

**INSTALLATION INSTRUCTIONS FOR REPLACEMENT DEFROST CONTROL KIT (84W88)
USED WITH VARIOUS HEAT PUMPS**

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

⚠ WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

Table 1. Applicable Defrost Controls

Original Defrost Control	Replacement Defrost Control
100269-01, -02 and -04	100269-05
29M0101	
29M0201	
56M3701	
68J2901	
68J8401	

Defrost System

The defrost system includes a defrost thermostat and a defrost control.

DEFROST THERMOSTAT

The defrost thermostat is located on the liquid line between the check/expansion valve and the distributor. When the defrost thermostat senses 42°F (5.5°C) or cooler, its contacts close and send a signal to the defrost control to start the defrost timing. It also terminates defrost when the liquid line warms up to 70°F (21°C).

DEFROST CONTROL (CMC1)

The defrost control includes the combined functions of a time/temperature defrost control, defrost relay, time delay, diagnostic LEDs, and a terminal strip for field wiring connections.

The control provides automatic switching from normal heating operation to defrost mode and back. During compressor cycle (defrost thermostat is closed, calling for defrost), the control accumulates compressor run times at 30, 60, or 90 minute field adjustable intervals. If the defrost thermostat is closed when the selected compressor run time interval ends, the defrost relay is energized and defrost begins.

Defrost Control Timing Pins (P1)

Each timing pin selection provides a different accumulated compressor run time period for one defrost cycle. This time period must occur before a defrost cycle is initiated. The defrost interval can be adjusted to 30 (T1), 60 (T2), or 90 (T3) minutes (see figure 1). The maximum defrost period is 14 minutes and cannot be adjusted. Factory default is 90 minutes

If the timing selector jumper is missing, the defrost control defaults to a 90-minute defrost interval.

Shipping and Packing List

Package 1 of 1 contains:

- 1 - Defrost control (100269-05)
- 4 - 1/4" quick connect terminals
- 2 - Black wire
- 1 - Wire (1 foot in length)
- 1 - Defrost control replacement - information sticker (401843S)

Application

Replacement defrost control kit (84W88) includes defrost control 100269. This defrost control may be used in various heat pump units to replace any defrost control listed in table 1. The 100269 includes features which may not be found in all of the existing controls. If the unit was originally equipped with any defrost control other than a 100269 series, operation should be reviewed at the time of replacement. Features of 100269 defrost control include:

- Five-minute compressor anti-short cycle delay;
- Pressure switch lockout circuit;
- Loss of charge / low pressure switch circuit;
- Field-selectable compressor delay
- Field connection terminals for service light.



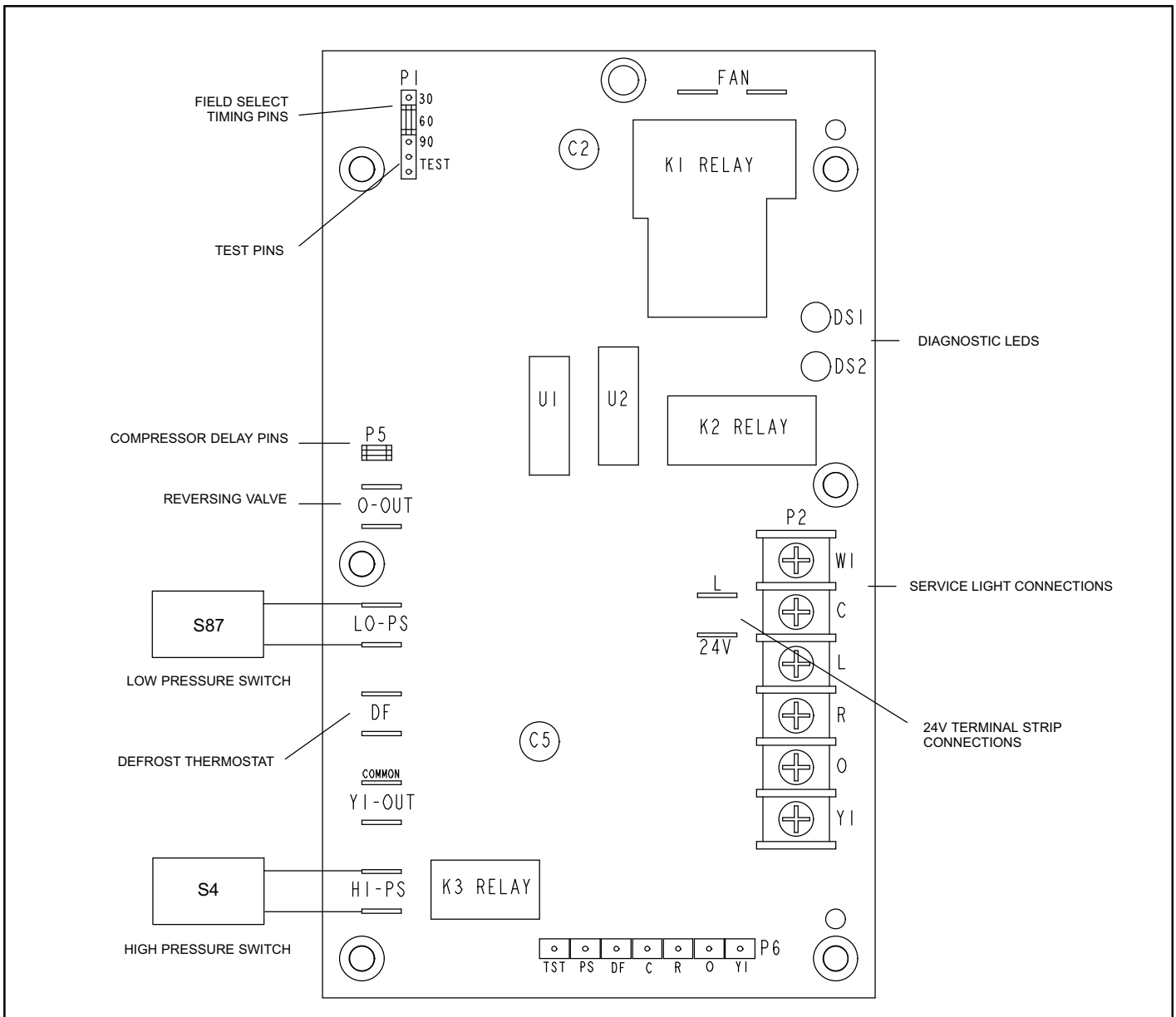


Figure 1. Defrost Control (100269-05)

Test Mode

The **TEST** mode is activated by removing the jumper on the defrost termination pins (**30, 60 or 90**) and placing the jumper on the **TEST** pins after 24VAC is applied to the control. The low pressure input is ignored in **TEST** mode.

⚠ IMPORTANT

The **TEST** pins are ignored and the **TEST** function is locked out:

- ❑ If the jumper is applied on the **TEST** pin before 24VAC is applied to the control.
- ❑ If there is a jumper on the 30 or 60 minute defrost termination pins.

Bypass-Anti-Short Cycle Delay

The **Y1** input must be active **ON**, the high pressure switch must be closed or a jumper must be installed on the high pressure terminals of the control.

Initiate a Forced Defrost

The **Y1** input must be active **ON**, the high pressure switch must be closed or a jumper must be installed on the high pressure terminals of the control, the defrost thermostat must be closed or a jumper must be placed across the **DF** terminals on the control and the **O** terminals must not have 24VAC (no power to reversing valve) before control will enter into a force defrost.

Test Mode Sequence

Using the defrost termination pin, short the **TEST** pins for a period of two seconds:

- Clear timed lockout / or pressure switch lockout function.
- Enter defrost mode

After entering forced defrost, if the jumper is removed before 5 seconds has elapsed, the unit will remain in forced defrost mode until defrost thermostat opens or terminated on maximum defrost time (14 minutes). If the jumper is not removed, once 5 seconds has elapsed (7 seconds total), the unit will terminate defrost and return to heat mode. The **TEST** mode will then be locked-out and no further **TEST** mode operation will be executed until the jumper on the **TEST** pins is removed and re-applied to the applicable defrost termination pins.

IMPORTANT

NOTE - After testing has been completed, properly re-position test jumper across desired timing pins.

Compressor Delay (P5)

The 100269-05 control, with the 30 second field-selectable delay, is active when the pins are jumpered. This feature helps reduce occasional sounds that may occur while the unit is cycling **In** and **Out** of the defrost mode.

NOTE — The 30-second compressor feature is ignored when jumper is installed on **TEST** pins.

Compressor Anti-Short-Cycle Delay

The timed-off delay is five minutes long. The delay helps protect the compressor from short-cycling in case the power to the unit is interrupted or a pressure switch opens. The delay is bypassed by placing the timer select jumper across the **TEST** pins for 0.5 seconds.

NOTE - The defrost control must have a thermostat demand for the bypass function to operate

Pressure Switch Circuits

The defrost control includes two pressure switch circuits. The factory-installed high pressure switch (S4) wires are connected to the defrost control's HI PS terminals (figure 1). The defrost control also includes LO PS terminals to accommodate an optional field-provided low (or loss-of-charge) pressure switch.

During a single thermostat cycle, the defrost control will lock out the unit after the fifth time that the circuit is interrupted by any pressure switch that is wired to the defrost control. In addition, the diagnostic LEDs will indicate a pressure switch lockout after the fifth occurrence of an open pressure switch (see table 1). The unit will remain locked out until 24V power from the indoor unit is broken then remade to the control or until the jumper is applied to the **TEST** pins for 0.5 seconds.

NOTE - The defrost control ignores input from the low pressure switch terminals during the **TEST** mode, during the defrost cycle, during the 90-second start-up period, and for the first 90 seconds each time the reversing valve

switches heat/cool modes. **If the **TEST** pins are jumpered and the 5-minute delay is being bypassed, the LO PS terminal signal is not ignored during the 90-second start-up period.**

DIAGNOSTIC LEDES

The defrost control uses two LEDs for diagnostics. The LEDs flash a specific sequence according to the diagnosis. See table 1.

Table 1. Defrost Control Diagnostic LEDs

DS2 Green	DS1 Red	Condition
OFF	OFF	Power problem
Simultaneous Slow Flash		Normal operation
Alternating Slow Flash		5-min. anti-short cycle delay
OFF	Slow Flash	Low Pressure Fault
OFF	ON	Low Pressure Lockout
Slow Flash	OFF	High Pressure Fault
ON	OFF	High Pressure Lockout

Service Light Connection

The switch is electrically connected to the service light in the indoor 24 volt mercury style room thermostat. The service light, when lit, indicates the compressor is not running. The service light is powered from W1 terminal of the indoor thermostat. The service light thermostat will close and light when the discharge line falls below 110 +/- 5°F, indicating a problem in the system. The service light thermostat opens and the service light goes off when the discharge line temperature falls to 130 +/- 5°F indicating the compressor is running. On late model units, the service light connections are made on terminals on the defrost control.

Ambient Compensating Thermistor

NOTE - The ambient compensator thermistor is not required with 24 volt electronic thermostats.

Units built **PRIOR** to March 2002 have an ambient compensating thermistor mounted on the outdoor fan wiring harness. The thermistor is an NTC (negative temperature coefficient – increase in temperature equals decrease in resistance). The device is connected in series with the heat anticipation resistor in the 24 volt mercury style room thermostats. The thermistor varies the room thermostat heat anticipator current according to outdoor ambient temperature to prevent abnormal thermostat droop. As outdoor temperature increases, the resistance across the thermistor drops. As the resistance across the thermistor drops, the current through the heat anticipator resistor increases. Therefore, heat anticipation increases as outdoor temperature decreases. (Resistance at 77°F = 260 ohms +/- 5%; at 100°F = 150 ohms; at 32°F = 861 ohms). On late model units, the ambient thermistor connections are made at terminals on the defrost control.

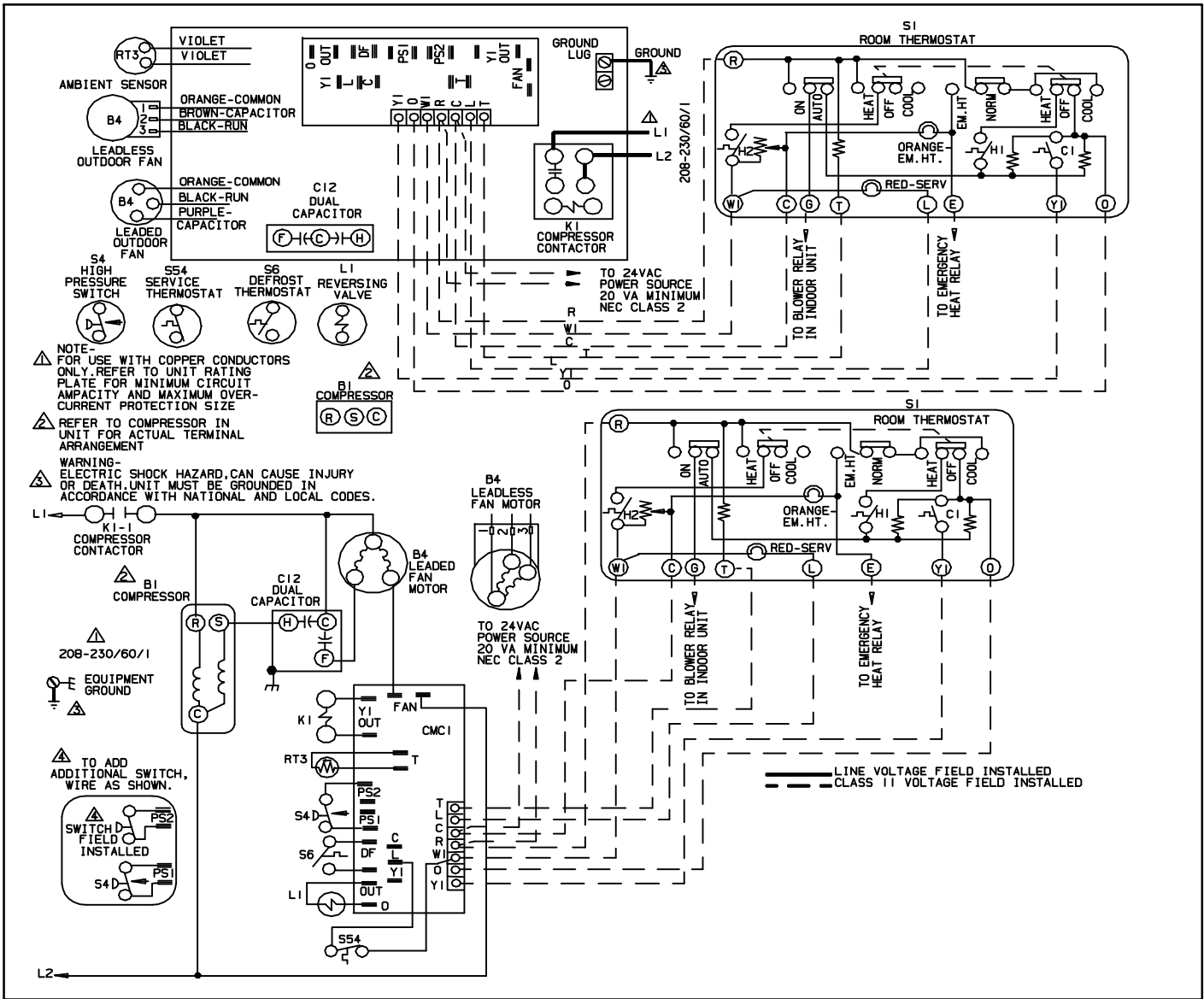


Figure 2. Typical Unit Wiring Diagrams - Defrost Control with C, L and Y1 Terminals)

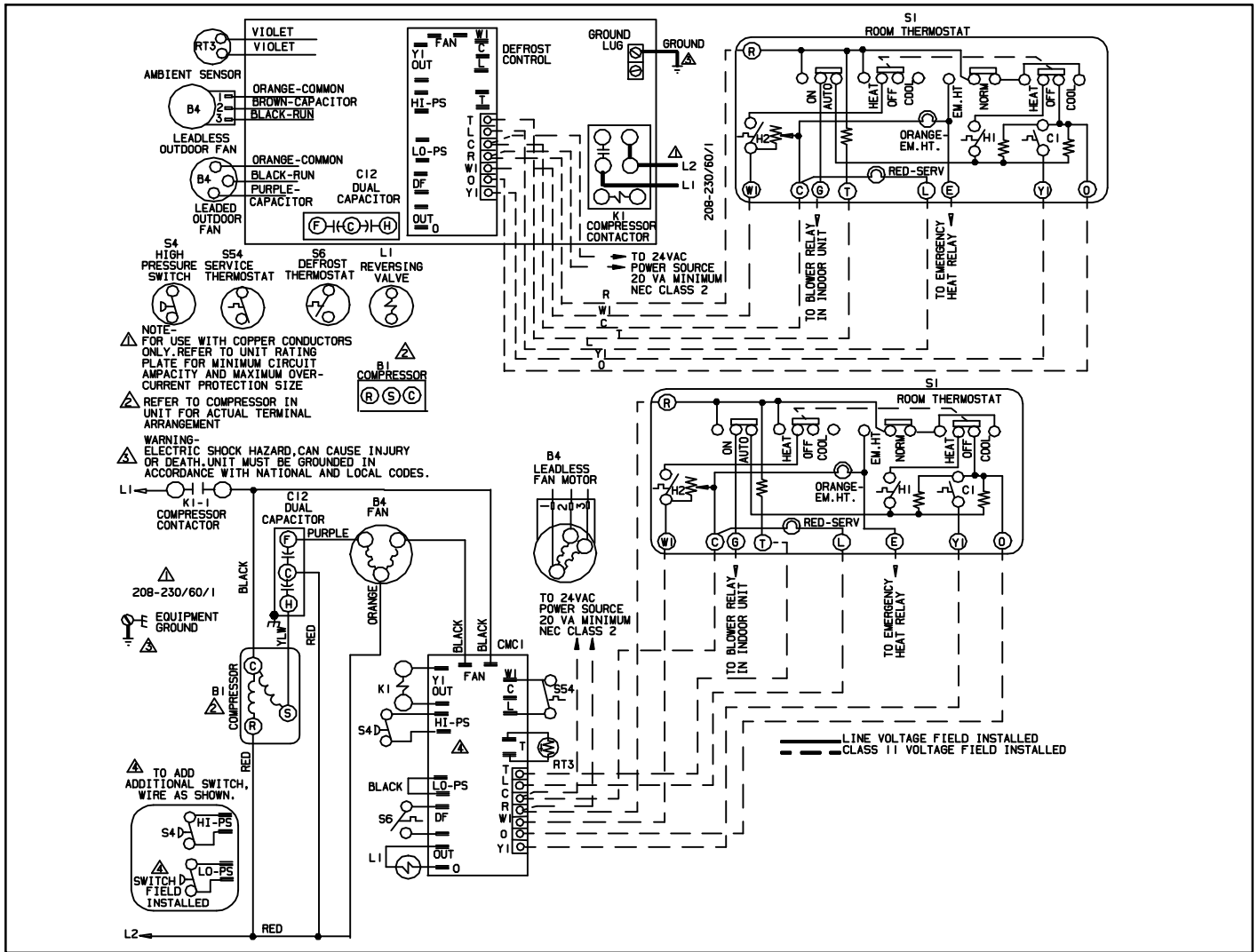


Figure 3. Typical Unit Wiring Diagrams - Defrost Controls with W1, C, L and T, T terminals)

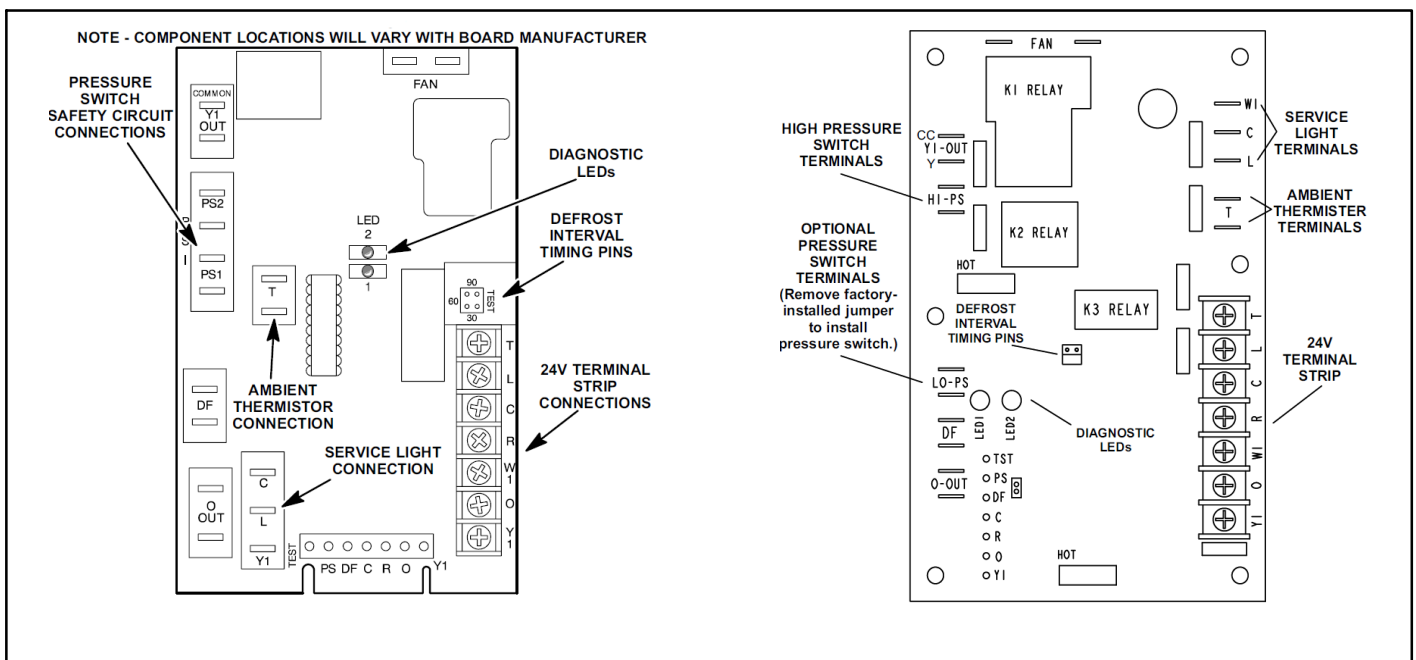
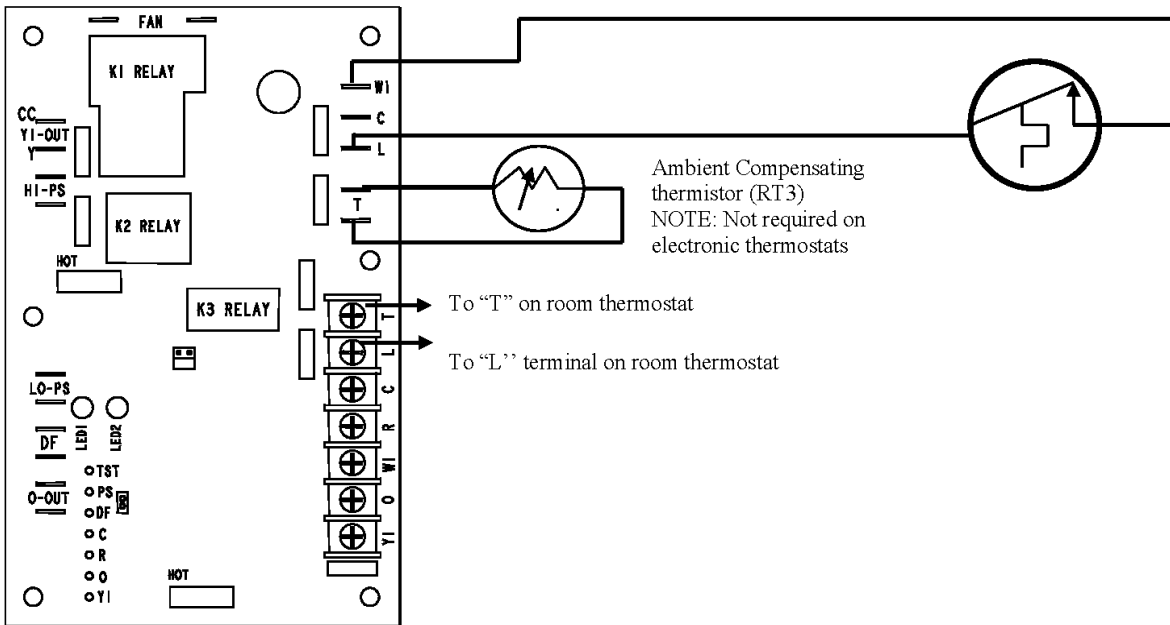


Figure 4. Earlier Model Defrost Control Terminal Designations for Service Light and Ambient Thermistor Connections

Service Light Thermostat (S54) & Ambient Compensator Thermistor (RT3) Wiring to Defrost Boards

**Defrost Boards with W1, C, L, T & T spade connections
(68J8401, 29M0101 & 56M3701)**

Service Light Thermostat (S54)
(NOTE: Opens when sensor goes above 130°F)



Defrost Board with 24V & L spade connections (Ex: 100269-XX)

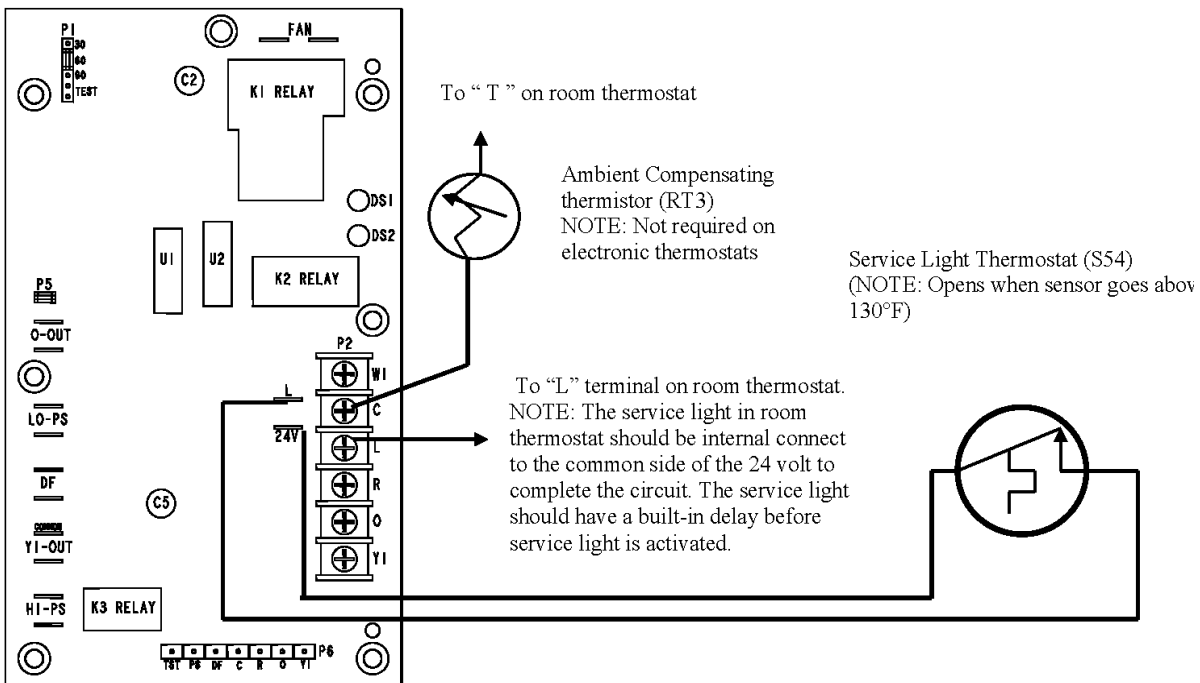


Figure 5. Wiring Ambient Compensator (RT3) and Service Light and Service Light Thermostat (S54) to New Defrost Control

**Defrost Boards with NO spade connections
(68J2901 & 29M0201)**

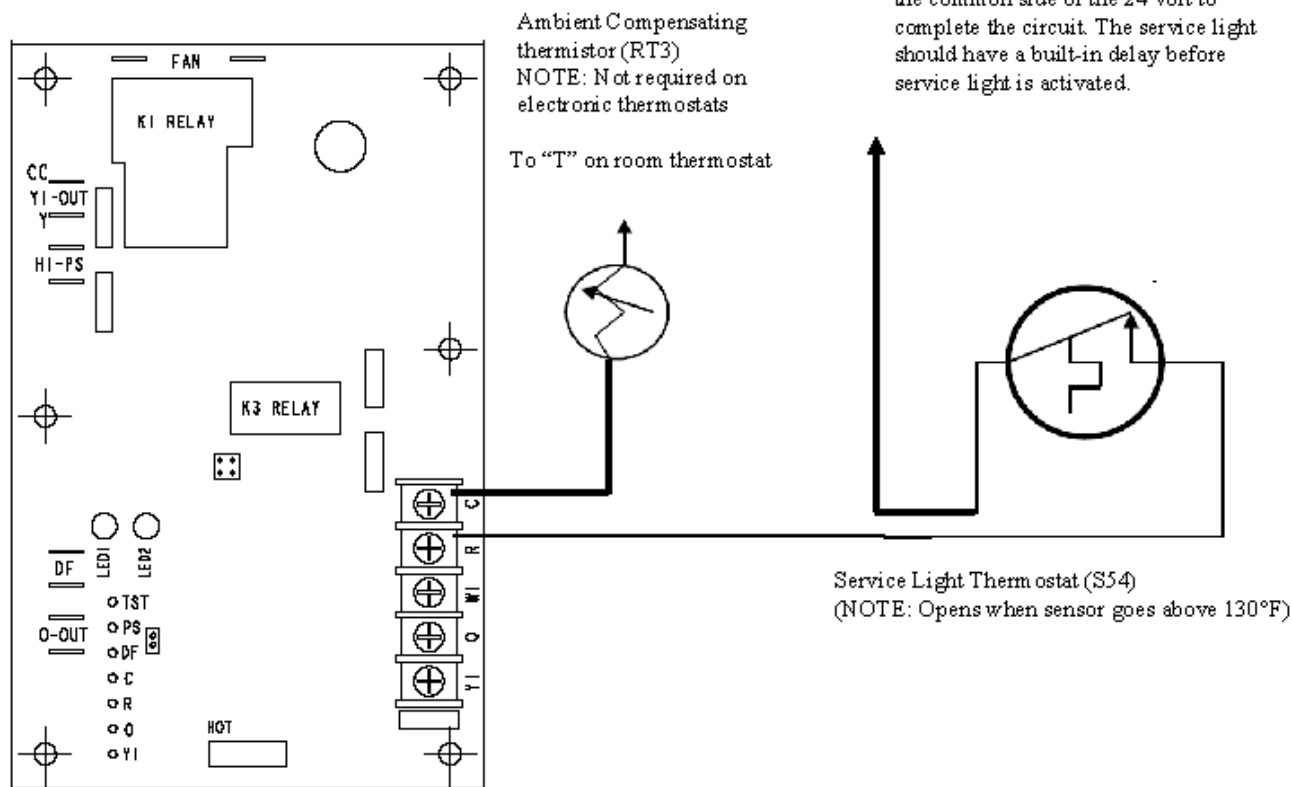


Figure 6. Wiring Ambient Compensator (RT3) and Service Light and Service Light Thermostat (S54) to New Defrost Control

Terminal Type	29M0101	56M3701	56M8501	60J3901	68J2901	68J8401	100269-04/05
Screw	Y1	Y1	Y1	Y1	Y1	Y1	Y1
Screw	O	O	O	O	O	O	O
Screw	R	R	R	R	R	R	R
Screw	C	C	C	C	C	C	C
Screw	W1	W1	W1	W1	W1	W1	W1
Screw	L	L	L	L	L	L	L
Screw	T	T		T		T	
Screw			Y2				
1/4"	HI PRESSURE (2)	HI PRESSURE (2)	HI PRESSURE (2)	HI PRESSURE (2)	PS1 (HP PRESS [2])	PS1 (HP PRESS [2])	HI PRESSURE (2)
1/4"	LO PRESSURE (2)	LO PRESSURE (2)	LO PRESSURE (2)	LO PRESSURE (2)	PS2 (LO PRESS [2])	PS2 (LO PRESS [2])	LO PRESSURE (2)
1/4"	Y1 OUT (2)	Y1 OUT (2)	Y1 OUT (2)	Y1 OUT (2)	Y1 OUT (2)	Y1 OUT (2)	Y1 OUT (2)
1/4"	O OUT (2)	O OUT (2)	O OUT (2)	O OUT (2)	O OUT (2)	O OUT (2)	O OUT (2)
1/4"	FAN (PWR IN)	FAN (PWR IN)	FAN (PWR IN)	FAN (PWR IN)	FAN (PWR IN)	FAN (PWR IN)	FAN (PWR IN)
1/4"	FAN (OUT TO FAN)	FAN (OUT TO FAN)	FAN (OUT TO FAN)	FAN (OUT TO FAN)	FAN (OUT TO FAN)	FAN (OUT TO FAN)	FAN (OUT TO FAN)
1/4"	L (Note 1)	L (Note 1)	L (Note 1)	L (Note 1)		L (Note 1)	L (Note 1)
1/4"	WI (Note 1)	WI (Note 1)	WI (Note 1)	WI (Note 1)			WI (Note 1)
1/4"	T (Notes 2 & 7)	T (Notes 2 & 7)		T (Notes 2 & 7)		T (Notes 2 & 7)	Note 7
1/4"	DF (Note 3)	DF (2) (Note 3)	(Note 6)	(Note 6)	DF (2) (Note 3)	(Note 6)	DF (2) (Note 3)
1/4"	C	C	C	C		C	
1/4"			Y2 (Note 4)				
			COIL PROBE	COIL PROBE (NOTE 5)			
			AMBIENT PROBE	AMBIENT PROBE (NOTE 5)			

NOTES-

1 - SERVICE LIGHT THERMO CONNECTION POINT

2 - AMBIENT COMPENSATING THERMISTER CONNECTION POINT (2)

3 - DEFROST THERMO CONNECTION [2]

4 - CONTROLS SECOND STAGE OPERATION

5 - ONE PAGE OF SPEC SHEET SHOWS BOTH AND COIL AND AMBIENT PROBES. NEXT PAGE ONLT SHOWS T ?

6 - THESE CONTROLS DID NOT INCLUDE DEFROST THERMOSTAT CONNECTIONST

7 - THE REPLACEMENT CONTROL DOES NOT INCLUDE AMBIENT COMPENSATING THERMISTER CONNECTION POINT S

Figure 7. Connector Descriptions

Installation

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

1. Disconnect all electrical power from the unit.
2. Locate existing defrost control
3. Mark and disconnect wires from existing defrost control. Remove existing defrost control .
4. Position replacement defrost control properly over mounting holes in unit and snap stand-offs into place.
5. Reconnect labeled wires to the proper terminals on the replacement defrost control. Refer to figure 1 for pressure switch wiring and terminal identification.
6. Remove the factory-installed jumper(s) to install the existing high pressure and low pressure (or loss of charge) switch(es).
7. Affix provided sticker to inside of control panel.
8. Restore electrical power to the unit and monitor unit function through a defrost test cycle.