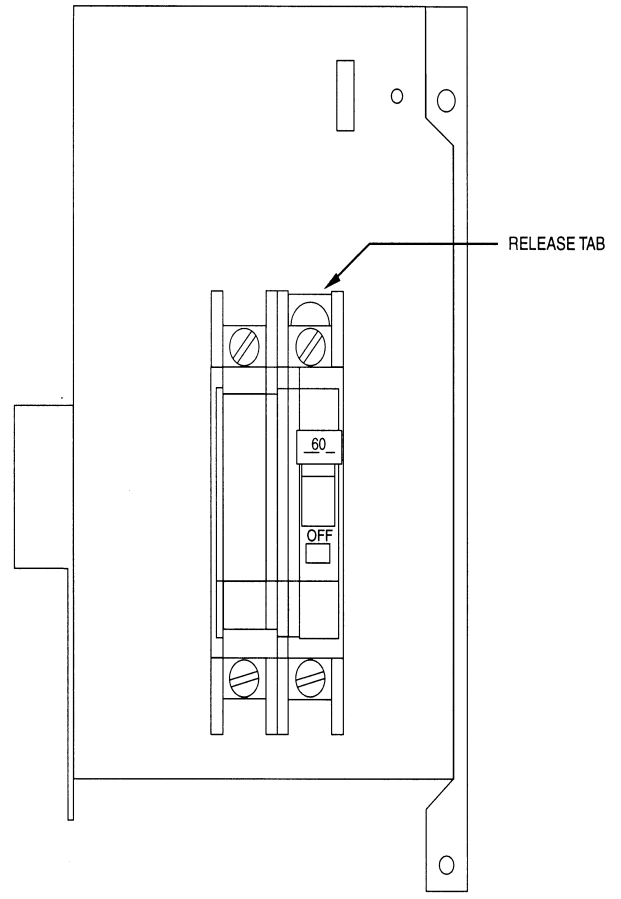


Figure 17 Heater Rating Label Location

