# DDC Fan Coil Controller 42C,D,S,V Units

# Installation and Start-Up Instructions

## CONTENTS



## SAFETY CONSIDERATIONS

### SAFETY NOTE

Air-handling equipment will provide safe and reliable service when operated within design specifications. The equipment should be operated and serviced only by authorized personnel who have a thorough knowledge of system operation, safety devices and emergency procedures.

Good judgement should be used in applying any manufacturer's instructions to avoid injury to personnel or damage to equipment and property.

### ⚠ WARNING

Disconnect all power to the unit before performing maintenance or service. Unit may automatically start if power is not disconnected. Electrical shock and personal injury could result.

### ⚠ WARNING

If it is necessary to remove and dispose of mercury contactors in electric heat section, follow all local, state, and federal laws regarding disposal of equipment containing hazardous materials.

## GENERAL

The DDC Fan Coil Controller is a factory-installed, CCN (Carrier Comfort Network) communication control for fan coil units. The fan coil controller is a microprocessor-based direct digital control (DDC) controller for fan coil units. See Fig. 1.

The fan coil controller can function as either a stand-alone control or as part of the CCN. User interfaces include the CCN Network Service Tool, ComfortVIEW™, and ComfortWORKS® software. When used as part of the CCN, other devices such as the CCN Data Transfer, Linkage Thermostat, or Comfort Controller can read data from or write data to the fan coil controller.

## INSTALLATION

**General —** The DDC fan coil controller can be connected to a wall-mounted, field-supplied, space temperature sensor (SPT) in order to monitor zone temperature changes and satisfy zone demand. An optional factory-mounted return air sensor is also available. See Fig. 2 and 3.

The following control options are available:

- heating only
- cooling only
- heating/cooling 2-pipe system with changeover
- heating/cooling 4-pipe system (available with 2-position or modulating water valves)
- DX (direct expansion) cooling only
- DX cooling only and electric heat

On all heating or cooling applications, the fan coil controller must be connected to a factory-installed supply-air temperature (SAT) sensor to monitor the temperature of the air delivered by the fan coil.

The following factory-installed sensor options are available:

- return-air sensor
- return-air sensor with T56 sensor (set point adjustment)
- return-air sensor with T57 fan coil thermostat (provides set point adjustment and fan speed adjustment)
- changeover sensor

Carrier's Network Service Tool can be connected to the system at the SPT sensor if CCN communication wiring is run to an RJ-11 jack at the SPT sensor. The Network Service Tool can be used to adjust set points, set operating parameters, and fully configure the fan coil controller.


**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**

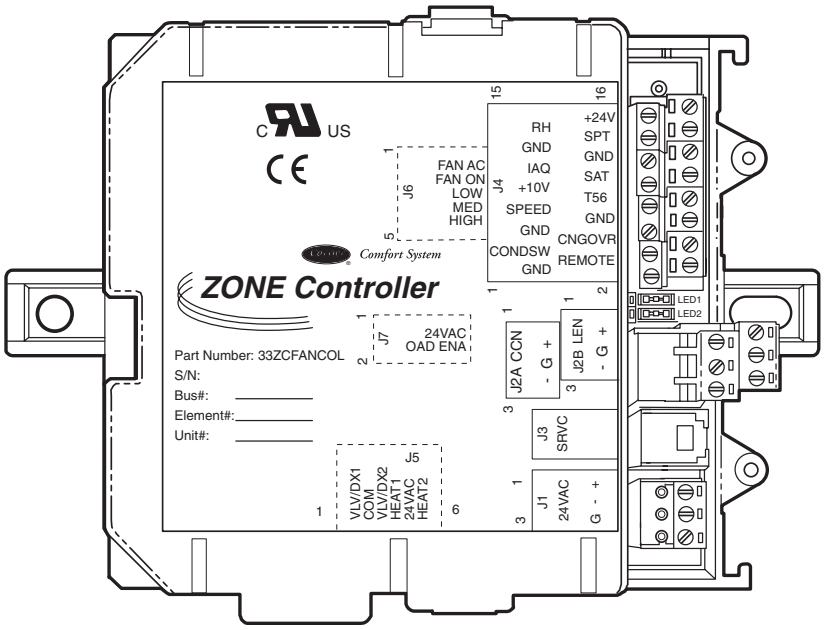



**Fig. 1 — Fan Coil Controller (33ZCFANCOL)**

SUPPLY AIR TEMPERATURE (SAT) SENSOR — The fan coil controller must be connected to a factory-supplied supply-air temperature (SAT) sensor (part number HH79NZ005) to monitor the temperature of the air delivered by the fan coil.

CHANGEOVER SENSOR — The 33ZCSENCHG changeover sensor is used by the fan coil controller in 2-pipe applications to determine the temperature of the heating and cooling medium which is supplied to the fan coil by the building piping system. The fan coil controller can then determine if it is capable of providing heating or cooling to the space based on sensing the pipe water temperature. This value may be broadcast to other fan coils.

**Optional Field-Supplied Hardware —** Each fan coil controller can support the following field-supplied components to complete its installation:

- wall-mounted space temperature sensor (as required)
- indoor air quality sensor (as required)
- relative humidity sensor (as required)
- linkage thermostat (as required)

WALL-MOUNTED SPACE TEMPERATURE SENSOR — Each fan coil controller can support a field-supplied Carrier space temperature sensor. There are three sensors available for this application:

- 33ZCT55SPT, Space Temperature Sensor with Override Button
- 33ZCT56SPT, Space Temperature Sensor with Override Button and Set Point Adjustment
- 33ZCT57SPT, Space Temperature Sensor with Override Button, Set Point Adjustment, and Manual Fan Speed control

RELATIVE HUMIDITY SENSOR — The 33AMSENRHS000 relative humidity sensor is an indoor, wall-mounted sensor and is required for zone humidity control (dehumidification).

INDOOR AIR QUALITY ($CO_2$) SENSOR — An indoor air quality sensor is required for IAQ monitoring. Two different $CO_2$ sensors are available for zone $CO_2$ level monitoring.

The 33ZCSENCO2 sensor is an indoor, wall mounted sensor with an LED (light-emitting diode) display.

The 33ZCT56CO2 sensor is an indoor, wall mounted sensor without display. The $CO_2$ sensor also includes a space temperature sensor with override button and temperature offset.

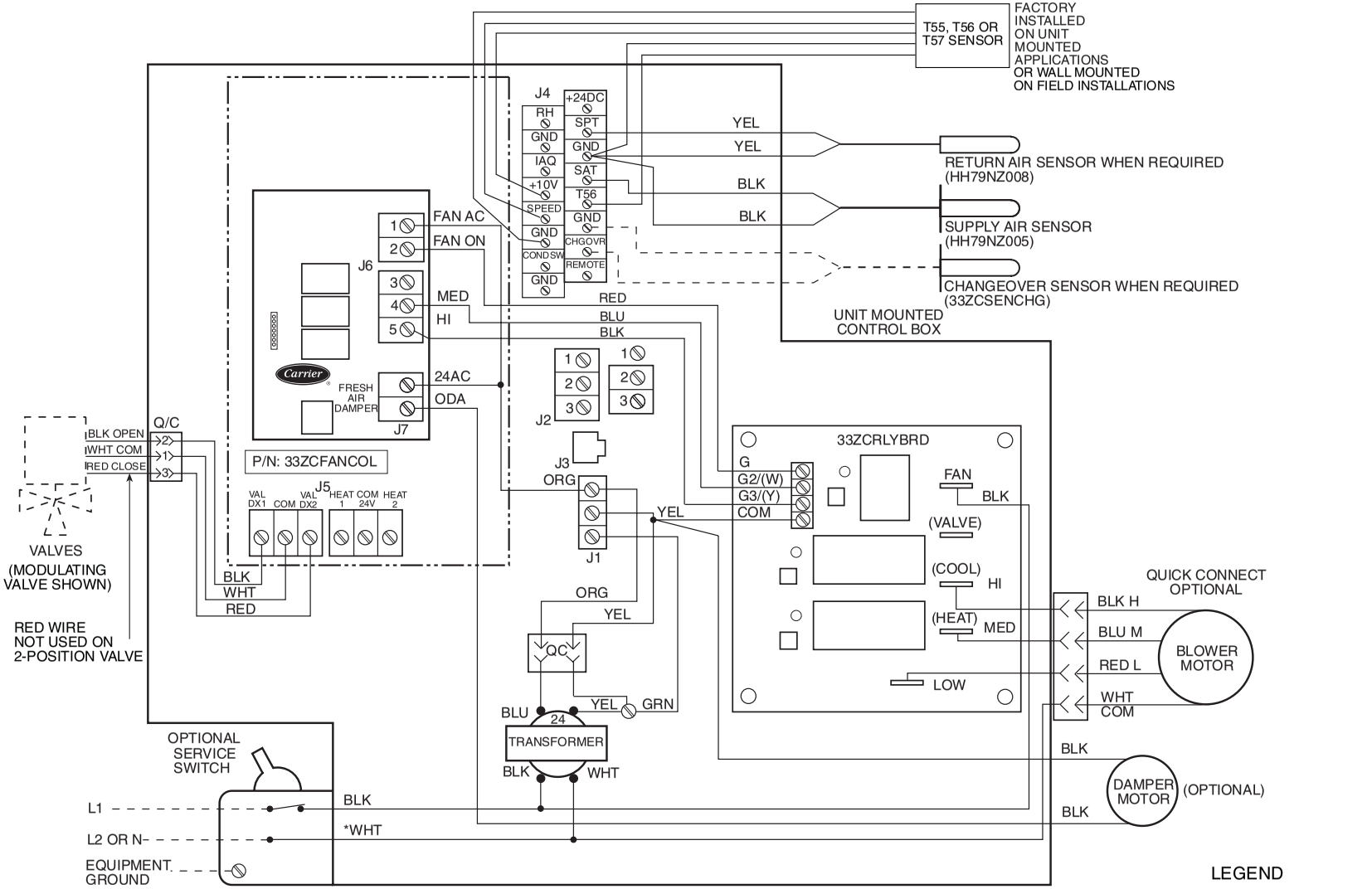
LINKAGE THERMOSTAT — The linkage thermostat (33CSKITLST-01) is used to control multiple units from a single thermostat. The linkage thermostat provides thermostat functions for up to 8 units. The fan operates in Auto mode only when multiple units are controlled by the linkage thermostat. Thermostat functions include space temperature sensing, set point adjustment, and occupancy scheduling. The linkage thermostat can be used in place of any space temperature sensor. For fail-safe operation, it is recommended to include a HH79NZ005 return air sensor mounted in the return air duct of the unit.

**Control Power —** An individual, factory-supplied, 24 vac power transformer is supplied for each fan coil controller. Transformers are UL (Underwriters' Laboratories) Class 2 rated. Standard applications require a 24 VAC transformer, rated at 40 VA minimum. All transformer secondaries are grounded.

The control transformer secondary is 24 vac nominal at 40 va (50/60 Hz).

The factory-supplied transformer provides sufficient power to supply the DDC fan coil controller and the fan relay board.

The fan relay board is used to interface between the DDC fan coil controller's 24-vac control voltage outputs and the fan's line voltage connections.

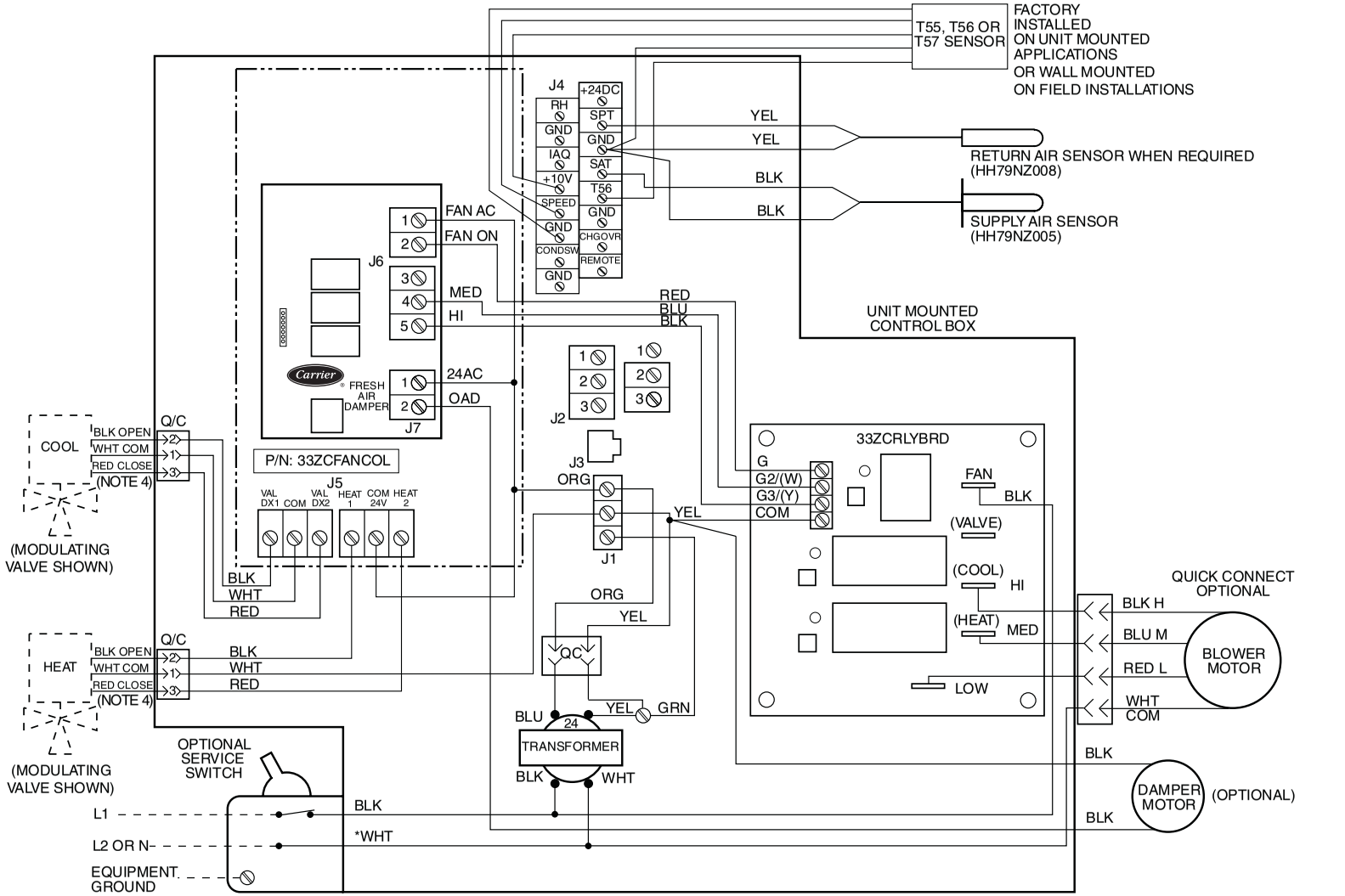



**⚠ CAUTION**

Disconnect power before servicing.

NOTES:
1. See nameplate for correct voltage. Use 75° C minimum copper conductors only. Unit terminals are not designed to accept any other wiring.
2. Motor(s) thermally protected units with 2 motors wired parallel.
3. Provide disconnect means and overcurrent protection as required.

**Fig. 2 — Fan Coil Controller Wiring (Two-Pipe System)**




**⚠ CAUTION**

Disconnect power before servicing.

NOTES:
1. See nameplate for correct voltage. Use 75° C minimum copper conductors only. Unit terminals are not designed to accept any other wiring.
2. Motor(s) thermally protected units with 2 motors wired parallel.
3. Provide disconnect means and overcurrent protection as required.
4. Red wire is not used with 2-position valves.

**Fig. 3 — Fan Coil Controller Wiring (Four-Pipe System)**

**Fan Coil Controller Inputs and Outputs —** The fan coil controller inputs and outputs are shown in Fig. 4-6.

**Install Sensors —** The return air sensor and space temperature sensors can come factory installed in the fan coil unit or can be field installed and wall mounted. There are multiple options for these sensors:

- return air sensor only (factory-installed in fan coil unit)
- return air sensor and T-56 space temperature sensor (both sensors are factory-installed in fan coil unit, the T-56 sensor is used for set point offset control only)
- return air sensor and T-57 space temperature sensor (both sensors are factory-installed in fan coil unit, the T-57 sensor is used for set point offset and fan speed control only)

There are also applications where wall-mounted space temperature sensors are required. In these applications, the T-55, T-56, or T-57 sensor is wall mounted outside the fan coil unit. The room temperature from the wall-mounted sensor is used in place of the return air sensor reading. Field-wiring and installation are required.

RETURN AIR SENSOR INSTALLATION — The return air sensor is factory-mounted and factory-wired in the fan coil unit. No installation is required.

NOTE: When a wall-mounted space temperature sensor is used, the return air sensor is disconnected by the installer.

WALL-MOUNTED SPACE TEMPERATURE SENSOR INSTALLATION — Wall-mounted space temperature sensors are used in place of the return-air sensor when required. See Fig. 7. Wall-mounted space temperature sensors must be field installed and wired. If wall-mounting is required, perform the following procedure.

The wall-mounted space temperature sensor is used to measure the building interior temperature and should be located on an interior building wall. The sensor wall plate accommodates the NEMA standard 2 x 4 junction box. The sensor can be mounted directly on the wall surface if acceptable by local codes.

Do not mount the sensor in drafty locations such as near air conditioning or heating ducts, over heat sources such as baseboard heaters, radiators, or directly above wall mounted lighting dimmers. Do not mount the sensor near a window which may be opened, near a wall corner, or a door. Sensors mounted in these areas will have inaccurate and erratic sensor readings.

The sensor should be mounted approximately 5 ft from the floor, in an area representing the average temperature in the space. Allow at least 4 ft between the sensor and any corner and mount the sensor at least 2 ft from an open doorway.

**Inputs (J4)**

| CHANNEL | J4 PINS (+,–) | DESCRIPTION | CONTROL DEVICE |
|---|---|---|---|
| **SPT** | 14, 12 | Space Temperature | 10K Thermistor |
| **SAT** | 10, 12 | Supply Air Temperature | 10K Thermistor |
| **SP_OFFSET (T56/T57)** | 8, 12 | Set Point Offset Adjust | 100K Potentiometer |
| **CNGOVR** | 4, 6 | Changeover Sensor | 10K Thermistor |
| **RH** | 16 (24 VDC), 15 (+), 13 (–) | RH Sensor | 2-10 VDC |
| **SPEED** | 9*, 7 (+), 5 (–) | Manual Speed Position | 0-10 VDC |
| **CONDSW** | 3, 9* | Condensate Pump Sensor | 0-10 V (DI) |
| **IAQ** | 11 (+), 13 (–) | Indoor Air Quality Sensor | 0-10 VDC |
| **REMOTE S/S** | 2, 16 (24 VDC) | Remote Start/Stop | 24 VAC (DI) |

LEGEND

**DI** — Discrete Input
**IAQ** — Indoor Air Quality
**RH** — Relative Humidity
**SAT** — Supply-Air Temperature
**SPT** — Space Temperature
**S/S** — Start/Stop

*Use shielded wire.

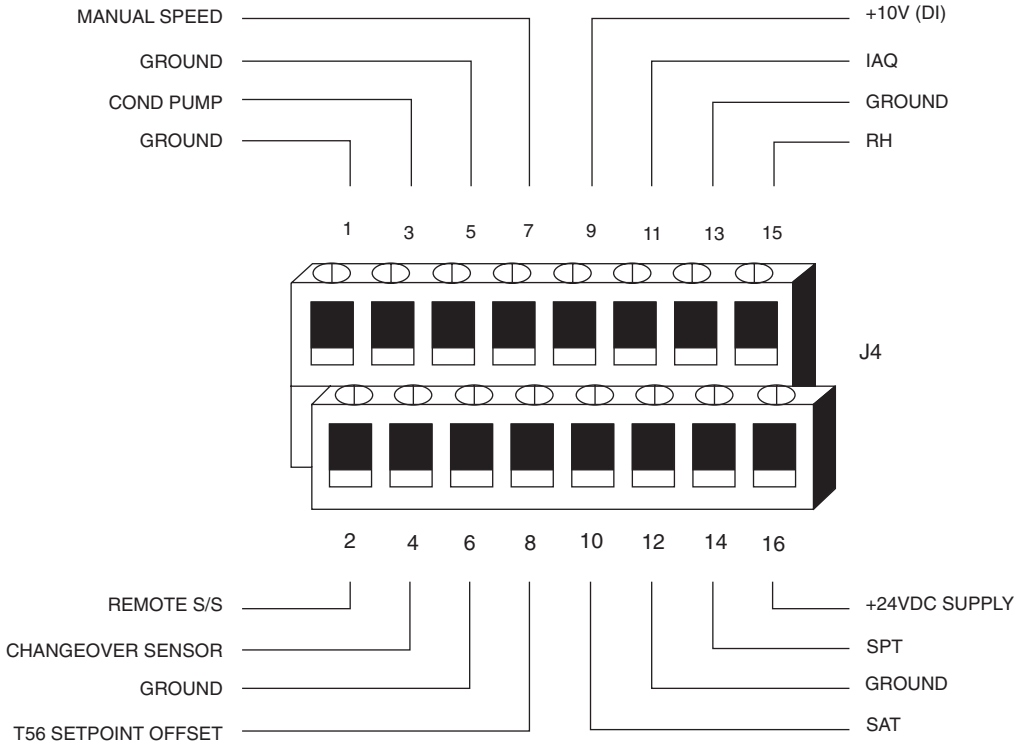



**Fig. 4 — Fan Coil Controller Inputs**

### Daughter Board Outputs (J6, J7)

| CHANNEL | TERMINATIONS(+,–) | DESCRIPTION | CONTROL DEVICE |
|---|---|---|---|
| **FAN AC** | J6-1, J1-1 | Fan Input Power | 24V, 5A |
| **FAN ON** | J6-2, J1-2 | Fan Start/Stop (Low Speed) | 24V, 5A |
| **LOW** | J6-3, J1-2 | Not Used | 24V, 5A |
| **MED** | J6-4, J1-2 | Med Speed | 24V, 5A |
| **HI** | J6-5, J1-2 | High Speed | 24V, 5A |
| **OAD** | J7-1, J7-2 | Outdoor Air Damper | 24 VAC 1A |

NOTE: J6-1 must be jumpered to 24 VAC +. (J1-1).

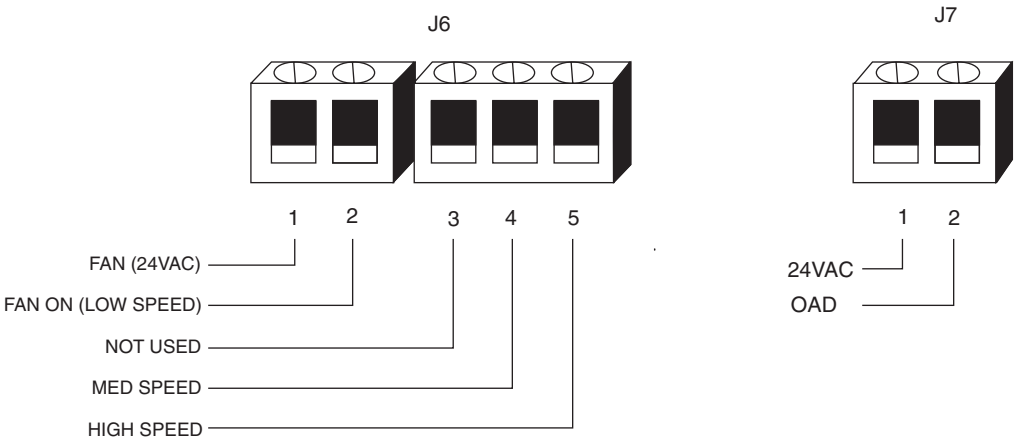



**Fig. 5 — Fan Coil Controller Daughter Board Outputs**

### Baseboard Outputs (J5)

| CHANNEL | J5 Pins (+,–) | DESCRIPTION | CONTROL DEVICE |
|---|---|---|---|
| **Valve DX1** | 1, 2* | Open | 24 VAC, 1A |
| **Valve DX2** | 3, 2* | Close | 24 VAC, 1A |
| **HEAT_ST1** | 5, 4† | Heat Open, 1st Stage | 24 VAC, 1A |
| **HEAT_ST2** | 5, 6† | Heat Close, 2nd Stage | 24 VAC, 1A |

*Terminals 1 and 3 provide switched 24 VAC output power to the load.
†J5-5 must be jumpered to 24 VAC + (J1-1).

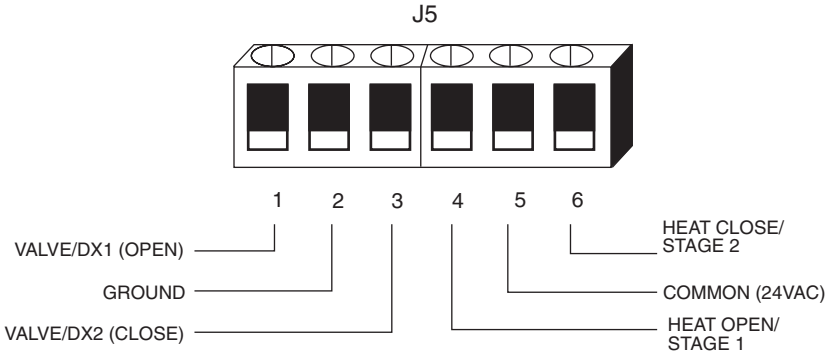



**Fig. 6 — Fan Coil Controller Baseboard Outputs**

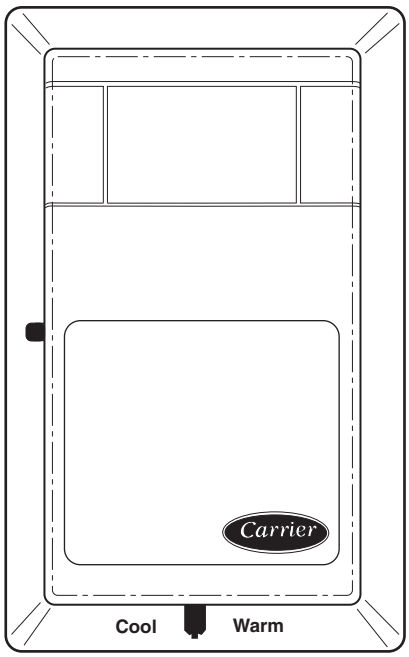



**Fig. 7 — Space Temperature Sensor (P/N 33ZCT56SPT Shown)**

Install the sensor as follows (see Fig. 8):

1. Locate the two Allen type screws at the bottom of the sensor.
2. Turn the two screws clockwise to release the cover from the sensor wall mounting plate.
3. Lift the cover from the bottom and then release it from the top fasteners.
4. Feed the wires from the electrical box through the opening in the center of the sensor mounting plate.
5. Using two no. 6-32 x 1 mounting screws (provided with the sensor), secure the sensor to the electrical box.

   NOTE: Sensor may also be mounted directly on the wall using 2 plastic anchors and 2 sheet metal screws (field-supplied).
6. Use 20 gage wire to connect the sensor to the controller. The wire is suitable for distances of up to 500 ft. Use a three-conductor shielded cable for the sensor and set point adjustment connections. The standard CCN communication cable may be used. If the set point adjustment (slidebar) is not required, then an unshielded, 18 or 20 gage, two-conductor, twisted pair cable may be used.

   The CCN network service jack requires a separate, shielded CCN communication cable. Always use separate cables for CCN communication and sensor wiring. (Refer to Fig. 9 and 10 for wire terminations.)
7. Replace the cover by inserting the cover at the top of the mounting plate first, then swing the cover down over the lower portion. Rotate the two Allen head screws counterclockwise until the cover is secured to the mounting plate and locked in position.
8. For more sensor information, see Table 1 for thermistor resistance vs temperature values.

NOTE: Clean sensor with damp cloth only. Do not use solvents.

Wiring the Space Temperature Sensor — To wire the sensor, perform the following (see Fig. 9 and 10):

1. Identify which cable is for the sensor wiring.
2. Strip back the jacket from the cables for at least 3-inches. Strip $^1/_4$-in. of insulation from each conductor. Cut the shield and drain wire from the sensor end of the cable.
3. Connect the sensor cable as follows:
   a. Remove the factory-installed wire between the terminals labelled SPT and the return air sensor.
   b. Connect one wire from the cable (RED) to the SPT terminal on the controller. Connect the other end of the wire to the left terminal on the SEN terminal block of the sensor.
   c. Connect another wire from the cable (BLACK) to the GND terminal on the controller. Connect the other end of the wire to the remaining open terminal on the SEN terminal block (COM on 33ZCT57SPT).
   d. Connect the remaining wire (WHITE/CLR) to the T56 terminal on the controller. Connect the other end of the wire to the SET terminal on the sensor.
   e. In the control box, install a no. 10 ring type crimp lug on the shield drain wire. Install this lug under the mounting screw of the fan coil controller.
   f. On 33ZCT55SPT or 33ZCT56SPT thermostats install a jumper between the two center terminals (right SEN and left SET). See Fig. 9.
   g. On 33ZCT57SPT thermostats, a separate 3-conductor, shielded cable is used to connect the fan speed wiring. Connect the SPD terminal on the thermostat to the SPEED terminal on the fan coil controller. Use the white/clr wire. Connect the COM terminal on the thermostat to the GND terminal on the fan coil controller. Use the black wire. Connect the 10V terminal on the thermostat to the +10V terminal on the fan coil controller. Use the red wire.

      In the control box, install a no. 10 ring type crimp lug on the fan speed wiring shield drain wire. Install this lug under the mounting screw of the fan coil controller.

Wiring the CCN Network Communication Service Jack — See Fig. 9 and 10. To wire the service jack, perform the following:

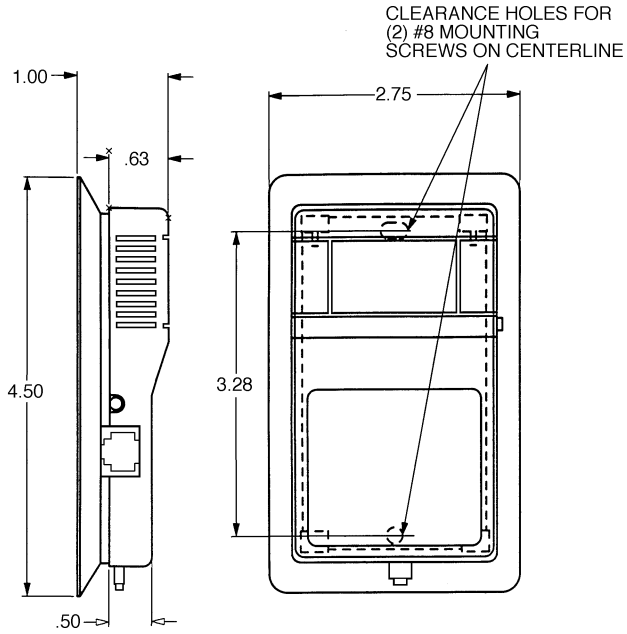
1. Strip back the jacket from the CCN communication cable(s) for at least 3 inches. Strip $^1/_4$-in. of insulation from each conductor. Remove the shield and separate the drain wire from the cable. Twist together all the shield drain wires and fasten them together using an closed end crimp lug or a wire nut. Tape off any exposed bare wire to prevent shorting.
2. Connect the CCN + signal wire(s) (RED) to Terminal 5.
3. Connect the CCN – signal wire(s) (BLACK) to Terminal 2.
4. Connect the CCN GND signal wire(s) (WHITE/CLR) to Terminal 4.

Before wiring the CCN connection, refer to the Connect the CCN Communication Bus section on page 13, for communication bus wiring and cable selection. The cable selected must be identical to the CCN communication bus wire used for the entire network.

The other end of the communication bus cable must be connected to the remainder of the CCN communication bus. If the cable is installed as a T-tap into the bus, the cable length cannot exceed 50 ft. No more than 10 T-taps are allowed per bus. Wire the CCN service jack of the sensor in a daisy chain arrangement with other equipment. Refer to the Connect to the CCN Communication Bus section, page 13, for more details. See Fig. 11.

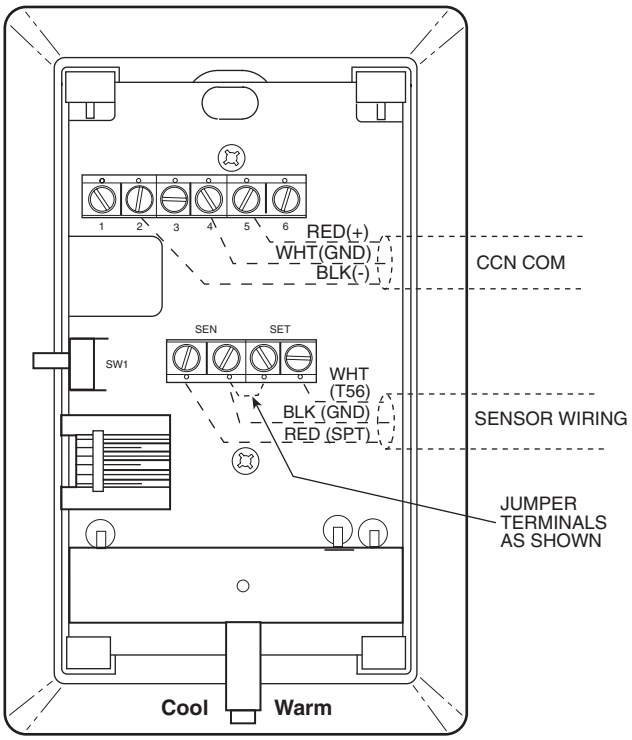
**Table 1 — Thermistor Resistance vs Temperature Values for Space Temperature Sensor, Return-Air Temperature Sensor, and Supply-Air Temperature Sensor**

| TEMP (C) | TEMP (F) | RESISTANCE (Ohms) | TEMP (C) | TEMP (F) | RESISTANCE (Ohms) |
|---|---|---|---|---|---|
| –40 | –40 | 335,651 | 20 | 68 | 12,494 |
| –35 | –31 | 242,195 | 25 | 77 | 10,000 |
| –30 | –22 | 176,683 | 30 | 86 | 8,056 |
| –25 | –13 | 130,243 | 35 | 95 | 6,530 |
| –20 | –4 | 96,974 | 40 | 104 | 5,325 |
| –15 | 5 | 72,895 | 45 | 113 | 4,367 |
| –10 | 14 | 55,298 | 50 | 122 | 3,601 |
| –5 | 23 | 42,315 | 55 | 131 | 2,985 |
| 0 | 32 | 32,651 | 60 | 140 | 2,487 |
| 5 | 41 | 25,395 | 65 | 149 | 2,082 |
| 10 | 50 | 19,903 | 70 | 158 | 1,752 |
| 15 | 59 | 15,714 | | | |




NOTE: Dimensions are in inches.

**Fig. 8 — Space Temperature Sensor and Wall Mounted Humidity Sensor Mounting**




NOTE: On factory-installed unit mounted applications, the SPT terminal is not wired to the SEN terminal.

**Fig. 9 — Space Temperature Sensor Wiring (33ZCT56SPT)**

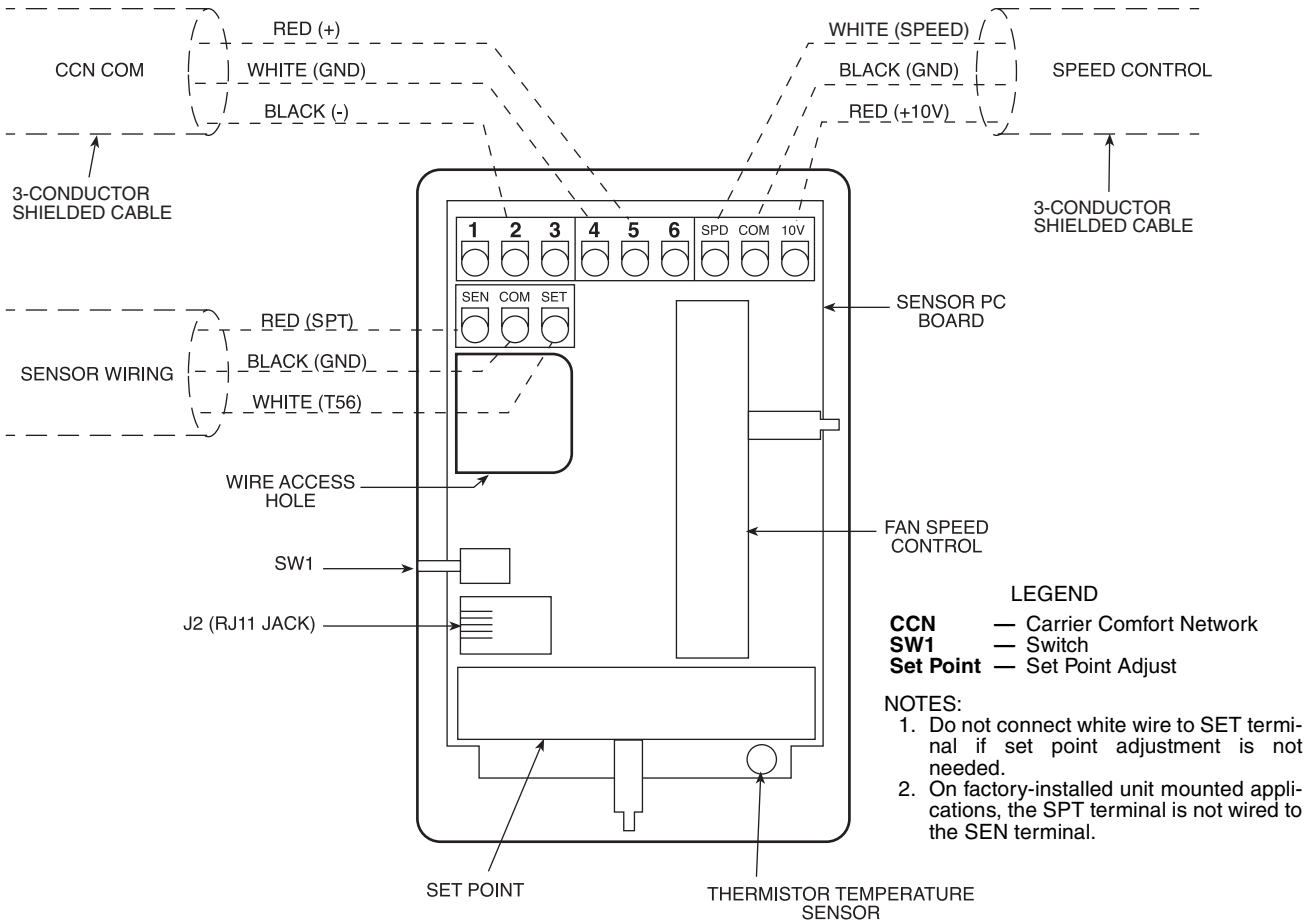
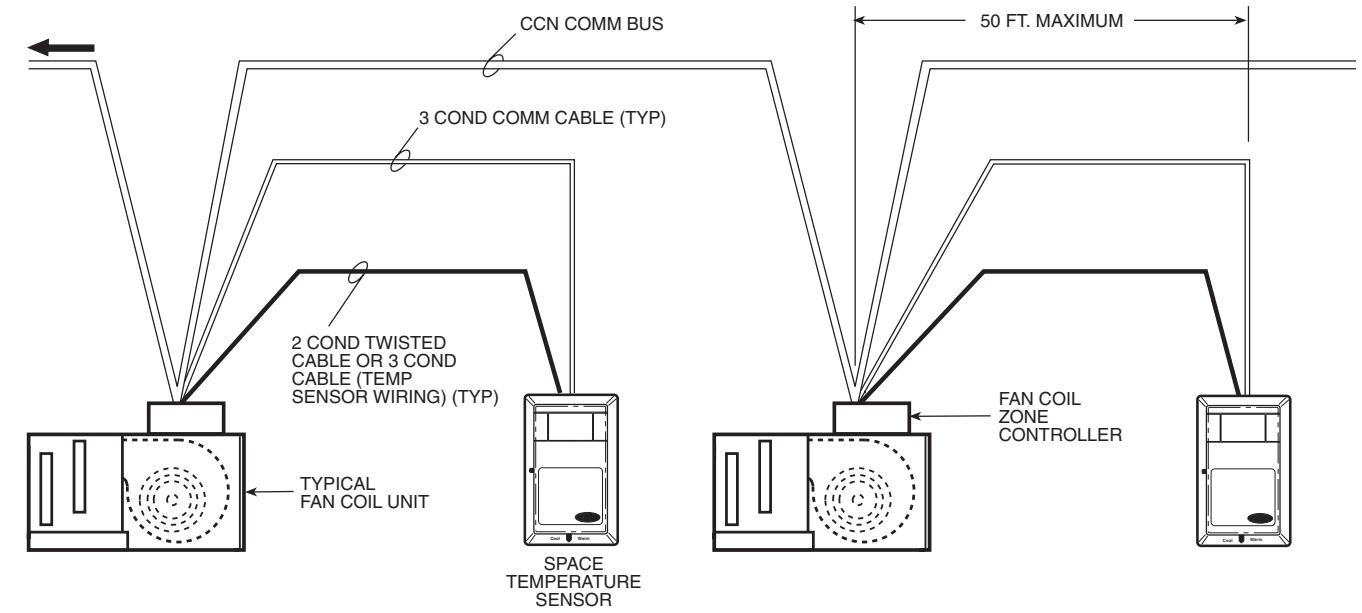



**Fig. 10 — Fan Coil Thermostat Wiring (33ZCT57SPT)**

Wiring when distance between fan coil controller and space temperature sensor is 50 feet or less




Wiring when distance between fan coil controller and space temperature sensor is greater than 50 feet

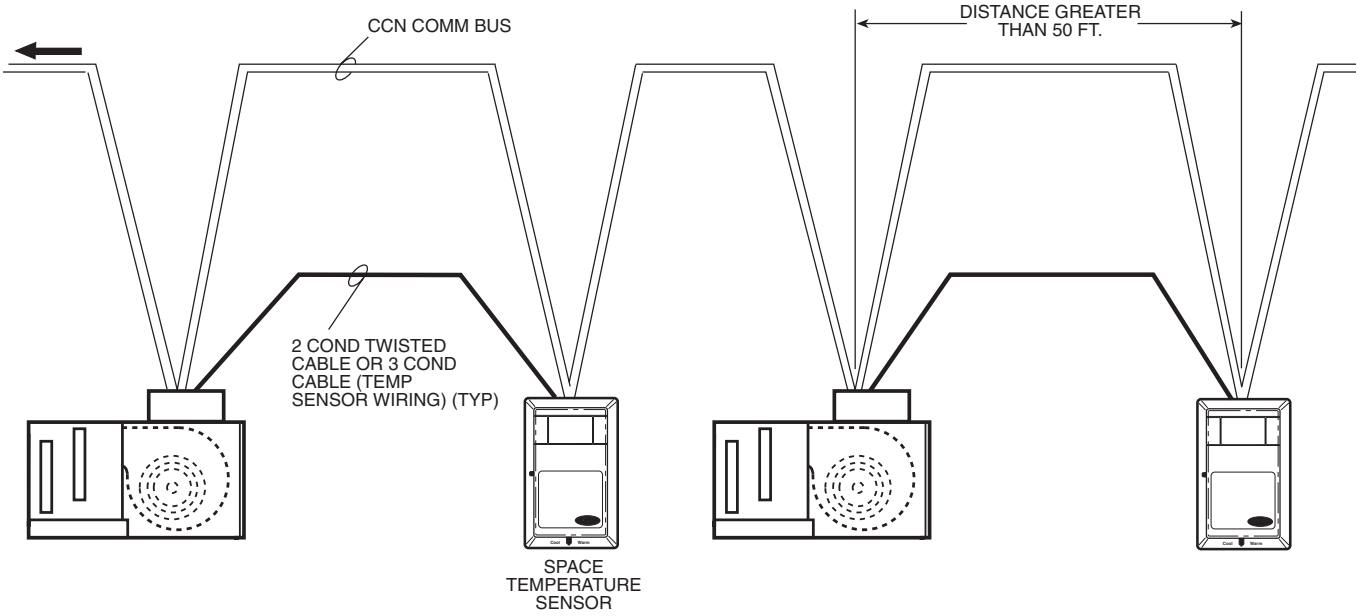



**Fig. 11 — Communication Bus Wiring to Fan Coil Zone Controller**

SUPPLY AIR TEMPERATURE (SAT) SENSOR INSTALLATION — On fan coil units with heating or cooling, the SAT sensor is factory-installed. The SAT is factory-installed in the fan coil air outlet. No installation is required. The part number is HH79NZ005.

INDOOR AIR QUALITY SENSOR INSTALLATION (Monitor Only) — The indoor air quality (IAQ) sensor accessory monitors carbon dioxide levels. This information is used to monitor IAQ levels. Three types of sensors are provided. The wall sensor can be used to monitor the conditioned air space. Sensors use infrared technology to measure the levels of $CO_2$ present in the air. The wall sensor is available with or without an LCD readout to display the $CO_2$ level in ppm. See Fig. 12.

Sensor accessory descriptions and part numbers are shown in Table 2. To mount the sensor, refer to the installation instructions shipped with the accessory kit.

**Table 2 — $CO_2$ Sensor Accessories**

| $CO_2$ SENSOR ACCESSORY PART NUMBERS | DESCRIPTION |
|---|---|
| 33ZCSENCO2 | Wall Mount Sensor (with display) |
| 33ZCT55CO2 | Wall Mount Sensor with 33ZCT55SPT space temperature sensor (no display) |
| 33ZCT56CO2 | Wall Mount Sensor with 33ZCT56SPT space temperature sensor and set point adjustment (no display) |

The $CO_2$ sensors listed in Table 2 are all factory set for a range of 0 to 2000 ppm and a linear voltage output of 0 to 10 vdc. Refer to the instructions supplied with the $CO_2$ sensor for electrical requirements and terminal locations.

To accurately monitor the quality of the air in the conditioned air space, locate the sensor near a return air grille (if present) so it senses the concentration of $CO_2$ leaving the space. The sensor should be mounted in a location to avoid direct breath contact.

Do not mount the IAQ sensor in drafty areas such as near supply ducts, open windows, fans, or over heat sources. Allow at least 3 ft between the sensor and any corner. Avoid mounting the sensor where it is influenced by the supply air; the sensor gives inaccurate readings if the supply air is blown directly onto the sensor or if the supply air does not have a chance to mix with the room air before it is drawn into the return air-stream.

Indoor Air Quality Sensor Wiring — To wire the sensors after they are mounted in the conditioned air space or outdoor location, see Fig. 13 and the instructions shipped with the sensors. For each sensor, use two 2-conductor 18 AWG twisted-pair cables (unshielded) to connect the separate isolated 24 vac power source to the sensor and to connect the sensor to the control board terminals. To connect the sensor to the control board, identify the positive (0-10 VDC) and ground (SIG COM) terminals on the sensor. Connect the 1-10 VDC terminal to terminal IAQ and connect the SIG COM terminal to terminal GND.

HUMIDITY SENSOR (Wall-Mounted) INSTALLATION — The accessory space humidity sensor is installed on an interior wall to measure the relative humidity of the air within the occupied space. See Fig. 14.

The use of a standard 2- x 4-in. electrical box to accommodate the wiring is recommended for installation. The sensor can be mounted directly on the wall, if acceptable by local codes.

If the sensor is installed directly on a wall surface, install the humidity sensor using 2 screws and 2 hollow wall anchors (field-supplied); *do not overtighten screws.* See Fig. 8.

**⚠ CAUTION**

Do NOT clean or touch the sensing element with chemical solvents; they can permanently damage the sensor.

The sensor must be mounted vertically on the wall. The Carrier logo should be oriented correctly when the sensor is properly mounted.

DO NOT mount the sensor in drafty areas such as near heating or air-conditioning ducts, open windows, fans, or over heat sources such as baseboard heaters, radiators, or wall-mounted light dimmers. Sensors mounted in those areas will produce inaccurate readings.

Avoid corner locations. Allow at least 4 ft between the sensor and any corner. Airflow near corners tends to be reduced, resulting in erratic sensor readings.

Sensor should be vertically mounted approximately 5 ft up from the floor, beside the space temperature sensor.

For distances up to 500 feet, use a 3-conductor, 18 or 20 AWG cable. A CCN communication cable can be used, although the shield is not required. The shield must be removed from the sensor end of the cable if this cable is used. See Fig. 15 for wiring details.

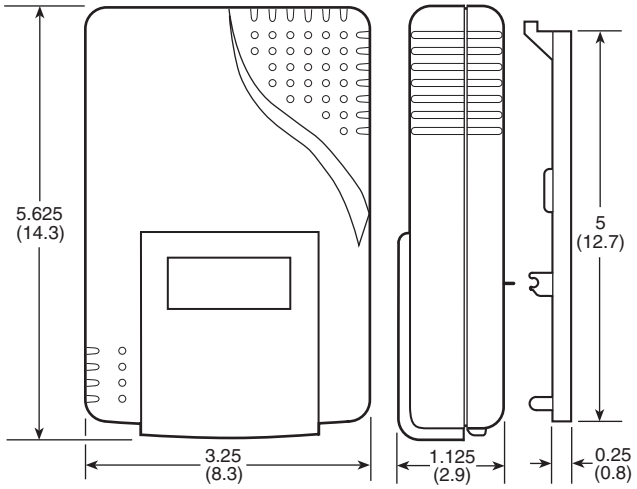
The power for the sensor is provided by the control board. The board provides 24 vdc for the sensor. No additional power source is required.

To wire the sensor, perform the following:

1. At the sensor, remove 4-in. of jacket from the cable. Strip $^1/_4$-in. of insulation from each conductor. Route the cable through the wire clearance opening in the center of the sensor.
2. Connect the RED wire to the sensor screw terminal marked (+).
3. Install one lead from the resistor (supplied with the sensor) and the WHITE wire, into the sensor screw terminal marked (–). After tightening the screw terminal, test the connection by pulling gently on the resistor lead.
4. Connect the remaining lead from the resistor to the BLACK wire and secure using a closed end type crimp connector or wire nut.
5. Using electrical tape, insulate any exposed resistor lead to prevent shorting.
6. At the control box, remove the jacket from the cable and route the RED conductor over to the left side of the control board. Route the remaining conductors to the right side of the control board.
7. Strip $^1/_4$-in. of insulation from each conductor and equip each with a $^1/_4$-in. female quick connect terminal.
8. Connect the RED wire to terminal 24VDC on the control board.

   NOTE: The 24VDC terminal is used for RH sensor wiring only.
9. Connect the BLACK wire to terminal GND on the control board.
10. Connect the WHITE/CLEAR wire to terminal RH on the control board.
11. Connect shield to ground (if shielded wire is used).

**Connect the Outputs —** Wire the fan coil controller's outputs (fan, staged heat, valves) as shown in the applicable typical wiring diagrams in Fig. 2 and 3. Please refer to fan coil unit schematic for full wiring details.




NOTE: Dimensions are in inches.
Dimensions in ( ) are in centimeters.

**Fig. 12 — Indoor Air Quality ($CO_2$) Sensor (33ZCSENCO2) (Monitor Only)**

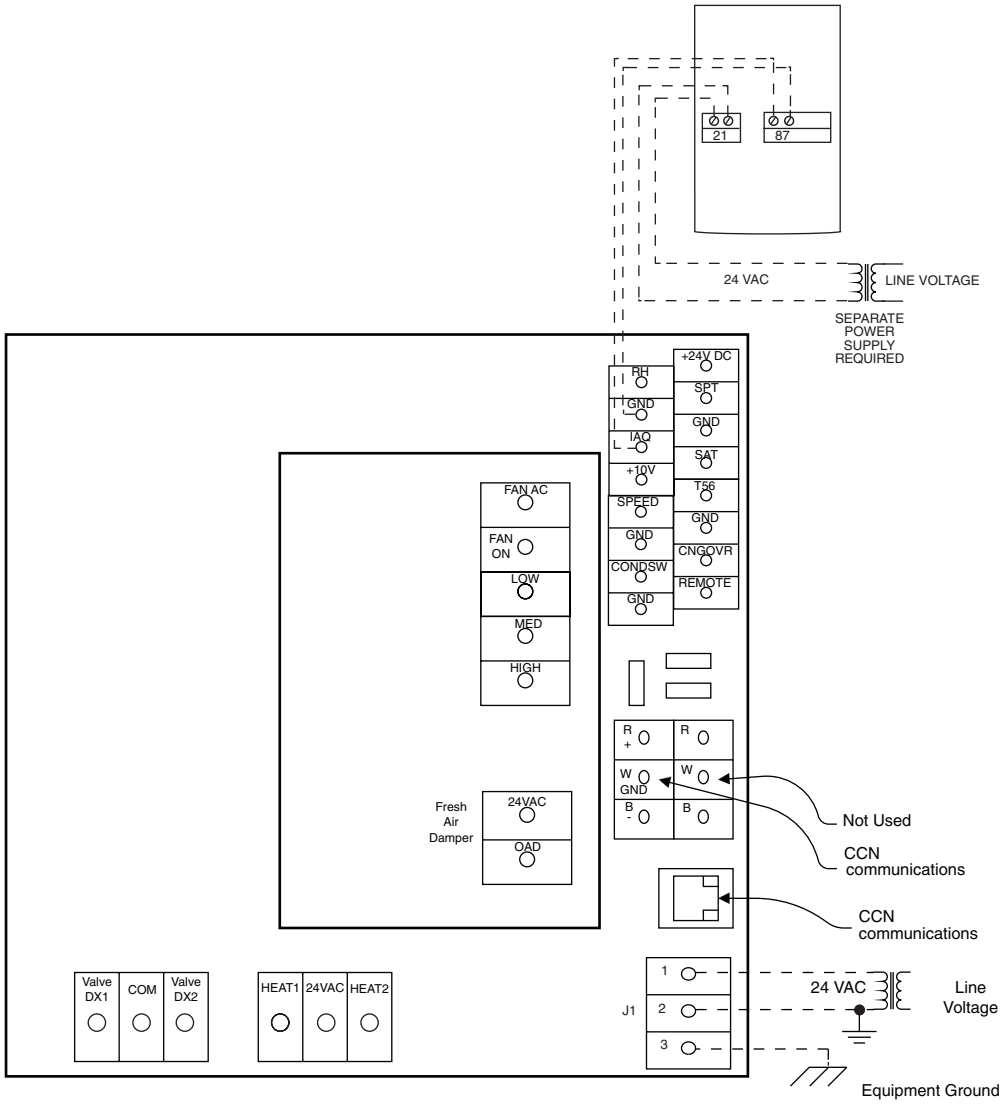



**Fig. 13 — IAQ Sensor Wiring (Monitor Only)**

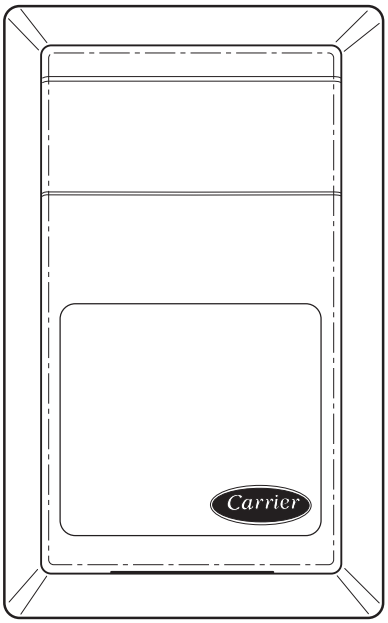



**Fig. 14 — Wall Mounted Relative Humidity Sensor (P/N 33AMSENRHS000)**

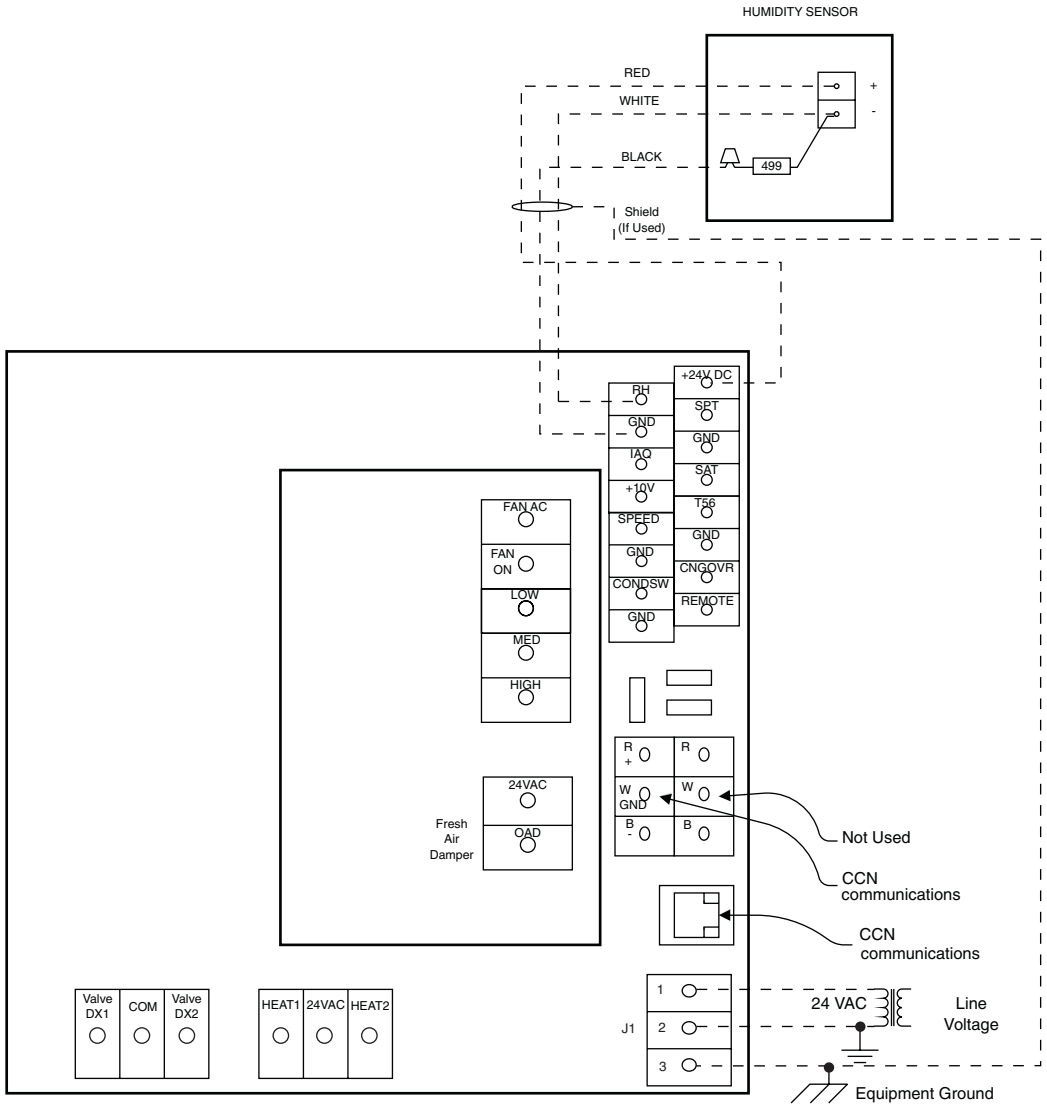



**Fig. 15 — Humidity Sensor Wiring**

**Connect Accessories —** Refer to accessory installation instructions for installation procedures. Fan coil controller wiring is shown for the following accessories:

- Linkage Thermostat (Fig. 16)
- Condensate Pump Switch (Fig. 17)
- Two-Position Minimum Outdoor Air Damper (Fig. 18)
- Remote Occupancy (Fig. 19)

**Connect the CCN Communication Bus —** The fan coil controllers connect to the bus in a daisy chain arrangement. The fan coil controller may be installed on a primary CCN bus or on a secondary bus from the primary CCN bus. Connecting to a secondary bus is recommended.

At any baud (9600, 19200, 38400 baud), the number of controllers is limited to 239 zones maximum. When Carrier linkage thermostats are used on the same bus as fan coil units, no more than 128 fan coils and 12 linkage thermostats may be on the same bus. Bus length may not exceed 4000 ft, with no more than 60 total devices on any 1000-ft section. Optically isolated RS-485 repeaters are required every 1000 ft.

NOTE: Carrier linkage thermostats operate at 9600 band.

The first fan coil controller in a network connects directly to the bridge and the others are wired sequentially in a daisy chain fashion. Refer to Fig. 20 for an illustration of CCN Communication Bus wiring.

The CCN Communication Bus may also connect to the fan coil controller space temperature sensor. Refer to the Install Sensors section for sensor wiring instructions.

COMMUNICATION BUS WIRE SPECIFICATIONS — The Carrier Comfort Network (CCN) Communication Bus wiring is field-supplied and field-installed. It consists of shielded three-conductor cable with drain (ground) wire. The cable selected must be identical to the CCN Communication Bus wire used for the entire network. See Table 3 for recommended cable.

**Table 3 — Recommended Cables**

| MANUFACTURER | CABLE PART NO. |
|---|---|
| **Alpha** | 2413 or 5463 |
| **American** | A22503 |
| **Belden** | 8772 |
| **Columbia** | 02525 |

NOTE: Conductors and drain wire must be at least 20 AWG (American Wire Gage), stranded, and tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –20 C to 60 C is required.

CONNECTION TO THE COMMUNICATION BUS

1. Strip the ends of the red, green/white, and black conductors of the communication bus cable.
2. Connect one end of the communication bus cable to the bridge communication port labeled COMM2 (if connecting on a secondary bus).

   When connecting the communication bus cable, a color code system for the entire network is recommended to simplify installation and checkout. See Table 4 for the recommended color code.

**Table 4 — Color Code Recommendations**

| SIGNAL TYPE | CCN BUS WIRE COLOR | PLUG PIN NUMBER |
|---|---|---|
| **+** | Red | 1 |
| **Ground** | Green/White | 2 |
| **–** | Black | 3 |

3. Connect the other end of the communication bus cable to the terminal block labeled CCN in the fan coil controller of the first air terminal. Following the color code in Table 4, connect the Red (+) wire to Terminal 1. Connect the Green/White (ground) wire to Terminal 2. Connect the Black (–) wire to Terminal 3.
4. Connect additional fan coil controllers in a daisy chain fashion, following the color coded wiring scheme in Table 4. Refer to Fig. 20.

NOTE: The communication bus drain wires (shield) must be tied together at each fan coil controller. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. If the communication bus cable exits from one building and enters another building, connect the shields to ground at a lightning suppressor in each building where the cable enters or exits (one point only).

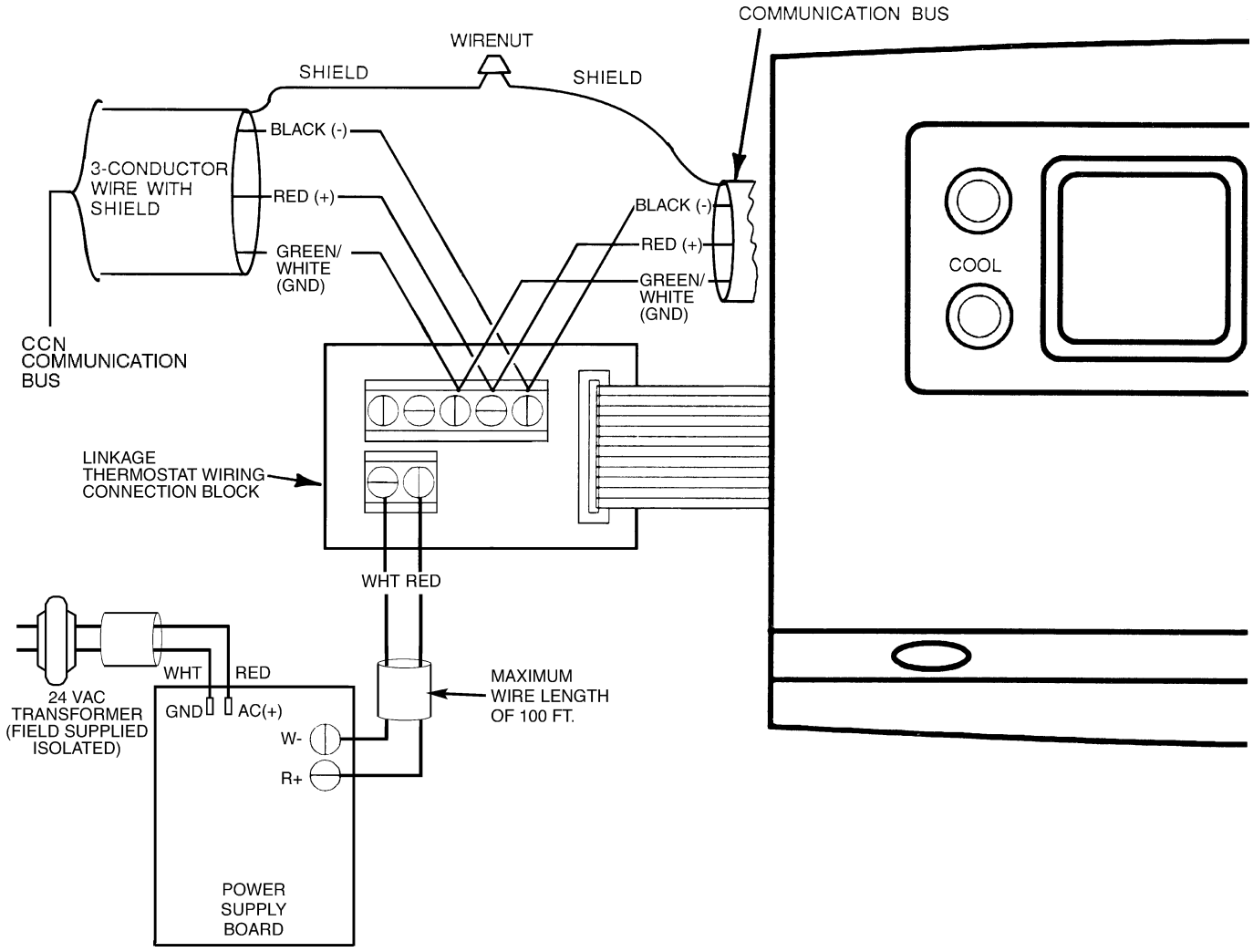
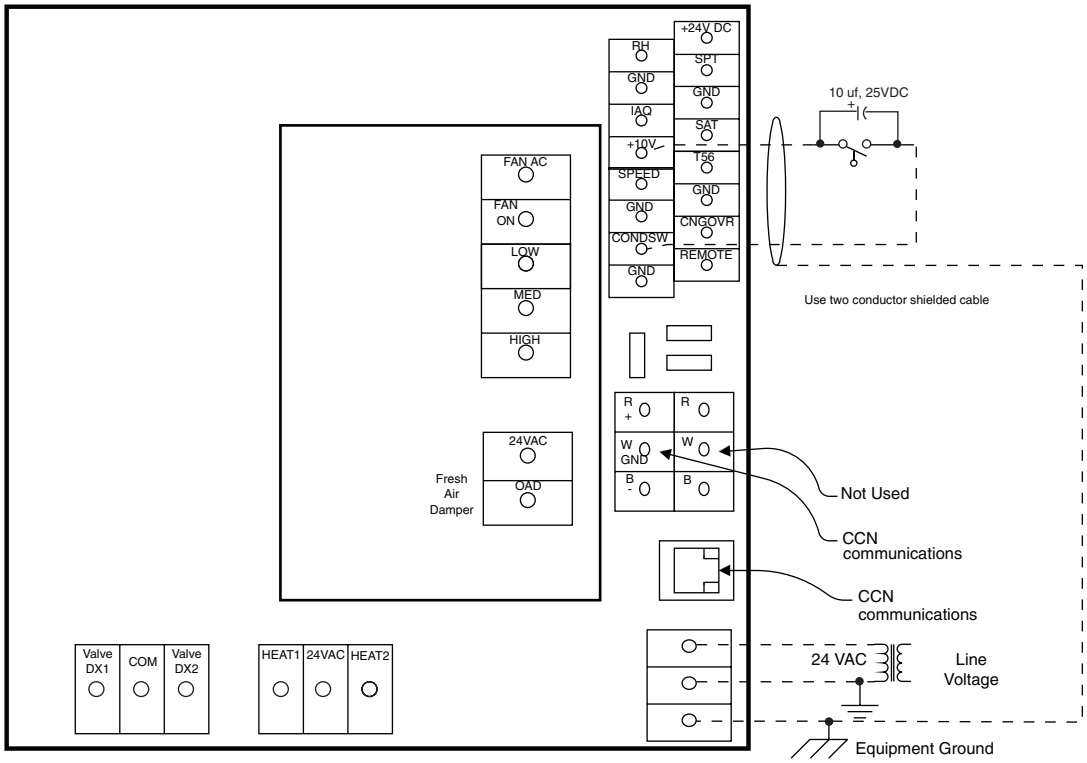



**Fig. 16 — Linkage Thermostat Wiring Connections (Field-Installed)**




NOTE: To ensure that the switch operates reliably in a low voltage circuit, install a field-supplied 10 *µf*, 25 VDC capacitor across the switch contacts. Be sure to observe polarity.

**Fig. 17 — Condensate Pump Switch Wiring (Field-Installed)**

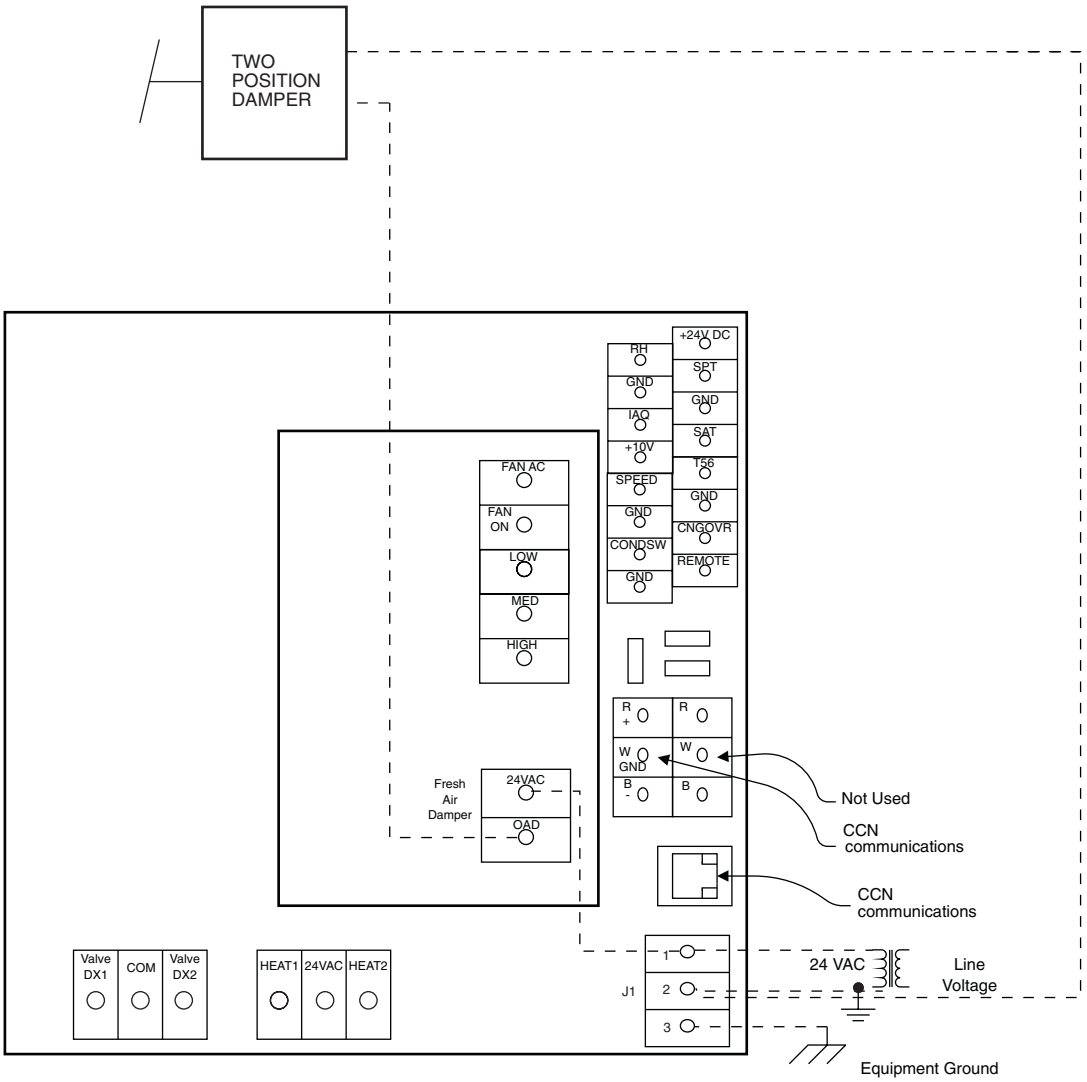



**Fig. 18 — Two-Position, Minimum Outdoor Air Damper Wiring (Field-Installed)**

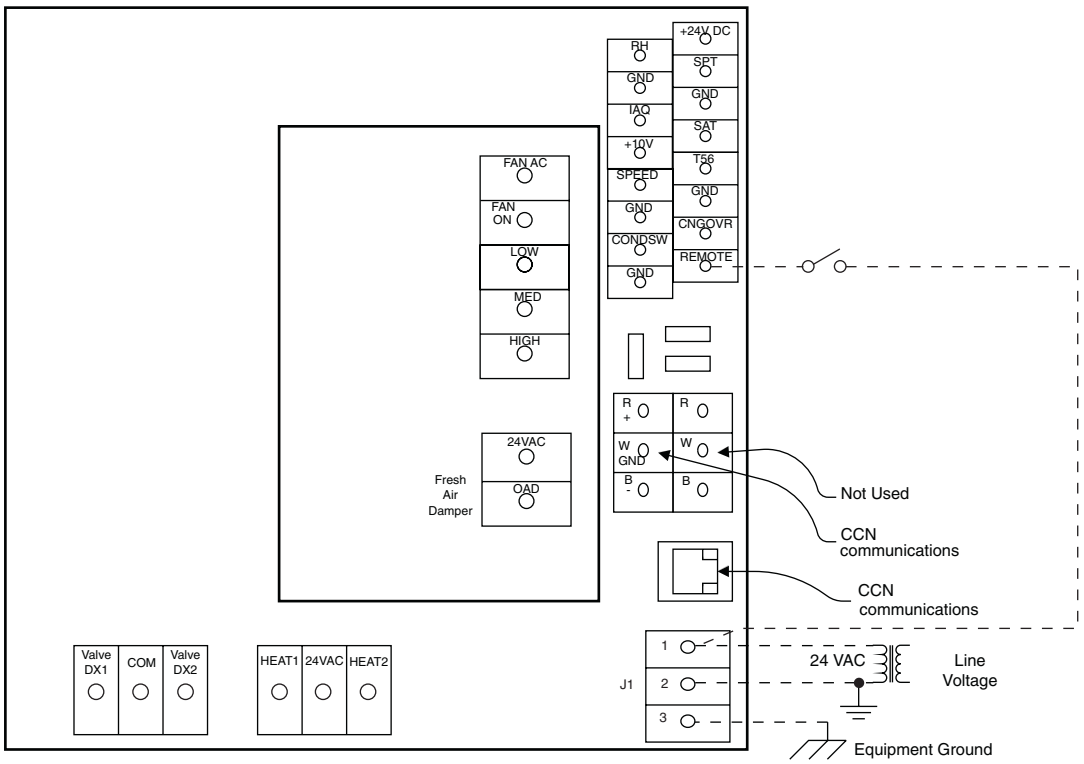
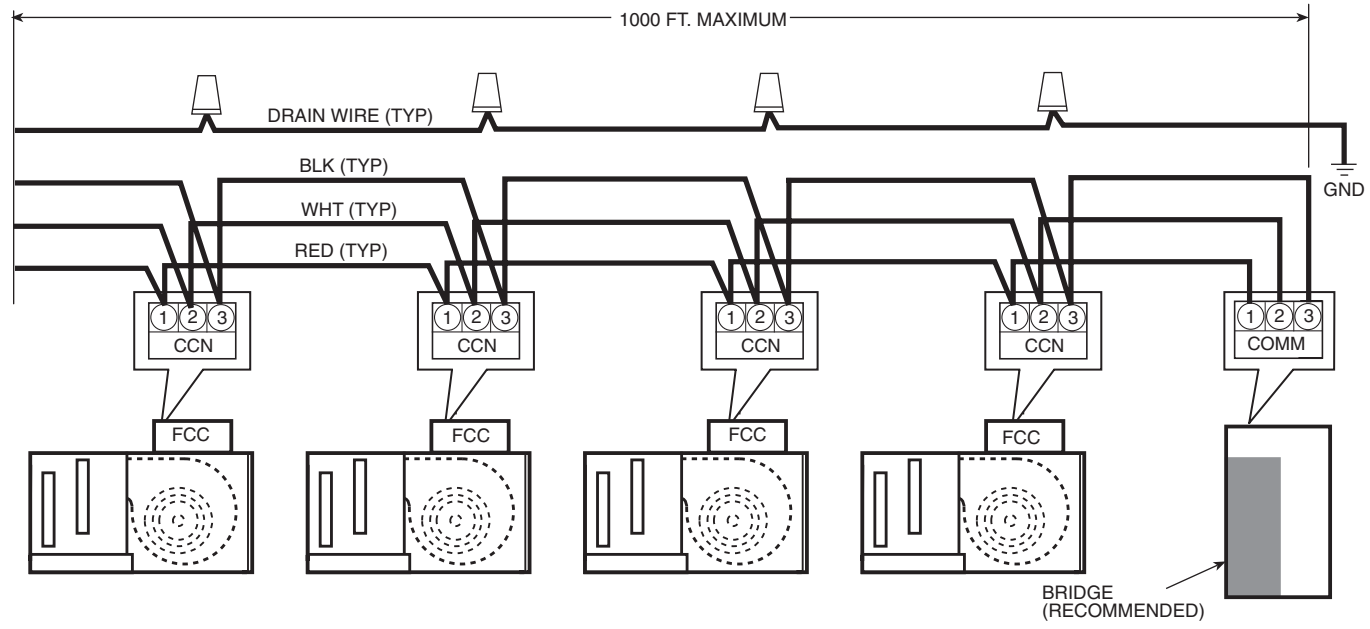



**Fig. 19 — Remote Occupancy Wiring (Field-Installed)**




LEGEND

**CCN** — Carrier Comfort Network
**FCC** — Fan Coil Controller

**Fig. 20 — Communication Bus Wiring**

## START-UP

Use the Carrier network communication software to start up and configure the fan coil controller.

All set-up and set point configurations are factory-set and field-adjustable.

Changes can be made using the ComfortWORKS® software, ComfortVIEW™ software, or Network Service Tool. The Network Service Tool is a portable interface device that allows the user to change system set-up and set points from a zone sensor or terminal control module. During start-up, the Carrier software can also be used to verify communication with each fan coil controller.

For specific operating instructions, refer to the literature provided with the software.

### Perform System Check-Out

1. Check correctness and tightness of all power and communication connections.
2. At the fan coil, check fan and system controls for proper operation.
3. At the fan coil, check electrical system and connections of any optional electric reheat coil. If hot water reheat is used, check piping and valves against job drawings.
4. Check to be sure the area around the fan coil is clear of construction dirt and debris.
5. Check that final filters are installed in the fan coil. Dust and debris can adversely affect system operation.
6. Verify that the fan coil controller controls are properly connected to the CCN bus.

**Initial Operation and Test —** Perform the following procedure:

1. Apply 24 vac power to the control.
2. Connect the Network Service Tool to the phone jack service port of the controller.
3. Using the Network Service Tool, upload the controller from address 0,1. The address may be set at this time. Make sure that Network Service Tool is connected to this fan coil unit only when changing the address.

**DDC Fan Coil Control Testing Procedure —** The Network Service Tool, ComfortVIEW or ComfortWORKS software can be used to test the fan coil unit for proper operation. The software may also be used to change or modify the appropriate decisions as required for each factory-supplied accessory package (supplied with unit).

The control inputs are tested to verify functionality and proper input operation. The control outputs are tested to verify that the output devices are wired correctly and operate properly. By applying a FORCE to the appropriate points as specified, the output device operation is verified.

To test the unit, perform the steps in the following sections. Specific tests are used to test each control sequence.

PREPARE UNIT

1. Connect the communication cable from the computer to the SRVC port (J3) of the control module.
2. Connect the appropriate power source to the unit. Apply power to the unit and set the disconnect switch (if supplied) to ON. Verify that the red LED on the control module begins to flash on and off.
3. Using the software, select the fan coil unit at the default address (0,1). All the following tests are done with the software.

TEMPERATURE SENSOR INPUT TEST — From the Points Display screen, verify the Space (Return Air) Temperature (RAT) and the Supply Air Temperature (SAT) are reading a value equal to the ambient temperature.

SUPPLY FAN TEST

NOTE: If a T57 sensor is being used with this application, the fan speed selector on the sensor must be in the AUTO position while performing this test.

1. From the Points Display screen, highlight the Remote Start (REMOTE) point. Force the Remote Start point to ON. Verify that the fan starts.
2. From the Maintenance screen, select the FCMAINT display.
3. Select the T57 Status point and force this value to 0. Verify that the supply fan stops.
4. Select the T57 Status point and force this value to 1. Verify that the supply fan runs at Low speed.
5. Select the T57 Status point and force this value to 2. Verify that the supply fan runs at Medium speed.
6. Select the T57 Status point and force this value to 3. Verify that the supply fan runs at high speed. (Continue to the next test with the fan operating at high speed.)

MODULATING VALVE TEST (4-Pipe Heating/Cooling, Cooling Only, and 2-Pipe Changeover Units)

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section above to start the fan.

1. From the Points display screen select the VALVE/DX2 (CCV2) output. Force this point to OFF.
2. Select the VALVE/DX1 (CCV1) point. Force this point to ON.
3. Verify that the water valve is opening or open.
4. Force the VALVE/DX1 (CCV1) point to OFF. The valve should stop opening and hold its position.
5. Select the VALVE/DX2 (CCV2) output. Force this point to ON.
6. Verify that the water valve closes.

MODULATING HEATING VALVE TEST (4-Pipe Heating/Cooling, and Heating Only Units)

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section above to start the fan.

1. From the Points display screen select the HEATING2 (HCV2) output. Force this point to OFF.
2. Select the HEATING1 (HCV1) point. Force this point to ON.
3. Verify that the hot water valve is opening or open.
4. Force the HEATING1 (HCV1) point to OFF. The valve should stop opening and hold its position.
5. Select the HEATING2 (HCV2) output. Force this point to ON.
6. Verify that the water valve closes.

DIECT EXPANSION (DX) COOLING TEST

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section above to start the fan.

1. Select the VALVE/DX1 (CCV1) point. Force this point to ON.
2. Verify that the DX relay is energized.
3. Force the VALVE/DX1 (CCV1) point to OFF.
4. Verify that the DX relay is deenergized.

ELECTRIC HEAT TEST (Single-Stage Heat)

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section on page 18 to start the fan.

1. From the Points display screen select the HEATING1 (HCV1) output. Force this point to ON.
2. Verify that the first stage of electric heat is energized and the supply air temperature rises.
3. Force the HEATING1 (HCV1) point to OFF.
4. Verify that the first stage of electric heat is deenergized.

ELECTRIC HEAT TEST (Two-Stage Heat)

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section on page 18 to start the fan.

1. From the Points display screen select the HEATING1 (HCV1) output. Force this point to ON.
2. Verify that the first stage of electric heat is energized and the supply air temperature rises.
3. Select the HEATING2 (HCV2) output. Force this point to ON.
4. Verify that the second stage of electric heat is energized.
5. Force the HEATING2 (HCV2) point to OFF.
6. Verify that the second stage of electric heat is deenergized.
7. Force the HEATING1 (HCV1) point to OFF.
8. Verify that the first stage of electric heat is deenergized.

WALL-MOUNTED T56 SPACE TEMPERATURE SENSOR TEST

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section on page 18 to start the fan.

1. Go to the Maintenance screen.
2. Go the FCMAINT screen.
3. View the Set Point Offset (T56OFF) point.
4. Move the slide bar adjustment on the sensor to the full left position. Verify on the display screen that the temperature reset value changes to –2.
5. Move the slide bar adjustment on the sensor to the full right position. Verify on the display screen that the temperature reset value changes to 2.

WALL-MOUNTED T57 SPACE TEMPERATURE SENSOR TEST

NOTE: This test should be performed with the unit power on and the supply fan running at high speed. If the fan is not running, refer to the Supply Fan Test section on page 18 to start the fan.

1. Set the fan speed selector switch on the sensor to the Off position.
2. Go to the Maintenance screen.
3. Go the FCMAINT screen.
4. Select the T57 Status point.
5. Remove the FORCE from this point (select AUTO). Verify that the fan stops.
6. Move the fan speed selector switch on the sensor to the High position. The fan will start to switch to high speed. Verify that the fan is operating at High speed after 10 seconds.
7. Move the fan speed selector switch on the sensor to the Medium position. Verify that the fan is operating at Medium speed.
8. Move the fan speed selector switch on the sensor to the Low position. Verify that the fan is operating at Low speed.
9. View the Set Point Offset (T56OFF) point.
10. Move the slide bar adjustment on the sensor to the full left position. Verify on the display screen that the temperature reset value changes to –2.
11. Move the slide bar adjustment on the sensor to the full right position. Verify on the display screen that the temperature reset value changes to 2.

CHANGEOVER SENSOR TEST (2-Pipe Units Only)

1. Go to the Maintenance screen.
2. Go the FCMAINT screen.
3. View the Changeover Temperature (CHGTEMP) status point.
4. Verify that the temperature reading is equal to ambient temperature.

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