



## INSTALLATION INSTRUCTIONS

©1993 Lennox Industries Inc.  
Dallas, Texas

## HEAT PUMP KITS AND ACCESSORIES

Technical  
Literature  
Litho U.S.A.

502,673M  
9/93  
Supersedes 3/92

## SOLID STATE DEFROST REPLACEMENT BOARD

### INSTALLATION INSTRUCTIONS FOR SOLID STATE DEFROST REPLACEMENT BOARD LB-83114C (61H42) USED ON HP7-1, -2, HP8, CHP9 AND CHP10 SERIES UNITS

#### SHIPPING AND PACKING LIST

##### Package 1 of 1 contains:

- 1- Control board on mounting bracket
- 1- Defrost thermostat
- 1- Outdoor fan/defrost relay
- 8- Wires with 3/16" terminals
- 1- Screw
- 2- Wire nuts

#### INSTALLATION

- 1- Turn off power supply to unit.
- 2- Remove compressor access panel and control box cover.

##### A-Defrost Thermostat

- 3- Disconnect coil thermistor from coil return bend and air thermistor from fan section. Replace coil thermistor with provided defrost thermostat. Secure to liquid line as close as possible to the outdoor coil.

*NOTE-It may be necessary to remove the front corner panel for access to coil thermistor.*

##### B-Defrost Board

- 4- Remove and retain screw from existing solid state defrost board located in control box. Note existing wiring. See figure 1.
- 5- Install new control board assembly using existing screw and hole.
- 6- Drill new hole into control panel and secure with screw provided in kit.

##### C-Outdoor Fan/Defrost Relay

- 7- Remove outdoor fan/defrost relay. Install replacement outdoor fan/defrost relay.

#### WIRING - (Figure 2)

- 1- Connect one end of long wire (provided) to "HLD" terminal on the defrost board. Disconnect defrost high pressure switch from between high pressure switch and loss of charge switch.
  - 2- Splice remaining end of long wire to wire between high pressure switch and loss of charge switch where high pressure switch was originally connected.
  - 3- Connect one wire from defrost relay coil to "OUT" terminal of defrost board.
  - 4- Cut off terminal of remaining wire from defrost relay coil and strip wire 5/8 inch. At a convenient location, splice wire to long wire from "HLD" terminal using a wire nut.
  - 5- Connect wire from defrost thermostat to one of the "24V" terminals on defrost board.
- IMPORTANT-Make sure defrost thermostat is securely fastened to the liquid line.*
- 6- Cut off terminal from remaining defrost thermostat wire and strip wire 5/8 inch. Splice with one of the defrost pressure switch wires using a wire nut.
  - 7- Locate blue transformer wire and splice with remaining defrost high pressure switch wire using a wire nut.
  - 8- Connect the remaining existing wire to "COM" terminal on defrost board.
  - 9- Defrost time interval can be selected to defrost every 30, 60 or 90 minutes. This is selected using the jumper on the defrost board.
  - 10- Replace all panels and restore power to unit.

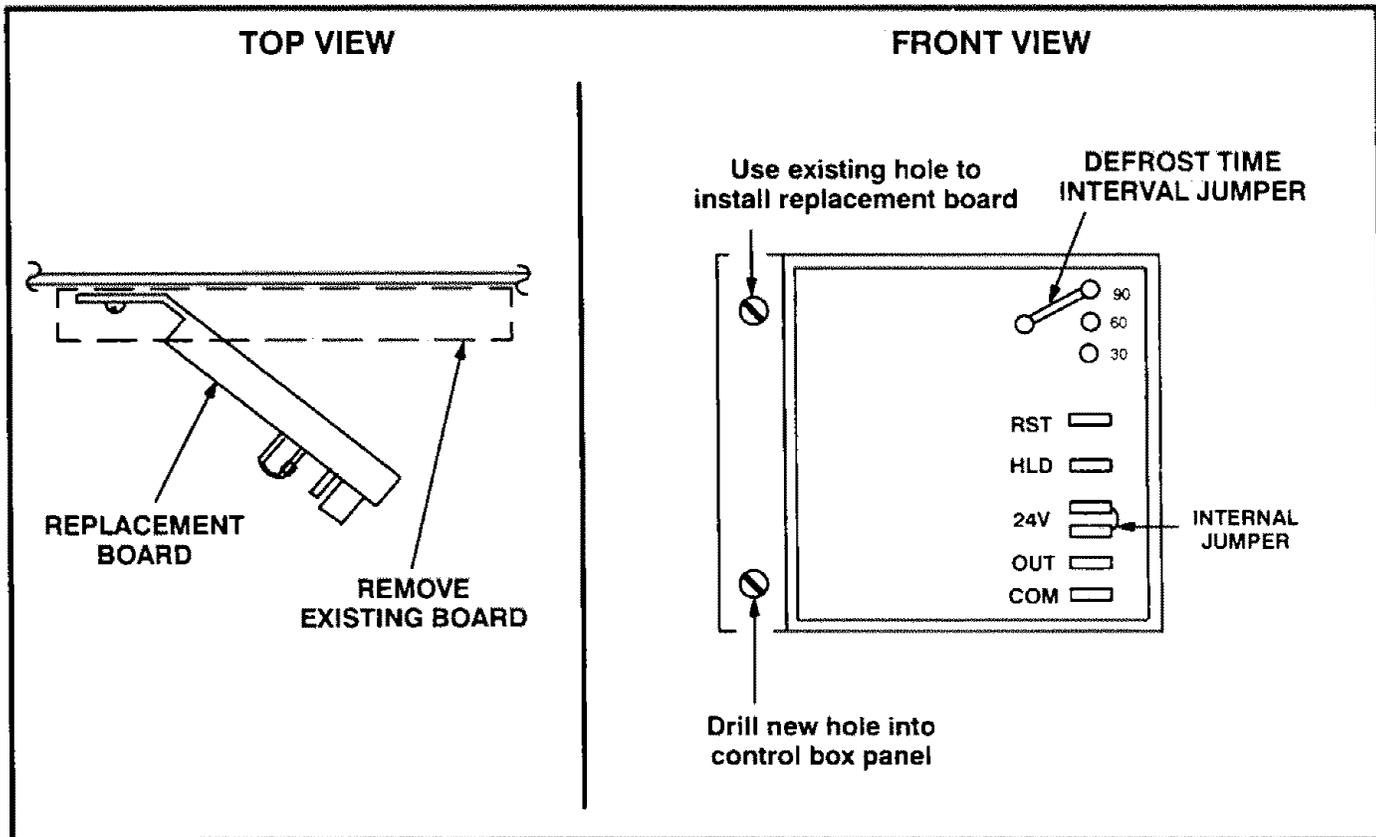


FIGURE 1

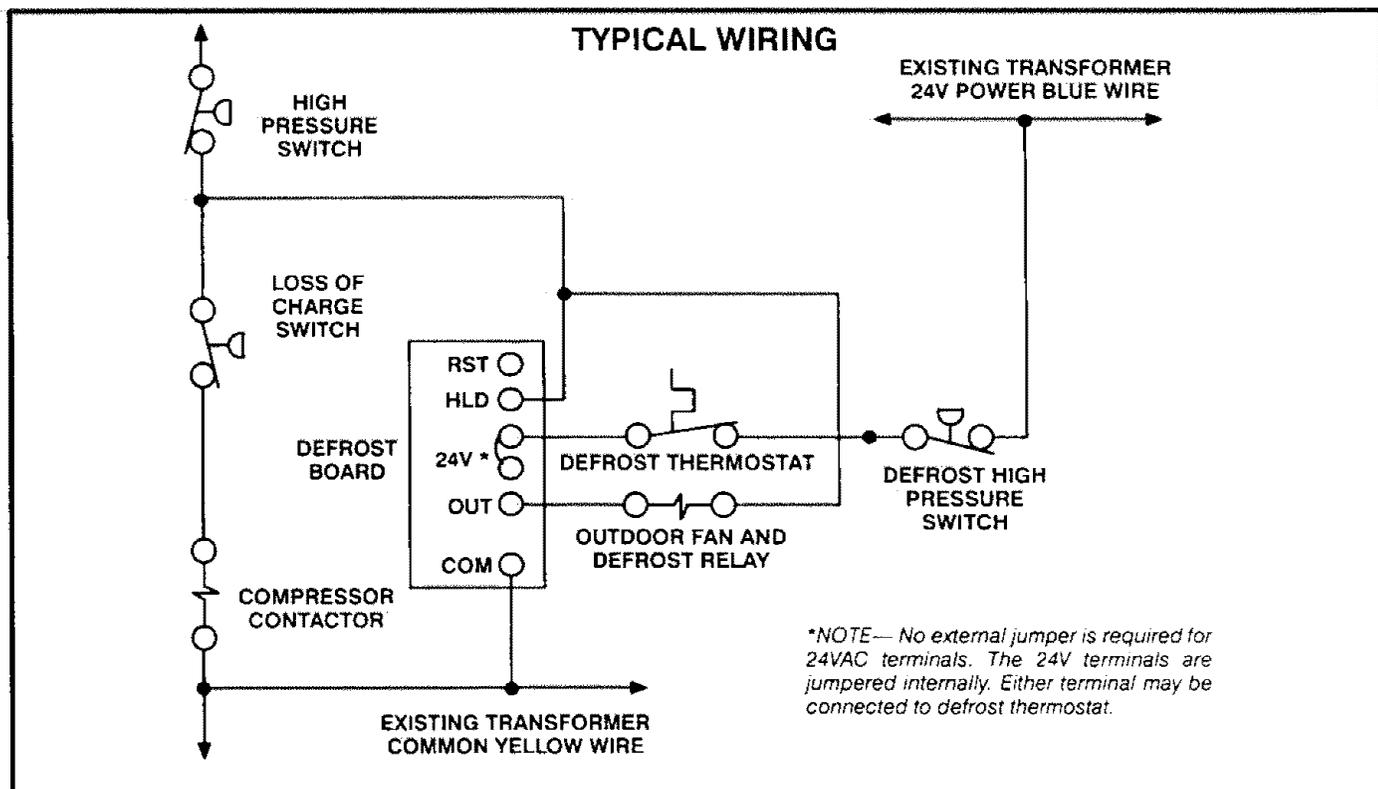


FIGURE 2

## CONTROL OPERATION

The defrost control is a solid state control manufactured by Hamilton Standard. The control provides automatic switching from normal heating operation to defrost mode and back. The defrost control contains a solid state timer which switches an external defrost relay through 1/4" male spades mounted on the control's circuit board. The control energizes the defrost relay at regular timed intervals. On some units, a normally open defrost switch placed in series between the defrost relay and the control initiates defrost only when needed at the end of the timed intervals. On other units, the control initiates defrost on demand from the defrost thermostat.

### Defrost Control Components:

- 1- 24V Terminal  
Terminal 24V receives 24VAC from the control transformer. This terminal powers the control's internal timer and relays. Terminal 24V must be powered at all times to provide HOLD between thermostat demands.
- 2 COM Terminal  
Terminal COM provides 24VAC common.
- 3- HLD Terminal  
Terminal HLD hold the internal timer in place between thermostat demands and allows the unit to continue timing upon resumption of thermostat demand. In most units, terminal HLD is connected directly to thermostat demand.
- 4- OUT Terminal  
Terminal OUT controls unit defrost when connected to one side of the defrost relay coil. An internal relay connected to terminal OUT closes to allow external defrost relay to energize and initiate defrost. At the end of the defrost period, the internal relay connected to terminal OUT opens to de-energize the external defrost relay.
- 5- RST Terminal  
This terminal is not functional for the specified application.
- 6- Timing Pins (T1,T2,T3)  
Each of these pins provides a different timed interval between defrosts (30, 60 or 90 seconds). A jumper connects the pins to circuit board terminal W1. To change the interval between defrosts, remove the jumper from the pin it is connected to and reconnect the jumper to one of the other available pins.

- 7- Timing Jumper  
A factory installed jumper on the circuit board connects terminal W1 on the circuit board to one of the three timing pins.
- 8- TST Pins  
Each board is equipped with a test pins for use in troubleshooting the unit. When jumpered together, these pins reduce the control timing to about 1/256 original time.

## CAUTION

Do not connect the timing jumper to either of the "TST" pins. "TST" pins must only be jumpered together during a test and must not connect with any other pins. Control damage could result.

### To Place Control in Test Mode:

- 1- Turn off all power to avoid damaging the circuit board.
- 2- Make sure all control terminals are connected as shown on unit wiring diagram before attempting to place control in test mode.

## IMPORTANT

The control will begin test mode only if a normal load is applied to control's terminal. Do not attempt to operate or test control out of unit.

- 3- Connect jumper to "TST" pins.
- 4- Turn indoor thermostat to heat mode and adjust to highest temperature setting.
- 5- See table 1 for control timings in "TST" mode.
- 6- Turn on power to unit and re-adjust thermostat. Be sure to remove jumper when test is complete.

TABLE 1  
TEST MODE CONTROL TIMINGS

DEFROST CONTROL TIMINGS	INTERVAL BETWEEN DEFROSTS WITH JUMPER CONNECTED TO:			DEFROST TIME
	30 (T1)	60 (T2)	90 (T3)	
NORMAL OPERATION	30 ± 3 MIN.	60 ± 6 MIN.	90 ± 9 MIN.	14 ± 1.4 MIN.
"TST" PINS JUMPERED TOGETHER	7 ± 0.7 SEC.	14 ± 1.4 SEC.	21 ± 2.1 SEC.	3.3 ± 0.3 SEC.

# DEFROST CONTROL TROUBLESHOOTING FLOWCHART

**START HERE**

Check control transformer primary and secondary voltages. Repair or replace as necessary.

Turn off power to unit.

Check defrost sensor. Is sensor temperature or pressure activated? For help in determining, refer to operation of control in unit installation instructions and unit wiring diagram.

Pressure

Temperature

Is sensor making good contact with coil?

Yes

No

Repair or replace sensor bracket.

Check all electrical connections at the defrost control. Defrost sensor and defrost relay.

Connect a jumper across the defrost relay.

Connect a jumper across the two "TST" pins on the defrost control.

Turn indoor thermostat to heat mode and adjust to highest temperature setting.

Turn on power to unit.

Check voltage across "HLD" terminal and "COM" terminal. Is voltage  $24 \pm 6VAC$ ?

Is defrost control set for 30, 60 or 90 minute defrost intervals?

Yes

No

Check thermostat and thermostat wiring. Repair or replace as necessary.

Repeat troubleshooting procedure.

Does unit go into defrost within appropriate time?

Yes

No

Unit is operating properly. Turn off power to unit. Remove all test jumpers. Reassemble unit.

Is compressor contactor energized?

No

Yes

Check circuit from "HLD" terminal back to thermostat. Repair or replace as necessary.

Repeat troubleshooting procedure.

Check voltage across "OUT" terminal and "COM" terminal. Is voltage  $24 \pm 6VAC$ ?

Yes

No

Connect a jumper between "OUT" terminal and "COM" terminal. CAUTION—Be careful not to short "OUT" terminal to "24V" terminal. Permanent control damage could result.

Does unit go immediately into defrost?

Yes

No

Turn off power to unit. Remove all test jumpers. Replace defrost control with new control board. Repeat troubleshooting procedure.

Check voltage across defrost relay coil. Is voltage  $24 \pm 6VAC$ ?

Yes

No

Is defrost relay energized?

Yes

No

Check voltage across reversing valve coil. Is voltage  $24 \pm 6VAC$ ?

Yes

No

Turn off power to unit. Check and repair circuit from reversing valve through defrost relay to control transformer. Repeat troubleshooting procedure.

Check voltage across "24V" terminal and "COM" terminal. Is voltage  $24 \pm 6VAC$ ?

No

Yes

Turn off power to unit. Check circuit from defrost switch back to control transformer. Repair or replace as necessary. Repeat troubleshooting procedure.

Turn off power to unit. Replace defrost relay. Repeat troubleshooting procedure.

Is solenoid engaging?

Yes

No

Replace reversing valve. Repeat troubleshooting procedure.

Replace solenoid. Repeat troubleshooting procedure.