

505,224M
11/2013
Supersedes 10/2012

**LOW AMBIENT CONTROL
KIT**

**INSTALLATION INSTRUCTIONS FOR LOW AMBIENT CONTROL KIT (68M04) USED WITH
VARIABLE SPEED FAN OUTDOOR UNITS**

⚠ 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.

⚠ CAUTION

Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working nearby these areas during installation or while servicing this equipment.

⚠ 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.

Shipping and Packing List

Kit 68M04 contains the the following parts:

- 1 — Low ambient pressure switch assembly (S11)
- 1 each — K58 and K159 relays
- 10 — 20" Lengths of wire (c/w 3/16" female quick connects on one end of each wire)
- 10 — Wire nuts
- 4 — #10-16 X 5/8" S.D.S.T. screws
- 1 — Schrader[®] depressor tee with seal cap

Additional Parts Required

- 1 - All units will require one field-provided properly sized freezestat (S49) for use with this kit. Order part using table 1.

Table 1. Freezestat Selection (S49)

Tubing Size	Wire Length	Wire Gauge	Lennox Catalog Number	Freezestat Set Points	
				Open	Close
3/8"	90-13/16"	18	93G35	29°F (-2°C)	58°F (10°C)
5/8"	36-1/2"	18	50A93	36°F (2°C)	58°F (10°C)

- 2 - Use ONLY expansion valve metering devices on units with low ambient kits. Refer to the heat pump's Production Specification bulletin to order the required expansion valve for the indoor coil.

Application

NOTE — This kit may be used in expansion valve systems only. It is not suitable for use in systems using either piston-type or capillary tube metering devices.

NOTE — All units reference in this instruction are factory-equipped with a crankcase heater.

NOTE — This kit is suitable only for use in HFC-410A refrigerant applications.

The low ambient control pressure switch **S11** cycles the outdoor fan, while allowing continuous compressor operation during a cooling demand. This intermittent outdoor fan operation maintains a minimum pressure differential across the expansion device as the ambient temperature drops, thus reducing capacity losses during low ambient conditions. The freezestat (ordered separately) senses suction line temperature and cycles the compressor off when suction line temperature falls below its setpoint. This kit is designed for use in ambient temperatures that are no lower than 30°F (-1°C) unless otherwise noted in the Product Specification bulletin.



Installation

LOW AMBIENT PRESSURE SWITCH (S11)

The provided low ambient pressure switch is factory set for 450 psig (3100 kPa) cut-in and 240 psig (1600 kPa) cut-out. This switch is not adjustable.

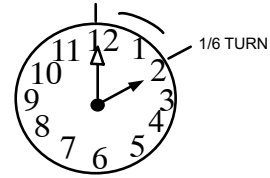
NOTE — Use **ONLY** expansion valve metering devices on units with low ambient kits.

- 1 - Turn off the electrical power to the unit.
- 2 - Remove compressor compartment access panel, if applicable.
- 3 - Install provided low ambient pressure switch on open port (no valve core) of provided tee fitting (see figure 1 for example).

NOTE — *Pressure switch must be installed on tee first. Then install tee on liquid line service port to avoid refrigerant loss.*

- 4 - Install tee fitting on outdoor unit liquid line service port.
- 5 - Install seal cap on tee valve core port and tighten to 6 to 8 ft.-lbs. When a torque wrench is not available,

finger tighten and use an appropriately sized wrench to turn an additional 1/6 turn clockwise.



- 6 - Route pressure switch wires to control box and connect using applicable unit wiring diagram.

RELAYS (K58 and K159)

Depending on the specific model unit, one of the provided relays will be used (see figure 1 for relay(s) installation location).

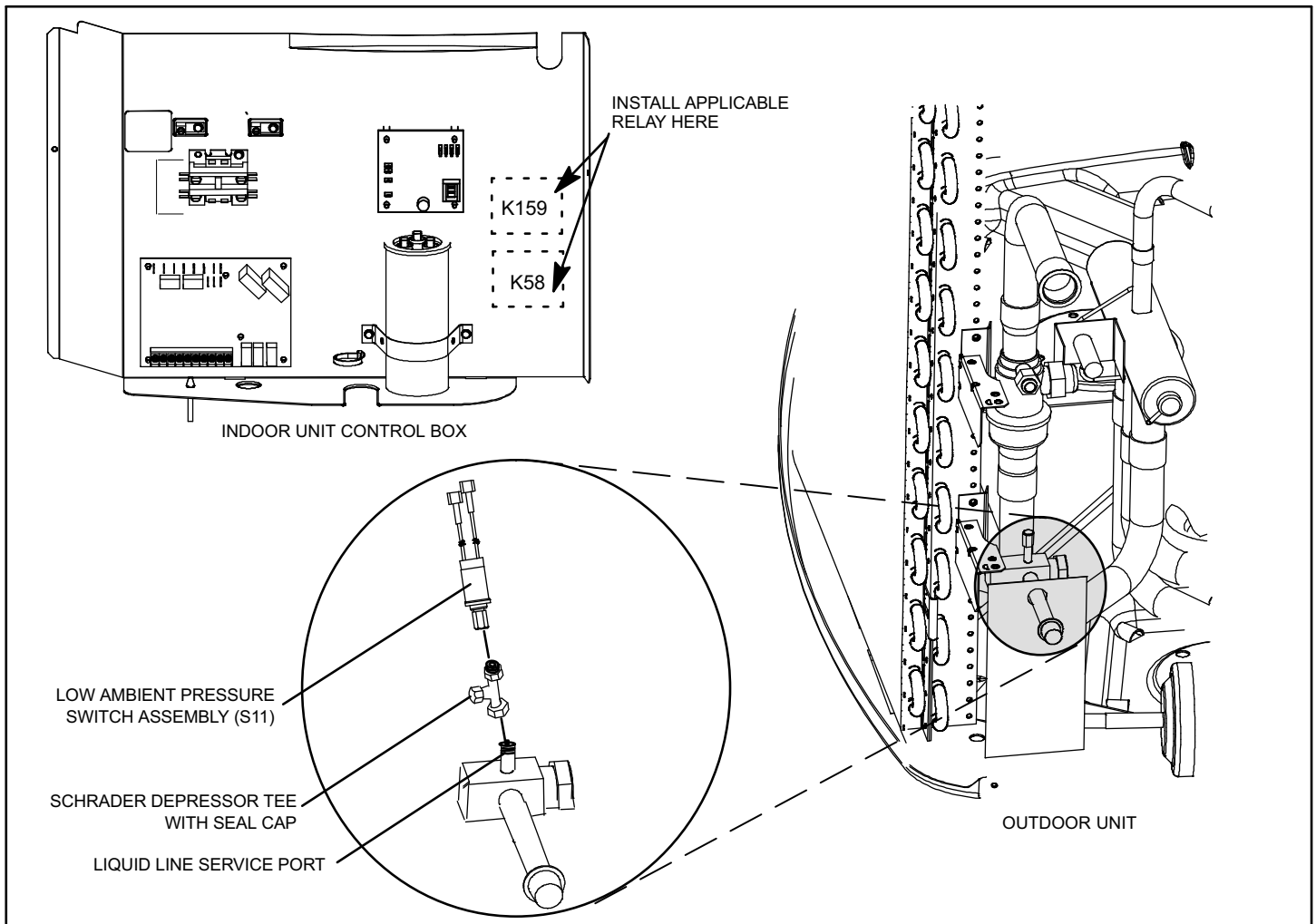


Figure 1.

FREEZESTAT (S49)

The freezestat (ordered separately) will open and close at the non-adjustable set points listed in table 1.

Installation Method 1 — (Non-Communicating Unit)

- 1 - A freezestat, sized per table 1 and ordered separately, must be installed. Install the freezestat on one of the copper lines between the last hairpins and the suction manifold (see figure 2) of the indoor coil.
- 2 - The freezestat senses the line temperature and cycles the compressor off when the line temperature falls below its setpoint. The freezestat will open and closed as listed in table 1.
- 3 - Connect freezestat (S49) wires as exemplified in the applicable unit wiring diagrams.

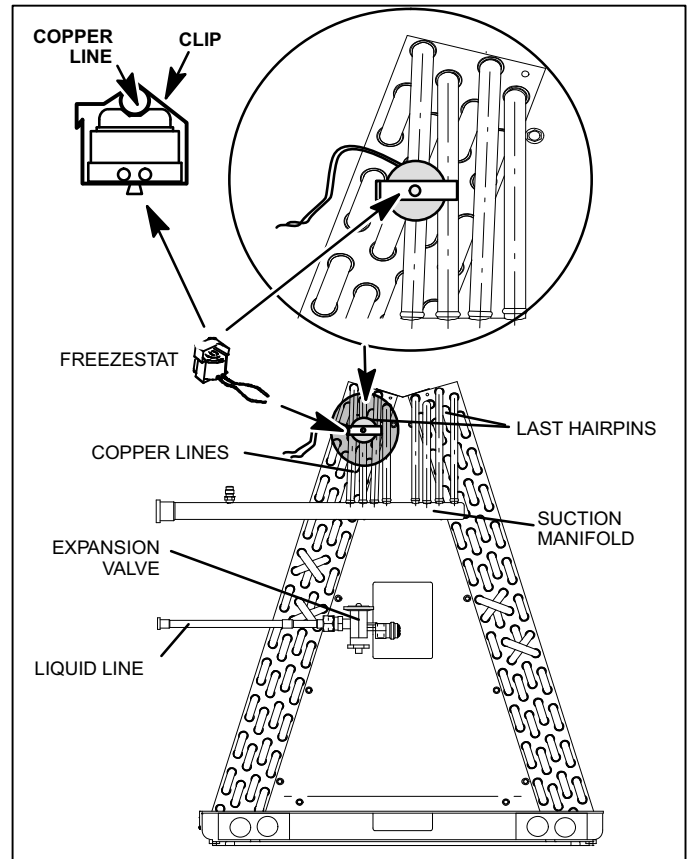


Figure 2. Typical Freezestat (S49) Installation (Indoor Coil)

CAUTION

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS AND PROCEDURES

Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

Installation Method 2 — (Communicating Unit)

- 1 - A freezestat, sized per table 1 and ordered separately, must be installed. Install the freezestat near last bend (tube) of the indoor coil before the suction manifold (see figure 2).
- 2 - The freezestat senses the line temperature and cycles the compressor off when the line temperature fails below its setpoint. The freezestat will open and closed as listed in table 1.
- 3 - Connect freezestat (S49) wires as exemplified in the applicable unit wiring diagrams and figure 3.

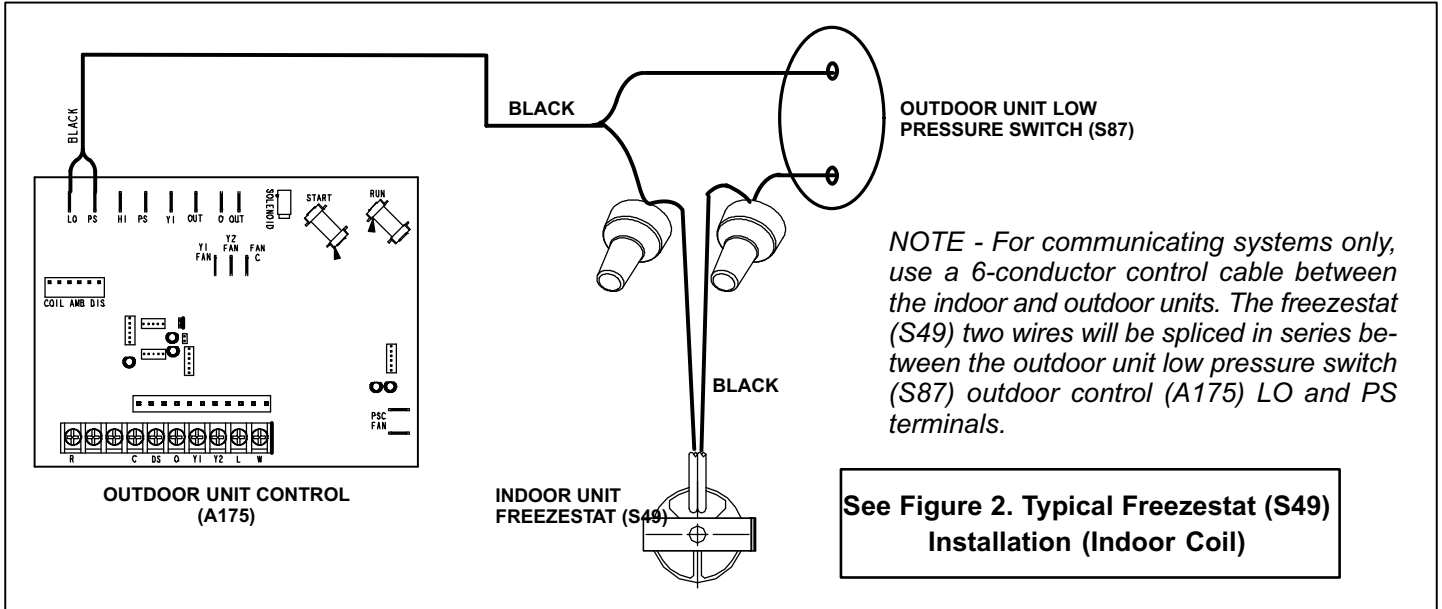
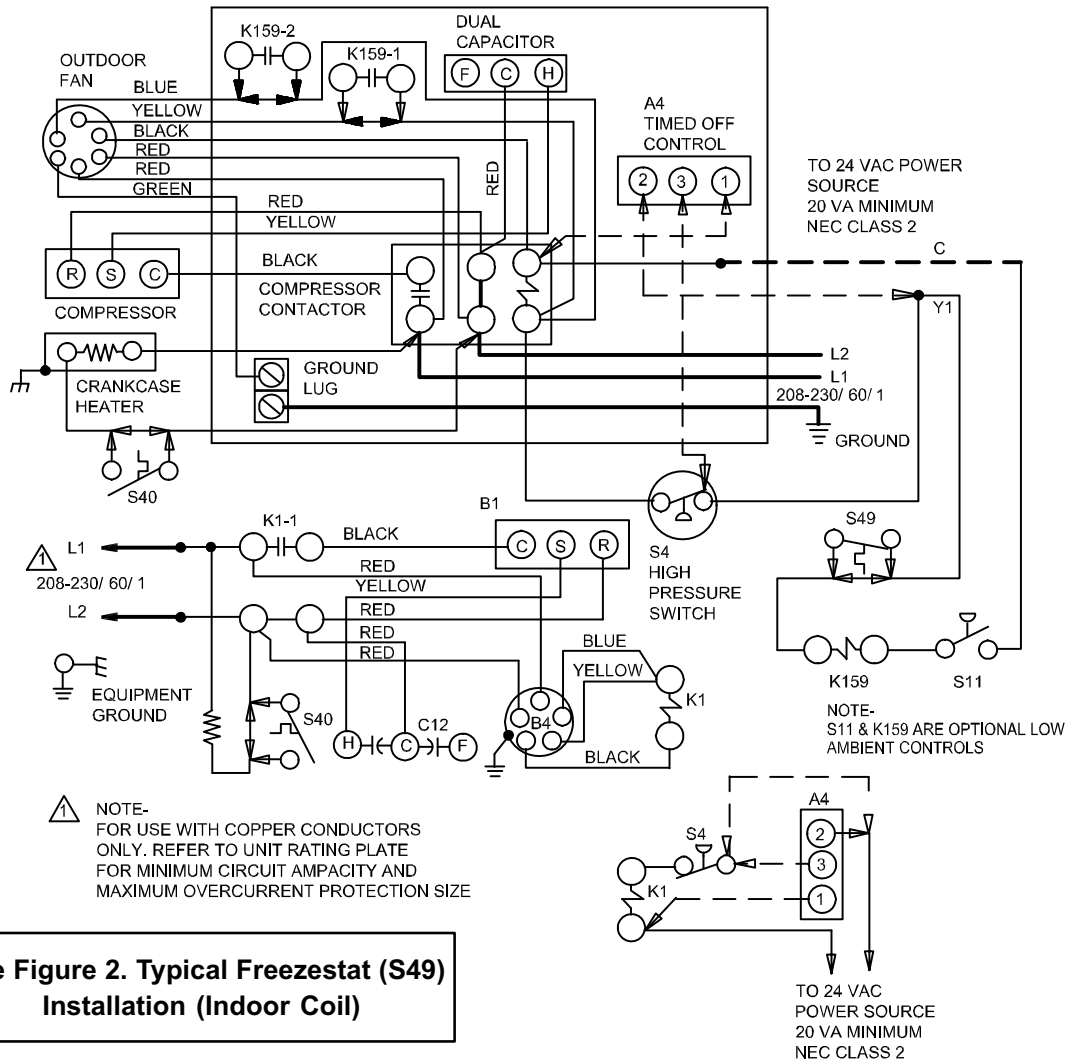


Figure 3.

Wire Connections

Complete the wiring connections per the appropriate wiring diagram (figures 6 through 14).



KEY	DESCRIPTION
	COMPONENT
A4	CONTROL-TIMED OFF
B1	COMPRESSOR
B4	MOTOR-OUTDOOR FAN
C12	CAPACITOR-DUAL
HR1	HEATER-COMPRESSOR
K1,-1	CONTACTOR-COMPRESSOR
S4	SWITCH-HIGH PRESSURE
S24	SWITCH-LOSS OF CHARGE
S40	TERMOSTAT-CRANKCASE
S89	SWITCH-THERMOSTAT, DISCHARGE TEMP
S87	SWITCH-LOW PRESS. COMP 1

Figure 4.

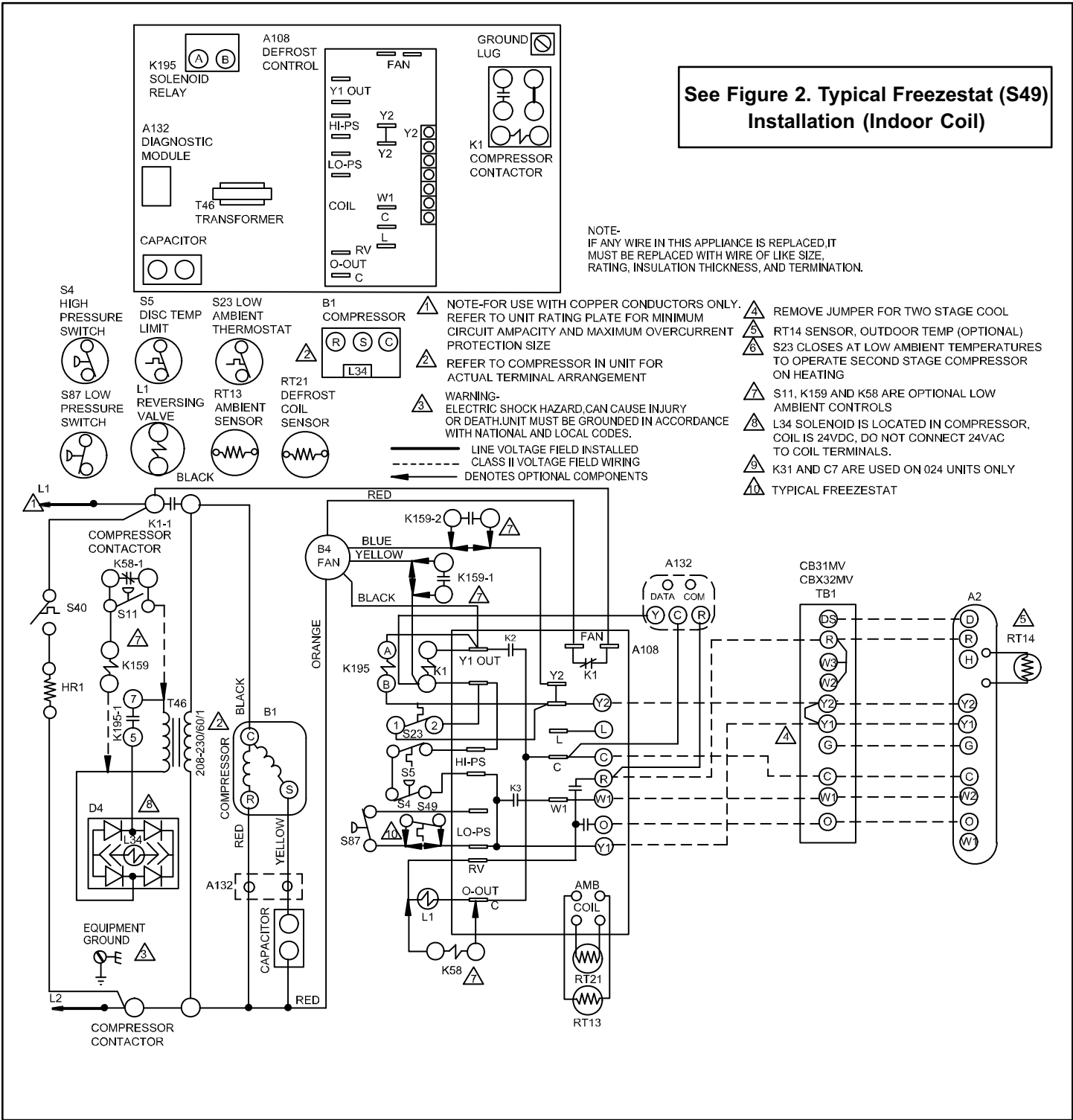


Figure 5.

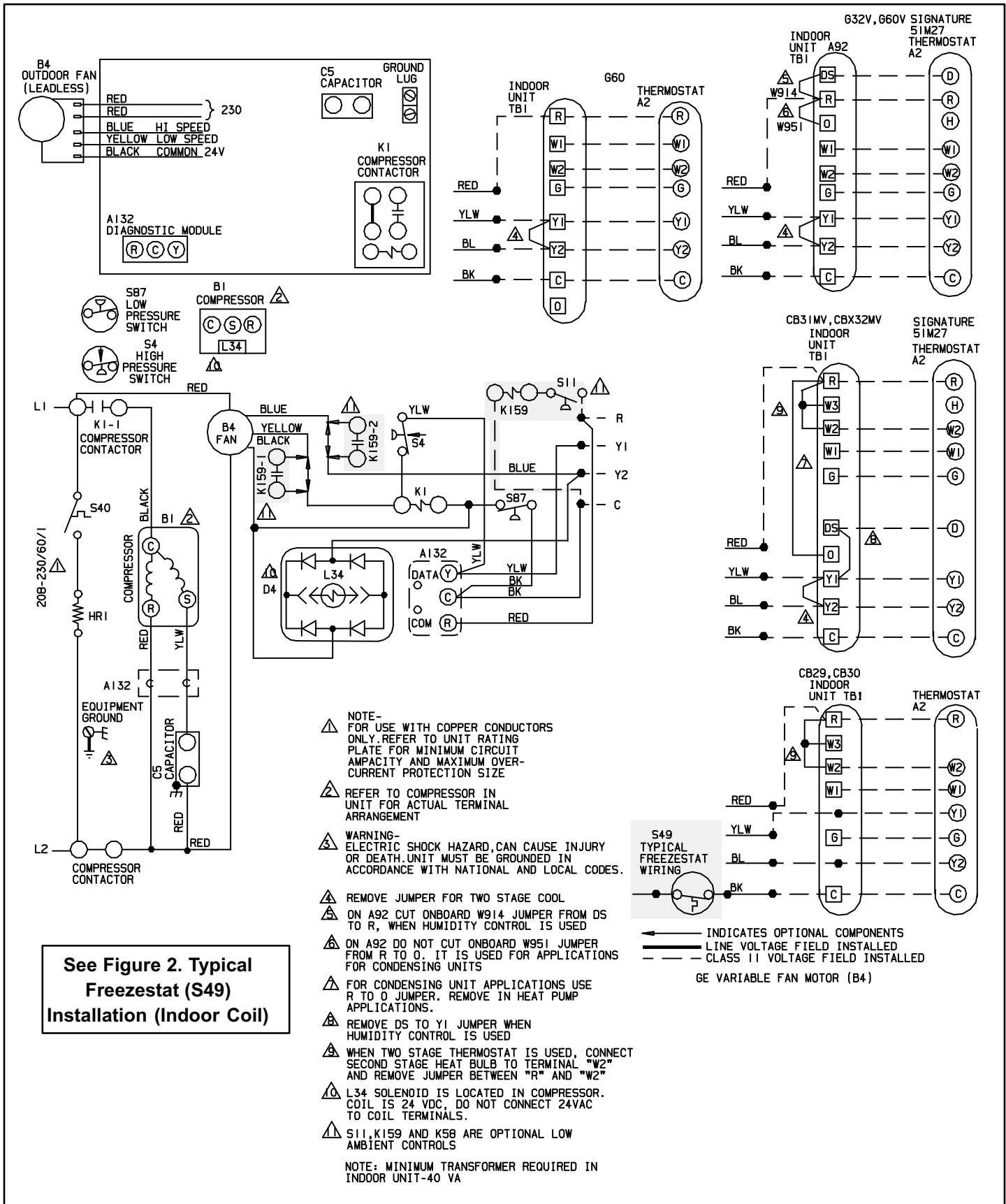


Figure 6.

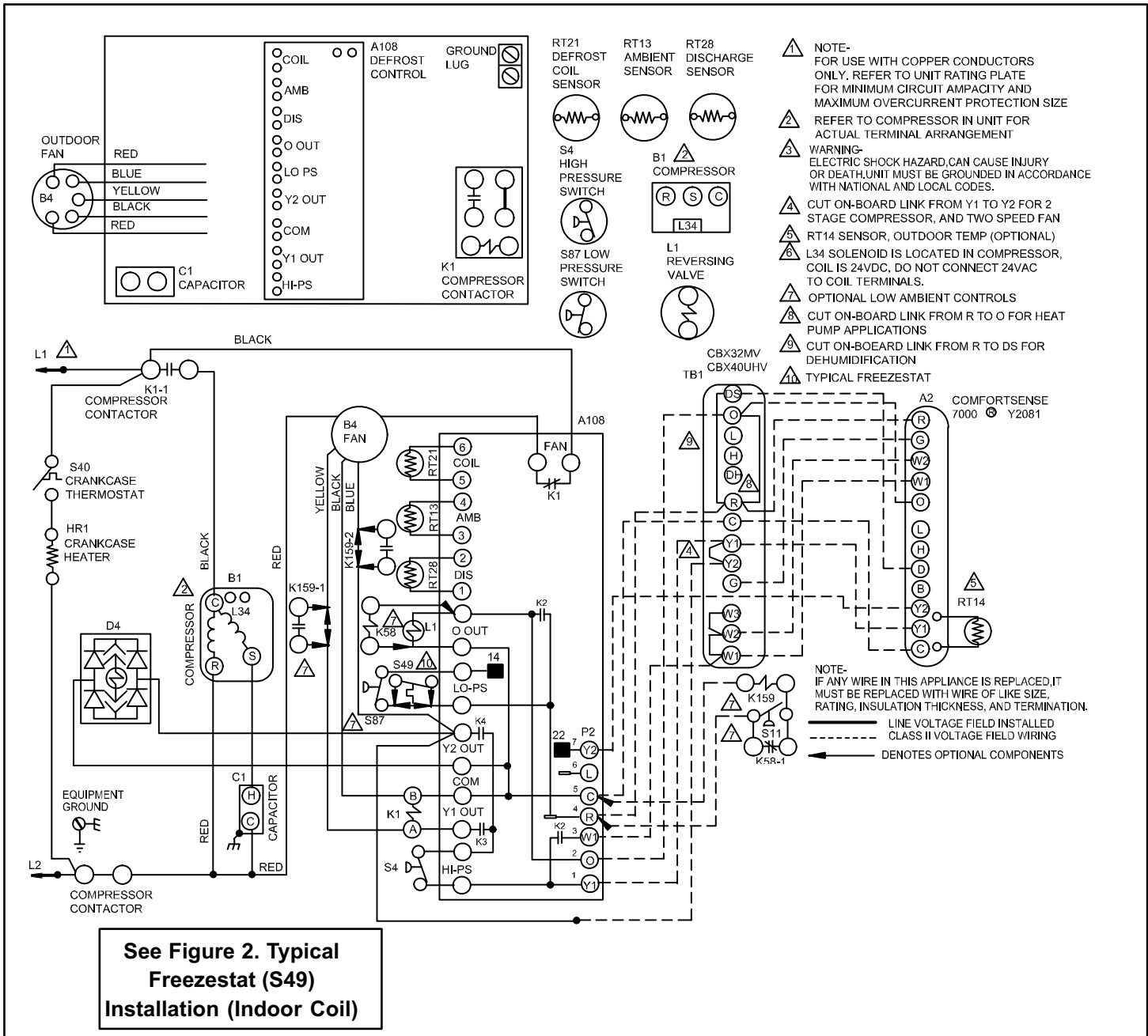


Figure 7.

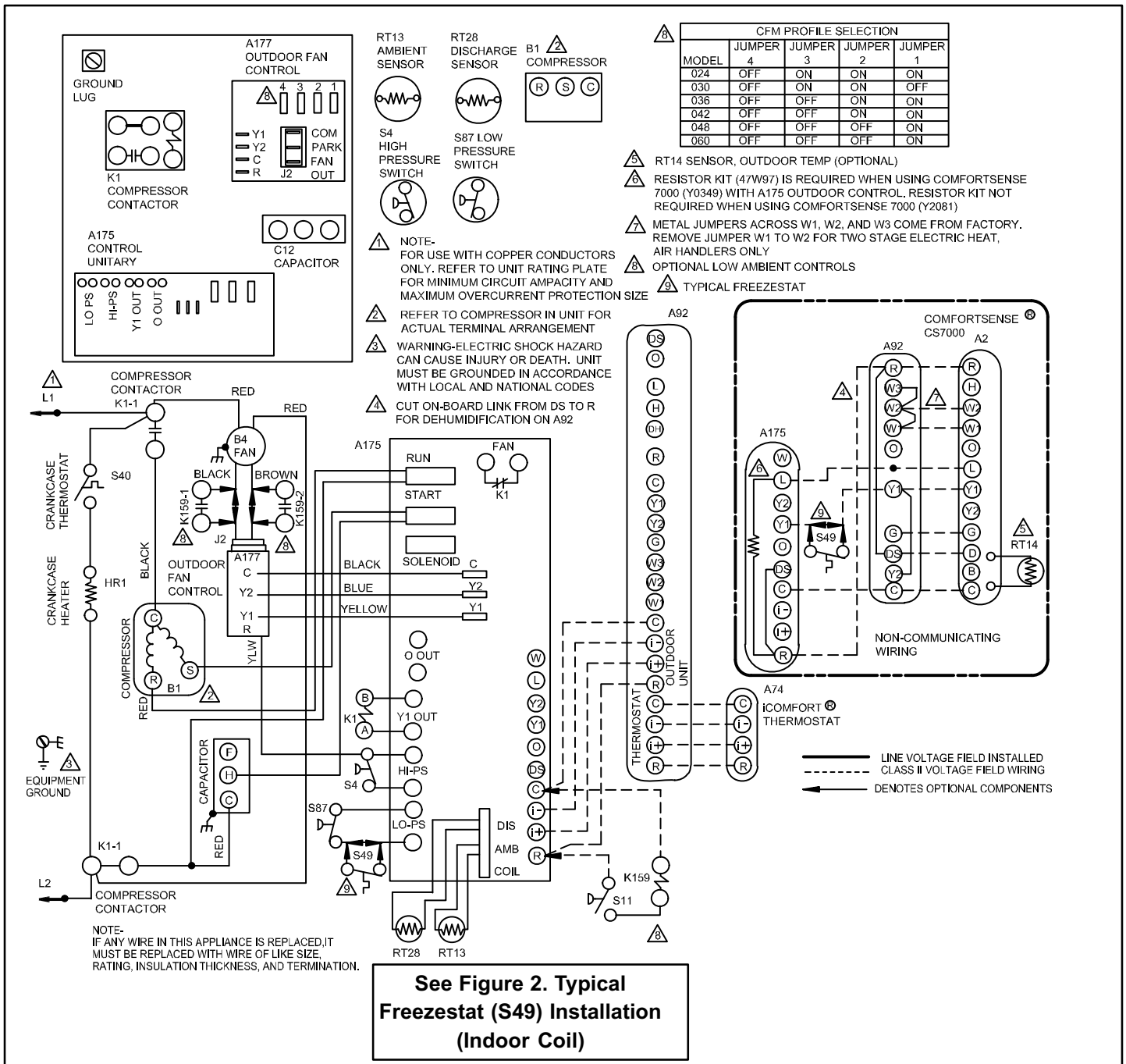


Figure 8. (Communicating or Non-Communicating)

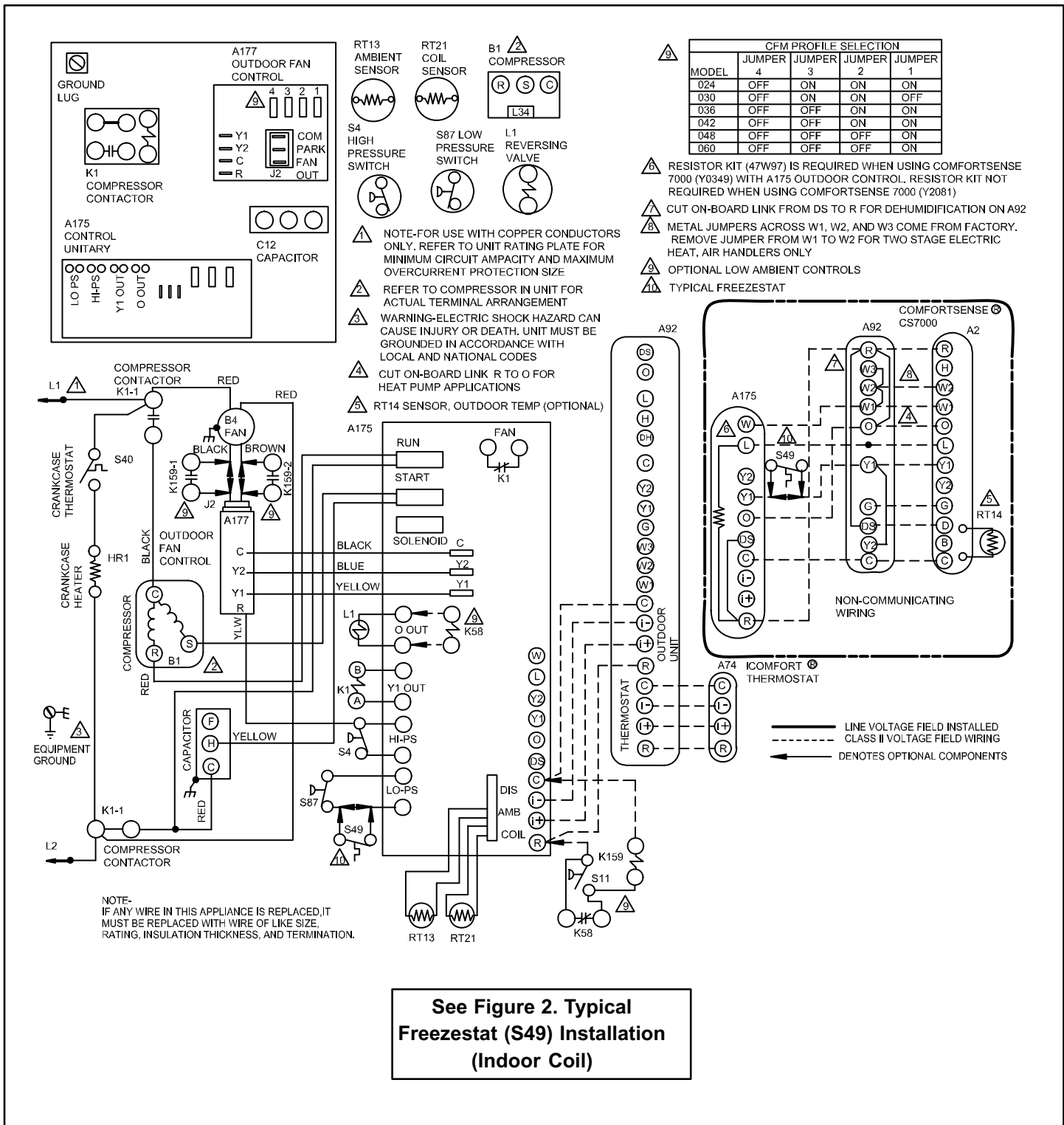
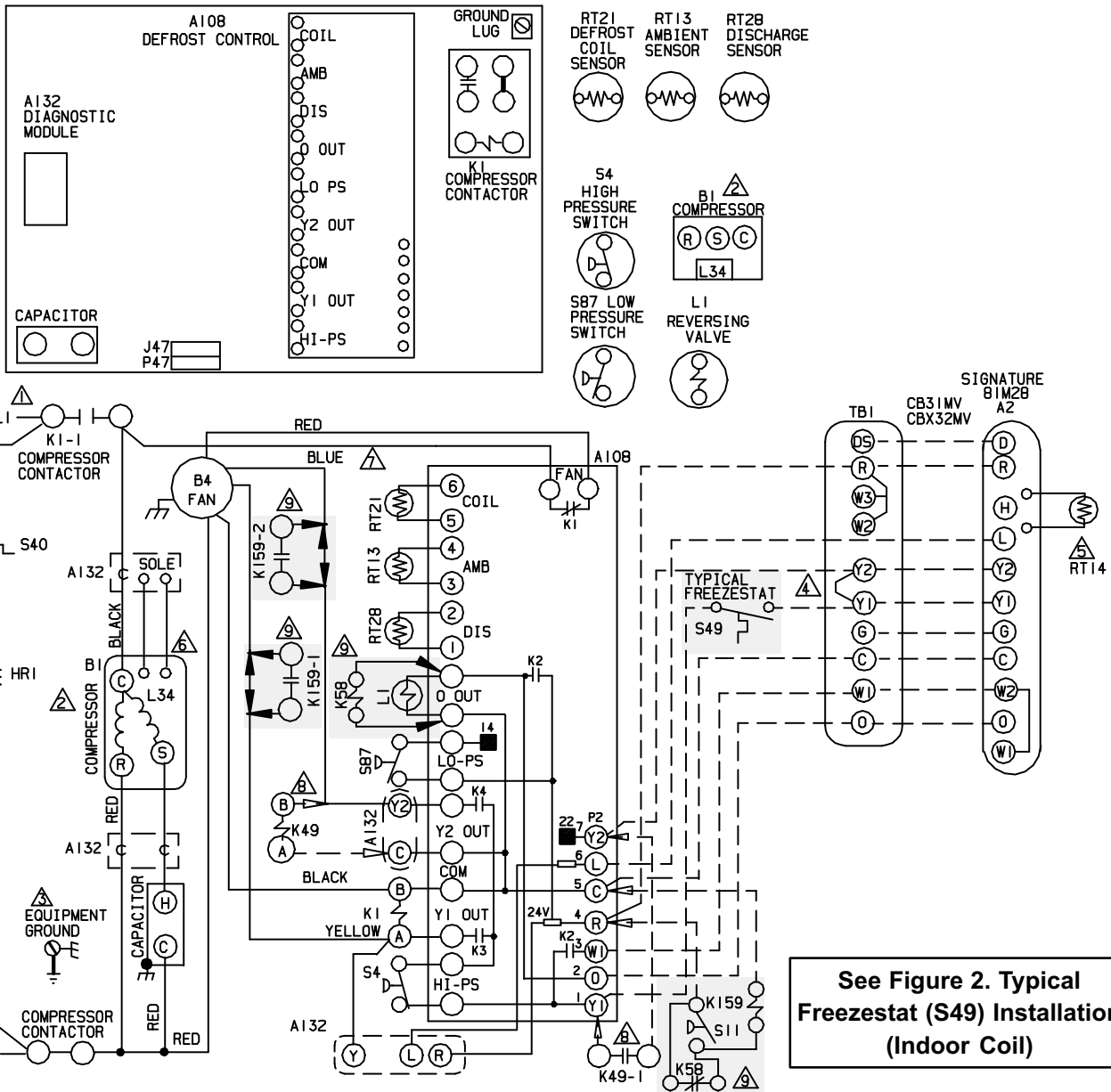


Figure 9. (Communicating or Non-Communicating)

Wiring Diagram



See Figure 2. Typical Freezestat (S49) Installation (Indoor Coil)

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

⚠ REFER TO COMPRESSOR IN UNIT FOR ACTUAL TERMINAL ARRANGEMENT.

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

⚠ REMOVE JUMPER FOR TWO STAGE COOL

⚠ RT14 SENSOR, OUTDOOR TEMP (OPTIONAL)

⚠ L34 SOLENOID IS LOCATED IN COMPRESSOR, COIL IS 24VDC, DO NOT CONNECT 24VAC TO COIL TERMINALS

⚠ Q24 UNITS COME FACTORY WIRED FOR LOW OUTDOOR FAN SPEED ONLY, HIGH SPEED Y2, (BLUE WIRE) IS NOT CONNECTED

⚠ K49 RELAY FIELD ADDED FOR TWO SPEED OR VARIABLE SPEED AIR HANDLERS

⚠ OPTIONAL LOW AMBIENT CONTROLS

— LINE VOLTAGE FIELD INSTALLED
 - - - CLASS 1 VOLTAGE FIELD INSTALLED
 GE VARIABLE FAN MOTOR (B4)

Figure 10.

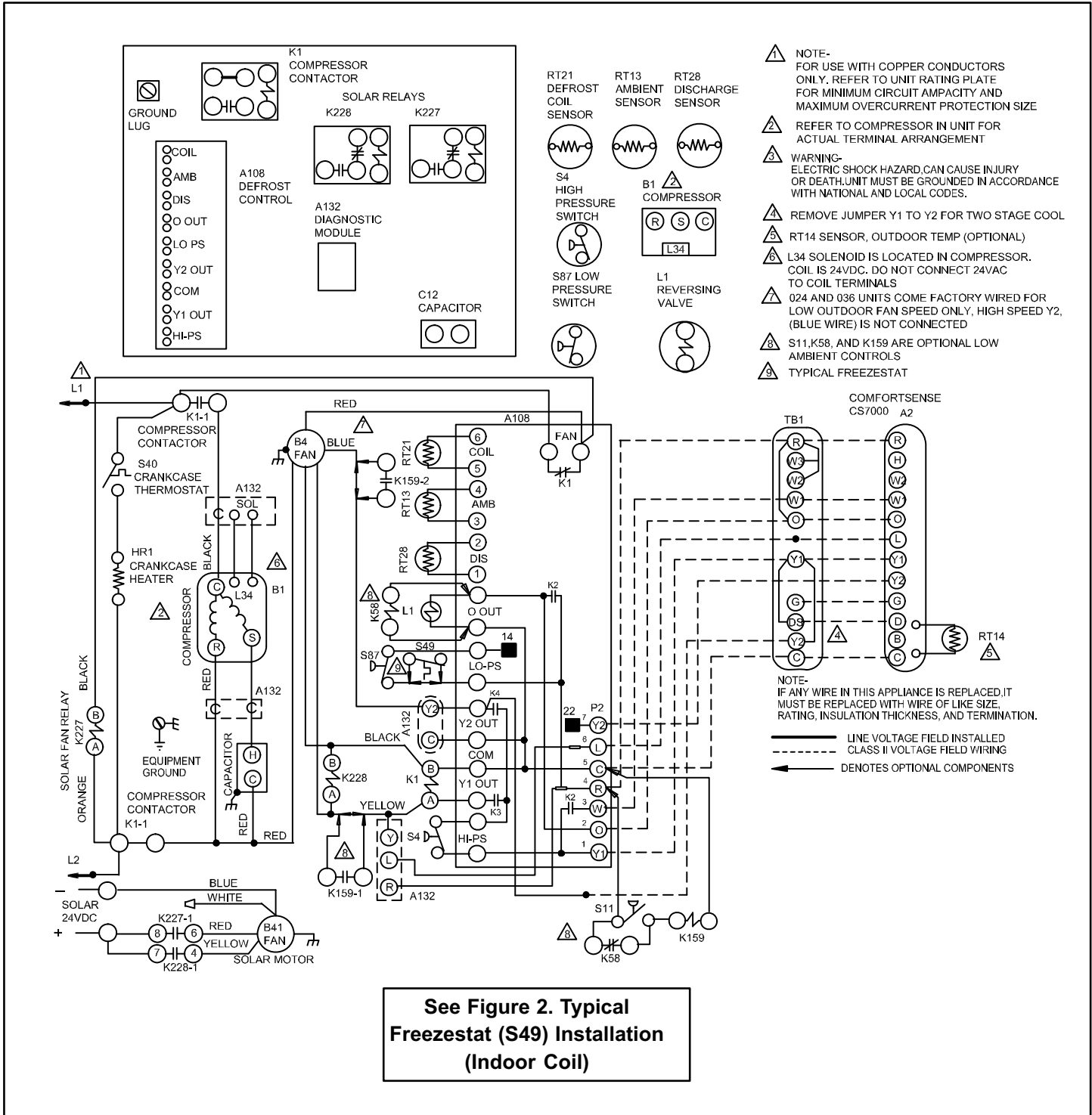


Figure 11.

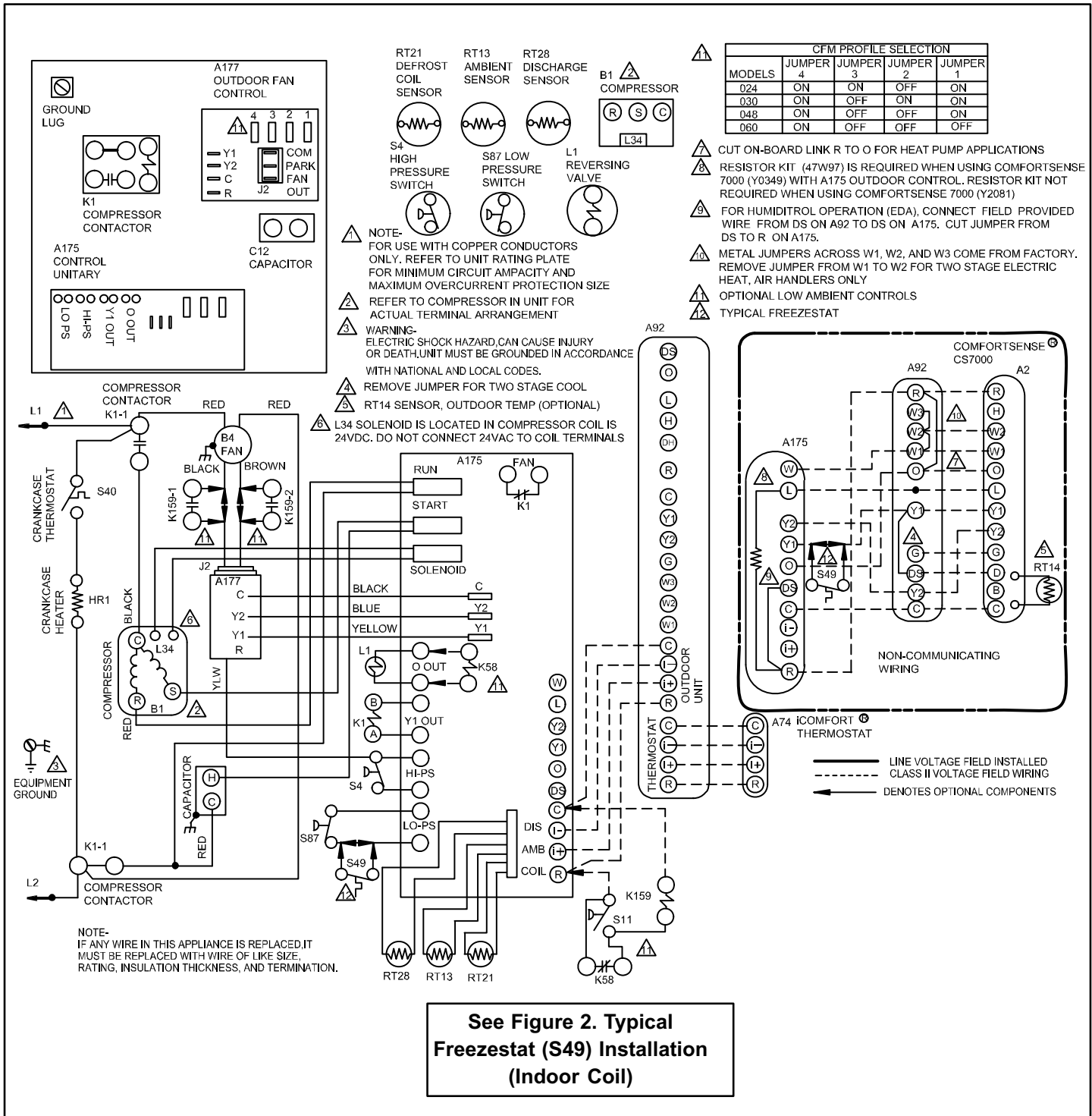
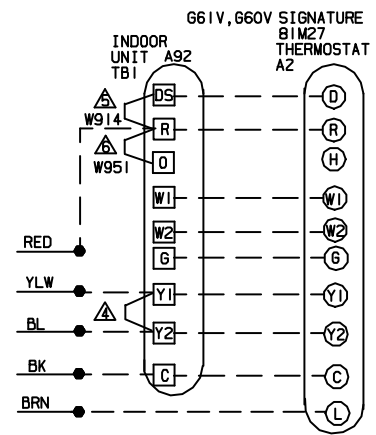
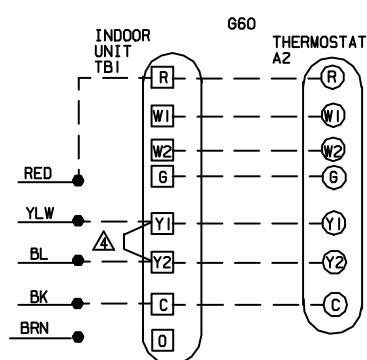
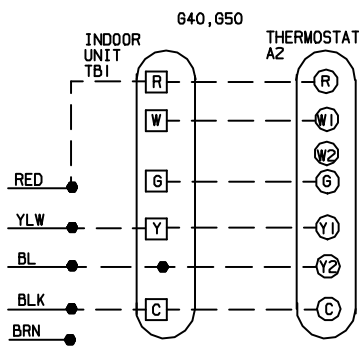
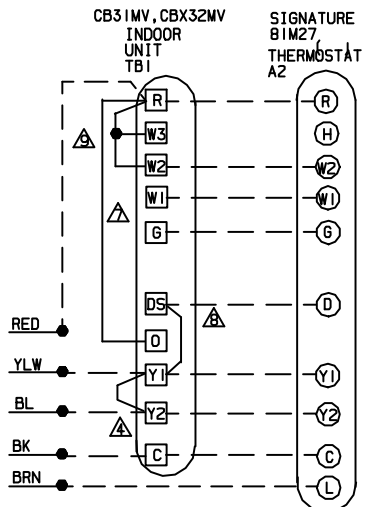
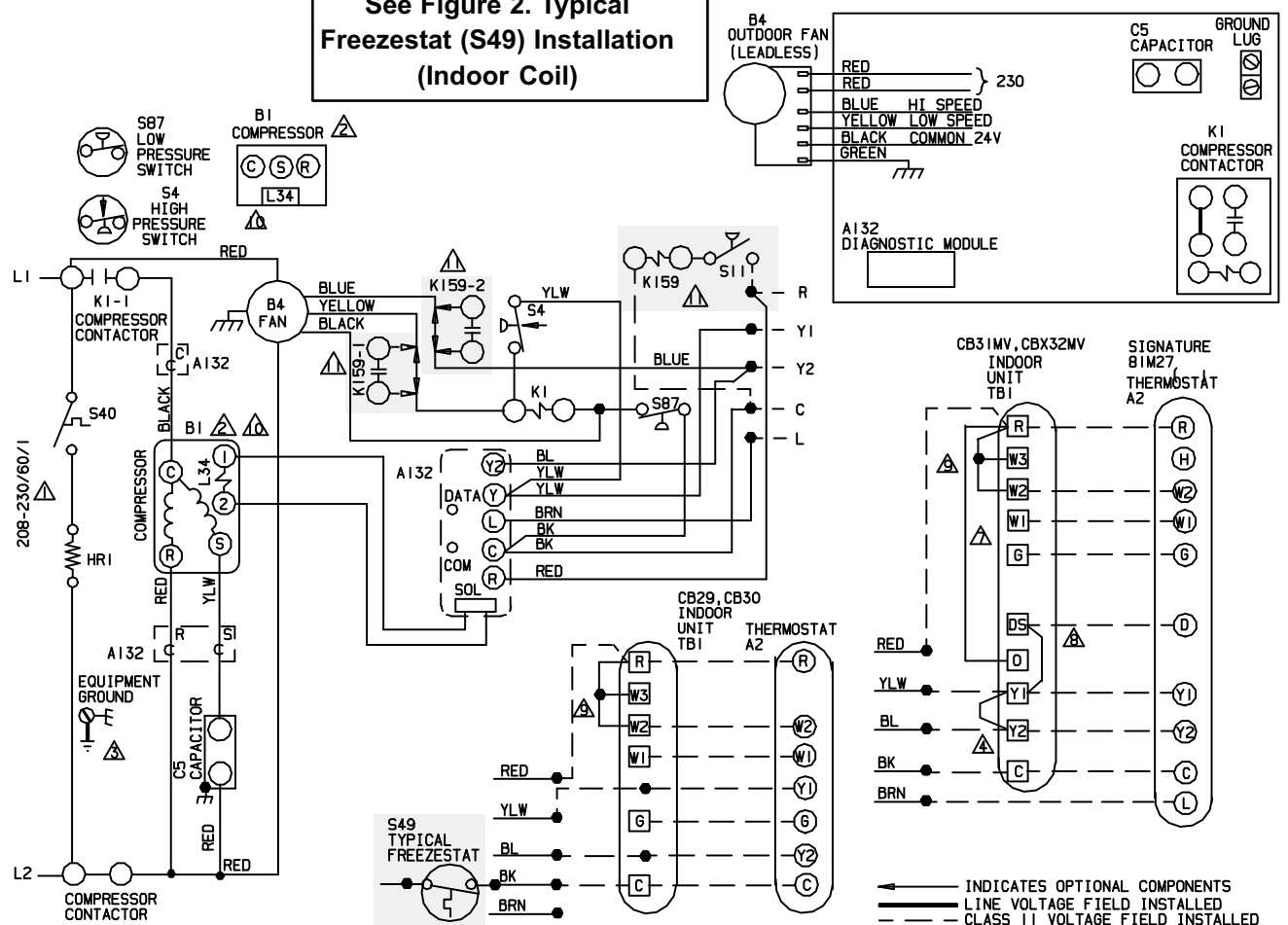


Figure 12. (Communicating or Non-Communicating)

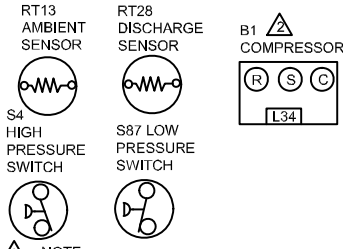
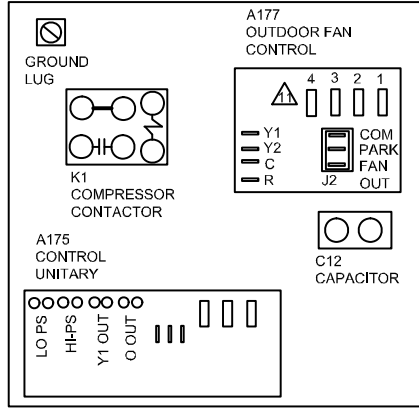


See Figure 2. Typical Freezestat (S49) Installation (Indoor Coil)



- ⚠ NOTE-FOR USE WITH COPPER CONDUCTORS ONLY, REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE
 - ⚠ REFER TO COMPRESSOR IN UNIT FOR ACTUAL TERMINAL ARRANGEMENT
 - ⚠ WARNING-ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY OR DEATH,UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.
 - ⚠ REMOVE JUMPER FOR TWO STAGE COOL
 - ⚠ ON A92 CUT ONBOARD W914 JUMPER FROM DS TO R, WHEN HUMIDITY CONTROL IS USED
 - ⚠ ON A92 DO NOT CUT ONBOARD W951 JUMPER FROM R TO O. IT IS USED FOR APPLICATIONS FOR CONDENSING UNITS
 - ⚠ FOR CONDENSING UNIT APPLICATIONS USE R TO O JUMPER. REMOVE IN HEAT PUMP APPLICATIONS.
 - ⚠ REMOVE DS TO Y1 JUMPER WHEN HUMIDITY CONTROL IS USED
 - ⚠ WHEN TWO STAGE THERMOSTAT IS USED, CONNECT SECOND STAGE HEAT BULB TO TERMINAL "W2" AND REMOVE JUMPER BETWEEN "R" AND "W2"
 - ⚠ L34 SOLENOID IS LOCATED IN COMPRESSOR. COIL IS 24 VDC, DO NOT CONNECT 24VAC TO COIL TERMINALS.
 - ⚠ OPTIONAL LOW AMBIENT CONTROLS
- NOTE: MINIMUM TRANSFORMER REQUIRED IN INDOOR UNIT-40 VA
- ← INDICATES OPTIONAL COMPONENTS
 ——— LINE VOLTAGE FIELD INSTALLED
 - - - CLASS II VOLTAGE FIELD INSTALLED
- GE VARIABLE FAN MOTOR B4'

Figure 13. (build -03 or earlier)



CFM PROFILE SELECTION				
MODEL	JUMPER 4	JUMPER 3	JUMPER 2	JUMPER 1
024	ON	ON	OFF	OFF
036	ON	OFF	ON	ON
048	ON	OFF	OFF	ON
060	ON	OFF	OFF	ON

L34 SOLENOID IS LOCATED IN COMPRESSOR. COIL IS 24VDC. DO NOT CONNECT 24VAC TO COIL TERMINALS

FOR HUMIDITROL OPERATION (EDA), CONNECT FIELD PROVIDED WIRE FROM DS ON A92 TO DS ON A175. CUT JUMPER FROM DS TO R ON A175.

RESISTOR KIT (47W97) IS REQUIRED WHEN USING COMFORTSENSE 7000 (Y0349) WITH A175 OUTDOOR CONTROL. RESISTOR KIT NOT REQUIRED WHEN USING COMFORTSENSE 7000 (Y2081)

CUT ON-BOARD LINK FROM DS TO R FOR DEHUMIDIFICATION ON A92

METAL JUMPERS ACROSS W1, W2, AND W3 COME FROM FACTORY. REMOVE JUMPER FROM W1 TO W2 FOR TWO STAGE ELECTRIC HEAT, AIR HANDLERS ONLY

OPTIONAL LOW AMBIENT CONTROLS

TYPICAL FREEZESTAT

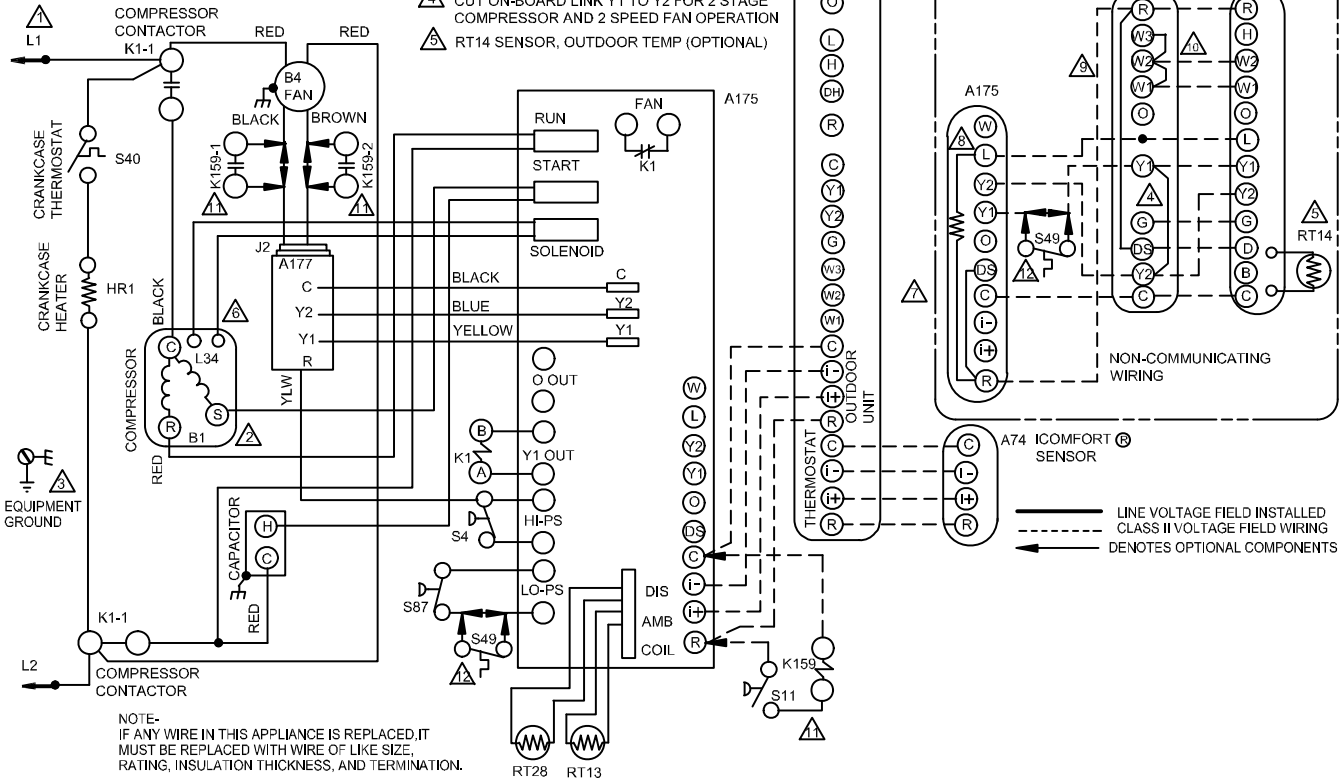
NOTE- FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE

REFER TO COMPRESSOR IN UNIT FOR ACTUAL TERMINAL ARRANGEMENT

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

CUT ON-BOARD LINK Y1 TO Y2 FOR 2 STAGE COMPRESSOR AND 2 SPEED FAN OPERATION

RT14 SENSOR, OUTDOOR TEMP (OPTIONAL)



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

See Figure 2. Typical Freezestat (S49) Installation (Indoor Coil)

Figure 14. Build -04 and Later (Noncommunicating or Communicating)

Operational Checkout

COOLING MODE

- Set the room thermostat to call for cooling.
- The unit will receive a **Y** signal from the room thermostat through the field mounted freeze thermostat.
- The compressor will cycle **ON**.
- The outdoor fan will be **OFF** until the liquid line pressure reaches the **ON** setting (450 psig - 3100kPa) of the low ambient pressure switch.
- The low ambient pressure switch **S11** contacts will close, and the **K159** relay coil will be energized.
- **K159-1** relay contacts will close, and the outdoor fan motor will cycle **ON**.

NOTE — The outdoor fan motor will be cycled by the low ambient and K159 relay. During a call for cooling when the liquid line pressure rises above 450 psig (3100 kPa), the outdoor fan will cycle ON. When the liquid line pressure falls below 240 psig (1600 kPa), the outdoor fan will cycle OFF.

- Set the room thermostat to call for cooling.
- The defrost control in the unit will receive a **Y** and **O** signal from the room thermostat.
- The **O** signal will energize the reversing valve and the **K58** relay coil. Contact **K58-1** will open.
- The **Y** signal will go through the freezestat to **Y1** on the defrost control.
- The signal will go into defrost control to the **HI-PS** terminals, out to the high pressure switch and discharge thermostat, then back to the other **HI-PS** terminal.
- The signal will come back out of the defrost control on the **Y** terminal, which will energize the compressor contactor coil. The compressor will cycle **ON**.

- The outdoor fan motor will be **OFF** until the liquid line pressure reaches the setting of the low ambient pressure switch (450 psig - 3100kPa).
- The low ambient pressure switch will close and **K159** relay coil will be energized.
- **K159-1** contacts will close and the outdoor fan motor will cycle ON.

NOTE — The outdoor fan motor will be cycled by the low ambient and K159 relay. During a call for cooling when the liquid line pressure rises above 450 psig (3100 kPa), the outdoor fan will cycle ON. When the liquid line pressure falls below 240 psig (1600 kPa), the outdoor fan will cycle OFF.

HEATING MODE

- Set the room thermostat to call for heating.
- The defrost control in the unit will receive a **Y** signal from the room thermostat.
- The **O** signal from the room thermostat is not energized, so the **K58** relay coil will not be energized. Contact **K58-1** will remain closed.
- The **Y** signal will go through the freezestat to **Y1** on the defrost control.
- The signal will go into defrost control to the **HI-PS** terminals, out to the high pressure switch and discharge thermostat and back to the other **HI-PS** terminal.
- The signal will come back out of the defrost control on the **Y** terminal which will energize the compressor contactor coil. The compressor will cycle **ON**.
- The **K58-1** relay contacts (which are normally closed) will prevent the low ambient pressure switch from interrupting the outdoor fan motor operation during the heating mode.