Technical Publications
Litho U.S.A.

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Supersedes 2/98

DEFROST CONTROL KIT

INSTALLATION INSTRUCTIONS FOR DEFROST CONTROL KIT (23L00 - LB-93614) USED WITH HP14, 16, 18, 20, CHP16, 20, 24, AND CHP15-261 TO 461 UNITS

Shipping and Packing List

Package 1 of 1 contains:

1--Defrost control assembly (CMC1 & K4)

2- Wiring diagrams stickers

1--Bag assembly containing:

- 1- Defrost thermostat switch (S6)
- 1- Defrost (refrigerant-type) pressure switch (S46) assembly (HP14, HP16 and HP18)
- 1- 1/2" snap-hole plug (HP16 units only)
- 8- Wire nuts
- 1- Wire tie
- 2- Insulating sleeves
- 2- #8 - 32 X 1/2" Screws
- 1- Saddle valve (HP14 and HP18)

Application

This defrost control kit replaces the existing defrost control systems in HP14, HP16, HP18, HP20, CHP16, CHP20, CHP24 and CHP15-261 to 461 units.

This kit is used to upgrade units to a temperature initiated / pressure terminated defrost system. Various defrost components are used in each unit. Once updated, all units will contain these four defrost components:

CMC1 Defrost Control
S6 Defrost Thermostat Switch
S46 Defrost Pressure Switch (refrigerant type)
K4 Defrost Relay

The replacement defrost control system checks every 90 minutes (factory-set) to determine if defrost is necessary. If the defrost thermostat senses a temperature below 35°F (1.6°C), the thermostat contacts close to initiate defrost. When the pressure level sensed by defrost pressure switch rises to 275 psi, switch contacts open and defrost terminates.

HP14 Installation

1 - Turn off electrical power to unit at disconnect switch.

2- Remove access panels and remove defrost pressure switch cover.

3- Remove existing S9 defrost (air-type) pressure switch and install replacement S46 (refrigerant-type) pressure switch as shown in figure 1. Replace switch cover.

4- Install S6 defrost thermostat on the liquid line as shown in figure 1.

5- *Single-Phase Units Only* -- Start capacitor and mounting bracket must be relocated to a position outside of the control box. Remove the start C3 capacitor and mounting bracket and discard the wires connected to the capacitor.
Position capacitor mounting bracket below control box. Use mounting bracket as a template to drill two .218" diameter mounting holes. Use existing screws to install bracket and capacitor.

6- Position the CMC1 defrost control in the control box. See figure 2. Use the mounting bracket as a template to drill two 3/16" diameter holes. Use two #8 - 32 X 1/2" screws provided to secure bracket.

7- Wire defrost components as shown in figures 4 and 6. Wires are identified in figure 7. Figure 8 shows terminal designations for older model Essex cube-style relays versus standard relays.

8- Affix appropriate wiring diagram adjacent to existing unit diagram.

HP14 UNIT DEFROST SYSTEM

Install S46 replacement defrost pressure switch with saddle valve/depressor tee (provided) on liquid line. See saddle valve installation procedure in these instructions.

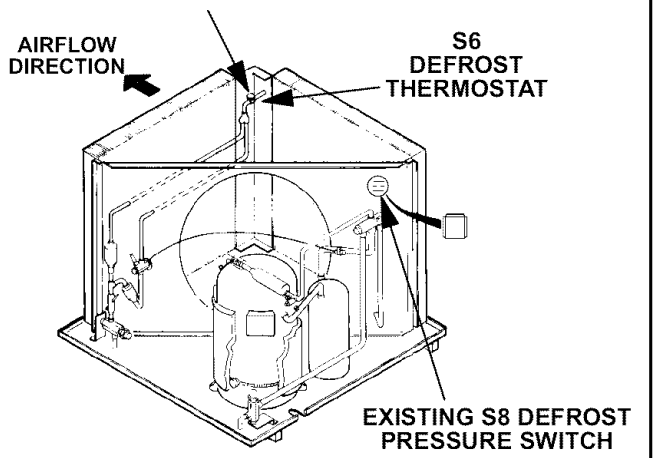


FIGURE 1

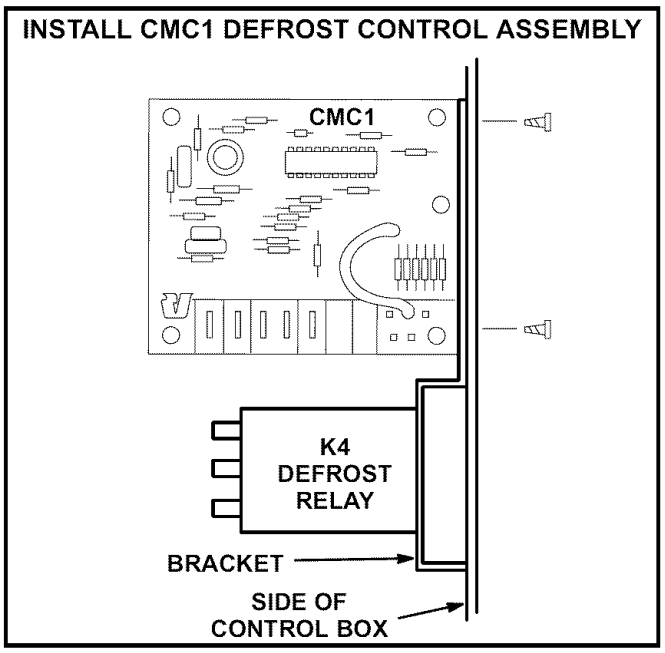


FIGURE 2

9- Turn on electrical power to unit.

10- Run defrost system through several cycles. Check for proper function.

11- Reinstall access panels.

HP16 Installation

1 - Turn off electrical power to unit at disconnect switch.

2 - Remove access panels and remove defrost pressure switch cover.

3 - Remove existing defrost pressure switch and sensor. Install snaphole plug (provided) into panel hole. If electronic defrost pressure switch has been previously used, remove and discard the two pressure switch wires. Install replacement S46 (refrigerant-type) pressure switch with valve depressor tee on service port of liquid line service valve.

4 - Install S6 defrost thermostat on the liquid line between the drier and the distributor.

5 - Route brown defrost thermostat wires through hole in bottom or back of control box.

6- Position the CMC1 defrost control in control box and use the mounting bracket as a template to drill two 3/16" diameter holes. Use two #8-32 X 1/2" screws provided to secure bracket.

7- Wire defrost components as shown in figure 5 and 6. Wires are identified in figure 7. Figure 8 shows terminal designations for older model Essex cube-style relays versus standard relays.

8- Affix appropriate wiring diagram adjacent to existing unit diagram.

9- Turn on electrical power to unit.

10- Run defrost system through several cycles. Check for proper function.

11- Reinstall access panels.

HP18, HP20, CHP16, 20, 24, and CHP15 Installation

1- Turn off electrical power to unit at disconnect switch.

2- Remove access panels.

3- HP18 units - Install saddle valve on liquid line. Install defrost refrigerant-type pressure switch/depressor tee to saddle valve (early model units).

CHP16, 20, 24, and CHP15-261/461 units - Install (refrigerant-type) pressure switch on existing liquid line pressure tap fitting.

4- Position the CMC1 defrost control in control box and use the mounting bracket as a template to drill two 3/16" diameter holes. Use two #8-32 X 1/2" screws provided to secure bracket.

5- Wire defrost components as shown in figure 5 through 8. Wires are identified in figure 9. Figure 10 shows terminal designations for older model Essex cube-style relays versus standard relays.

6- Affix appropriate wiring diagram adjacent to existing unit diagram.

7- Turn on electrical power to unit.

8- Run defrost system through several cycles. Check for proper function.

9- Reinstall access panels.

Saddle Valve Installation

1 - Braze saddle valve (provided) onto 3/8" O.D. process tube between unit distributor and drier for leakproof joint. Cool with wet rag and clean joint. Apply process hose to pressurize and check for leaks as shown in figure 3.

IMPORTANT - Do not install saddle valve near an existing fitting or solder joint.

2 - After cooling, place teflon seal on pin as shown and insert steel pin (core side down) into valve body.

3 - Screw cap down on valve body, forcing steel pin to pierce line. Use two wrenches to avoid breaking brazed joint. Continue to tighten cap until valve body is smoothly crimped over steel pin.

Defrost Operation

A - Defrost Timer

The defrost control will not allow a defrost to last more than 14 minutes. The defrost timer can be field adjusted from a 90-minute to a 30- or 60-minute defrost interval if warranted by climatic conditions.

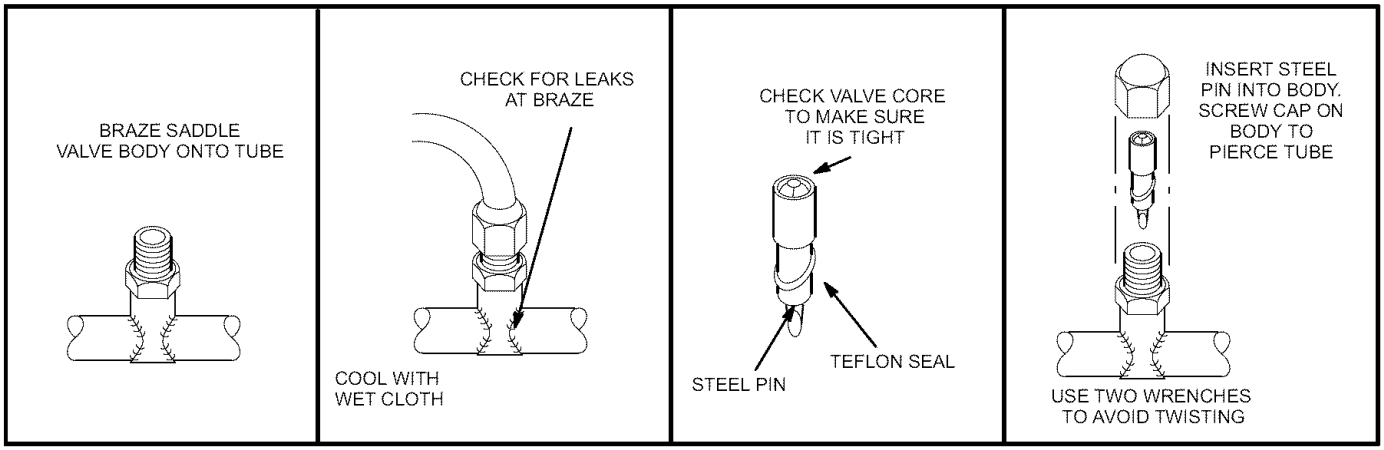


FIGURE 3

B - Defrost Thermostat

The thermostat closes at 35°F ± 4°F initiating the defrost cycle. It is mounted on the liquid line between the drier and the distributor.

C - Defrost Pressure Switch

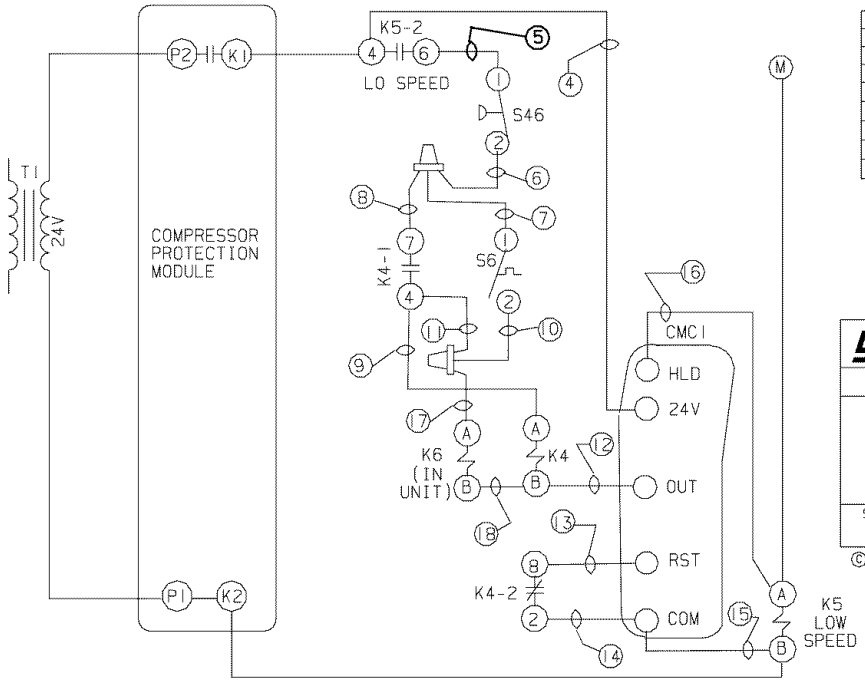
The defrost cycle is terminated by the defrost pressure switch when the switch senses a rise in pressure to a level of 275 psi. If the coil pressure does not rise to this value within the time override period of the defrost timer (approximately 14 minutes), the defrost cycle is terminated by the defrost timer. The pressure switch is located as follows for the various units covered by this instruction:

HP14/HP18 - liquid line with saddle valve/valve depressor tee.
HP16 - service port of liquid line service valve with valve depressor tee.
CHP16, 20, 24 and CHP15-261/461 - existing liquid line pressure tap fitting.

NOTE - Termination of the defrost cycle, by rising refrigerant pressure or by defrost timer override, begins another 90-minute (30- or 60-minute) period before the system checks for defrost again.

IMPORTANT - Inspect both sides of the outdoor coil periodically and remove any grass, leaves, or other obstructions.

DEFROST KIT WIRING FOR HP14 UNITS



DESCRIPTION	
KEY	COMPONENT
* CMC1	TIMER-DEFROST
* K4,-1,2,3	RELAY-DEFROST 1
K5,-2	RELAY-DEFROST 2(LO SPD)
K6	RELAY-LATCH(IN UNIT)
* S6	SWITCH-DEFROST
* S46	SWITCH-DEFROST,TERMINATION
T1	TRANSFORMER-CONTROL

* DENOTES NEW COMPONENTS, OTHERS SHOWN ARE EXISTING.

LENNOX® Industries Inc. WIRING DIAGRAM 1/98

HEAT PUMP-OUTDOOR UNITS

DEFROST CONTROL KIT
FOR HP14 SERIES UNITS

208-230/60/1

Supersedes Form No.	New Form No.
	532,711W

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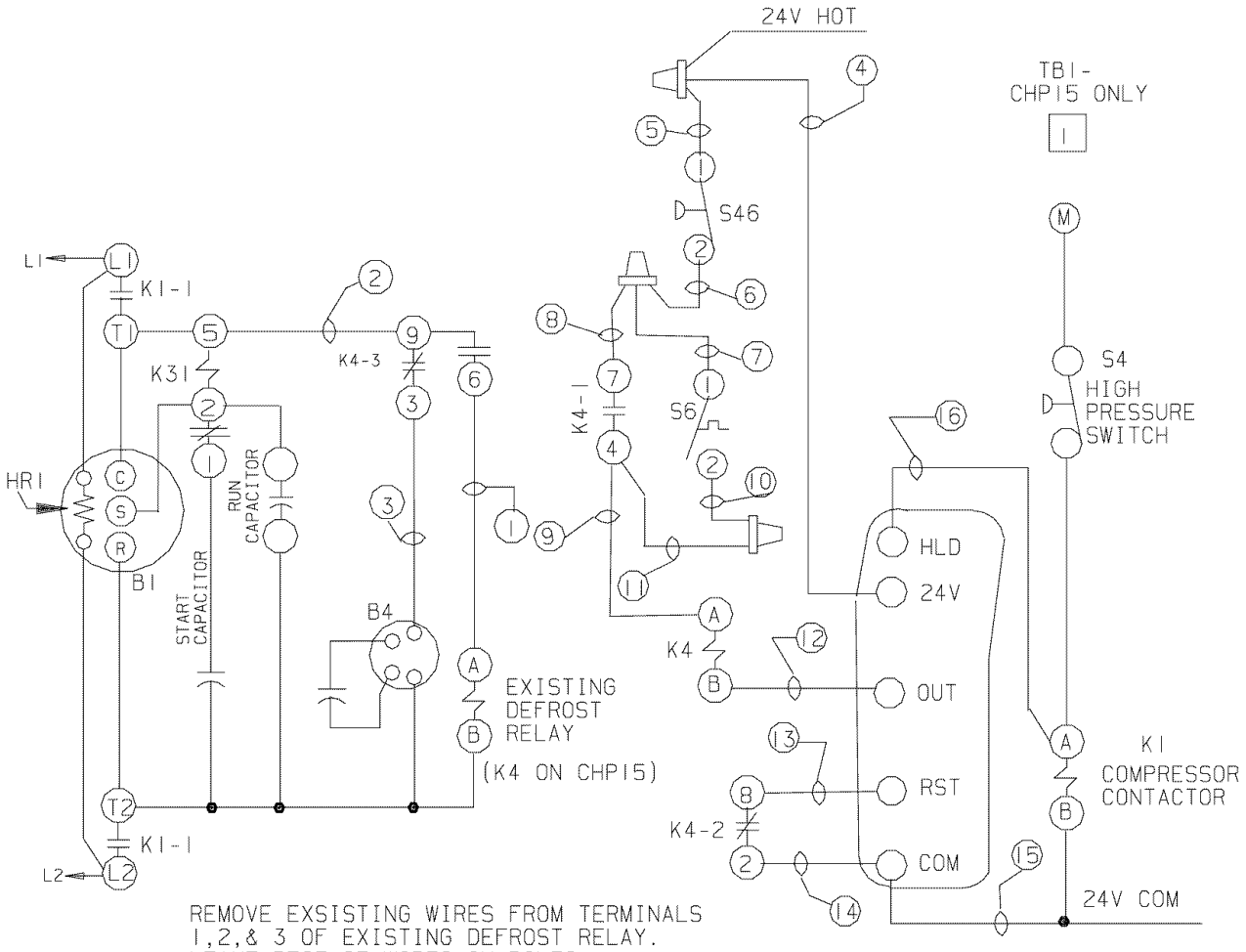
FIGURE 4

DEFROST KIT WIRING FOR
HP16, HP18, HP20 AND CHP15 UNITS



LENNOX® Industries Inc.	WIRING DIAGRAM	1/98
HEAT PUMP-OUTDOOR UNITS		
DEFROST CONTROL KIT FOR HP16,HP18,HP20 & CHP15 SERIES UNITS 208-230/60/1		
Supersedes Form No.	New Form No. 532,710W	

Litho U.S.A.

DESCRIPTION	
KEY	COMPONENT
B1	COMPRESSOR
B4	MOTOR-FAN
*CMC1	TIMER-DEFROST
HR1	HEATER-COMPRESOR
K1,-1	CONTACTOR-COMPRESSOR
*K4,-1,2,3	RELAY-DEFROST
K31	RELAY-HARD START KIT
S4	SWITCH-PRESSURE,HIGH
*S6	SWITCH-DEFROST
*S46	SWITCH-DEFROST,TERMINATION

FIGURE 5

DEFROST KIT FIELD WIRING

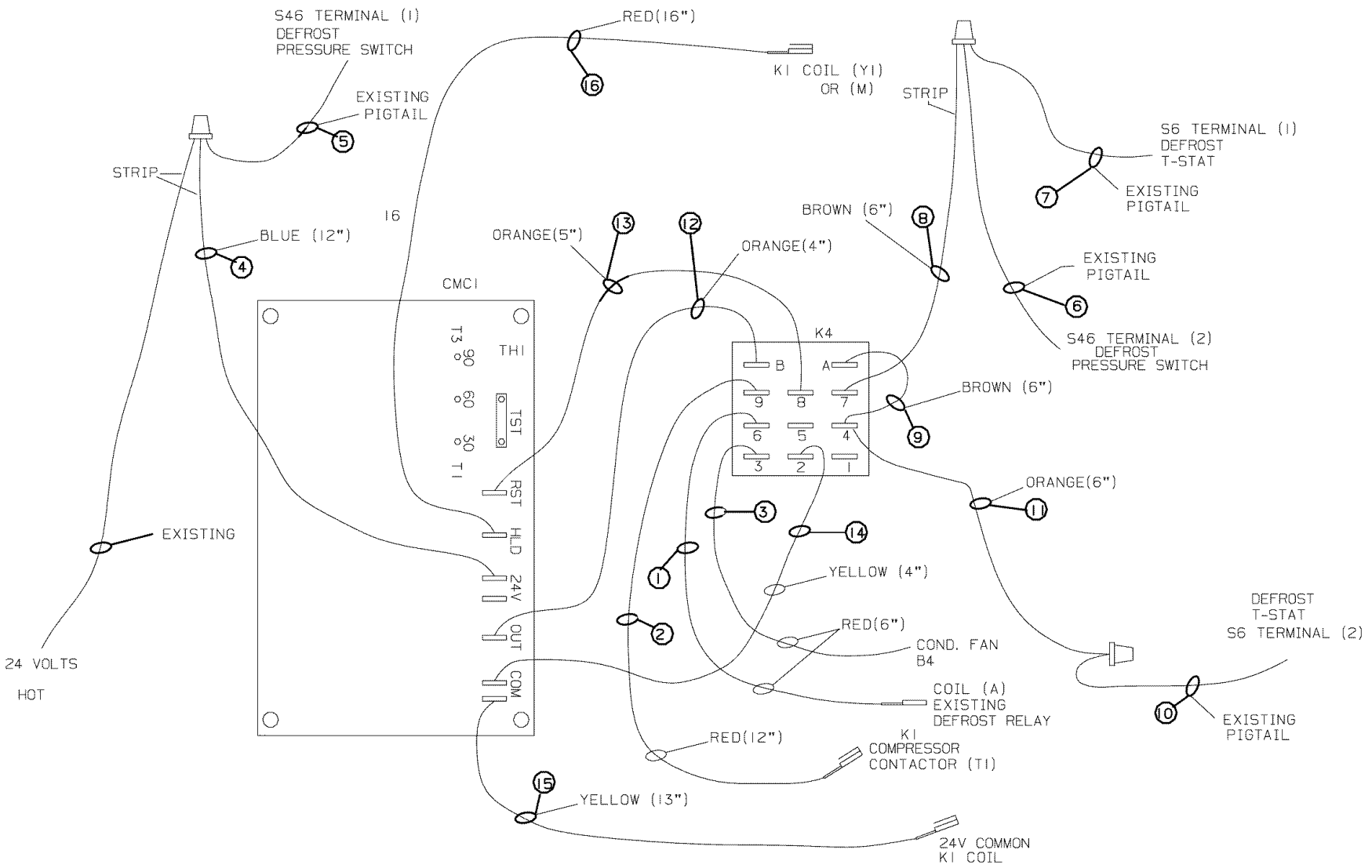
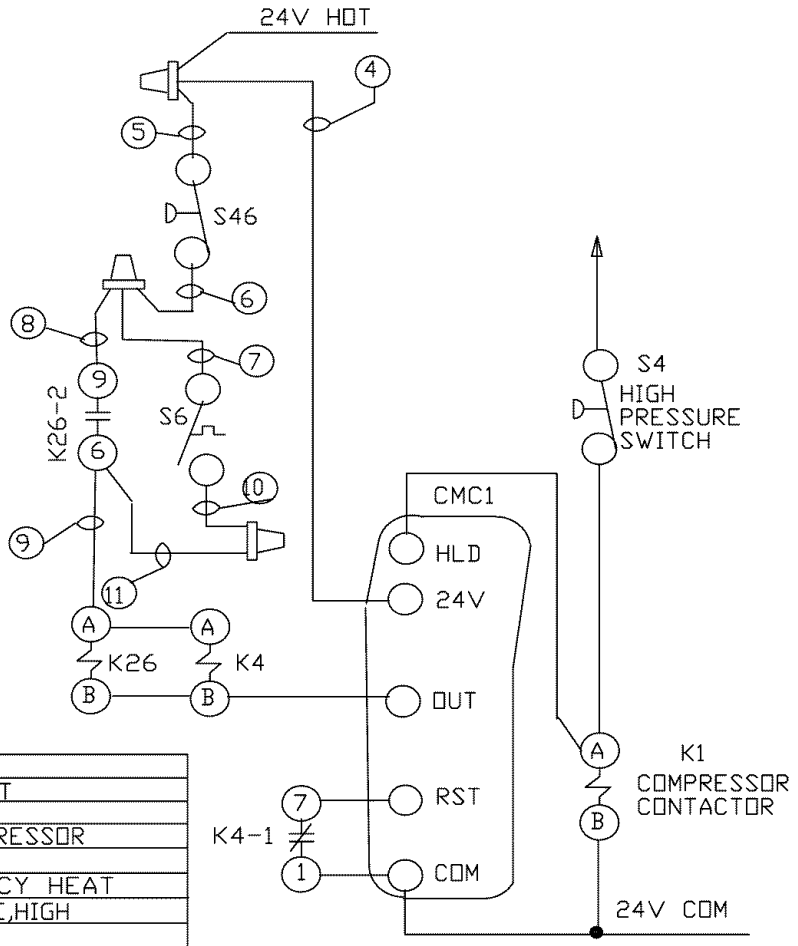


FIGURE 6

DEFROST KIT WIRING FOR
CHP16, CHP20, CHP24 UNITS



DESCRIPTION	
KEY	COMPONENT
*CMC1	TIMER-DEFROST
K1,-1	CONTACTOR-COMPRESSOR
*K4,-1,2,3	RELAY-DEFROST
K26,-1,2	RELAY-EMERGENCY HEAT
S4	SWITCH-PRESSURE,HIGH
*S6	SWITCH-DEFROST
*S46	SWITCH-DEFROST,TERMINATION

* DENOTES NEW COMPONENTS,OTHERS SHOWN ARE EXISTING.

WIRING DIAGRAM	11/07
HEAT PUMP-OUTDOOR UNITS	
DEFROST CONTROL KIT FOR CHP16,CHP20 AND CHP24 SERIES UNITS	
Supersedes Form No.	New Form No. 537021-01

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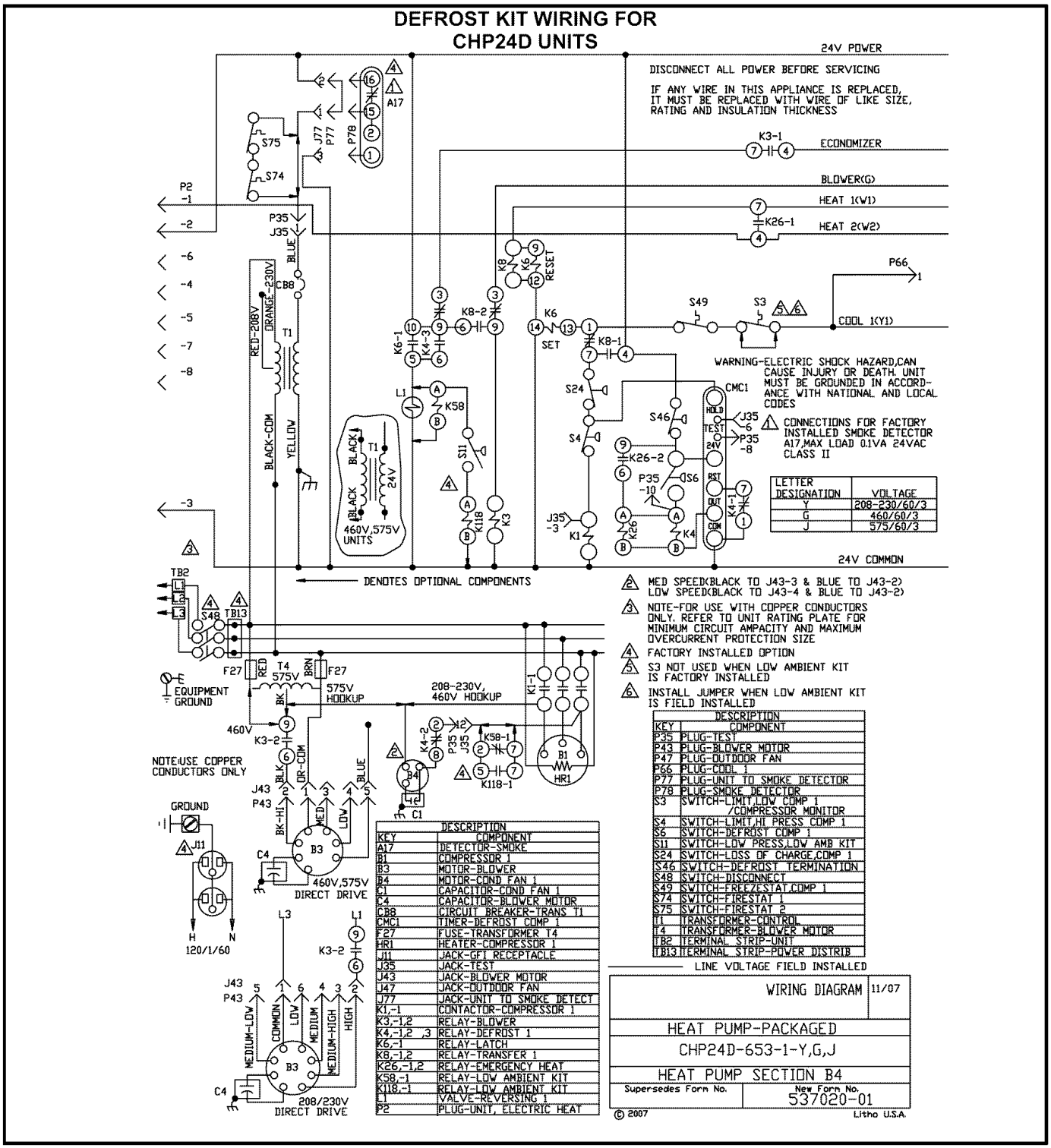
FIGURE 7



LETTER DESIGNATION	VOLTAGE
Y	208-230/60/3
G	460/60/3
J	575/60/3

KEY	DESCRIPTION COMPONENT
A17	DETECTOR-SMOKE
B1	COMPRESSOR 1
B3	MOTOR-BLOWER
B4	MOTOR-COND FAN 1
C1	CAPACITOR-COND FAN 1
C4	CAPACITOR-BLOWER MOTOR
CB8	CIRCUIT BREAKER-TRANS T1
CMC1	TIMER-DEFROST COMP 1
F27	FUSE-TRANSFORMER T4
HR1	HEATER-COMPRESSOR 1
J11	JACK-GFI RECEPTACLE
J35	JACK-TEST
J43	JACK-BLOWER MOTOR
J47	JACK-OUTDOOR FAN
J77	JACK-UNIT TO SMOKE DETECT
K1,-1	CONTACTOR-COMPRESSOR 1
K3,-1,2	RELAY-BLOWER
K4,-1,2 ,3	RELAY-DEFROST 1
K6,-1	RELAY-LATCH
K8,-1,2	RELAY-TRANSFER 1
K26,-1,2	RELAY-EMERGENCY HEAT
K58,-1	RELAY-LOW AMBIENT KIT
K118,-1	RELAY-LOW AMBIENT KIT
L1	VALVE-REVERSING 1
P2	PLUG-UNIT, ELECTRIC HEAT

KEY	DESCRIPTION COMPONENT
P35	PLUG-TEST
P43	PLUG-BLOWER MOTOR
P47	PLUG-OUTDOOR FAN
P66	PLUG-COOL 1
P77	PLUG-UNIT TO SMOKE DETECTOR
P78	PLUG-SMOKE DETECTOR
S3	SWITCH-LIMIT,LOW COMP 1 /COMPRESSOR MONITOR
S4	SWITCH-LIMIT,HI PRESS COMP 1
S6	SWITCH-DEFROST COMP 1
S11	SWITCH-LOW PRESS,LOW AMB KIT
S24	SWITCH-LOSS OF CHARGE,COMP 1
S46	SWITCH-DEFROST TERMINATION
S48	SWITCH-DISCONNECT
S49	SWITCH-FREEZESTAT,COMP 1
S74	SWITCH-FIRESTAT 1
S75	SWITCH-FIRESTAT 2
T1	TRANSFORMER-CONTROL
T4	TRANSFORMER-BLOWER MOTOR
TB2	TERMINAL STRIP-UNIT
TB13	TERMINAL STRIP-POWER DISTRIB

FIGURE 8

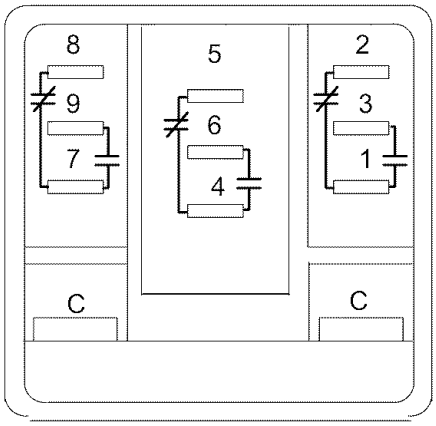
WIRE IDENTIFICATION

1	K4-6	Red 6"	Defrost Relay Coil "A"
2	K4-9	Red 12"	K1 Contactor "T1"
3	K4-3	Red 6"	B4 Outdoor Fan Motor
4	CMC1 "24v"	Blue 12"	24V Hot, S46-1, K5-4 (HP14)
5		Existing Wire	
6		Existing Wire	
7		Existing Wire	
8	K4-7	Brown 6"	S46-2, S6-1
9	K4-4	Brown 4"	K4-A
10		Existing Wire	
11	K4-4	Orange 6"	S6-2, K6-A (HP14)
12	K4-B	Orange 4"	CMC1 "OUT"
13	K4-8	Orange 5"	CMC1 "RST"
14	K4-2	Yellow 4"	CMC1 "COM"
15	CMC1 "COM"	Yellow 13"	K1-B, COM, K5 (HP14)
16	CMC1 "HLD"	Red 16"	K1-A, K5 (HP14)
17		Existing Wire - HP14	
18		Existing Wire - HP14	

FIGURE 9

RELAY TERMINAL IDENTIFICATION

EXISTING DEFROST RELAY



REPLACEMENT DEFROST RELAY

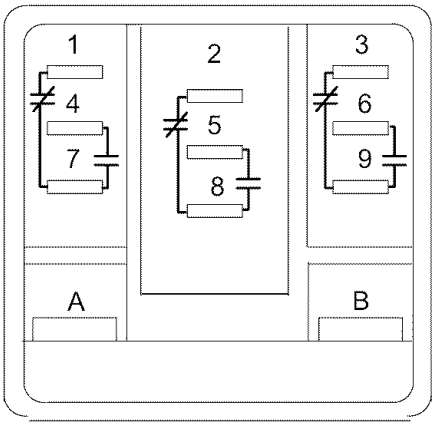


FIGURE 10