Comfort™ Pro Non-Programmable Commercial Thermostat

Installation Instructions

Part Number 33CSCNACHP-01

IMPORTANT: Read entire instruction before installing the thermostat.

CONTENTS

SAFETY CONSIDERATIONS

Read and follow manufacturer instructions carefully. Follow all local electrical codes during installation. All wiring must conform to local and national electrical codes. Improper wiring or installation may damage thermostat.

Recognize safety information. This is the safety alert symbol ⚠ . When the safety alert symbol is present on equipment or in the instruction manual, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies a hazard which could result in personal injury or death. CAUTION is used to identify unsafe practices which would result in minor personal injury or property damage.

GENERAL

Carrier's Comfort Pro non-programmable thermostats are wall-mounted, low-voltage thermostats that maintain room temperature by controlling the operation of a heating and/or air conditioning system (Fig. 1). This thermostat can be used with a heat pump, air conditioner or water source heat pump operation. A variety of features are provided including battery operation, separate heating and cooling set points, auto changeover, keypad lockout, backlighting, and built-in installer test.

This Installation Instruction covers installation, configuration, and start-up of the Comfort Pro non-programmable thermostat. For operational details, consult the Owner's Manual for this specific thermostat.

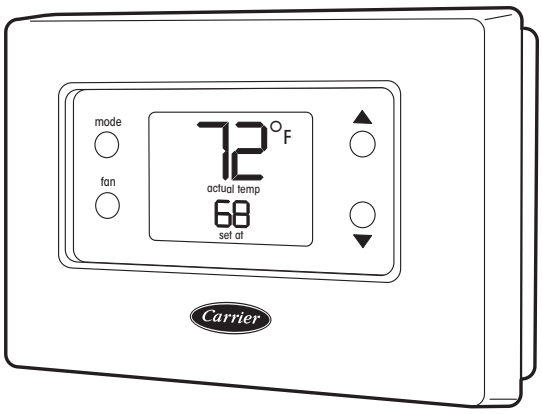


Fig. 1 — Comfort Pro Non-Programmable Commercial Thermostat

PACKAGE CONTENTS

1 — Thermostat
1 — Backplate (mounting base)
2 — Screws and anchors

INSTALLATION CONSIDERATIONS

Power — The thermostat will obtain full operating power one of two ways: full 24 volt AC (50/60 Hz) power via the Rc/Rh and C terminals or two AA alkaline batteries. The 24 vac operation is preferred, if available. Battery operation is used when there are not enough wires to support 24 vac operation.

When the battery is low, a Low Battery indication will be displayed to the user.

For an air conditioning system, up to six wires are needed for 24 vac operation and one less wire for battery operation. For a heat pump system, up to seven wires are needed for 24 vac operation and one less wire would be sufficient for battery operation. For heat only operation with batteries, only two wires are required. When battery operation is used, the C terminal does not need to be connected.

Provision is also made for separate heating and cooling transformers via separable Rc and Rh terminals which are connected via factory-installed jumper wire.

Wiring — The wire length should be no more than 250 ft (76 m). Use 22 AWG (American Wire Gage) for normal wiring applications. Continuous wire lengths over 100 ft (30.5 m) should use 20 AWG or larger.

Thermostat Location — The thermostat should be mounted:

- approximately 5 ft (1.5 m) from the floor
- close to or in a frequently used space, preferably on an inside wall
- on a section of wall without pipes or ductwork

The thermostat should **NOT** be mounted:

- close to a window, on an outside wall, or next to a door leading to the outside
- where exposed to direct light and heat or any other temperature-radiating object which may cause a false reading
- close to or in direct airflow from supply registers or return air grille in areas with poor air circulation

INSTALLATION

To install the thermostat, perform the following procedure:

1. Turn off all power to equipment.

⚠ WARNING

Electrical shock can cause personal injury and death. Before installing thermostat, shut off all power to this equipment during installation. There may be more than one power disconnect. Tag all disconnect locations to alert others not to restore power until work is completed.

2. If an existing thermostat is being replaced:
   a. Remove existing thermostat from wall.
   b. Disconnect wires from existing thermostat, one at a time. Be careful not to allow wires to fall back into the wall.
   c. As each wire is disconnected, record the wire color and terminal marking.
   d. Discard or recycle old control.

⚠ CAUTION

ENVIRONMENTAL HAZARD:

Failure to follow this caution may result in environmental damage.

Mercury is a hazardous waste. Federal regulations require that mercury be disposed of properly.

3. Press the thumb release at the top of the thermostat and snap apart carefully to separate backplate from the thermostat and expose mounting holes.
4. Route thermostat wires through large hole in backplate. Level backplate against wall (for appearance only, the thermostat does not need be leveled for proper operation) and mark wall through two mounting holes. See Fig. 2.

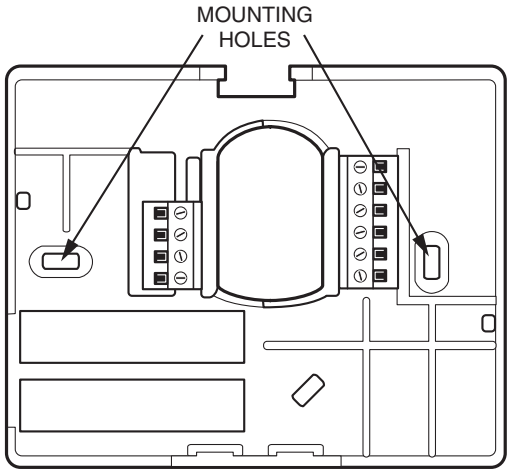


Fig. 2 — Backplate Mounting

5. Drill two $^{3}/_{16}$-in. mounting holes in the wall where marked.
6. Secure backplate to wall with two screws and anchors provided. Make sure all wires extend through hole in backplate.
7. Adjust length and routing of each wire to reach proper connector block and terminal on backplate with $^{1}/_{4}$-in. (6 mm) of extra wire. Strip only $^{1}/_{4}$-in. of insulation from each wire to prevent adjacent wires from shorting together when connected.

⚠ CAUTION

Failure to follow this caution may result in equipment damage or improper operation.

Improper wiring or installation may damage the thermostat. Check to make sure wiring is correct before proceeding with installation or turning on unit.

8. Match and connect equipment wires to proper terminals of the connector blocks (see Fig. 3). If there are separate 24 vac transformers, one in the indoor unit and one in the outdoor unit, connect the common of each to the C terminal. Remove factory-installed jumper wire from Rc and Rh terminals. Connect the R from the indoor unit to the Rh terminal. Connect the R from the outdoor unit to the Rc terminal. Then the W signal is taken from the Rh power and the Y1, Y/Y2, G and O/B signals are taken from the Rc power.

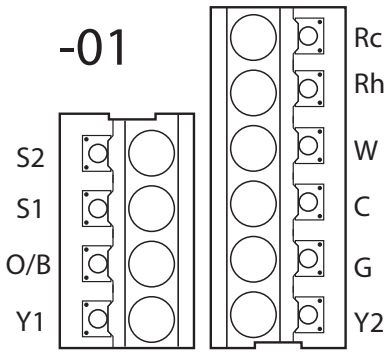


Fig. 3 — Terminal Strip

9. Push any excess wire into wall and against backplate. Seal hole in wall to prevent air leaks. Leaks can affect operation.
10. Attach thermostat to backplate by inserting tab on bottom edge and hinging up until top snap secures.
11. Turn ON power to unit.

When power is applied, all display icons are lit for 2 seconds to test the display. Following this, the equipment type for which the thermostat is configured is displayed for an additional 2 seconds. Equipment type will be either HP, AC, H, C or 35 (for WSHP) (for explanation see Option 01 below).

NOTE: If a common wire has not been connected, two AA batteries must be used to power the thermostat.

CONFIGURATION

Configuration options enable the installer to configure the thermostat for a particular installation. These configuration options are stored to the internal memory so they are retained through a power outage. The availability of some configuration options will be dependent upon other conditions in the thermostat. For example, the backlight configuration is not available unless full 24 vac power is connected. See Table 1.

Table 1 — Configuration Options Summary

OPTION NUMBER	CONFIGURATION
01	Equipment Type
02	Remote Sensor Selection
03*	English/Metric
04	Fan (G) on with W Output
05	Space Temperature Sensing
07	Equipment DDC Controller
10	Reversing Valve
11	Deadband between Heating and Cooling Set Points
13	Space Temperature Display Adjustment (Offset)
15	Auto Mode Availability
16	Maximum Cycles Per Hour
17	Time Between Equipment Stages
18*	Backlight Configuration
20	Outdoor Air Temperature Adjustment (Offset)
21	Keypad Lockout
26	Minimum Cooling Set Point
27	Maximum Heating Set Point
35	Emergency Heat Mode Availability
39	Temperature Display
99	Reset to Factory Defaults

* These settings are adjustable by the user. See Owner's Manual for additional information.

Entering and Exiting Configuration Mode —

Press and hold the **fan** button for about 10 seconds. After the 10-second period the Option number "01" will appear flashing in the space temperature location. The value of the configuration setting will be displayed in the set point location.

The parameter that is changeable will be determined by the flashing area. The **up** or **down** button can be used to select a new value. The **mode** button can be used to toggle/move the selection between the configuration option number and the configuration value. To exit the installer configuration screen, press the **fan** button. If no button is pressed for three minutes, the installer configuration screen will time out and the thermostat will return to normal operation.

All changes to the installer configuration are saved as they are made. There is no provision to exit the installer configuration and cancel the change. The installer will have to manually change a configuration back to its original value to "undo" a change.

Configuration Options

OPTION 01 — EQUIPMENT TYPE — This option determines the control method of the thermostat. It should match the type of equipment used.

Selection: HP, AC, H, C, 35

HP — operates a two-stage heat pump

AC — operates a two-stage AC with single unit

H — operates a heat only system

C — operates a cool only system

35 — operates a water source heat pump

Default: AC

OPTION 02 — REMOTE SENSOR SELECTION — A remote thermistor can be connected to the S1 and S2 screw terminals to sense either remote space, outdoor air, supply or return air temperature.

NOTE: Carrier sensors 33ZCT55SPT, 33ZCSENDAT, 33ZCSENSAT, and 33ZCSENOAT may be used for standard space temperature sensor averaging. Sensors must be used as a single sensor, 4 sensors or 9 sensors, with total sensor wiring not to exceed 1,000 ft.

Selection: rS, SA, Od, rA

rS — Sense remote space temperature

SA*— Sense supply air temperature

Od*— Sense outdoor air temperature

rA* — Sense return air temperature

* Display only, not used for temperature control.

Default: Od

OPTION 03 — ENGLISH/METRIC — This configuration selects between Fahrenheit (F) and Celsius (C) operation.

Selection: F, C

Default: F

OPTION 04 — FAN (G) ON WITH W OUTPUT — This configuration is not available if the thermostat is configured as Cool Only in Option 01. This selection determines whether fan (G) output is to be on or off when the W is energized in AC, HP, H or 35 (WSHP) configurations, and when the O/B output is energized in the AC or H (heat only) configurations.

Selection: OF(F), ON

OF — Fan does not turn on with W output

ON — Fan turns on with W output

Default: ON

OPTION 05 — SPACE TEMPERATURE SENSING — This selection determines which sensor the control will use for measuring space temperature. Space temperature can be

sensed in one of three ways: the local sensor (L) located on the thermostat, the remote sensor (r), or the average of local and remote sensors (Lr).

Selection: L, r, Lr

L — Local sensor: The onboard thermistor is the control point for the temperature control algorithm.

r — Remote space sensor: The remote space temperature is the control point for the temperature control algorithm.

NOTE: This selection is only available if Option 02 indicates that the S1, S2 terminals are sensing a remote space temperature.

Lr — Average (remote space sensor and space temperature): The average of the onboard thermistor and the remote space sensor is the control point for the temperature control algorithm.

NOTE: This selection is only available if Option 02 indicates that the S1, S2 terminals are sensing a remote space temperature.

Default: L

OPTION 07 — EQUIPMENT DDC CONTROLLER — This selection should be set to ON when control is to be used with DDC (direct digital controller) equipment. These control systems will take care of the time guard and cycle timers. Examples are zone controlling units or two-position valve assemblies that can open or close as required, without regard to exceeding a maximum number of operations per hour. Rooftop units used with PremierLink™ or ComfortLink controls do not require thermostat control to handle timers and safeties, so this selection would also be set to ON in this case.

Set this selection to OF (off) if the thermostat is directly connected to equipment such as a furnace or fan coil unit with DX condensing units, or electro-mechanical rooftop units that have a maximum number of cycles per hour rating, but do not implement that requirement themselves and rely instead on the thermostat.

Selection: OF(F), ON

OF — Timeguard and cycle timers are enabled

ON — Timeguard and cycle timers are disabled

Default: OF (off)

OPTION 10 — REVERSING VALVE — This feature is only available on heat pump (HP) systems. Although the water source heat pump is also a heat pump system, a WSHP system will always energize the reversing valve in cooling and therefore, this option is not available to the installer on either 35 or WSHP systems.

The "O/B" terminal can be configured to be energized in either heating mode or in cooling mode, depending on heat pump operation. The "C" configuration is used to describe a heat pump system that energizes its reversing valve in cooling. The "H" configuration is used to describe a heat pump system that energizes its reversing valve in heating.

Selection: H, C

H — The reversing value output (O/B) is energized when HEAT mode is selected.

C — The reversing value output (O/B) is energized when COOL mode is selected.

Default: H

OPTION 11 — DEADBAND BETWEEN HEATING AND COOLING SET POINTS — The selection allows the installer to choose how much differential will exist between the heating and cooling set points.

Selection: 1 to 10 (F or C)

Default: 5

OPTION 13 — SPACE TEMPERATURE DISPLAY ADJUSTMENT (OFFSET) — This configuration is the number of degrees to be added to the displayed temperature to calibrate or deliberately miscalibrate the measured space temperature. This selection is not available to the installer if Option 39 is set to SP (setpoint display).

Selection: –5 to 5 F (always in F)

Default: 0

OPTION 15 — AUTO MODE AVAILABILITY — The ON selection will allow automatic changeover between heating and cooling as demand requires a mode selection. OF maintains either heating or cooling mode selection only. Auto changeover is not available when H or C is selected under Option 01.

Selection: ON, OF(F)

ON — Auto mode is an available option that can be selected

OF — Auto mode is not an available option

Default: ON

OPTION 16 — MAX CYCLES PER HOUR — The maximum cycle rate is limited by internal timers to the selected number of cycles per hour. Selection of a higher number causes faster cycling resulting in more constant room temperature.

Selection: 4, 6, 8

4 — The Y1 and W outputs will be energized at most twice per hour. When an output is energized, it will not be energized again for 15 minutes.

6 — The Y1 and W outputs will be energized at most four times per hour. When an output is energized, it will not be energized again for 10 minutes.

8 — The Y1 and W outputs will be energized at most six times per hour. When an output is energized, it will not be energized again for 8 minutes.

Default: 4

OPTION 17 — TIME BETWEEN EQUIPMENT STAGES — This configuration determines the minimum number of minutes of equipment operation before allowing the transition to the next logical stage.

Selection: 10, 15, 20, 25

Default: 15

NOTE: If the difference between the space air temperature and set point results in a demand greater than three degrees, then the staging timers are ignored and the equipment will stage up in 60-second increments.

OPTION 18 — BACKLIGHT CONFIGURATION — This function is only available when the thermostat is operating from 24 volt AC power connected to the R and C terminals. It is not available when the thermostat operates from batteries.

When set to OF (off), the backlight will be lit for 10 seconds after a button is pressed. After 10 seconds of no button presses, the backlight turns off.

When ON is enabled, the backlight will normally be on and dim in appearance. The backlight brightness becomes brighter when a button is pressed. After 10 seconds of no button presses, the backlight will return to the dimmer level until another button press occurs.

Selection: OF(F), ON

Default: ON with 24 vac power; for batteries only, default is OFF.

OPTION 20 — OUTDOOR AIR TEMPERATURE DISPLAY ADJUSTMENT (OFFSET) — This selection is not available unless Option 02 is set to Od (outdoor air temperature) and a valid sensor is connected to S1 and S2 terminals. It allows the calibration, or deliberate miscalibration of the outdoor air temperature sensor reading.

Selection: –5 to 5 (number of degrees F added to the outdoor air temperature reading to "calibrate" the temperature sensor)

Default: 0

OPTION 21 — KEYPAD LOCKOUT WITH PASSCODE — The thermostats are shipped with the keypad fully accessible. This option allows the installer to limit access to the keypad.

Selection: OF(F), 1, cd

OF — When set to OF, the user has full access to the keypad

1 — The user will only have access to modify the set points (within the set point limits of Option 26 and Option 27). The padlock icon will be displayed until the user presses and holds the **up** and **down** buttons simultaneously for five seconds to unlock the keypad. Once the keypad is unlocked, the user has full access to the thermostat functionality. The keypad returns to the locked condition after no buttons have been pressed for two minutes.

cd — The entire keypad is locked and the padlock icon is displayed. When the user presses a button the backlight turns on to maximum brightness for 10 seconds and a "--" is displayed in the temperature setting. The user must enter the unlock code and press the **mode** button to unlock the thermostat. The padlock icon will then turn off and the user will have full access to the thermostat functionality. The thermostat will lock after no buttons have been pressed for two minutes.

If the option value is set to "cd," the **mode**, **up** and **down** buttons will work as follows:

1. Pressing the **mode** button once will display the flashing Option number (21).
2. Pressing the **mode** button again and the option value will flash OF, 1 or cd.
3. Pressing the **mode** button a third time will display the keypad lock icon and the code entry values (see Fig. 4). The **up** and **down** buttons will allow the selection of a code value between 00 to 199.
4. Pressing the **mode** key again will return the focus to the Option number (21).

In the event that the installer or user cannot remember the unlock code for the thermostat, the code can be displayed if the user presses and holds the **fan** and the **down** buttons simultaneously for 30 seconds. After the 30-second period, the unlock code will be displayed for five seconds. This information does not appear in any other user documentation.

Default: OF (off)

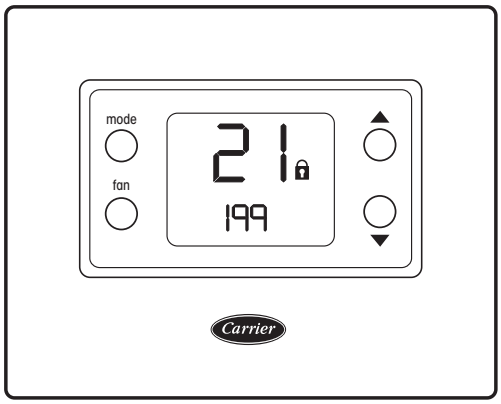


Fig. 4 — Selection of Code Value

OPTION 26 — MINIMUM COOLING SET POINT — This parameter establishes the minimum cooling set point that the user is allowed to set. If the equipment type is Cool Only, the lower limit is 55 F and the upper limit is 90 F. Otherwise, the equipment type allows both heating and cooling operation, so the minimum is 55 F plus Option 11 (deadband) and the maximum is 90 F.

Selection: minimum = 55 F + deadband, maximum = 90 F

Default: 60 F (based on the adjustable deadband default = 5)

OPTION 27 — MAXIMUM HEATING SET POINT — This parameter establishes the maximum heating set point that the user is allowed to set. If the equipment type is Heat Only, the lower limit is 50 F and the upper limit is 90 F. Otherwise, the equipment type allows both heating and cooling operations, so the minimum is 50 F plus Option 11 (deadband) and the maximum is 90 F.

Selection: minimum = 50 F, maximum = 90 F – deadband

Default: 85 F (based on adjustable deadband default = 5)

OPTION 35 — EMERGENCY HEAT MODE AVAILABILITY — This configuration allows the installer to turn on or off the Emheat (emergency heat) mode. When set to ON, the Emergency Heat mode is an available mode selection. When set to OF, the Emergency Heat mode is not an available mode selection. Not available if Option 01 is set to C (cool only).

Selection: OF(F), ON

Default: OF (off)

OPTION 39 — TEMPERATURE DISPLAY — This configuration allows the installer to select either the set point temperature or the space temperature to be displayed on the large temperature display digits.

When the option St is chosen, the space temperature, as defined by Option 05, is displayed using the traditional space temperature digits on the LCD display. The current set temperature is displayed using the normal set point display digits.

When SP is chosen, the current set point temperature is displayed using the traditional space temperature digits on the LCD display. The normal set point display digits remain blank. Space temperature is not displayed, but if a problem occurs with the actual space temperature sensor, the characters "- -" will be displayed instead of the Set temperature to indicate that the temperature sensor has an error.

NOTE: The "Actual Temp" icon is not be displayed when the sensor type is set to set point display (SP).

Selection: St, SP

Default: St (Space Temperature)

OPTION 99 — RESET TO FACTORY DEFAULTS — This configuration allows the installer to return the thermostat to its "out of the box" settings.

IMPORTANT: All configuration options, mode, fan and set point settings which have been manually entered will be lost and reset.

When this setting is first selected, 99 will be displayed in the space temperature location and an initial value of 10 will be displayed in the set point location.

To initiate factory defaults, the installer then presses the **mode** button until the 10 is flashing. The installer then presses and holds the **down** button. While the **down** button is held, the 10 will count down from 10 to zero at a rate of 2 counts per second (5 seconds total). When the value reaches zero, all display segments are turned on for five seconds and the factory defaults are restored. If at any time during the countdown the installer releases the **down** button, the countdown terminates and the display returns to the starting value of 10.

Exiting Configuration Mode — To exit the configuration mode, press the **fan** button.

SYSTEM START-UP AND CHECKOUT

Installer Test Mode — This thermostat has a built-in installer test capability. It allows easy operation of equipment without delays or set point adjustments to force heating or cooling. To enter installer test mode, press and hold the **fan** button for 15 seconds (after 10 seconds installer configuration is entered; a continuous 15 seconds and installer test is entered). At the start of installer test, the mode is Off, the fan is "fan auto" and the set point displays "InS."

The **mode** button is used to change the system operating mode to test the heating and cooling equipment. Auto mode is not available during installer test.

When the mode is set to heat, heating is energized for 180 seconds. During the installer test operation, the "on" icon is displayed.

At the end of the equipment test cycle the mode returns to OFF.

The LCD display counts down the time remaining (in seconds, from 180 to 0) for each stage when the equipment is energized. See Fig. 5.

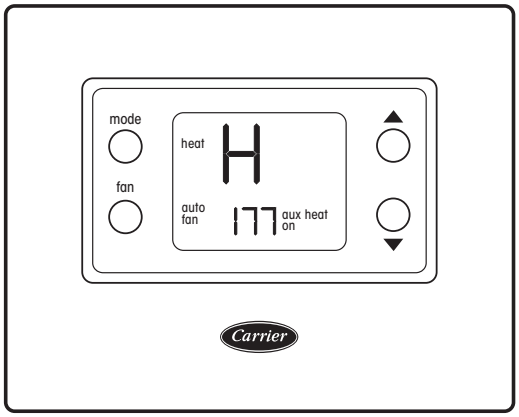


Fig. 5 — Installer Test Mode

The same procedure is repeated for the cool mode. "C" is displayed when cooling is active.

The test of a heating or cooling cycle can be terminated before the timer counts down to zero by pressing the **mode** button.

Pressing the **fan** button alternates the fan selection between fan auto and fan on and the fan output follows accordingly. There is no timer associated with the installer testing of the fan operation.

Setting the mode to Em heat, if available, turns on the auxiliary heat for 180 seconds. The space temperature location displays an "E," the clock display counts down from 180 to 0 in one-second increments and the "aux heat on" icon is displayed. At the end of the 180 seconds, the mode returns to OFF.

Terminating Installer Test — After 15 minutes of no button presses by the installer, installer test is terminated.

Pressing the up button, down button, or cycling thermostat power at any time during installer test terminates the installer test and returns the thermostat to normal operation.

Checklist — The following installer checklist should be performed after completing installation:

1. Run equipment through several heating and cooling cycles to ensure proper operation. To operate the thermostat in its normal operating mode, consult the Owner's Manual.
2. If the equipment is to be left in operation, the set points and operating mode must be properly selected.
3. Put away tools and instruments and clean up debris.
4. Review and leave Owner's Manual with customer.

OPERATION

Mode Selection — The **mode** button allows the user to display the off, heat, cool, auto and emergency heat icons. Pressing the **mode** button cycles through the available modes based on the equipment selection from Option 01, the auto availability setting from Option 15, and the electric heat availability from Option 35. Available choices are listed in Table 2.

Table 2 — Mode Selection

OPTION 01 (Equipment Selection)	OPTION 15 (Auto Available)	OPTION 35 (Emergency Heat Mode Available)	AVAILABLE MODES
AC, HP or 35 (WSHP)	On	On	Off, Heat, Cool, Auto, Em Heat
		Off	Off, Heat, Cool, Auto
	Off	On	Off, Heat, Cool, Em Heat
		Off	Off, Heat, Cool
H	Not Available	On	Off, Heat, Em Heat
		Off	Off, Heat
C	Not Available	Not Available	Off, Cool

Fan Selection — Pressing the **fan** button toggles between the Fan On and Fan Auto selections. When the "fan on" icon is displayed, the fan operates continuously. When "fan auto" is displayed, the fan will run only with the equipment.

Set Temperature Selection — If auto mode is not active and off mode is not active, pressing the **up** or **down** button causes the set point corresponding to the current system mode to be updated. If the **up** or **down** button is held, the set point value will be scrolled. The set point change also takes into account that Option 11 (deadband) is preserved along with ensuring that Option 26 (minimum cooling set point) and Option 27 (maximum heating set point) are taken into account to enforce set point limits.

If auto mode is active, pressing the **up** or **down** button causes the set point corresponding to the current operating mode to be updated. To move between the heat and cool set points, press the **mode** button to toggle between set points. Once the desired set point has been adjusted, press the **mode** button to return to auto mode.

If off mode is active, the **up** and **down** buttons are ignored for changing set point(s).

When changing the set points, the following restrictions are in place. The cool set point cannot be increased above 90 degrees F (32 C) or decreased below Option 26, the minimum cooling set point. The heat set point cannot be decreased below 50 F (10 C) or increased above Option 27, the maximum heating set point.

When Option 39 is set to SP (set point), the set point adjustment is displayed in the large space temperature digits.

Batteries — Battery operation is available for installations where there is no common (C) wire available at the thermostat. For battery operation, install two alkaline AA batteries. The

thermostat is designed to operate up to one year on a set of batteries. A battery indicator on the display warns when battery replacement is needed. If batteries are installed and the thermostat is operating from 24 vac power, battery operation will occur only when 24 vac power is not present. The changeover between 24 vac power and battery power is automatic.

Display Lighting — The display has two levels of lighting, high level and low level. High level lighting comes on for 10 seconds when buttons are being pressed with 24 vac and with batteries. Low level lighting is only available if the thermostat is operated from 24 vac; it is not available with batteries. The low level can be selected (see Option 18) for continuous backlight.

Remote Sensor Temperature Display — Pressing the **up** and **down** buttons simultaneously displays the temperature of the sensor connected to the S1 and S2 terminals for five seconds, then the thermostat returns to normal operation.

If the sensor is invalid, then the display shows "--" in the large temperature display digits.

NOTE: Carrier sensors 33ZCT55SPT, 33ZCSENDAT, 33ZCSENSAT, and 33ZCSENOAT may be used for standard space temperature sensor averaging. Sensors must be used as a single sensor, 4 sensors or 9 sensors, with total sensor wiring not to exceed 1,000 ft.

The remote space temperature 33ZCT55SPT sensor includes a button that, when pressed, shorts the S1 and S2 terminals. If the thermostat is powered by 24 vac and Option 02 is set to rS, pressing the button for two to five seconds has the same effect as an occupied button press on the thermostat. This button press is only recognized when the thermostat is powered by 24 vac.

Timers — Several timers that influence the thermostat's operation are listed below. If any of the timers is preventing the equipment from turning on, the "on" icon will flash.

Five-Minute Compressor Timeguard — This timer prevents the Y1 output from turning on unless it has been off for 5 minutes.

After a power cycle, a randomized delay will be added to end of the timeguard timer to prevent multiple units from hitting the power grid all at the same time. The randomization timer will be between zero and five minutes. If a demand exists, compressor outputs will energize between 5 and 10 minutes after the power cycle. It can be defeated by simultaneously pressing the **fan** and **up** keys.

Minimum On Timer — Once the equipment has been turned on, it must remain on for 3 minutes. A change in mode or set point will cancel this timer.

Cycle Timer — The number of equipment cycles per hour is determined by configuration Option 16. Based on the selection of 4, 6 or 8 cycles per hour, this timer is set to 15, 10 or 8 minutes. This much time must elapse from the start of one cycle before another cycle can start, imposing the cycles per hour limits. It can be defeated for one cycle by simultaneously pressing the **fan** and **up** keys.

Staging Timer — The staging timer enforces a minimum number of minutes for the current stage of equipment capacity to be energized before staging up to the next level of capacity. The number of minutes between each stage is configured by the installer in software configuration Option 17.

TROUBLESHOOTING

Three system error messages may appear on the thermostat screen indicating a problem with the thermostat's operation. See below for possible system error messages and their meaning.

Space Temperature Sensor Failure — If the room temperature sensor fails, the temperature display will show "--" (two dashes). If the space temperature is the average of both the local and remote sensors (as configured in Option 5), and one of the sensors fails, the thermostat provides control to the valid sensor only. The display will alternate every 10 seconds between "--" for the invalid sensor and the reading from the valid sensor.

Fan Failure — The fan setting is specified by Option 36 and cannot be changed by the user. If Option 36 is set to ON, and the **fan** button is pressed, an E7 error message will be displayed for three seconds and the fan selection will remain ON and not be changed.

Memory Failure — If there is an internal memory failure, the temperature display will show "E4," and the thermostat needs to be replaced.

Equipment Outputs — Table 3 can be used as a troubleshooting tool for determining which outputs will be active for a particular configuration and each operating mode.

Table 3 — Equipment Outputs

EQUIP CONFIG (Option 01 Setting)	COOL STAGE 1	COOL STAGE 2	HEAT STAGE 1	HEAT STAGE 2	HEAT STAGE 3	EM HEAT
AC	Y1	Y1, Y2	W	W, O/B	—	O/B
HP Option 10=C	Y1, O/B	Y1, Y2, O/B	Y1	Y1, Y2	Y1, Y2, W	W
HP Option 10=H	Y1	Y1, Y2	Y1, O/B	Y1, Y2, O/B	Y1, Y2, W, O/B	W
H	—	—	W	W, O/B	—	O/B
C	Y1	Y1, Y2	—	—	—	—
WSHP	Y1, O/B	Y1, Y2, O/B	Y1	Y1, Y2	Y1, Y2, W	W

WIRING DIAGRAMS

System wiring diagrams are provided for typical Carrier equipment. See Fig. 6-24.

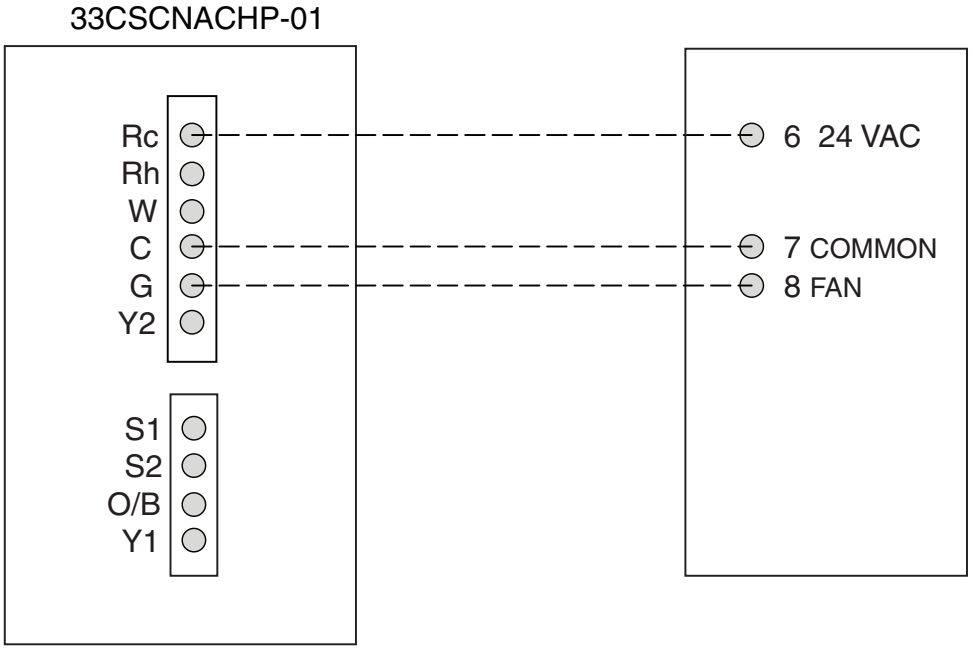


Fig. 6 — Thermostat Wiring — 42B Motor Controls — Single-Phase Only, 3-Phase Only, Single-Phase with Interlocking Disconnect, and 3-Phase with Interlocking Disconnect

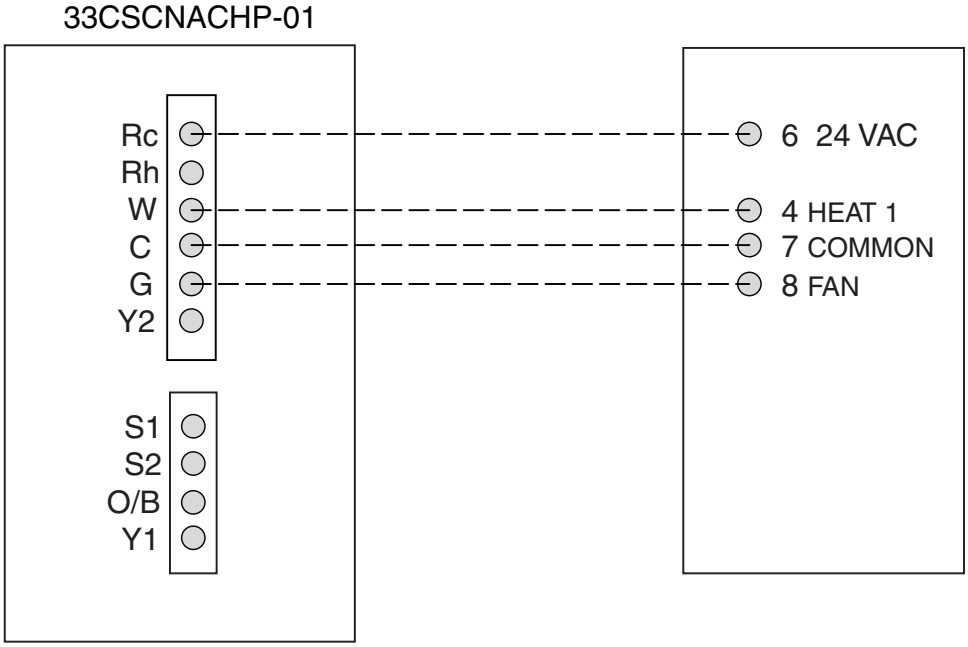


Fig. 7 — Thermostat Wiring — 42B Motor Controls — Single-Phase and 3-Phase with Interlocking Disconnect and Single-Stage Electric Heater

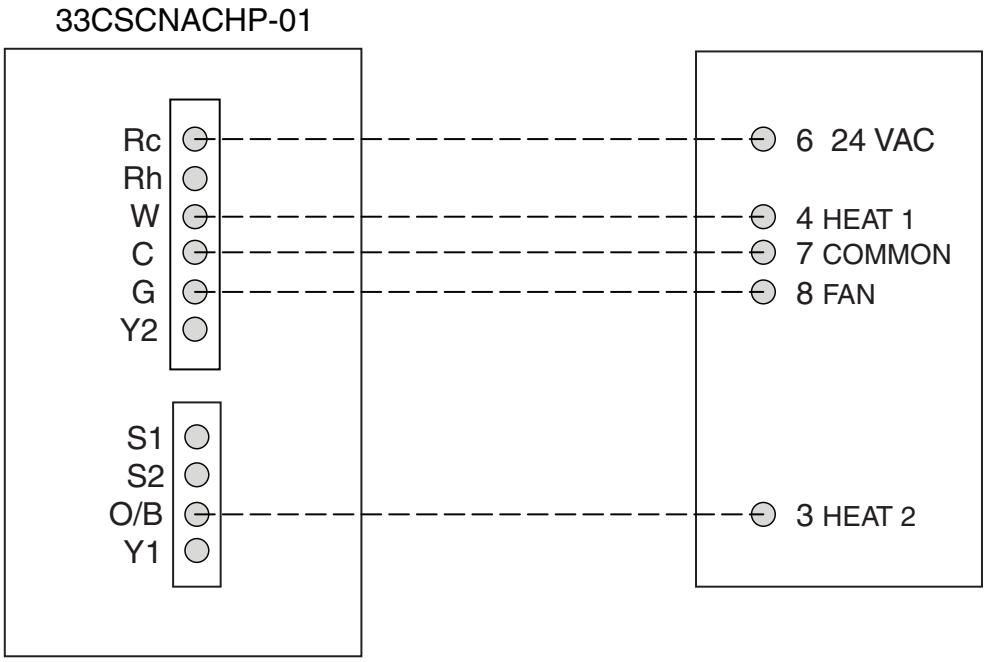


Fig. 8 — Thermostat Wiring — 42B Motor Controls — 3-Phase with Interlocking Disconnect and 2-Stage Electric Heater

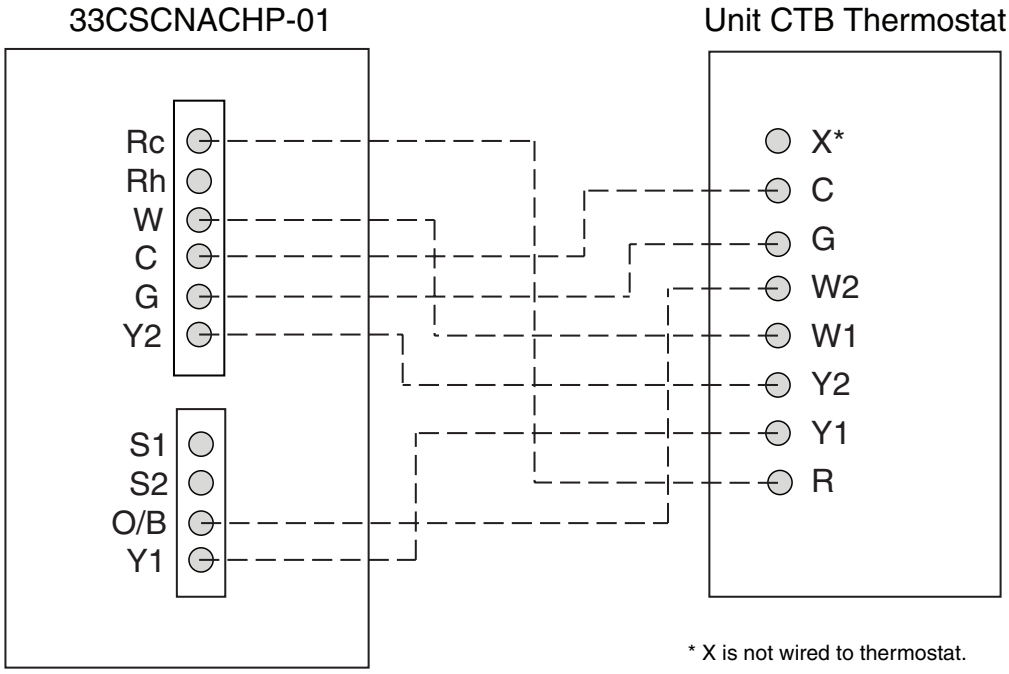


Fig. 9 — Thermostat Wiring — 48/50HC, 48/50TC, and 48/50LC04-06 Rooftop Units

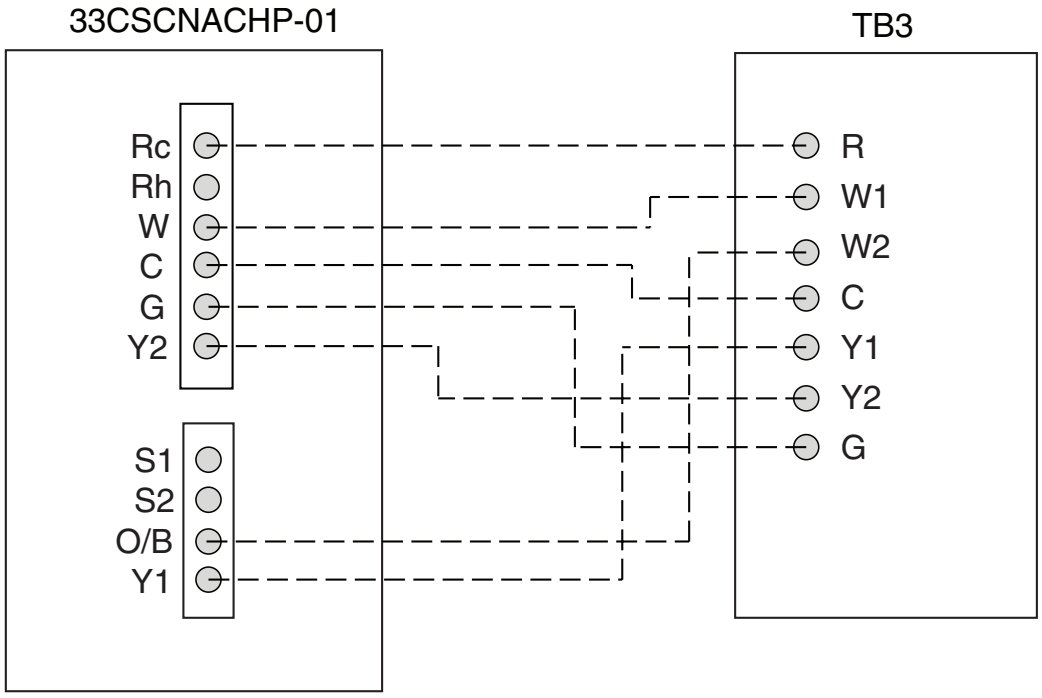
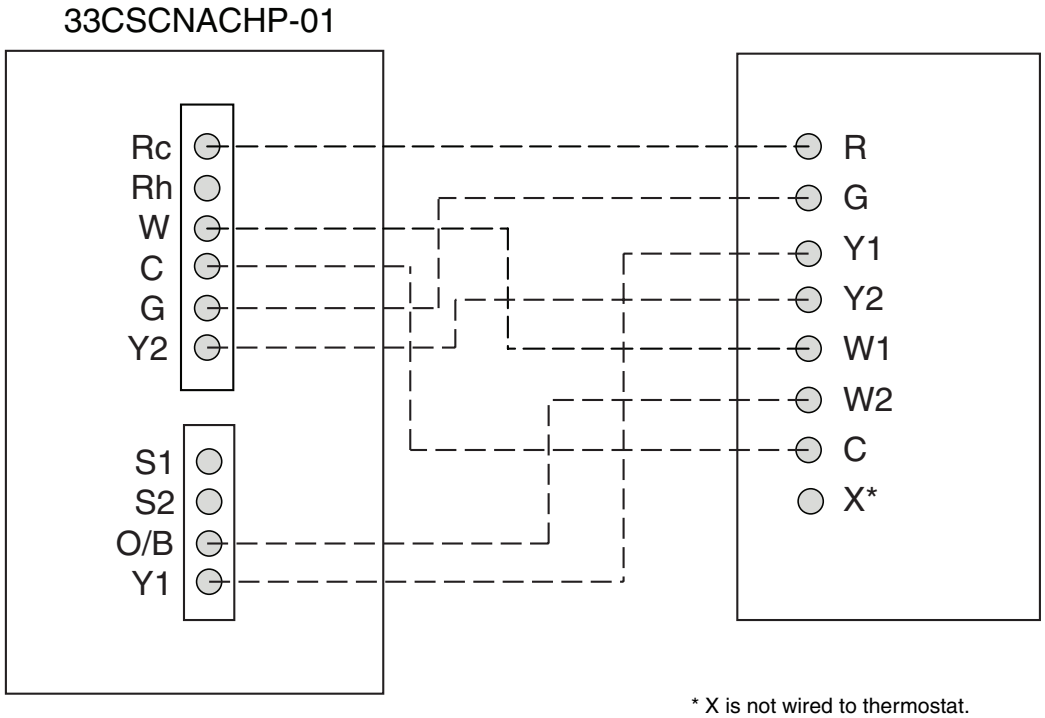


Fig. 10 — Thermostat Wiring — 50EJQ,EWQ024,028 Heat Pump Units



* X is not wired to thermostat.

Fig. 11 — Thermostat Wiring — 50HJQ004-016 Units

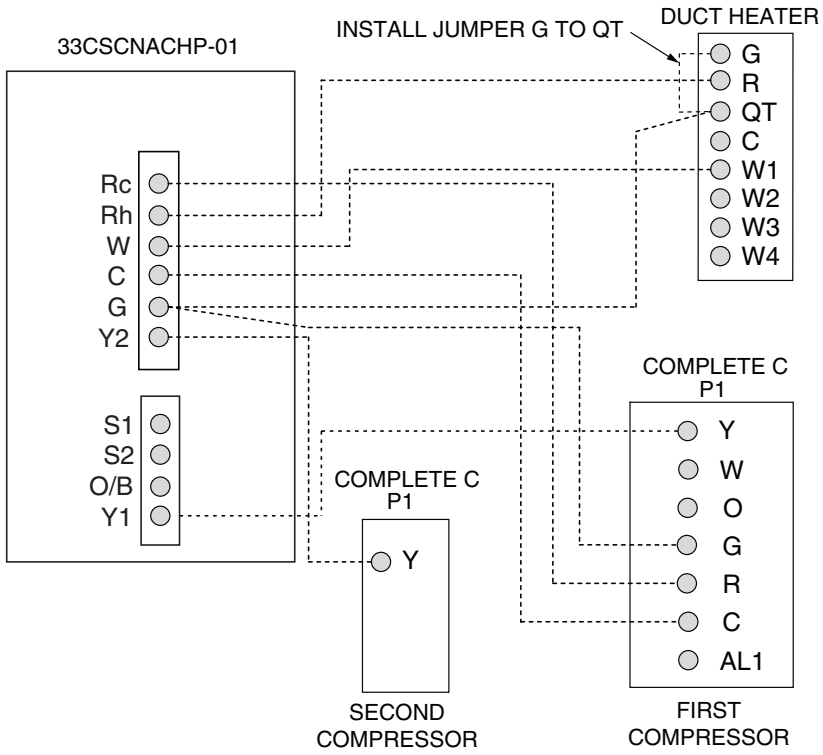


Fig. 12 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS, VQL Water Source Heat Pump Units with Complete C Controls and Duct Heating Option

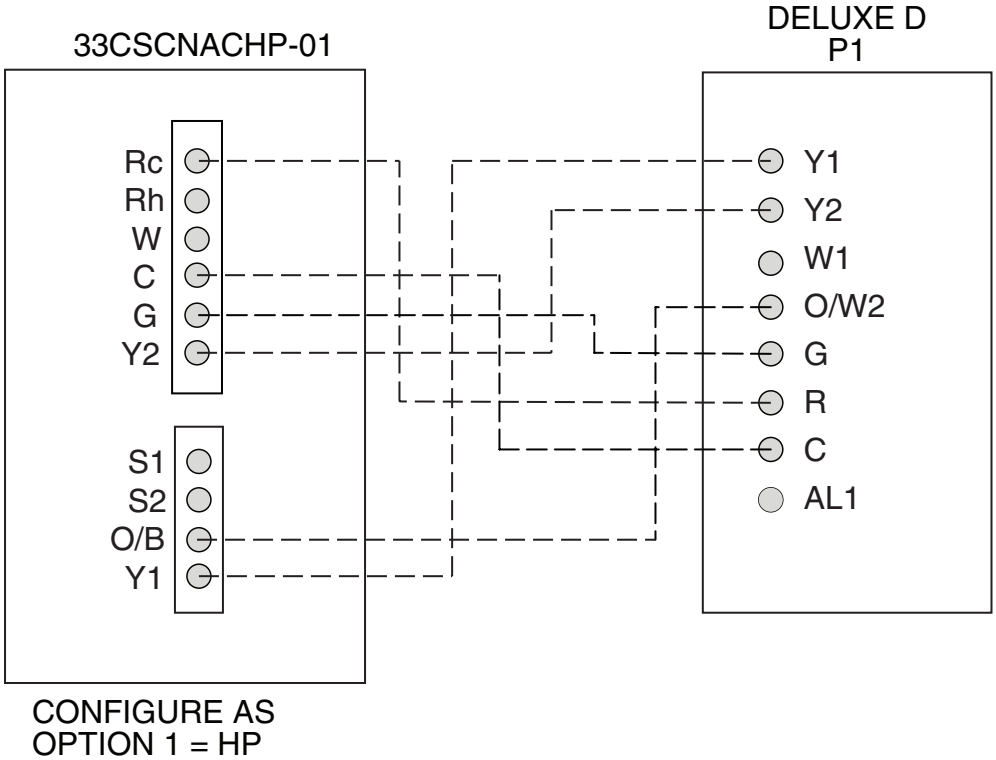


Fig. 13 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS, VQL Water Source Heat Pump Units with Deluxe D Controls

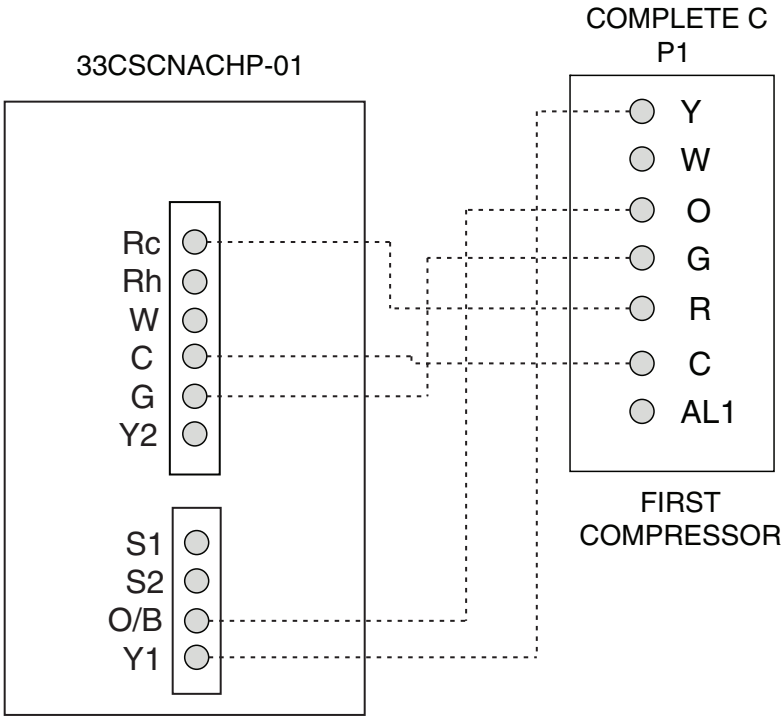


Fig. 14 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS,VQL Water Source Heat Pump Units with Complete C Controls

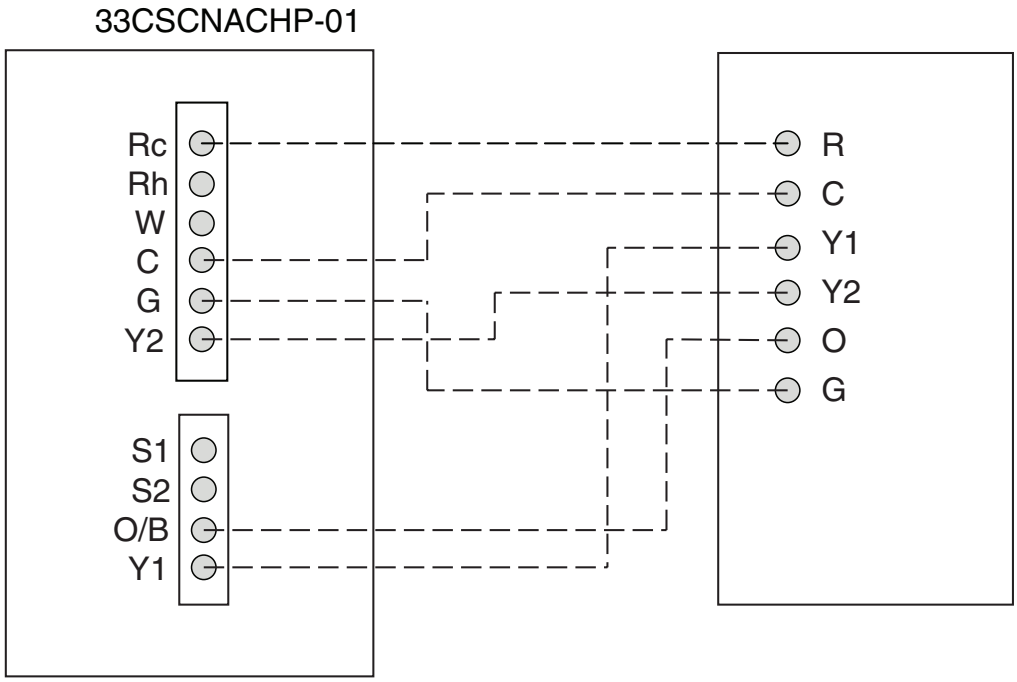
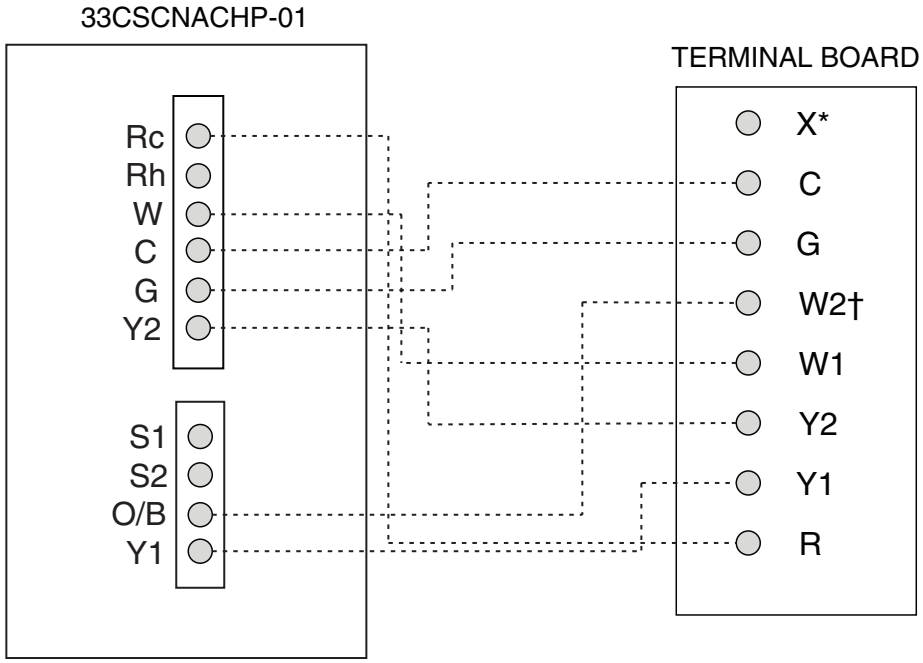
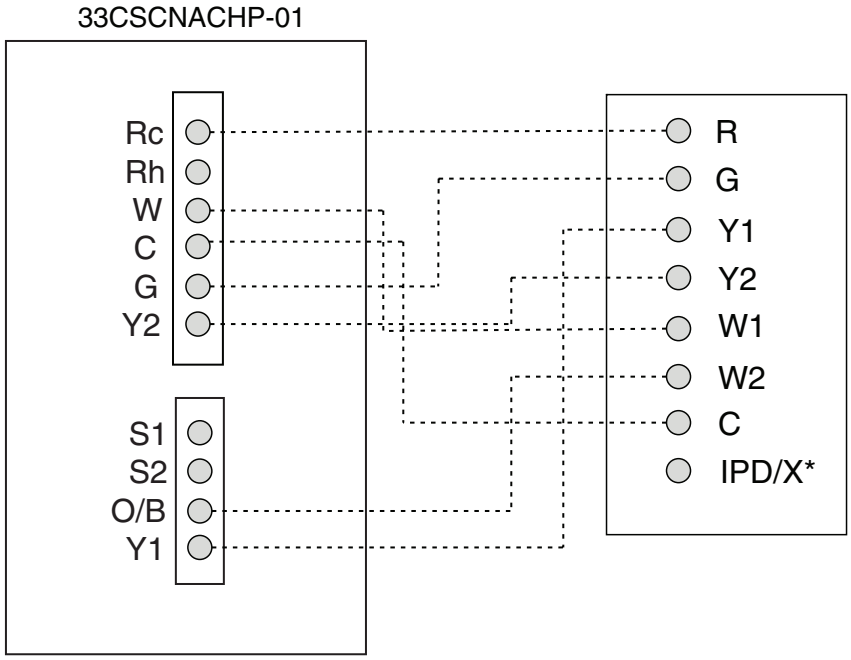


Fig. 15 — Thermostat Wiring — 50VS Water Source Heat Pump Units



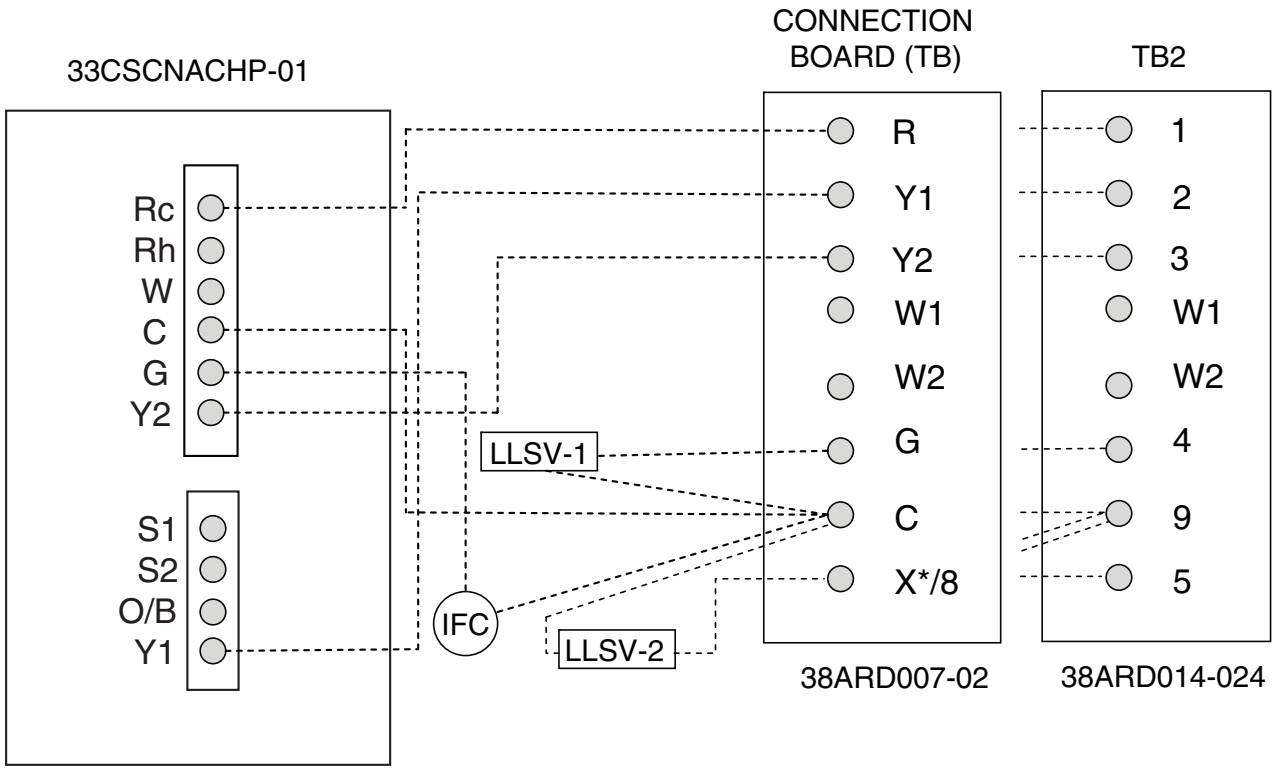
*Connection not required.
†W2 connection not required on units without electric heating.

Fig. 16 — Thermostat Wiring — 50HCQ,TCQ Rooftop Units



*Connection not required.

Fig. 17 — Thermostat Wiring — 50HJQ014,016 Heat Pump Units



*Connection not required.

LEGEND

IFC — Indoor Fan Contactor
LLSV — Liquid Line Solenoid Valve

Fig. 18 — Thermostat Wiring — 38ARD Commerical Split System Units

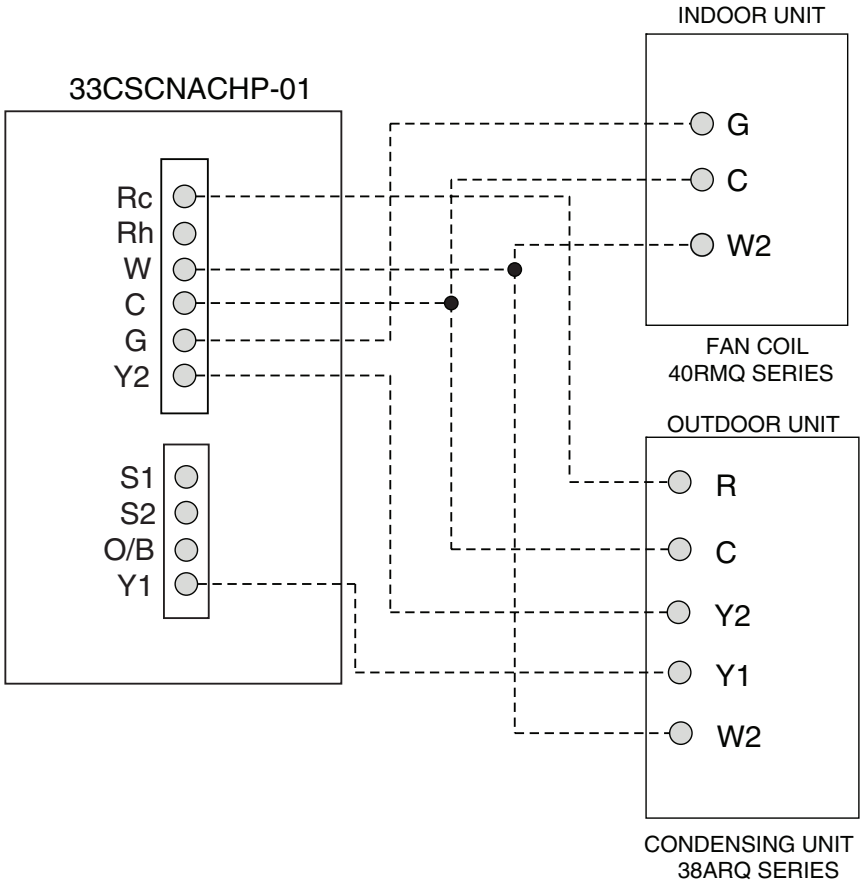


Fig. 19 — Thermostat Wiring — 38ARQ008-012 Series and 40RMQ008-012 Series Split System Units

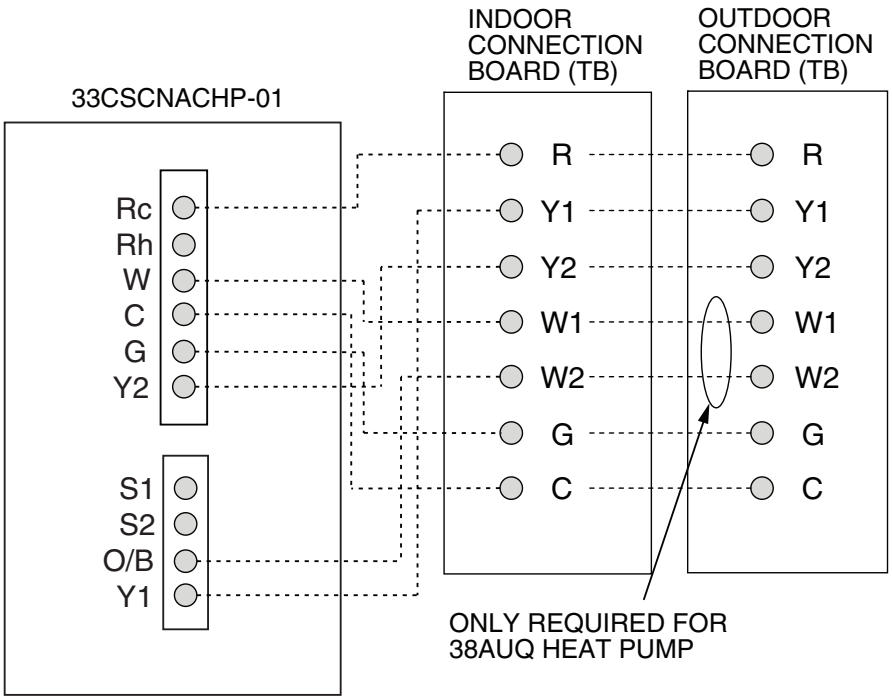


Fig. 20 — Thermostat Wiring — 38AU Commercial Split System Units with 40RUA Air Handler Units

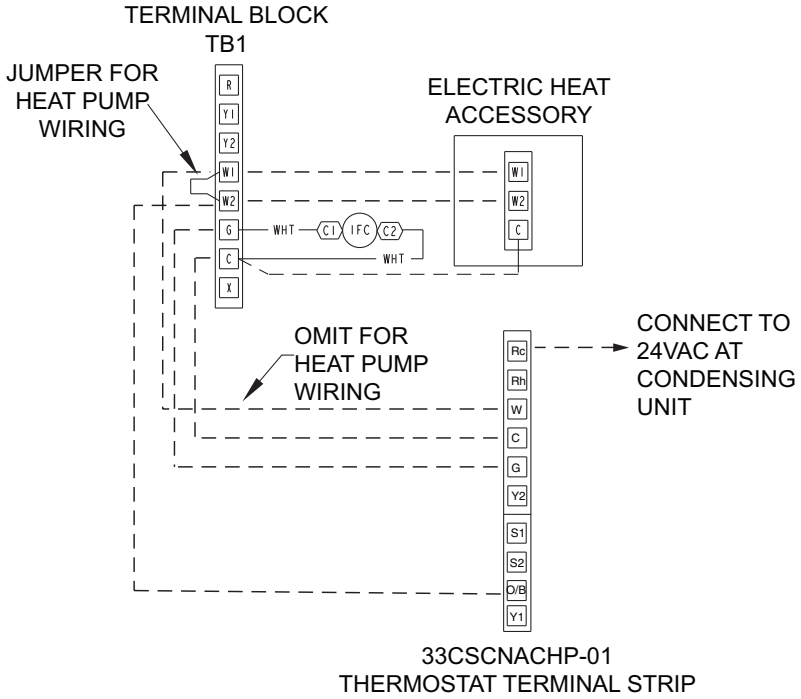


Fig. 21 — Thermostat Wiring — 40RU/38RU Packaged Air-Handler Units

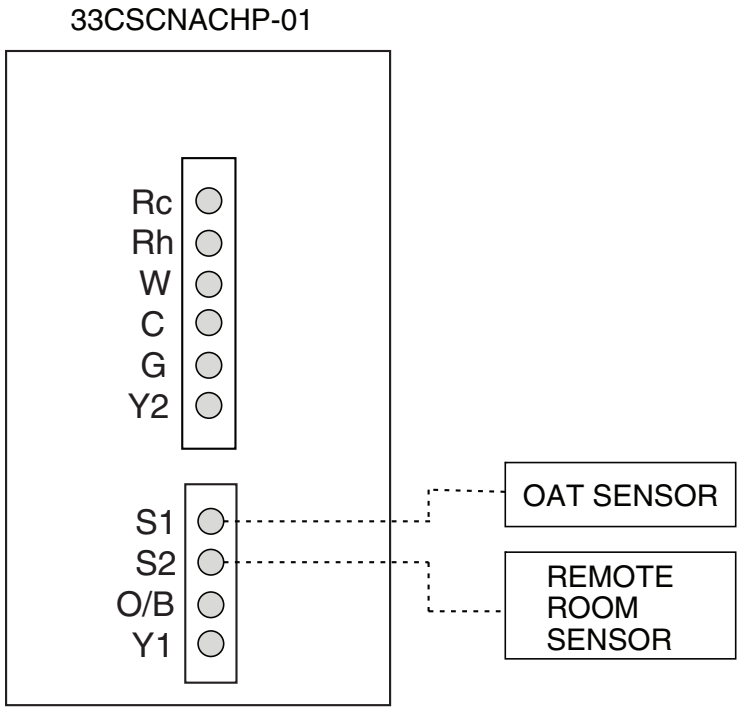


Fig. 22 — Thermostat Wiring — Outdoor Air Temperature and Remote Room Temperature Sensors

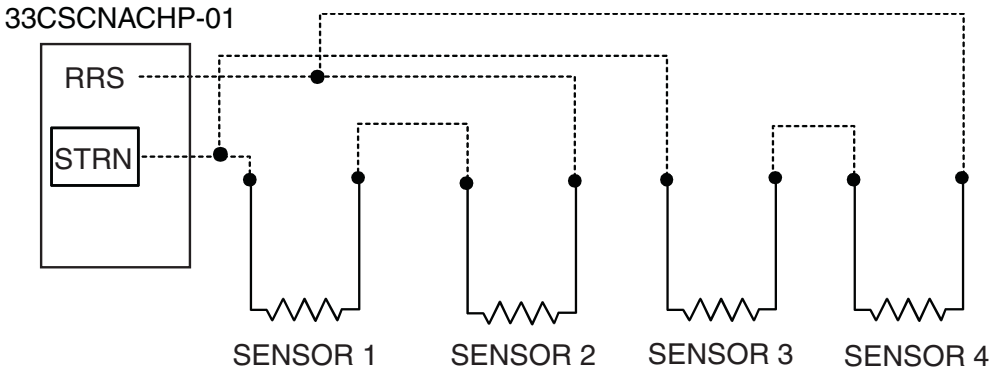


Fig. 23 — Thermostat Wiring — Space Temperature Sensor Averaging Wiring (4 Sensor Application)

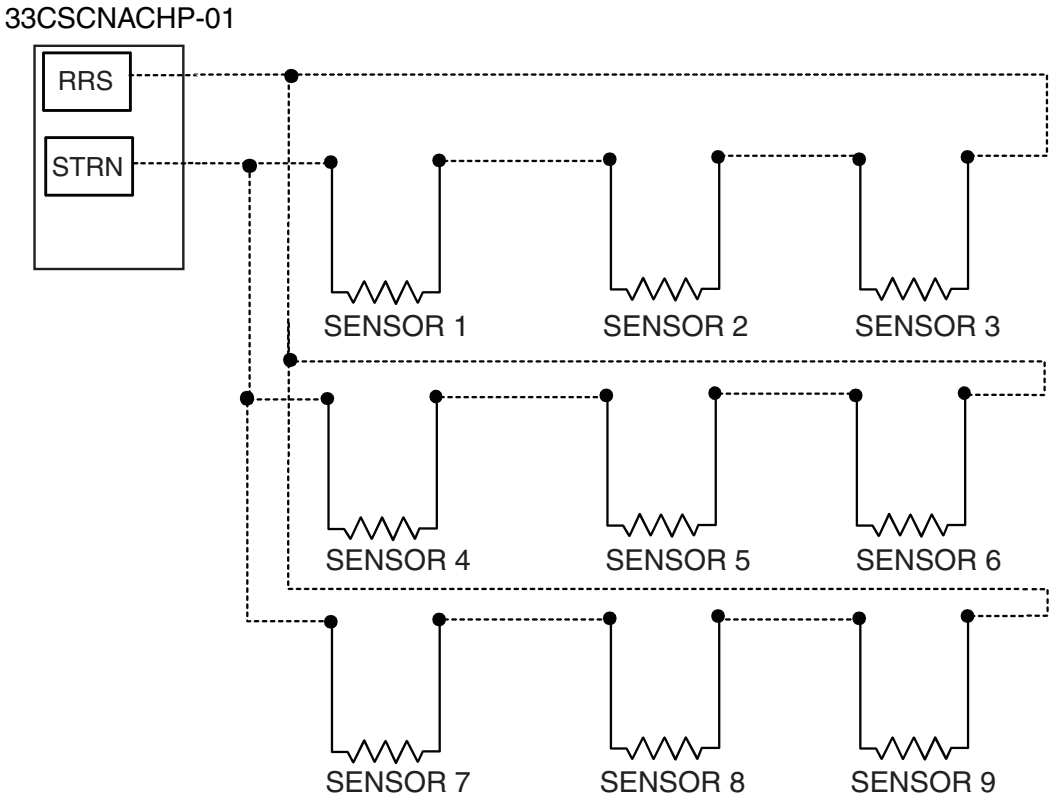


Fig. 24 — Thermostat Wiring — Space Temperature Sensor Averaging Wiring (9 Sensor Application)

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THERMOSTAT CONFIGURATION RECORD

INSTALLER

_____

PART NUMBER

_____

DATE

_____

HOLE IN WALL SEALED _____

MODE SETTINGS
MODE (Off, Heat, Cool, Auto, Em Heat) _____
HEATING SET POINT _____
COOLING SET POINT _____

CONFIGURATION OPTIONS	USER SETTING	DESCRIPTION
Option 01	_____	Equipment Type
Option 02	_____	Remote Sensor Selection
Option 03	_____	English/Metric
Option 04	_____	Fan (G) on with W Output
Option 05	_____	Space Temperature Sensing
Option 07	_____	Equipment DDC
Option 10	_____	Reversing Valve
Option 11	_____	Deadband between Heating and Cooling Set Points
Option 13	_____	Space Temperature Display Adjustment (Offset)
Option 15	_____	Auto Mode Availability
Option 16	_____	Maximum Cycles Per Hour
Option 17	_____	Time Between Equipment Stages
Option 18	_____	Backlight Configuration
Option 20	_____	Outdoor Air Temperature Display Adjustment (Offset)
Option 21	_____	Keypad Lockout
Option 26	_____	Minimum Cooling Set Point
Option 27	_____	Maximum Heating Set Point
Option 35	_____	Emergency Heat Mode Availability
Option 39	_____	Temperature Display
Option 99	_____	Reset Factory Defaults

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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