

## LOW AMBIENT CONTROL KIT

### INSTALLATION INSTRUCTIONS FOR LOW AMBIENT CONTROL KIT LB-57113BM (27J00) USED WITH SINGLE-COMPRESSOR HEAT PUMP UNITS

#### SHIPPING AND PACKING LIST

##### Package 1 of 1 contains:

- 1- Low ambient pressure switch assembly (S11)
- 1- 36" (914 mm) length of 1/4" (6.35 mm) copper tube with flare nuts
- 1- Relay
- 1- 20-Foot length of wire
- 4- 20" Lengths of wire
- 1- Bag assembly each containing:
  - 8-Wire nuts
  - 2-Saddle valves
  - 4-#10-16 X 5/8" S.D.S.T. screws
  - 1-Schrader depressor tee with seal cap

#### APPLICATION

The low ambient pressure switch (S11) cycles the outdoor fan while allowing compressor operation in the cooling cycle. This intermittent fan operation results in a high evaporating temperature which allows the system to operate without icing the evaporator coil and losing capacity. This kit is designed for use in ambient temperatures no lower than 30°F.

Lennox recommends a belly-band style crankcase heater (P-8-8852, 240v, 45w) be added to compressors which do not have one. A freezestat (LB-62858CA) should also be added to any system using a low ambient kit.

*NOTE - Do not use this low ambient kit on units with capillary tube metering devices. Install an expansion valve metering device if using this kit.*

#### INSTALLATION

##### A-Pressure Switch Assembly

- 1- Disconnect power to unit.
- 2- Remove compressor compartment access panel.
- 3- Install valve depressor tee discharge line gauge port.
- 4- Install pressure switch in compressor compartment with screws provided. Switch should be installed in a vertical position higher than mid-point of compressor. See figure 1.

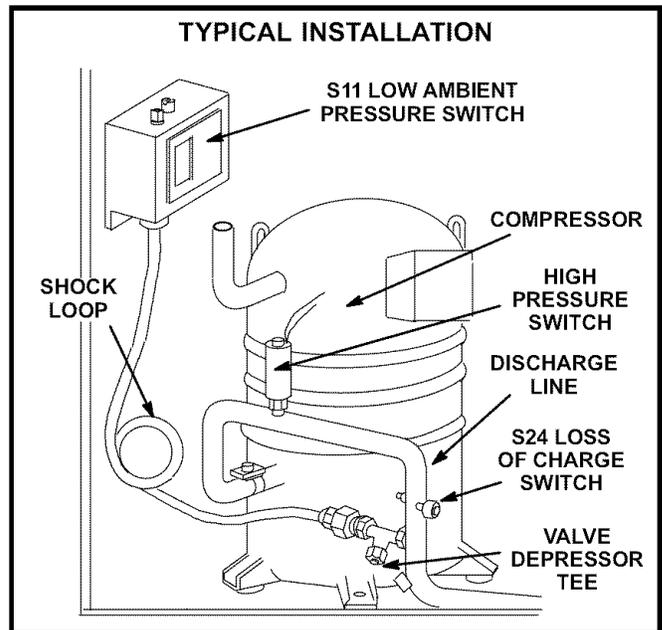


FIGURE 1

- 5- Connect copper line to low ambient pressure switch and open side of depressor tee (provided). Provide a shock loop in copper tubing to prevent breakage from vibration. Tighten connections. Depressor tee port with valve core is used as service port. If necessary, valve core can be moved to other leg of tee.

### B-Low Ambient Pressure Switch Setting (S11)

One of two types of pressure switches are provided. The Ranco switch has one square and one round adjustment knob and the Alco switch has two square adjustment knobs.

#### Ranco Model

The low ambient pressure switch provided in the kit is factory set for 285 psig (1965 kPa) cut-in and 140 psig (965 kPa) cut-out.

If necessary, adjust low ambient pressure switch as follows:

- 1-Rotate round knob to set cut-in pressure. Refer to right set of indicating numbers on face of control. See figure 3.
- 2- Rotate square knob to set differential indicator to 145 psig (999 kPa). Refer to left set of indicating numbers.

#### Alco Model

If necessary, adjust low ambient pressure switch as follows:

- 1-Rotate the square knob located on the left to set cut-in pressure. Refer to left set of indicating numbers on face of control. See figure 2.
- 2- Rotate the square knob located on the right to set differential indicator to 145 psig (999 kPa). Refer to right set of indicating numbers.
- 3- Use only terminals 1 and 4 when connecting wiring.

*NOTE - Disregard "Cut out minus Diff. is Cut In" statement on face of control. This does not apply in this application.*

### C-Low Ambient Relay (K58)

- 1- Install low ambient relay in control box.

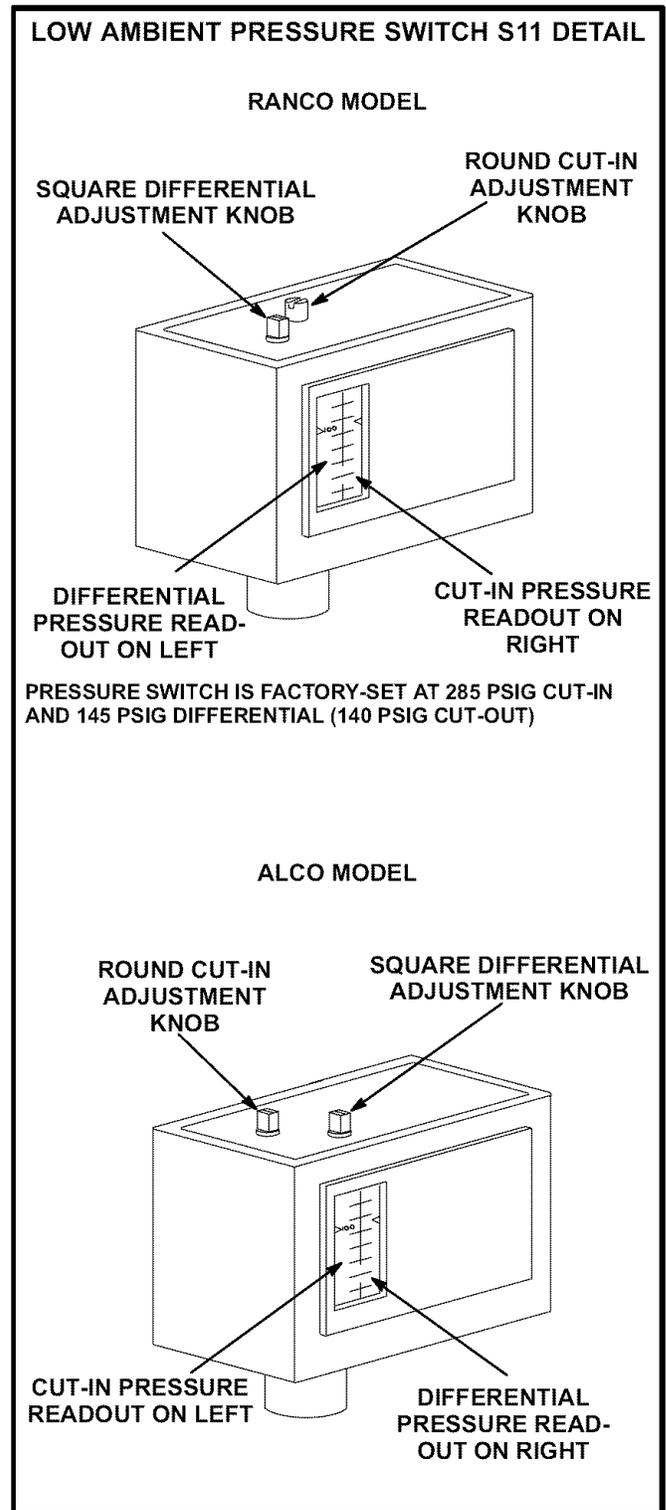


FIGURE 2

## WIRING

Low ambient pressure switch S11 is wired in series with outdoor fan relay or compressor contactor (single-stage or speed units).

Low ambient kits are shown with optional arrows on unit wiring diagrams. If unit wiring diagram is not available or does not show the low ambient kit, refer to appropriate wiring diagram in figures 3 through 13 for wiring connections.

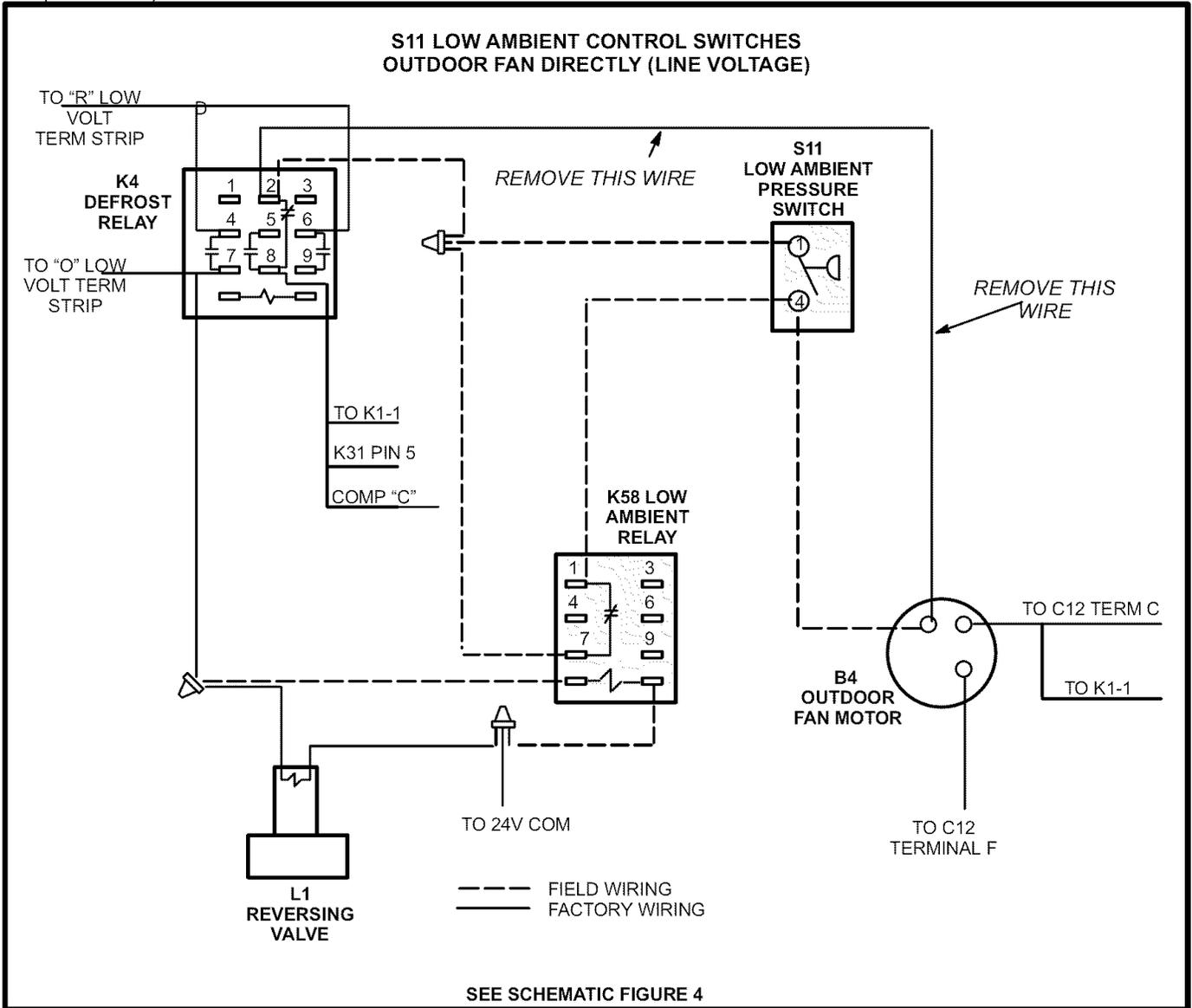
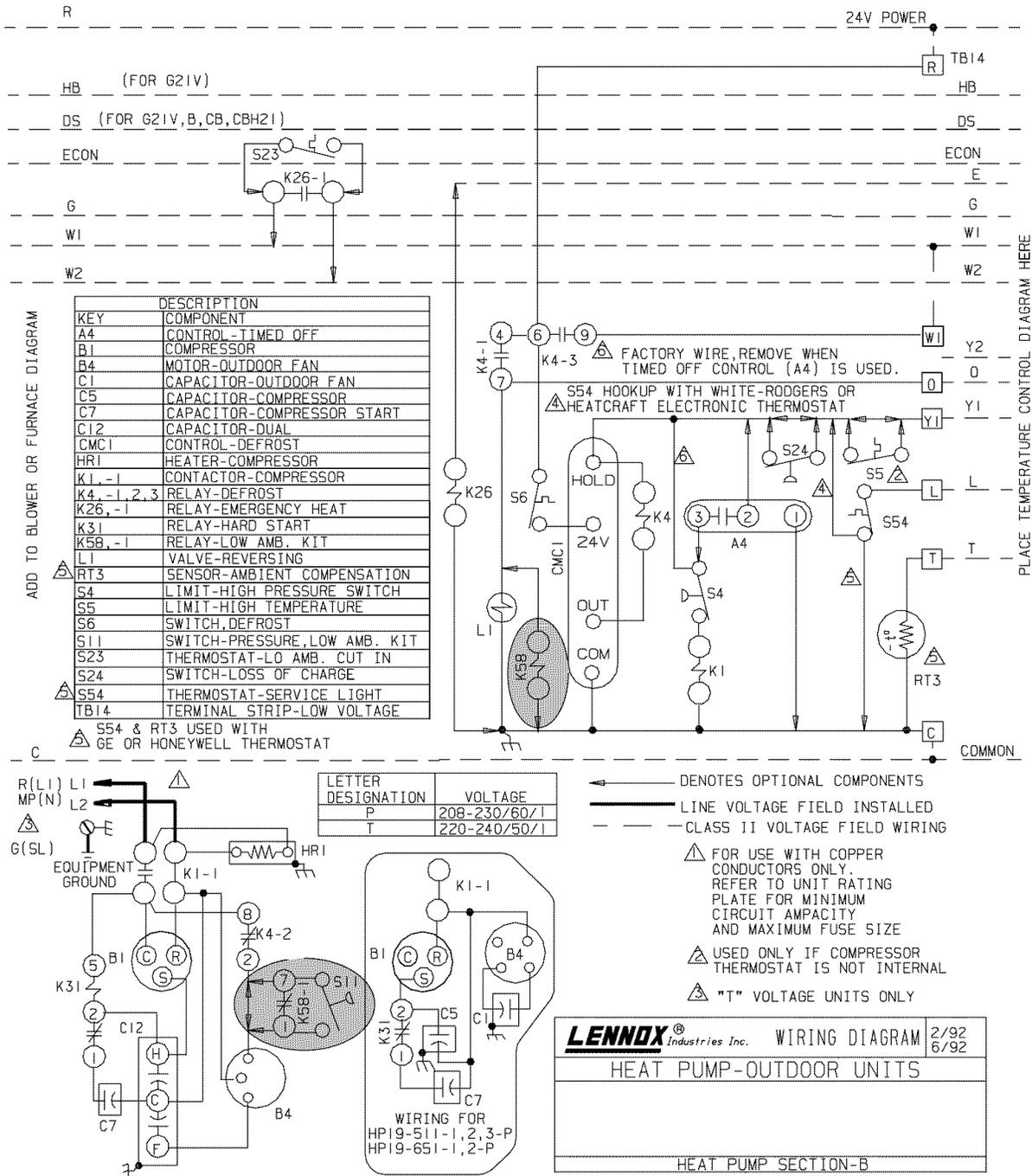


FIGURE 3

## TYPICAL SINGLE-COMPRESSOR HEAT PUMP UNIT WIRING DIAGRAM (S11 LOW AMBIENT CONTROL SWITCHES OUTDOOR FAN DIRECTLY)



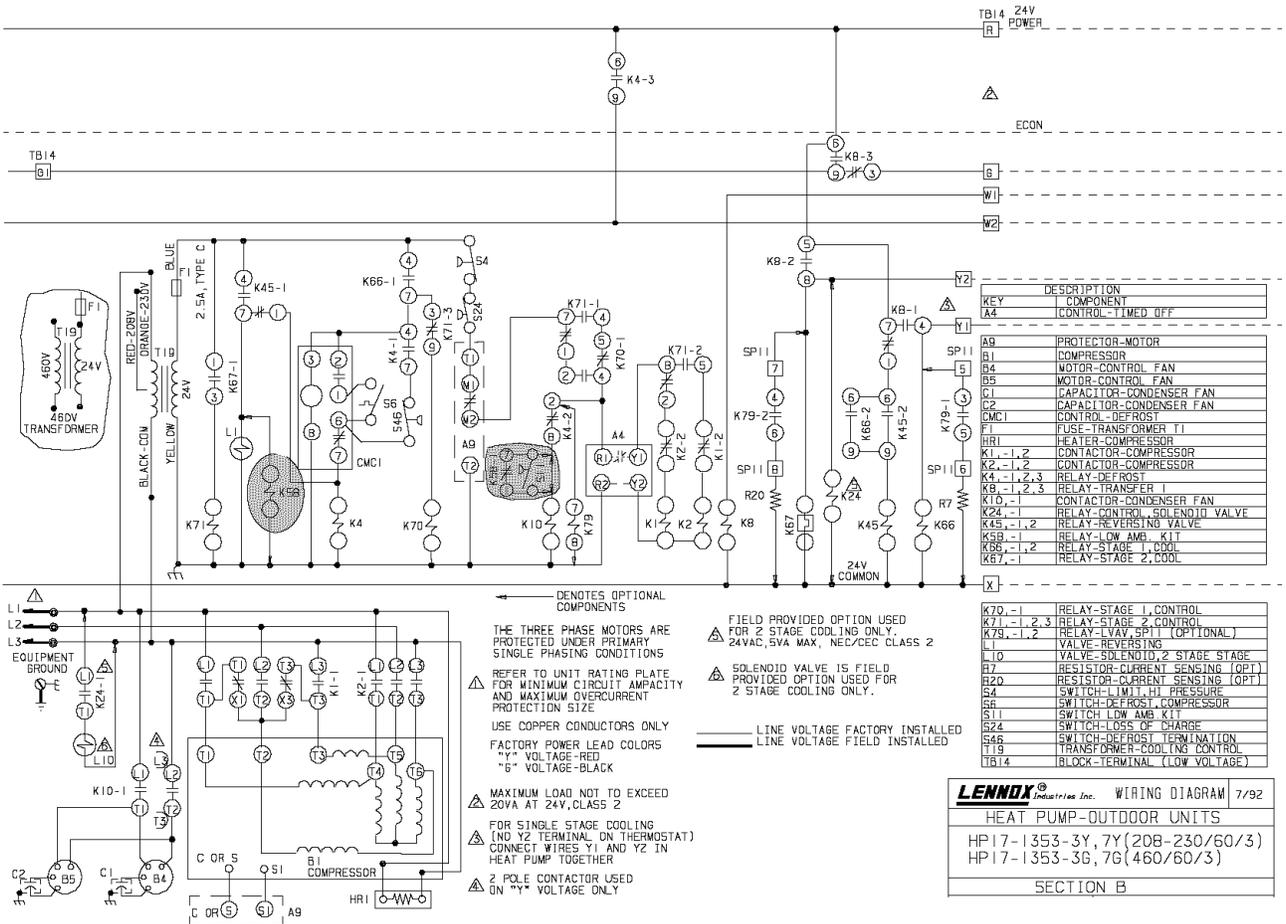
SEE PICTORIAL FIGURE 3

FIGURE 4



# TYPICAL SINGLE-COMPRESSOR HEAT PUMP UNIT WIRING DIAGRAM

(S11 LOW AMBIENT CONTROL SWITCHES OUTDOOR FAN THROUGH A RELAY OR CONTACTOR (PILOT CIRCUIT))



— DENOTES OPTIONAL COMPONENTS

THE THREE PHASE MOTORS ARE PROTECTED UNDER PRIMARY SINGLE PHASING CONDITIONS

REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE

USE COPPER CONDUCTORS ONLY  
FACTORY POWER LEAD COLORS  
"Y" VOLTAGE-RED  
"B" VOLTAGE-BLACK

MAXIMUM LOAD NOT TO EXCEED 20VA AT 24V, CLASS 2

FOR SINGLE STAGE COOLING (NO Y2 TERMINAL ON THERMOSTAT) CONNECT WIRES Y1 AND Y2 IN HEAT PUMP TOGETHER

2 POLE CONTACTOR USED ON "Y" VOLTAGE ONLY

FIELD PROVIDED OPTION USED FOR 2 STAGE COOLING ONLY. 24VAC, 3VA MAX., NEC/CEC CLASS 2

SOLENOID VALVE IS FIELD PROVIDED OPTION USED FOR 2 STAGE COOLING ONLY.

— LINE VOLTAGE FACTORY INSTALLED  
— LINE VOLTAGE FIELD INSTALLED

KEY	DESCRIPTION
A4	CONTROL-TIMED OFF
A9	PROTECTOR-MOTOR
B1	COMPRESSOR
B4	MOTOR-CONTROL FAN
B5	MOTOR-CONTROL FAN
C1	CAPACITOR-CONDENSER FAN
C2	CAPACITOR-CONDENSER FAN
CMC1	CONTROL-DEFROST
FT	FUSE-TRANSFORMER T1
HR1	HEATER-COMPRESSOR
K1-1,2	CONTACTOR-COMPRESSOR
K2-1,2	CONTACTOR-COMPRESSOR
K4-1,2,3	RELAY-DEFROST
K8-1,2,3	RELAY-TRANSFER 1
K10-1	CONTACTOR-CONDENSER FAN
K24-1	RELAY-CONTROL SOLENOID VALVE
K45-1,2	RELAY-REVERSING VALVE
K85-1	RELAY-LOW AMB. KIT
K86-1,2	RELAY-STAGE 1,COOL
K87-1	RELAY-STAGE 2,COOL

K70-1	RELAY-STAGE 1, CONTROL
K71-1,2,3	RELAY-STAGE 2, CONTROL
K75-1,2	RELAY-LVAV, SP11 (OPTIONAL)
L1	VALVE-REVERSING
L10	VALVE-SOLENOID, 2 STAGE STAGE
R7	RESISTOR-CURRENT SENSING (OPT)
R20	RESISTOR-CURRENT SENSING (OPT)
S4	SWITCH-LIMIT HI PRESSURE
S6	SWITCH-DEFROST COMPRESSOR
S11	SWITCH LOW AMB KIT
S24	SWITCH-LOSS OF CHARGE
S46	TRANSFORMER-COOLING CONTROL
T19	SWITCH-DEFROST TERMINATION
TB14	BLOCK-TERMINAL (LOW VOLTAGE)

**LENNOX**® Industries Inc. WIRING DIAGRAM 7/92

**HEAT PUMP-OUTDOOR UNITS**

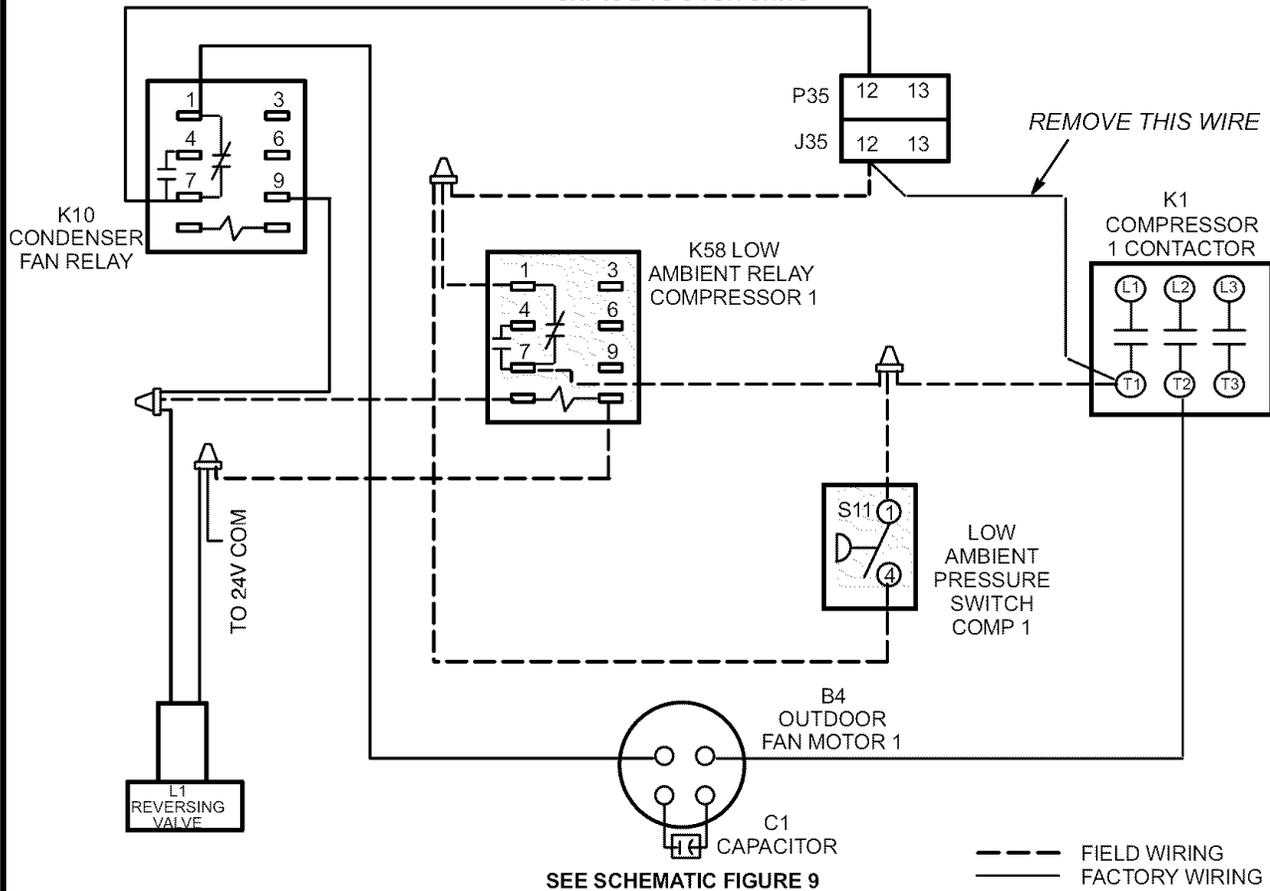
HP 17-1353-3Y, 7Y (20B-230/60/3)  
HP 17-1353-3G, 7G (460/60/3)

SECTION B

SEE PICTORIAL FIGURE 5

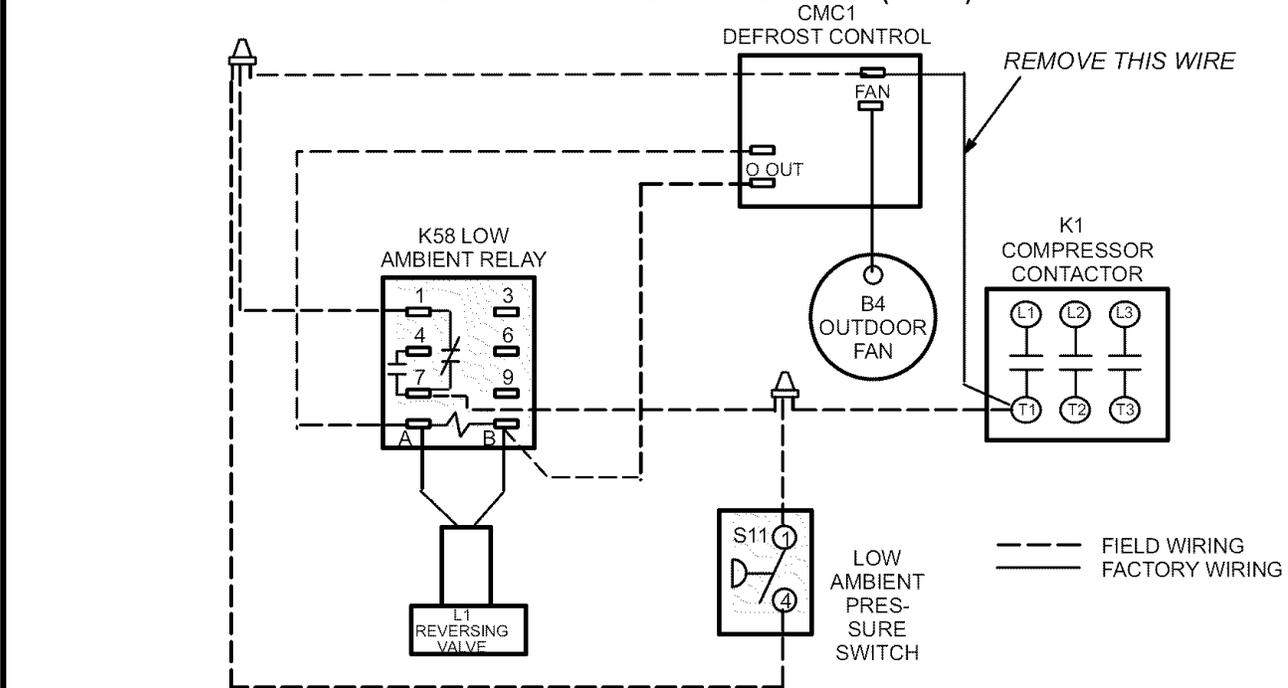
FIGURE 6

**TYPICAL SINGLE-COMPRESSOR PACKAGED HEAT PUMP UNIT WIRING DIAGRAM**  
 (S11 LOW AMBIENT CONTROL SWITCHES OUTDOOR FAN DIRECTLY)  
 CHP16-2 TO 5 TON UNITS



**FIGURE 7**

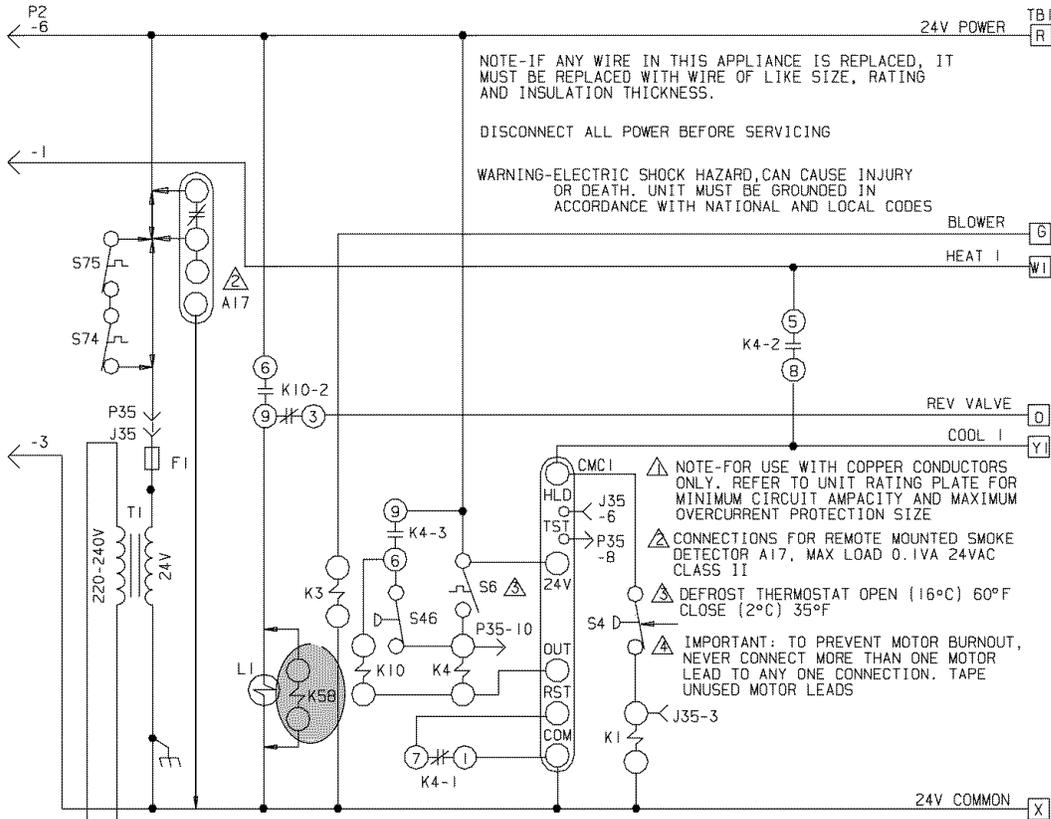
**TYPICAL SINGLE-COMPRESSOR LOW AMBIENT WIRING FOR UNITS CONTAINING**  
 68J29 AND 68J84 DEFROST BOARDS (CMC1)



**FIGURE 8**

# TYPICAL SINGLE-COMPRESSOR PACKAGED HEAT PUMP UNIT WIRING DIAGRAM (S11 LOW AMBIENT CONTROL SWITCHES OUTDOOR FAN DIRECTLY)

CHP16-2 TO 5 TON UNITS



NOTE-IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

DISCONNECT ALL POWER BEFORE SERVICING

WARNING-ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES

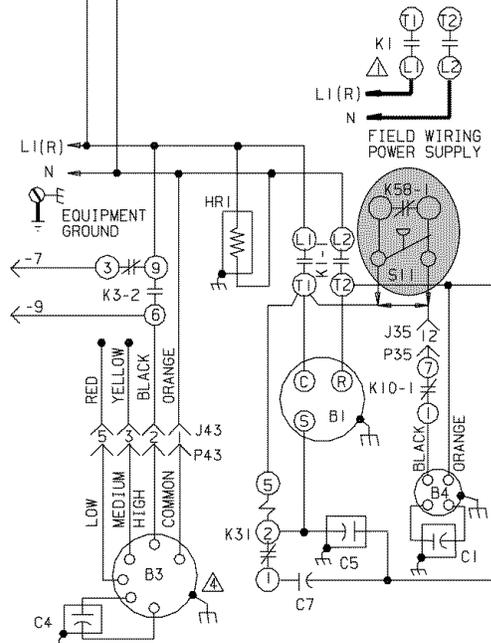
NOTE-FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE

CONNECTIONS FOR REMOTE MOUNTED SMOKE DETECTOR A17, MAX LOAD 0.1VA 24VAC CLASS 11

DEFROST THERMOSTAT OPEN (16°C) 60°F CLOSE (2°C) 35°F

IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS

— DENOTES OPTIONAL COMPONENTS



KEY	DESCRIPTION
A17	(SEE NOTE 2)
B1	COMPRESSOR
B3	MOTOR-BLOWER
B4	MOTOR-OUTDOOR FAN
C1	CAPACITOR-OUTDOOR FAN
C4	CAPACITOR-BLOWER MOTOR
C5	CAPACITOR-COMPRESSOR
C7	CAPACITOR-COMPRESSOR, HARD START
CMC1	TIMER-DEFROST, COMPRESSOR
F1	FUSE-TRANSFORMER T1
J35	JACK-TEST
J43	JACK-BLOWER MOTOR
K1,-1	CONTACTOR-COMPRESSOR
K3,-1,2	CONTACTOR-BLOWER
K4,-1,2,3	RELAY-DEFROST
K10,-1,2	RELAY-OUTDOOR FAN
K31	RELAY-HARD START KIT
K58,-1	RELAY-LOW AMBIENT KIT
L1	VALVE-REVERSING
P2	PLUG-ELECTRIC HEAT
P35	PLUG-TEST
P43	PLUG-BLOWER MOTOR
S4	SWITCH-LIMIT HI PRESS(MANUAL RESET)
S6	THERMOSTAT-DEFROST
S11	SWITCH-LOW PRESS,LOW AMB KIT
S46	SWITCH-PRESSURE, DEFROST
S74	SWITCH-FIRESTAT
S75	SWITCH-FIRESTAT 2
T1	TRANSFORMER-CONTROL
TB1	TERMINAL STRIP-LOW VOLTAGE

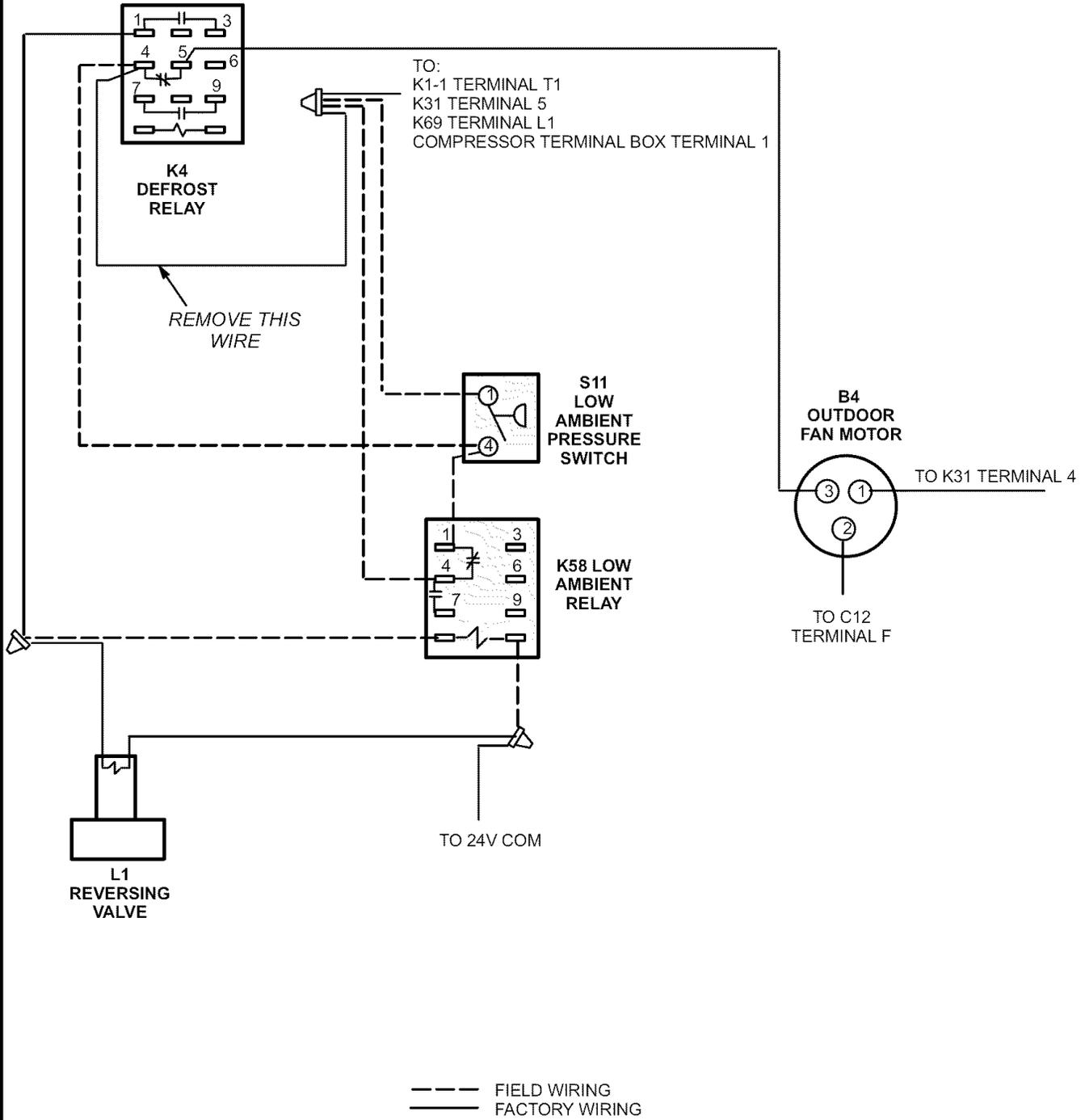
— LINE VOLTAGE FIELD INSTALLED

<b>LENNOX</b> Industries Inc.	WIRING DIAGRAM	6/92
HEAT PUMPS-PACKAGED		
CHP16H-261-1,2-T		
220-240/50/1		
HEAT PUMP SECTION B25		

SEE PICTORIAL FIGURE 7

FIGURE 9

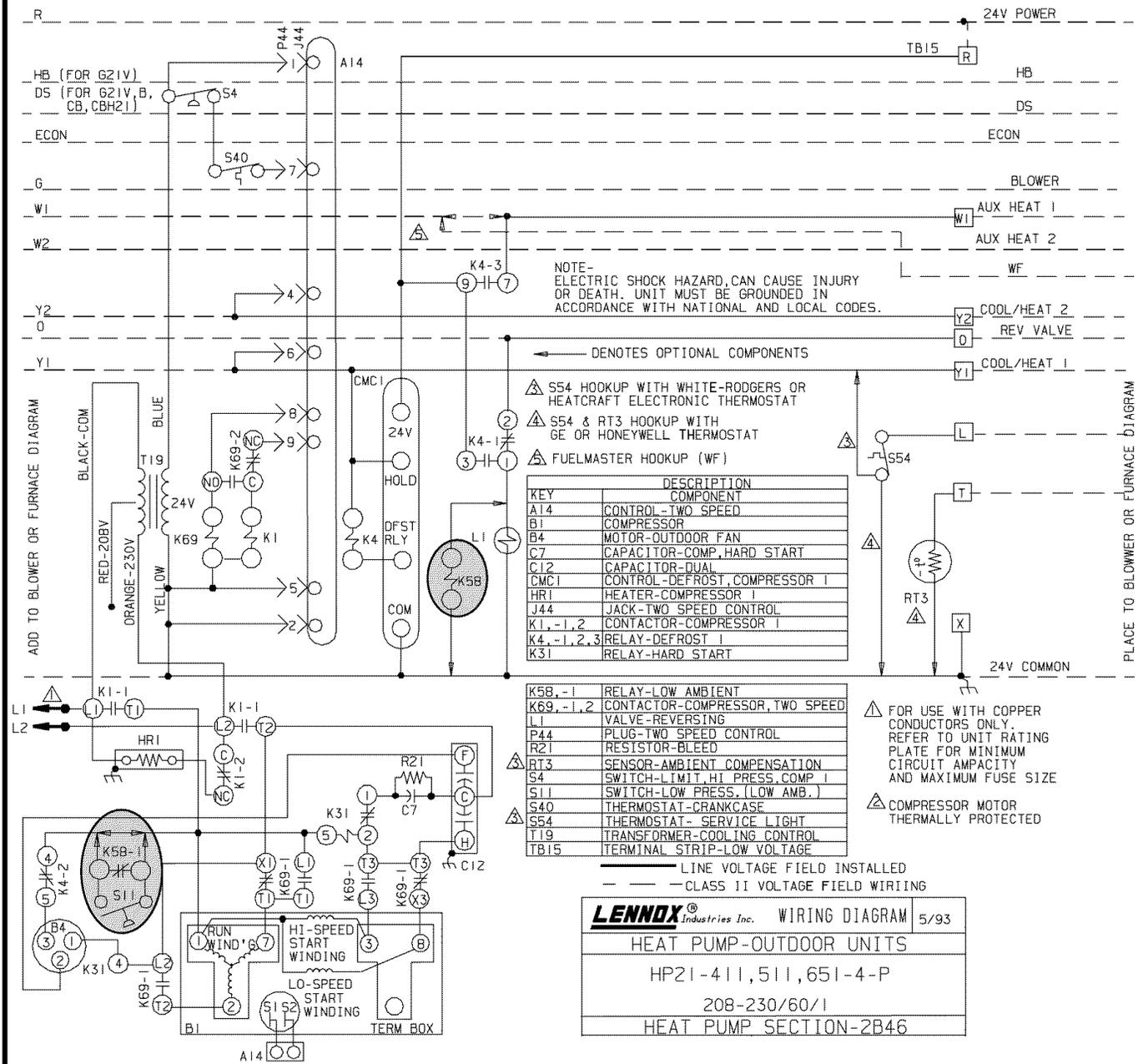
**S11 LOW AMBIENT CONTROL SWITCHES  
OUTDOOR FAN DIRECTLY (LINE VOLTAGE)  
SINGLE PHASE**



SEE SCHEMATIC FIGURE 11

**FIGURE 10**

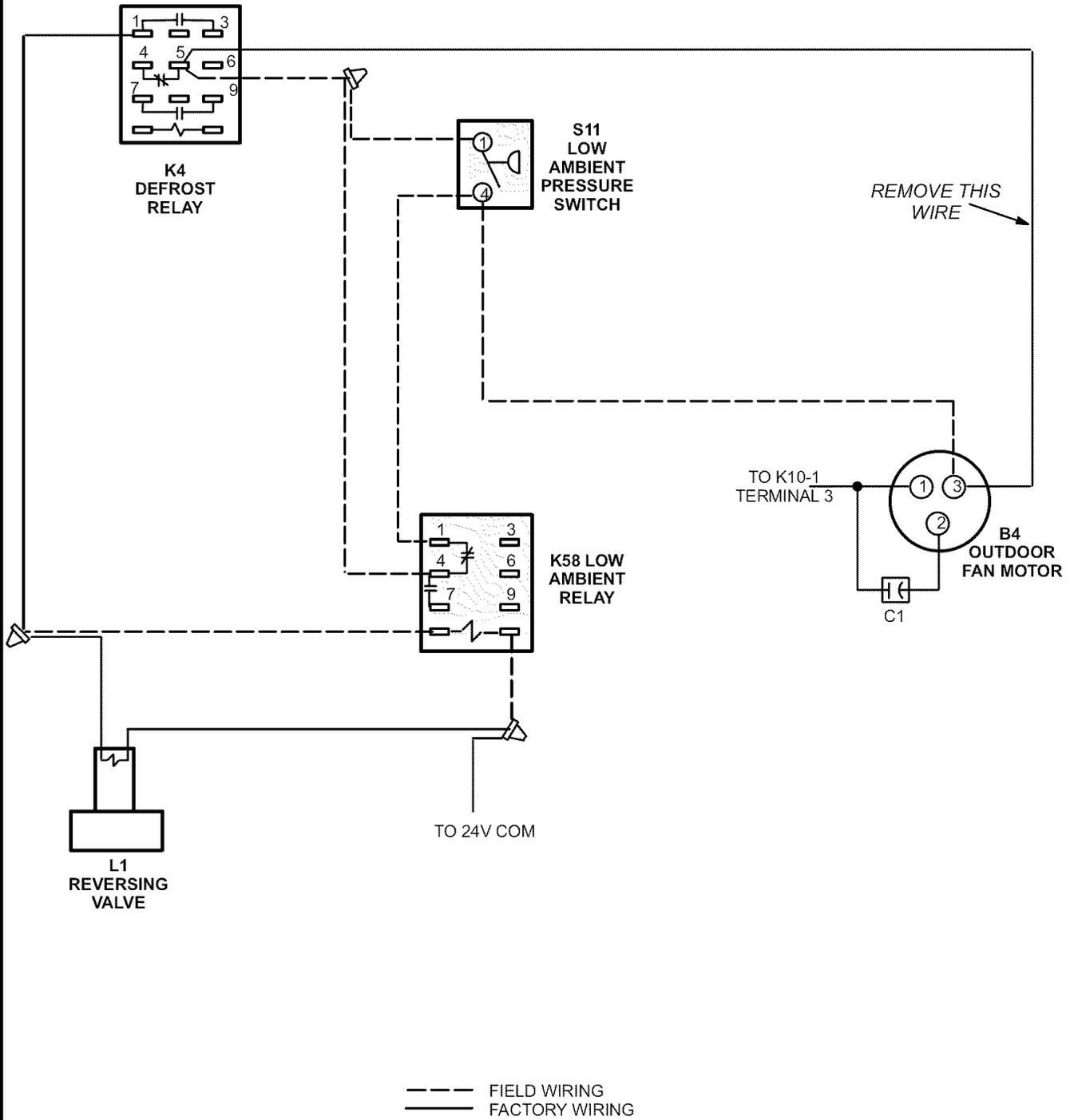
# TYPICAL SINGLE-COMPRESSOR, TWO-STAGE, SINGLE PHASE HEAT PUMP UNIT WIRING DIAGRAM (S11 Low Ambient Control Switches Outdoor Fan Directly)



SEE PICTORAL FIGURE 10

FIGURE 11

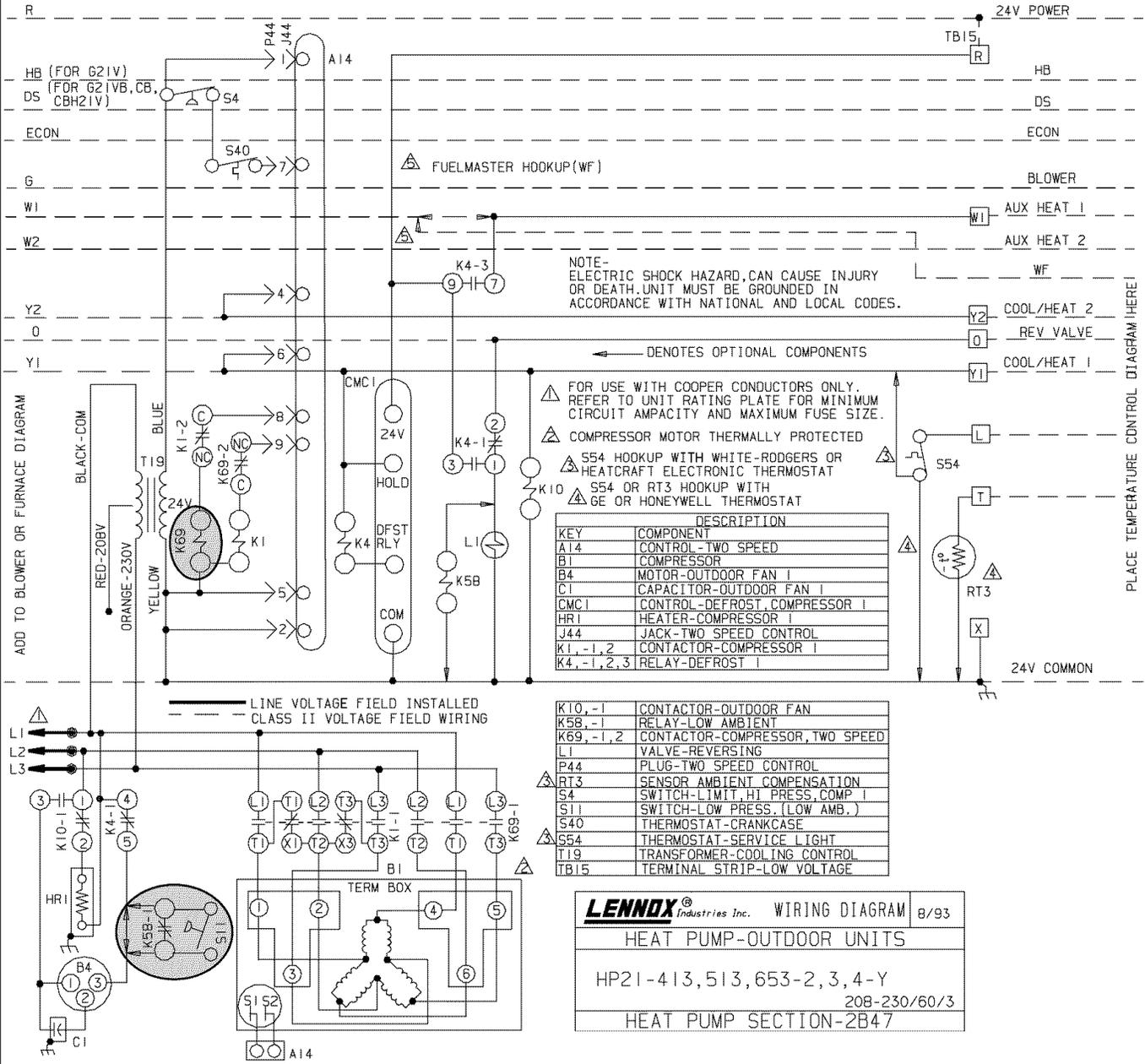
**S11 LOW AMBIENT CONTROL SWITCHES  
 OUTDOOR FAN DIRECTLY (LINE VOLTAGE)  
 THREE PHASE**



SEE SCHEMATIC FIGURE 13

**FIGURE 12**

# TYPICAL SINGLE-COMPRESSOR, TWO-STAGE, THREE PHASE HEAT PUMP UNIT WIRING DIAGRAM (S11 Low Ambient Control Switches Outdoor Fan Directly)



SEE PICTORAL FIGURE 12

FIGURE 13

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HEAT PUMP-OUTDOOR UNITS

HP21-413, 513, 653-2, 3, 4-Y

208-230/60/3

HEAT PUMP SECTION-2B47