



Comfort™ Pro Programmable Commercial Thermostat

Installation Instructions

Part Number 33CSCPACHP-01

IMPORTANT: Read entire instruction before installing the thermostat.

CONTENTS

	Page
SAFETY CONSIDERATIONS	1
GENERAL	1
PACKAGE CONTENTS	2
INSTALLATION CONSIDERATIONS	2
Power	2
Wiring	2
Thermostat Location	2
INSTALLATION	2,3
CONFIGURATION	3-7
Setting Time and Day of the Week	4
Entering and Exiting Configuration Mode	4
Configuration Options	4
SYSTEM START-UP AND CHECKOUT	7,8
Installer Test Mode	7
Terminating Installer Test Checklist	8
PROGRAMMING THE THERMOSTAT	8,9
Changing Heating and Cooling Temperature Settings	8
Temporarily Override Program Schedule	8
Permanently Override Program Schedule with Hold Feature	8
Using OCC, UNOCC and LIMIT Buttons	8
Programming Schedules	9
OPERATION	9,10
Mode Selection	9
Power Up Processing	9
Batteries	9
Display Lighting	9
Door Switch	9
Remote Sensors	9
Mounting Options	10
O/B Terminal-On HP Thermostat Only	10
Timers	10
Five-Minute Compressor Timeguard	10
Minimum On Timer	10
Cycle Timer	10
Staging Timer	10
TROUBLESHOOTING	10
Space Temperature Sensor Failure	10
Fan Failure	10
Memory Failure	10
Equipment Outputs	10
WIRING DIAGRAMS	10-20
THERMOSTAT CONFIGURATION RECORD	CL-1

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 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). The 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.

The programming interface is a one touch interface, with the comfort selections Occupied, Unoccupied, and Limit (Energy Savings Mode). The user can adjust the heating and/or cooling set points for each of the three comfort selections.

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

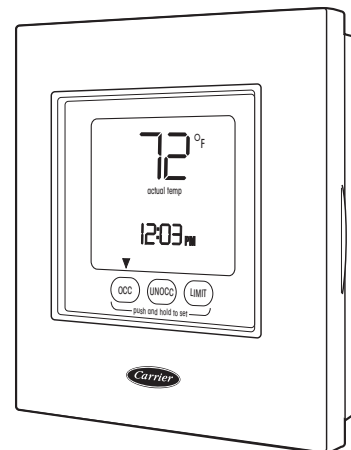


Fig. 1 — Comfort Pro Programmable Commercial Thermostat

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 AC 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 (R and W). 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 Gauge) 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 control 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.

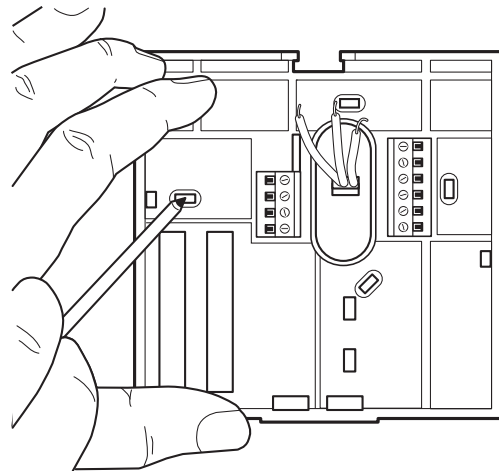


Fig. 2 — Backplate Mounting

5. Drill two $\frac{3}{16}$ -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 $\frac{1}{4}$ -in. (6 mm) of extra wire. Strip only $\frac{1}{4}$ -in. of insulation from each wire to prevent adjacent wires from shorting together when connected. See Fig. 2.

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.

- Match and connect equipment wires to proper terminals of the connector blocks (see Fig. 3 and 4). 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.

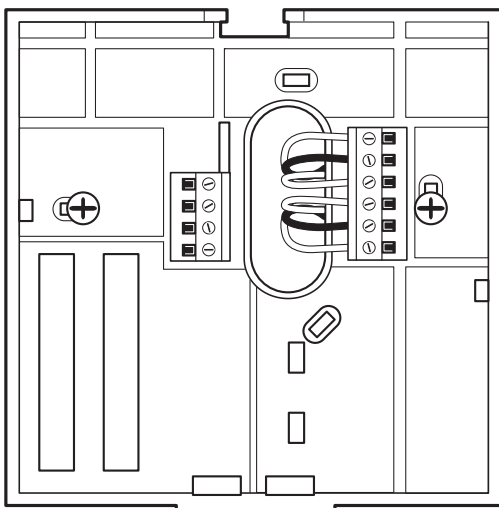


Fig. 3 — Secure Wires to Terminal Strip

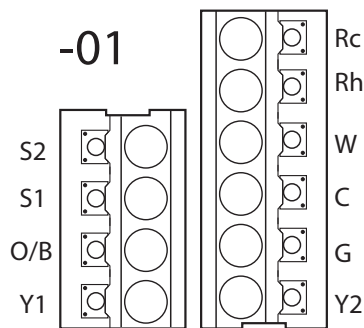


Fig. 4 — Terminal Strip

- Push any excess wire into wall and against backplate. Seal hole in wall to prevent air leaks. Leaks can affect operation.
- Attach thermostat to backplate by inserting tab on bottom edge and hinging up until top snap secures. See Fig. 5.
- Turn ON power to unit.

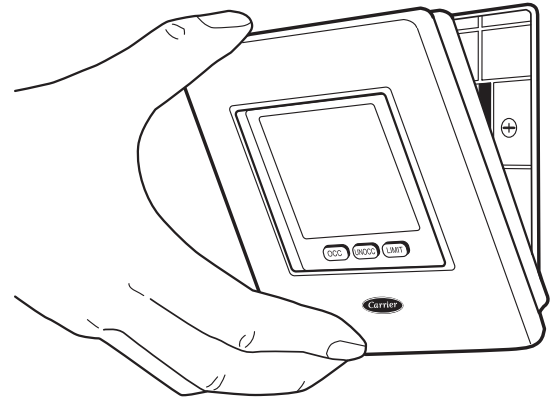


Fig. 5 — Attach Thermostat to Backplate

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 water source heat pump [WSHP]) (see explanation for 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
12	Smart Recovery
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
24	Programmable/Non-Programmable
25	Number of programmable periods per day
26	Minimum Cooling Set Point
27	Maximum Heating Set Point
35	Emergency Heat Mode Availability
36	Fan Selection
38	Override Timer Maximum
39	Temperature Display
99	Reset to Factory Defaults

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

Setting Time and Day of the Week — The installer must set the time and date before the thermostat's programming features can be used. Perform the following procedure:

1. Open the thermostat front panel door.
2. Press the **d/h/m** button located on the lower right under the display screen. The hours will be displayed.
3. Press the **up** or **down** button located to the right of the display to change the hours.
4. Pressing the **d/h/m** button again and the minutes will flash on the display.
5. Press the **up** or **down** button to change the minutes. Stop on the correct number.
6. Press the **d/h/m** button again and the day of the week will flash on the display.
7. Press the **up** or **down** button to change the day of the week. Stop on the correct day.
8. Press the **done** button or close the thermostat door.

Entering and Exiting Configuration Mode —

Press and hold the **fan** button for about 10 seconds. After the 10-second period the option number will appear in the heat set point location. The value of the configuration setting will be displayed in the cool 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
- 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 feet.

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 — 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.

When this value is changed, the Space Temperature Display Adjustment Offset (Option 13) is reset to zero.

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. 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 valve output (O/B) is energized when HEAT mode is selected.

C — The reversing valve 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 12 — SMART RECOVERY — Smart recovery is a function that transitions the space to the next programmed heating and cooling set points as energy efficiently as possible.

OF (off) means set points change precisely at setback recovery time. A value of 30, 60, or 90 selects the number of minutes that recovery starts before programmed recovery time. Recovery takes place smoothly during the selected recovery time, ending at the recovery time and temperature which is programmed. The HOLD function needs to be off in order for this to work correctly.

Selection: OF, 30, 60, 90

Default: 90

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 (set point 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.

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.

Selection: 10, 15, 20, 25

Default: 15

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. When this option is changed from OF to either 1, 2, 3 or cd, an access code will be need to be entered (see instructions below). Once entered, the thermostat will lock with that code and whatever security level (1, 2, 3 or cd) is selected by the installer as noted below.

NOTE: The option number and setting for code 21 will move to the large temperature display to allow the keypad code to be entered. The **mode** button will still move between the option number and the value setting. The **OCC** and **LIMIT** buttons in conjunction with the **up** or **down** button will facilitate code entry. Pressing the **mode** key at any time will return to the option value field (large digits).

Selection: OF(F), 1, 2, 3, cd

OF — User has full access to the keypad

1 — User has access to modify set points and time of day

2 — User can change set points only

3 — User cannot change any operating parameters

cd — Entire keypad is locked

1 — Without Unlock Code

To activate the locking code at level 1 without an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 01.

2. Press the **mode** button again and the 21 will flash. Use the **up** or **down** button to move to next option number.

When this option is chosen, the user has access to modify the set points (within the set point limits of Option 26 and Option 27), and the time of day. The occupied (**OCC**) button will be functional. The **hold** button will be locked out. The padlock icon will be on until the user presses and holds **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.

1 — With Code

To activate the locking code at level 1 with an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 01.
2. Press the **OCC** button to change the left dashes (- -) to a number between 0 and 19. Press the **LIMIT** button to change the right dashes to a number between 0 and 99. Make sure to record the numbers that have been entered.

When this option is chosen, the thermostat will be completely locked and the padlock icon will be on steady. Once the unlock code has been entered and the **done** button is pressed, the padlock icon flashes and the thermostat functionality operates as described above in the "1 — Without Unlock Code" description.

2 — Without Unlock Code

To activate the locking code at level 2 without an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 02.
2. Press the **mode** button again and the 21 will flash. Use the **up** or **down** button to move to next option number.

When this option is chosen, the user has access to change the set points only. The **hold** button will be locked out. The **OCC** button is functional. The padlock icon will be on 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.

2 — With Code

To activate the locking code at level 2 with an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 02.
2. Press the **OCC** button to change the left dashes (- -) to a number between 0 and 19. Press the **LIMIT** button to change the right dashes to a number between 0 and 99. Make sure to record the numbers that have been entered.
3. Press the **mode** button again and the 21 will flash. Use the **up** or **down** button to move to next option number.

When this option is chosen, the thermostat will be completely locked and the padlock icon will be on steady. Once the unlock code has been entered and the **done** button has been pressed, the padlock icon flashes and the thermostat functionality operates as described above in the "2 — Without Unlock Code" description.

3 — Without Unlock Code

To activate the locking code at level 3 without an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 03.
2. Press the **mode** button again and the 21 will flash. Use the **up** or **down** button to move to the next option number.

When this option is chosen, the entire keypad will be locked. When the user presses a button, the backlight turns on to maximum brightness for 10 seconds but none of the thermostat operating parameters can be changed. The padlock icon will be on 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.

3 — With Code

To activate the locking code at level 3 with an unlock code, perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until coming to the number 03.
2. Press the **OCC** button to change the left dashes (- -) to a number between 0 and 19. Press the **LIMIT** button to change the right dashes to a number between 0 and 99. Make sure to record the numbers that have been entered.
3. Press the **mode** button again and the 21 will flash. Use the **up** or **down** button to move to the next option number.

When this level is chosen, the thermostat will be completely locked and the padlock icon will be on steady. Once the unlock code has been entered and the **done** button has been pressed, the padlock icon flashes and the thermostat functionality operates as described above in the "3 — Without Unlock Code" description.

cd — Code Only

To activate the locking code at level cd (code only), perform the following:

1. Press the **mode** button to change the flashing icon from the option number 21 to the security level number. Press the **up** or **down** button until cd is displayed.
2. Press the **OCC** button to change the left dashes (- -) to a number between 0 and 19. Press the **LIMIT** button to change the right dashes to a number between 0 and 99. Make sure to record the numbers that have been entered.

When this level is chosen, the entire keypad will be locked and the padlock icon will be displayed. When the user presses a button, the backlight turns on to maximum brightness for 10 seconds and a "-- --" is shown in the clock display. The user enters the unlock code and presses the **done** button to unlock the thermostat. The padlock icon turns off and the user has full access to the thermostat functionality. The thermostat locks after no buttons have been pressed for two minutes.

The following applies to all levels of keypad lockout other than OFF:

1. The keypad will not lock itself if the thermostat is operating in installer configuration, user configuration or installer test.
2. When the user exits either installer configuration or user configuration, the thermostat keypad will lock immediately if the keypad lockout level is set to any value other than OFF.

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 days and the set clock 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)

OPTION 24 — PROGRAMMABLE/NON-PROGRAMMABLE — This allows the installer to configure the thermostat to operate as either programmable or non-programmable. When nP is selected, the clock is displayed, but the program schedule, the hold, smart recovery and day of the week functionality are disabled. The "hold" and "temporary hold" icons are inactive.

Selection: P, nP

Default = P

OPTION 25 — NUMBER OF PROGRAMMABLE PERIODS — This allows the installer to configure the thermostat for two or four periods per day. This configuration is not available if Option 24 has been set to nP to configure the thermostat for non-programmable operation.

Selection: 2,4

2 — Periods P1 (OCC) and P2 (UNOCC) are available

4 — Periods P1 (OCC), P2 (OCC), P3 (OCC) and P4 (UNOCC) are available.

Default: 4

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 Em heat (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.

Selection: OF(F), ON

Default: ON

OPTION 36 — FAN SELECTION — This configuration allows the installer to configure the fan selection allowed during the occupied and unoccupied period.

When ON is selected, the fan will operate continuously during occupied periods, and during the unoccupied periods the fan will be set to auto to run only when the heating or cooling equipment is energized.

When OF(F) is selected, the user can adjust the fan setting between On and Auto for both occupied and unoccupied periods.

NOTE: The OF(F) selection is a violation of ASHRAE 90.1 and Title 24 but is a feature of the thermostat for building owners that mandate auto fan operation during occupied periods

for energy conservation purposes. It is possible that an error code of E7 may appear on the screen if this option is set to ON and the user is trying to change the fan mode.

Selection: OF(F), ON

Default: ON

OPTION 38 — OVERRIDE TIMER MAXIMUM — This setting allows the installer to set the maximum override time between 0:15 and 6:00. The adjustment can be made in 15-minute increments. The maximum number of hours is 6:00.

Pressing the **up** button while in this configuration mode will increment the override time in 15-minute steps (15, 30, 45). The hours will increment during each pass through 00 minutes to a maximum setting of 6:00.

Pressing the **down** button while in this configuration mode will decrement the override time in 15 minute steps (45, 30, 15, 00). The hours will decrement during each transition from 45 to 00 to a minimum of 0:15.

Selection: 0:15 to 6:00

Default: 2:00 (two hours and zero minutes)

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 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 settings, modes, 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 0. When the counter reaches zero, "Fd" is displayed in the large space temperature display area to note that factory defaults are in progress. When the factory defaults have been restored, the thermostat will act as if power was cycled (all display icons are lit for 2 seconds) and the clock will be flashing. Follow the instructions in the Setting Time and Day of Week section.

NOTE: If the **down** button is released early, the number will return to 10 and the reset will not occur.

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 about 15 seconds until the display reads “In” on the left and “St” on the right. The mode will be set to off. The **mode** button (upper left) can now be used to select heat, cool, or emergency heat. Selecting one of the available modes will immediately command the equipment to turn on in that mode. It will run for 3 minutes on equipment stage and then return the mode to off. The clock display counts down from 180 seconds while each stage operates. Changing the mode to off will terminate any running test immediately. During any test, the display icons will be displayed the same as for normal operation of that stage, as shown in Table 2.

Table 2 — Installer Test

SELECTED MODE	DISPLAY ICONS
OFF	off
COOL	cool on, 2 (for second stage cooling)
HEAT	heat on, aux heat on
EM HEAT	aux heat on

Terminating Installer Test — To terminate the Installer Test mode, press the **done** button. After 15 minutes of no button presses by the installer, installer test is terminated.

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, operating mode, and possibly program schedule must be properly selected.
3. Put away tools and instruments and clean up debris.
4. Review and leave Owner's Manual with customer.

PROGRAMMING THE THERMOSTAT

Changing Heating and Cooling Temperature Settings — Perform the following procedure to change the heating and/or cooling set points:

1. Open the thermostat front panel door.
2. Press the **up** or **down** button located on the right side of the display. The preset temperature settings for heating and cooling are displayed. The word “heat” or “cool” will flash.
3. Press the **up** or **down** button to change the heat or cool setting. Stop on the correct setting. The Temporary Hold icon will be displayed below the temperature and the clock will show a 0:15 minute override time.
4. Close thermostat door. Follow the steps below to either temporarily use these settings for a specified period of time and then return to the program schedule or permanently use these settings instead of the program schedule.

Temporarily Override Program Schedule — Perform the following procedure to temporarily override the program schedule:

1. Open the thermostat front panel door.
2. To change the temporary override time displayed in the clock location, press the **start time** button. Each press of the **start time** button increments the override time by 15 minutes up to the maximum value set in Option 38. The temporary hold remains active until a power cycle is encountered, the override time has expired, off mode is

selected, or the user presses the **hold/run** button. Once the temporary hold has counted down to zero, the override will be considered inactive and the set point will reflect the program schedule set point.

3. Close the thermostat door.

To cancel the temporary override, press the **hold/run** button once to turn on the hold feature and then press the **hold/run** button again to cancel hold and run the program schedule.

Permanently Override Program Schedule with Hold Feature — Perform the following procedure to override the programmed temperature settings and hold the temperature at a specific setting:

1. Open the thermostat front panel door.
2. Press the **hold/run** button. This will hold the current comfort setting and the program schedule will be ignored as long as the hold remains active.
3. Close the thermostat door.

To turn off the hold feature, press the **hold/run** button again. The set points will change to the program schedule values.

Using OCC, UNOCC and LIMIT Buttons — When the user presses the **OCC**, **UNOCC**, or **LIMIT** button, the preset temperature settings will be viewed and a triangle icon will appear above the **OCC**, **UNOCC**, or **LIMIT** button indicating which presets are being used.

The **LIMIT** button is used for an occupied period with settings that are less conditioned than the occupied (**OCC**) settings but more conditioned than the unoccupied (**UNOCC**) settings. This is used as an occupied energy savings function.

The default set points for the Comfort settings (**OCC**, **UNOCC** and **LIMIT**) are listed in Table 3.

Table 3 — OCC, UNOCC, and LIMIT Settings

ONE-TOUCH SETTING	HEAT SET POINT	COOL SET POINT
OCC	68	78
UNOCC	60	85
LIMIT	66	80

The set points for the **OCC**, **UNOCC**, and **LIMIT** One-Touch functions can be modified from their factory defaults using the following procedure:

1. Open the thermostat front panel door. The heat or cool icon flashes indicating to the user that pressing the **up** or **down** button will change the set point value above the flashing icon.
2. Change the set point of the flashing mode by pressing the **up** or **down** button. The heat or cool icon and the triangle icon above the **OCC**, **UNOCC**, and **LIMIT** button will flash.
3. If desired, change the set point of the opposite mode by pressing the **mode** button until the opposite mode icon is flashing. The opposite mode icon and the triangle icon above the **OCC**, **UNOCC**, and **LIMIT** button flashes.
4. Press the **up** or **down** button to change the opposite mode set point.
5. Then press and hold either **OCC**, **UNOCC**, or **LIMIT** button for 3 seconds. The triangle icon above the **OCC**, **UNOCC**, or **LIMIT** button will stop flashing and remain on.

NOTE: This function will not be allowed if keypad lock 3 or cd is enabled. This will be allowed if the keypad lock is disabled or set to 1 or 2.

6. Close thermostat door.

Programming Schedules — The Comfort Pro programmable thermostat gives the user the option of programming for all days, weekdays or weekends. The thermostat is preprogrammed at the factory with the same settings for all seven days. See Table 4.

Table 4 — Schedule Factory Settings

PERIOD	START TIME	HEAT SET POINT	COOL SET POINT
OCC	6 AM	68	78
OCC	8 AM	68	78
OCC	3 PM	68	78
UNOCC	6 PM	60	85

To set up different schedule, perform following procedure:

1. Open the thermostat front panel door.
2. Press the **set schedule days** button until the screen displays the programming method of **all days**, **weekdays** or **weekend** icons at the right of the screen. Press the **up** or **down** button to change as necessary to the desired programming selection icon.
3. Press the **period** button to continue programming the thermostat. The periods are displayed as **P1** through **P4** (OCC, OCC, OCC, UNOCC) if Option 25 was set to 4 periods/day or **P1** through **P2** (OCC, UNOCC) if Option 25 was set to 2 periods/day. Press the **period** button to display the next programmable period.
4. As each period is displayed, the comfort setting that is used for that period is displayed, along with whether it is in the occupied, unoccupied or limit configuration as shown by the triangle over the **OCC**, **UNOCC** or **LIMIT** buttons. Change the **OCC**, **UNOCC** or **LIMIT** configuration by pressing the appropriate button and the triangle will move to that setting.
5. To change the time for a period, press the **start time** button and use the **up** or **down** button to change the hours.
6. Press the **start time** button again to change the minutes using the **up** or **down** button.
7. To go to the next programming period press the **period** button twice. Enter in the changes for all of the periods as described in Steps 4, 5 and 6 above.
8. Press the **done** button when complete.
9. Close the thermostat door.

NOTE: Once a change is made to the programming schedule, it is saved when the user moves along to the next programming interval or level. Changes within a given programming period are considered temporary changes that require user confirmation by either closing the door or pressing the **done** button which would confirm any changes made up to that point.

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 emergency heat availability from Option 35. Available choices are listed in Table 5.

Table 5 — 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

Power Up Processing — Immediately following a power cycle, the thermostat display will light all LCD segments for two seconds. During this process, the thermostat memory will be accessed to establish thermostat operating parameters.

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 the door is opened and/or 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.

Door Switch — When the door is opened, the display changes from its normal operation view. The large temperature display disappears so it will be available for other user functions. If the door is left open for 3 minutes, the display reverts to normal operation.

Remote Sensors — Pressing the **up** and **down** buttons simultaneously displays the temperature of the sensor connected to the S1 and S2 terminals and the sensor usage as defined by Option 02 in the cool set point display.

If the sensor is invalid, then the display will show "-" in the large temperature display digits and the cool set point display will be blank.

If the sensor is valid but Option 02 is set to rS and Option 39 is set to SP then the display will show "-."

Fig. 6 shows Option 02 set to outdoor air (Od) and the sensor temperature reading of 72 degrees. The remote sensor temperature will be displayed for five seconds and then the thermostat returns to normal operation.

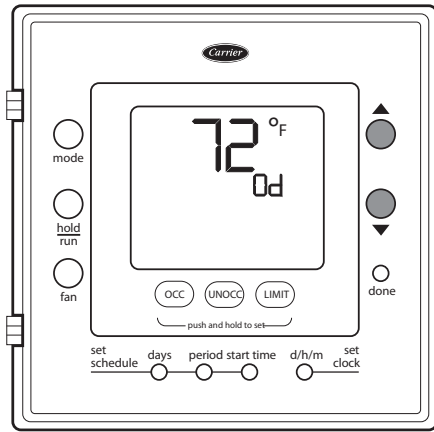


Fig. 6 — Remote Sensor Temperature

Any buttons that are pressed while the remote sensor temperature is being displayed will be ignored.

NOTE: Carrier sensors 33ZCT55SPT, 33ZCSENDAT, 33ZCSENSAT, and 33ZCSENSOAT 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.

Mounting Options — For those installations requiring it, mounting hole locations for the programmable model are spaced to fit either a horizontal or vertical junction box.

O/B Terminal-On HP Thermostat Only — This terminal is normally connected to the reversing valve of the heat pump. It is called O when the valve is energized in cooling and B when it is energized in heating. Option 10 of the Configuration Options makes the O/B selection.

Timers — There are several timers which influence the thermostat's operation. If any of the timers listed below is preventing the equipment from turning on, the display icons, which show the equipment is operating, will be flashing to indicate a turn-on delay is present.

Five-Minute Compressor Timeguard — The timeguard timer is set to 5 minutes at power up and any time the compressor turns off. The compressor cannot turn on until the timeguard timer has expired.

After a power cycle, a randomized delay will be added to the end of the timeguard timer to prevent multiple units from hitting the power grid all at the same time. The randomization timer is between zero and five minutes. If a demand exists, compressor outputs energize between 5 and 10 minutes after the power cycle.

NOTE: The timeguard can be defeated for one cycle by simultaneously pressing the **fan** and **up** keys. The indication of a flashing heat or cool icon means that there is a demand in the space but the equipment is being held off due to the timeguard timer.

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. It serves to impose 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 will control 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 6 can be used as a troubleshooting tool for determining which outputs will be active for a particular configuration and operating mode.

Table 6 — 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. 7-25.

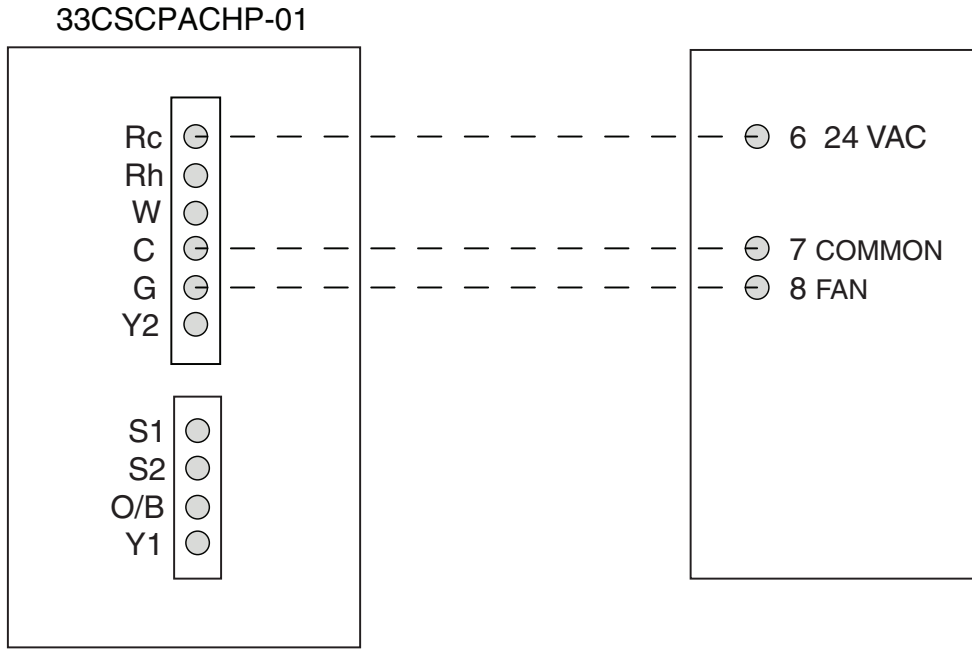


Fig. 7 — Thermostat Wiring — 42B Motor Controls — Single-Phase Only, 3-Phase Only, Single-Phase with Interlocking Disconnect, and 3-Phase with Interlocking Disconnect

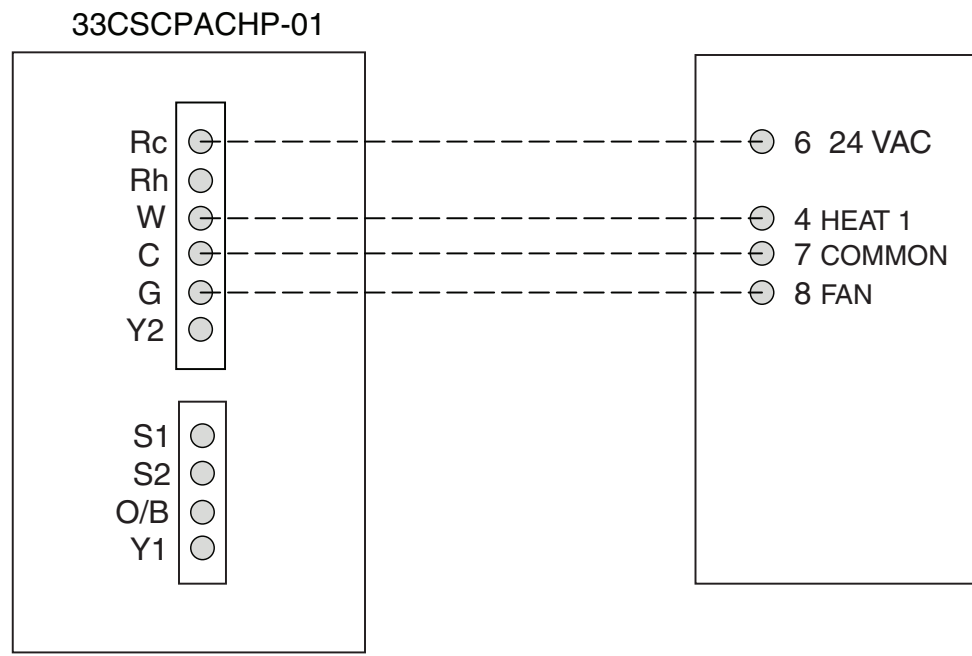


Fig. 8 — Thermostat Wiring — 42B Motor Controls — Single-Phase and 3-Phase with Interlocking Disconnect and Single-Stage Electric Heater

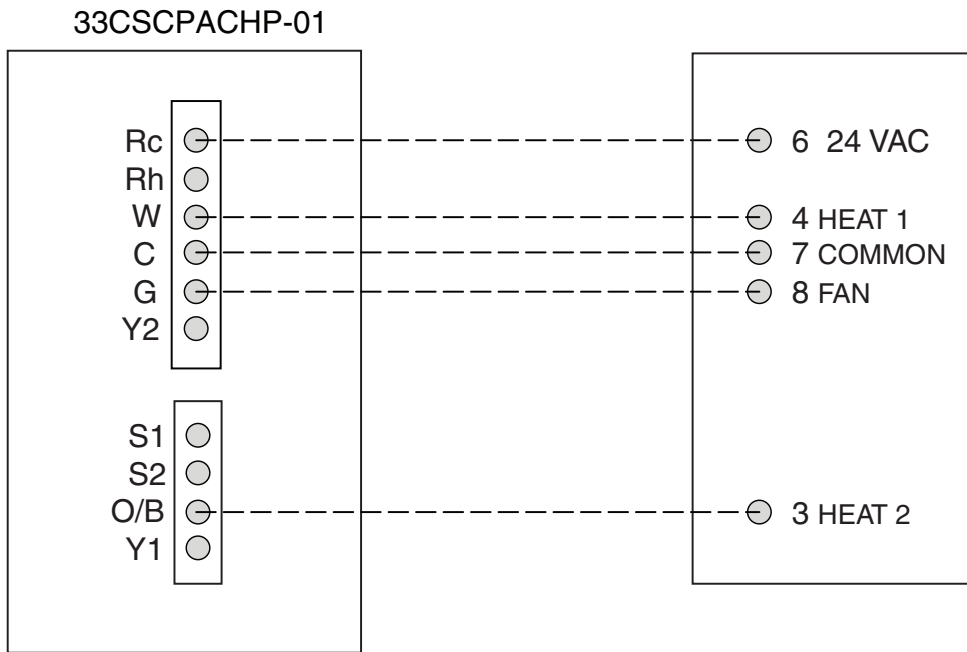


Fig. 9 — Thermostat Wiring — 42B Motor Controls — 3-Phase with Interlocking Disconnect and 2-Stage Electric Heater

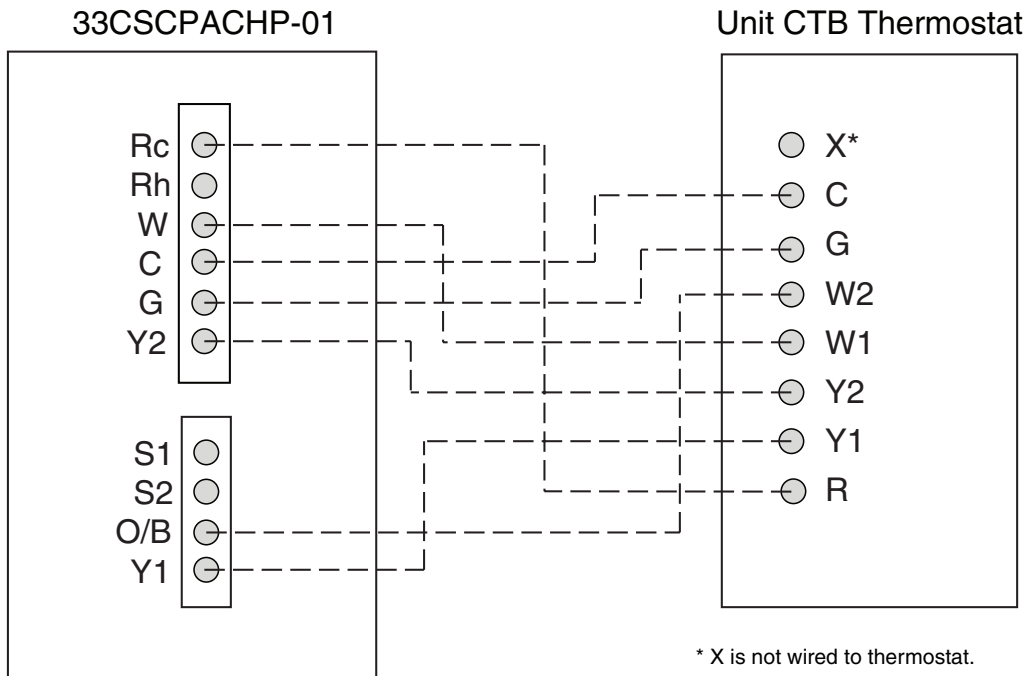


Fig. 10 — Thermostat Wiring — 48/50HC, 48/50TC, and 48/50LC04-06 Rooftop Units

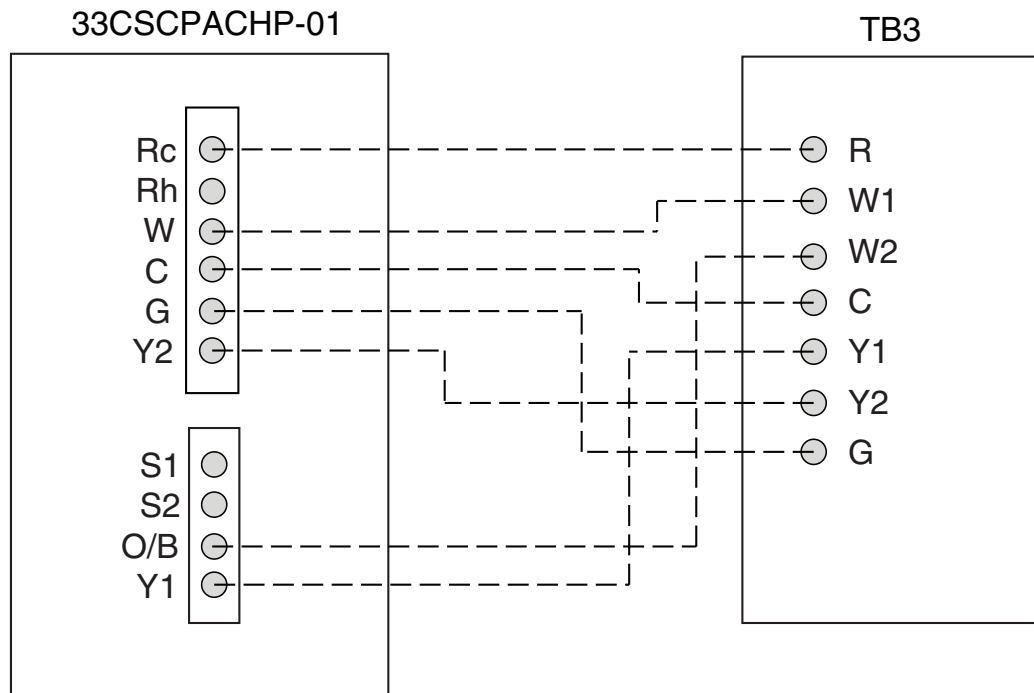


Fig. 11 — Thermostat Wiring — 50EJQ, EWQ024, 028 Heat Pump Units

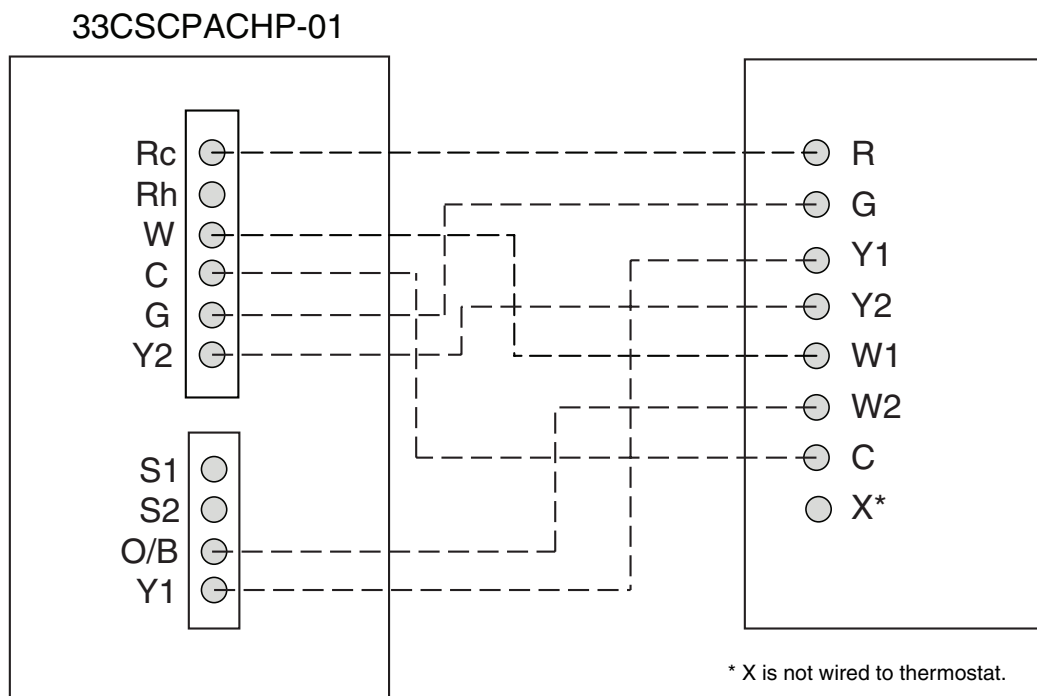


Fig. 12 — Thermostat Wiring — 50HJQ004-016 Units

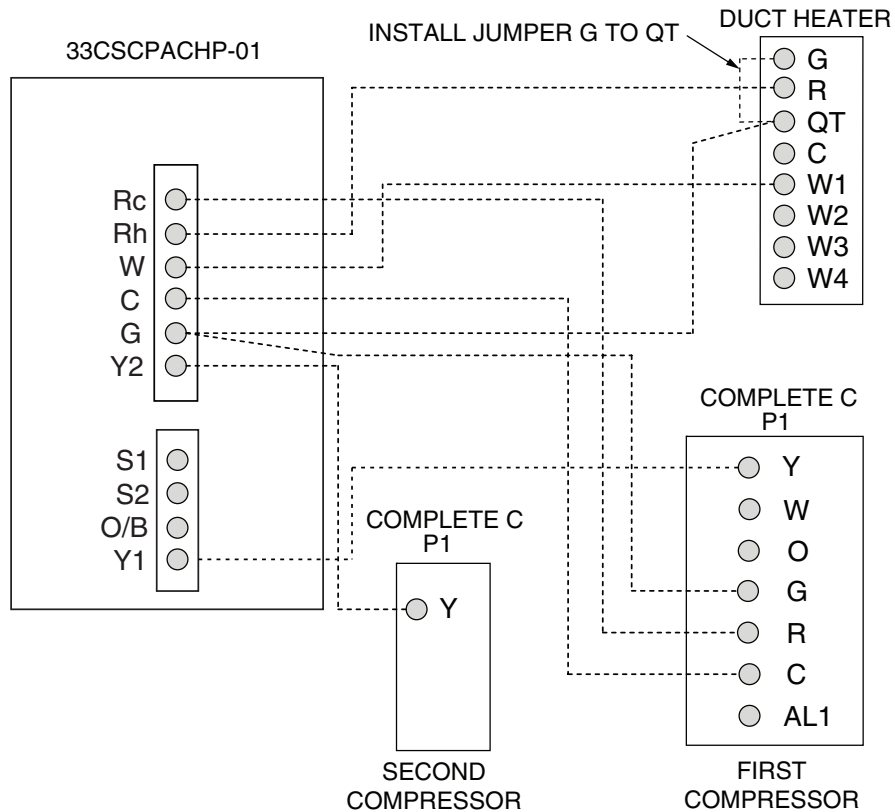


Fig. 13 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS, VQL Water Source Heat Pump Units with Complete C Controls and Duct Heating Option

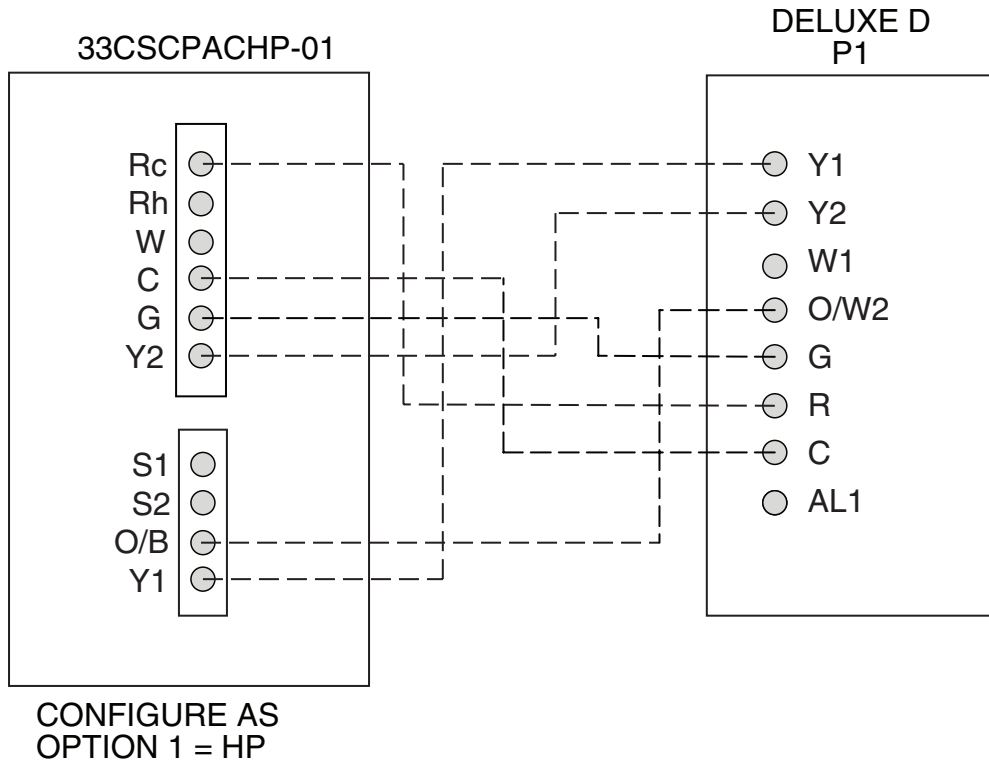


Fig. 14 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS, VQL Water Source Heat Pump Units with Deluxe D Controls

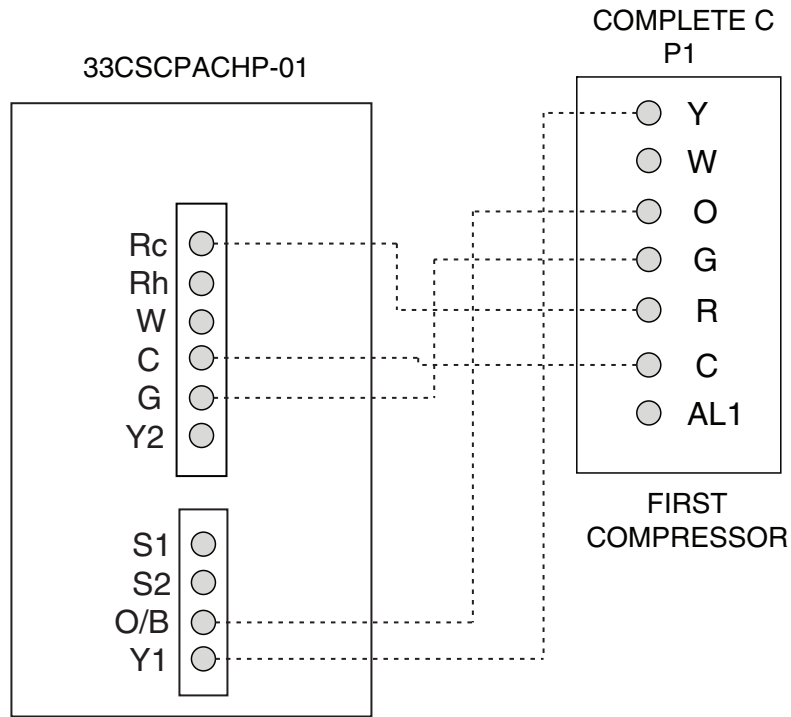


Fig. 15 — Thermostat Wiring — 50HQL, KQE, KQL, P1, PC, PEC, PS, PSW, PT, RHC, RHE, RHR, RHS, RTG, RVC, RVE, RVR, RVS, RWS, VQL Water Source Heat Pump Units with Complete C Controls

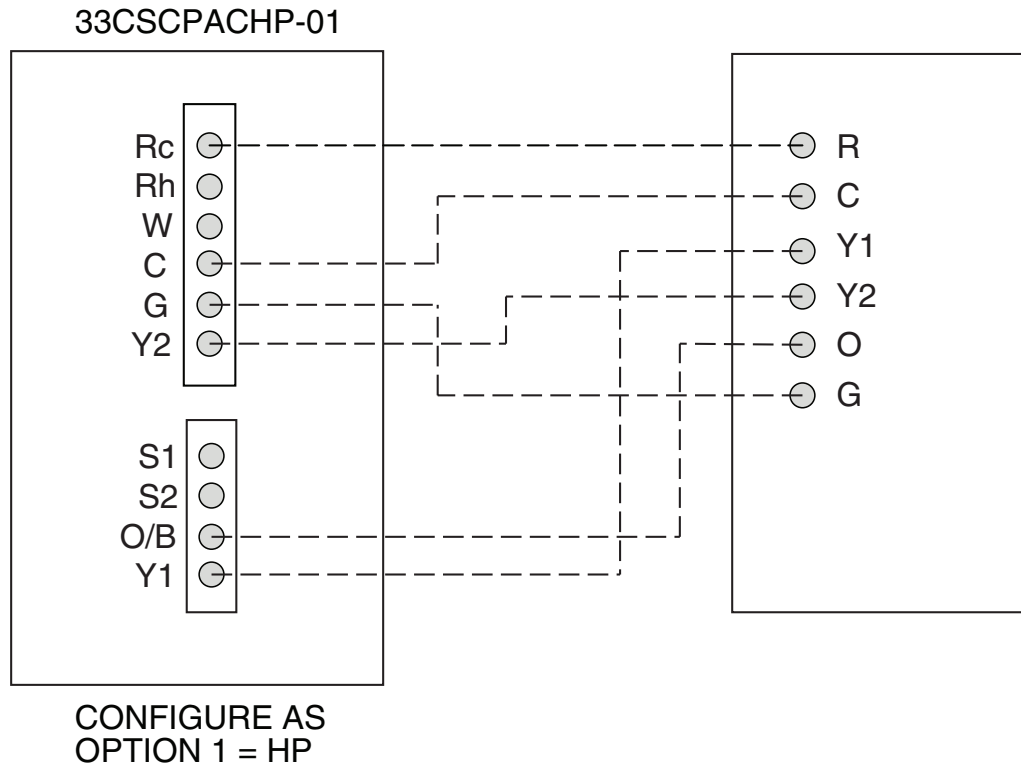
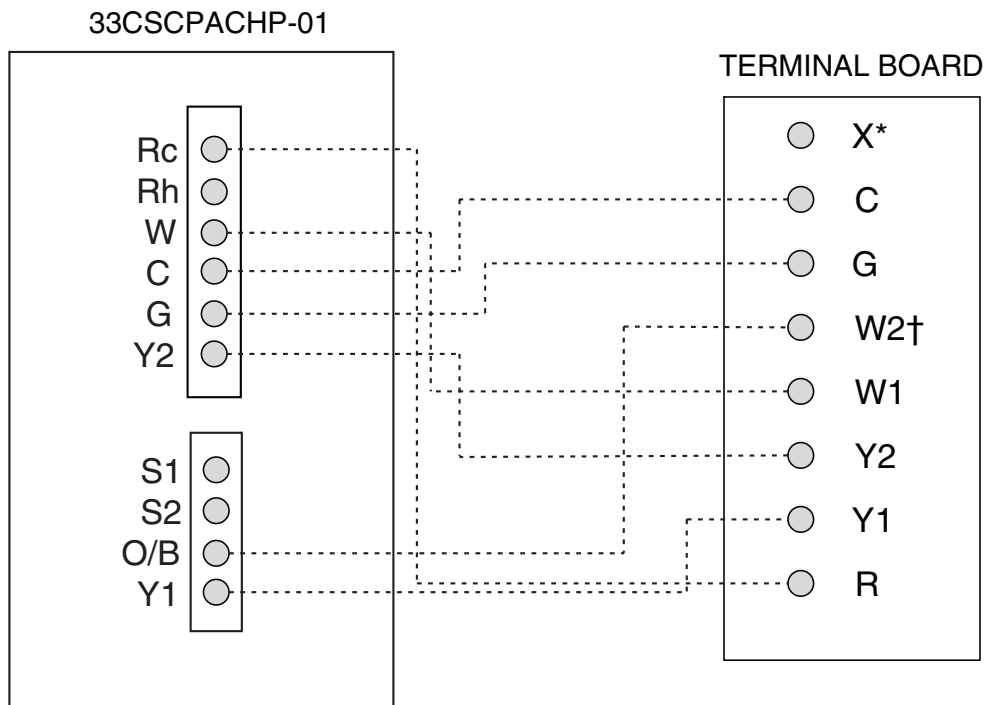
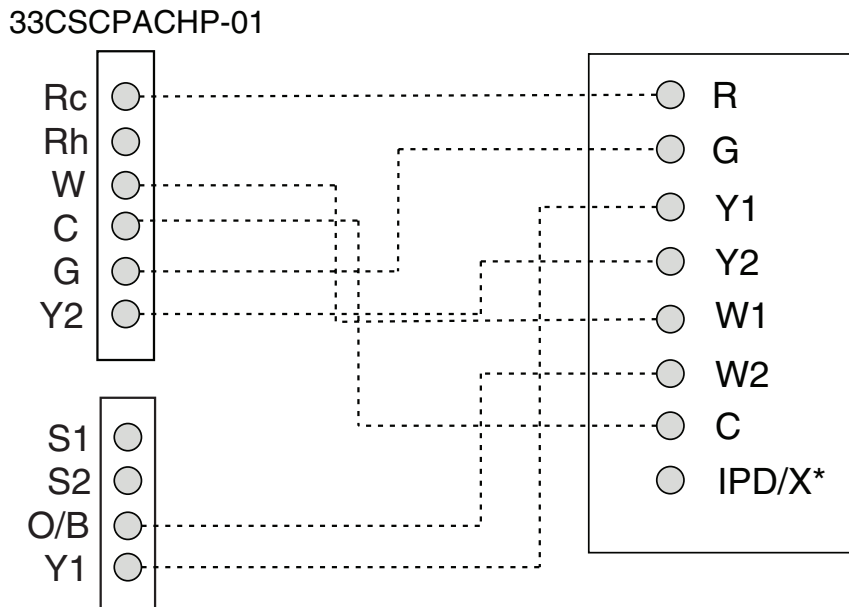


Fig. 16 — Thermostat Wiring — 50VS Water Source Heat Pump Units



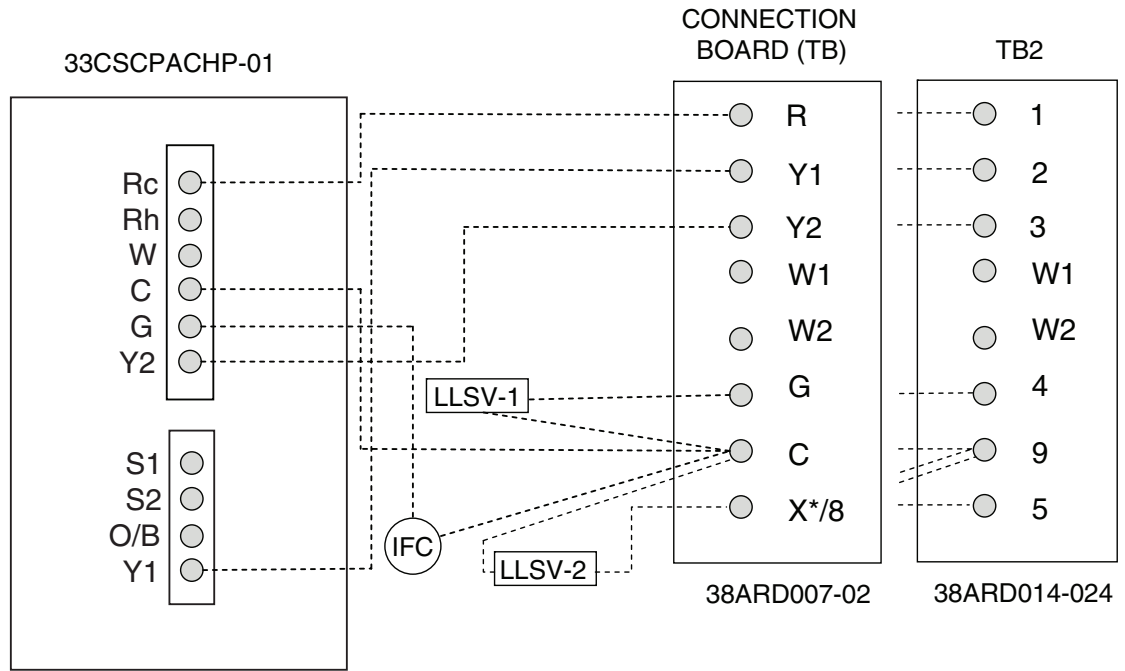
*Connection not required.
 †W2 connection not required on units without electric heating.

Fig. 17 — Thermostat Wiring — 50HCQ,TCQ Rooftop Units



*Connection not required.

Fig. 18 — Thermostat Wiring — 50HJQ014,016 Heat Pump Units



*Connection not required.

LEGEND
 IFC — Indoor Fan Contactor
 LLSV — Liquid Line Solenoid Valve

Fig. 19 — Thermostat Wiring — 38ARD Commercial Split System Units

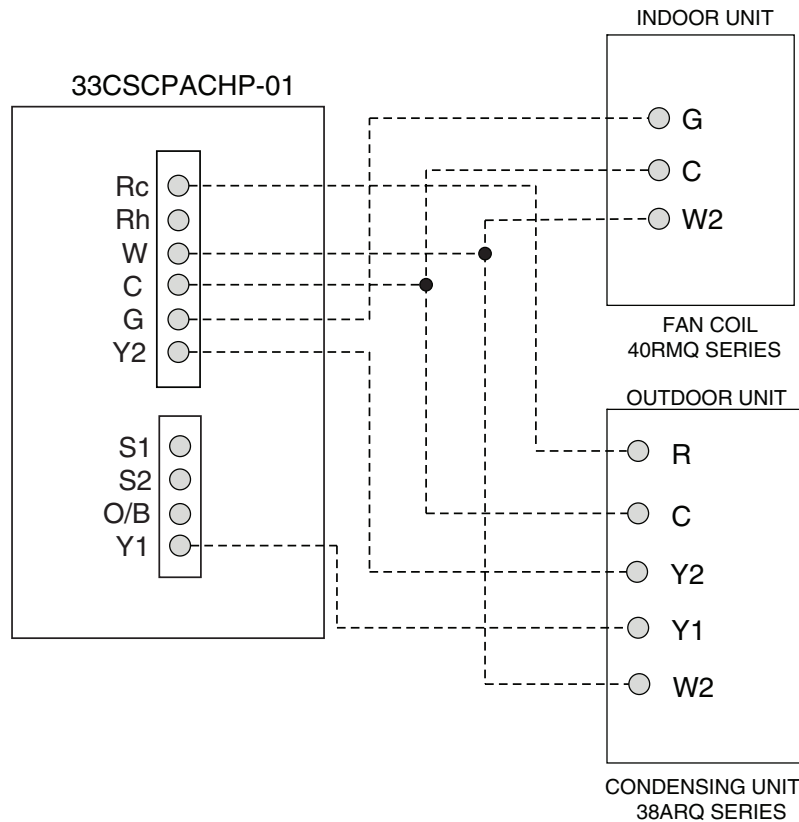


Fig. 20 — Thermostat Wiring — 38ARQ008-012 Series and 40RMQ008-012 Series Split System Units

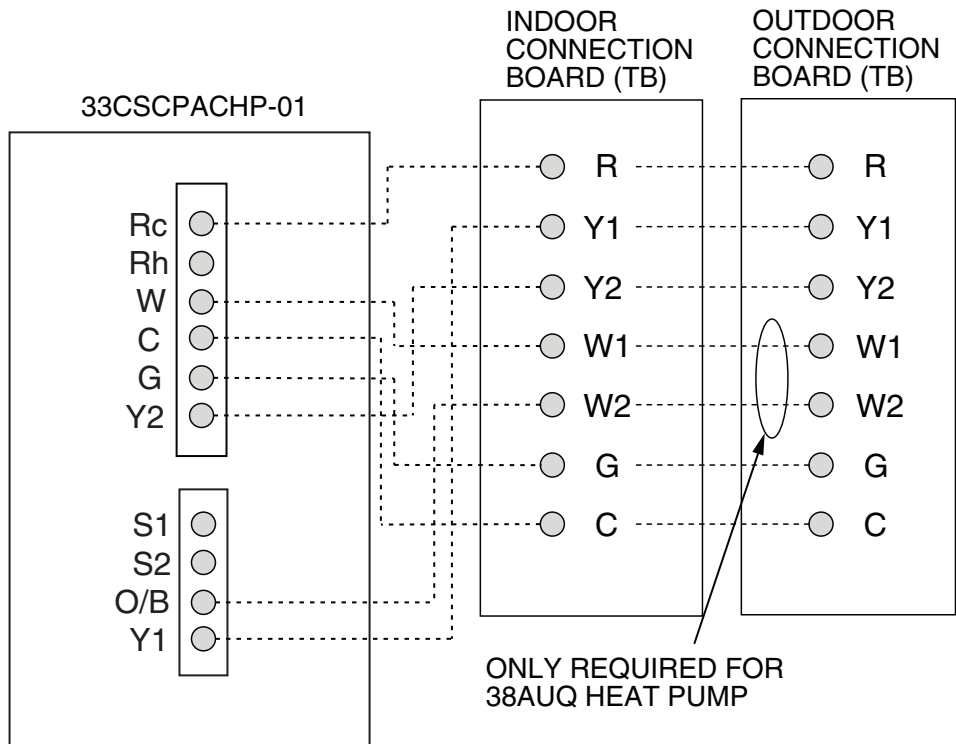


Fig. 21 — Thermostat Wiring — 38AU Commercial Split System Units with 40RUA Air Handler Units

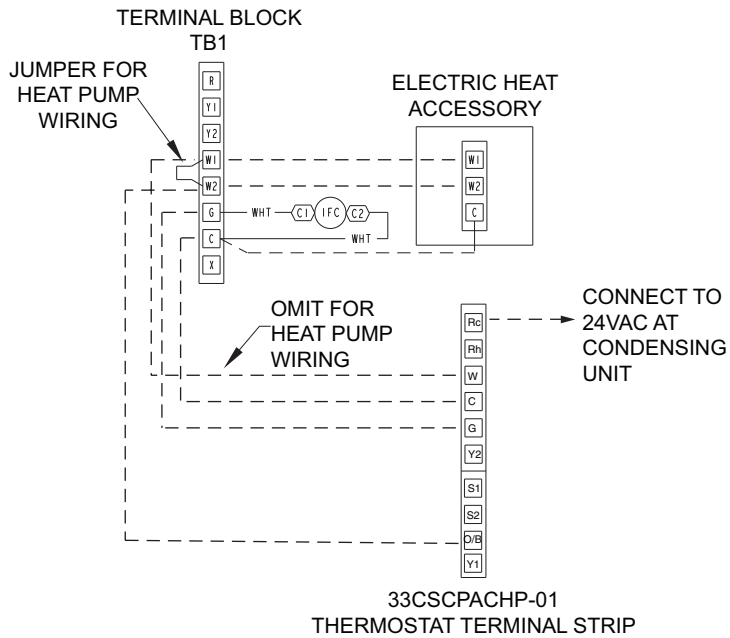
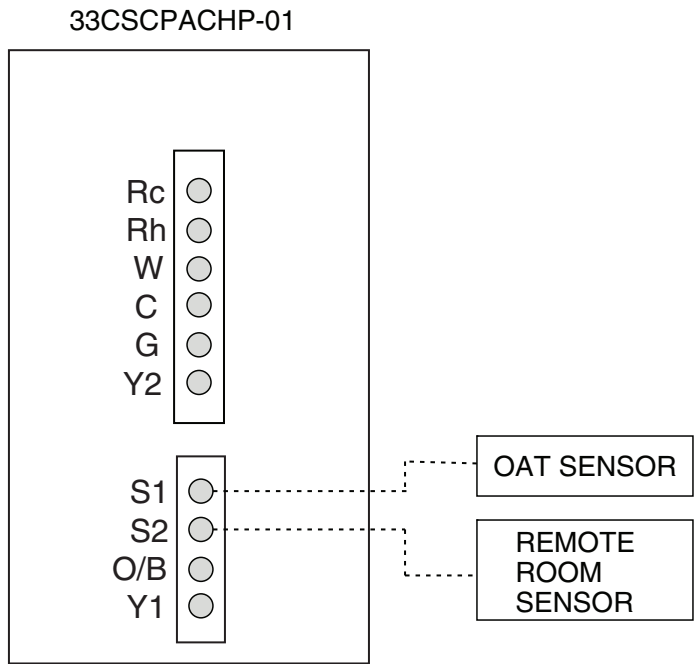


Fig. 22 — Thermostat Wiring — 40RU/38RU Packaged Air-Handler Units



NOTE:
 Selection: rS, SA, Od, rA
 rS — remote space temperature
 SA* — sensor supply air temperature
 Od* — sensor outdoor air temperature
 rA* — sensor return air temperature

*Display only, not used for temperature control

Fig. 23 — Thermostat Wiring — Outdoor Air Temperature and Remote Room Temperature Sensors

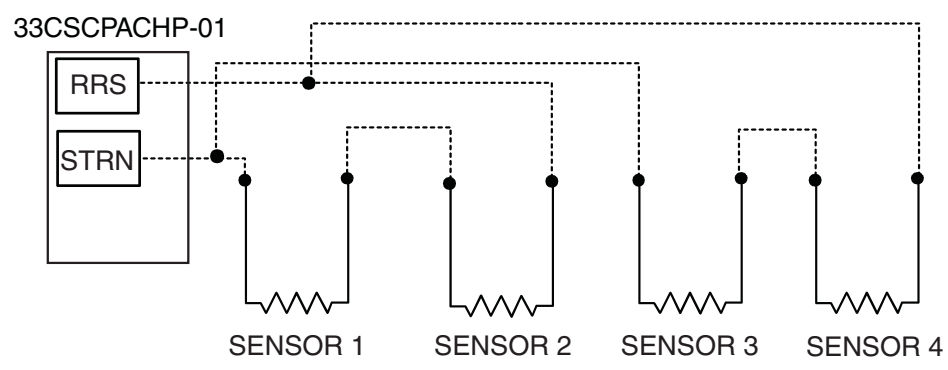


Fig. 24 — Thermostat Wiring — Space Temperature Sensor Averaging Wiring (4 Sensor Application)

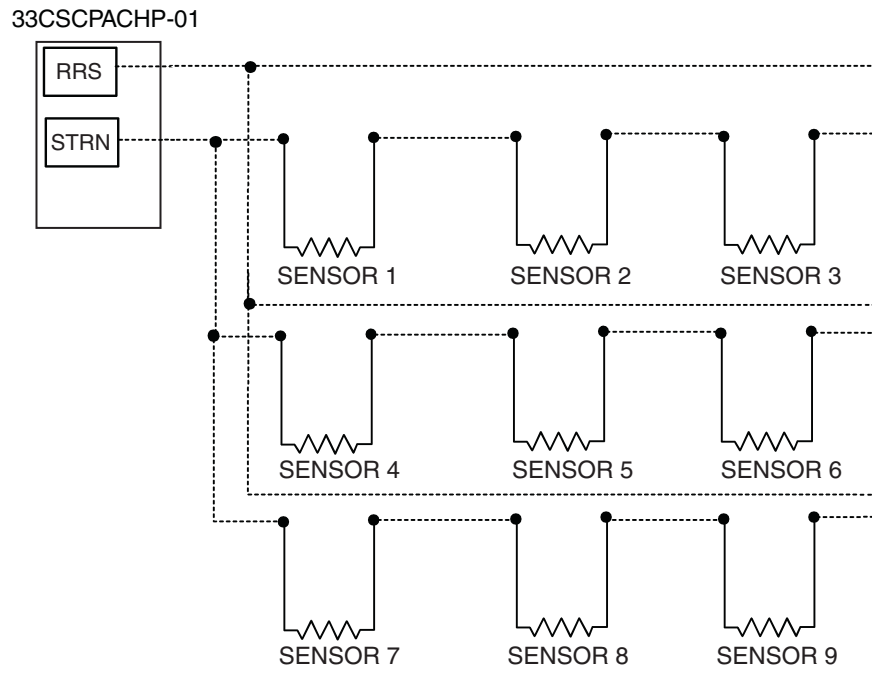


Fig. 25 — Thermostat Wiring — Space Temperature Sensor Averaging Wiring (9 Sensor Application)

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 _____

SCHEDULE

	Occ			Occ2			Occ3			Unocc		
	Time	Heat	Cool	Time	Heat	Cool	Time	Heat	Cool	Time	Heat	Cool
Monday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Tuesday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Wednesday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Thursday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Friday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Saturday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Sunday	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

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 Controller
Option 10	_____	Reversing Valve
Option 11	_____	Deadband between Heating and Cooling Set Points
Option 12	_____	Smart Recovery
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 24	_____	Programmable / Non-Programmable
Option 25	_____	Number of Programmable Periods
Option 26	_____	Minimum Cooling Set Point
Option 27	_____	Maximum Heating Set Point
Option 35	_____	Emergency Heat Mode Availability
Option 36	_____	Fan Selection
Option 38	_____	Override Timer Maximum
Option 39	_____	Temperature Display
Option 99	_____	Reset Factory Defaults

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE