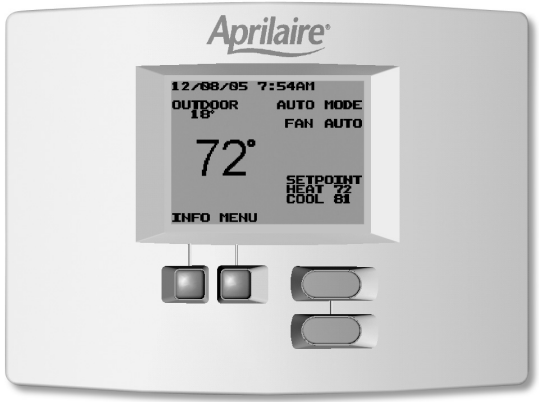
Aprilaire®

Premium Programmable Thermostat



Safety & Installation Instructions

Model 8570

READ AND SAVE THESE INSTRUCTIONS

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SAFETY INSTRUCTIONS

Read this Installation Manual before beginning installation of the Aprilaire® 8570 Thermostat. For questions call Research Products Corporation at (800) 334-6011.

WARNING

1. 120 Volts may cause serious injury from electrical shock. Disconnect electrical power to the HVAC equipment before starting installation. This thermostat is not a 120-volt (line voltage) device.
2. Improper installation may cause serious injury from electrical shock. This product must be installed by a qualified heating and air conditioning contractor in accordance with NEC Standards and applicable local and state codes.
3. Mercury is toxic and may be hazardous to health. Any replaced thermostats containing mercury must be disposed of properly. Contact local authorities for disposal information.

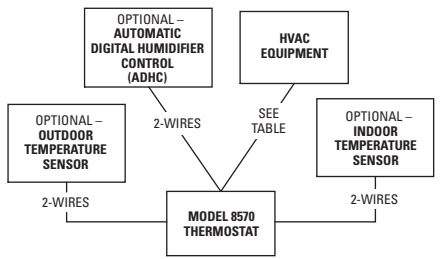
MODEL 8570 SPECIFICATIONS

Electrical	
Thermostat Voltage:	24-volts ± 20% AC or DC
Total Load Current:	5A
Single Output Load Current:	2A
Thermal	
Operating Range:	32°F – 99°F (0 C – 37 C)
Display Accuracy:	±1°F between 60°F and 80°F, ±2°F outside this range
Control Accuracy:	±1°F
Control Range Heat:	40°F – 88°F (4 C – 30 C)
Control Range Cool:	42°F – 90°F (6 C – 32 C)
Heat/Cool Deadband:	Adjustable 2° or 5° F or C
1st Stage Differential:	Adjustable 1°F – 4°F (1°F default)
2nd Stage Differential:	Adjustable 1°F – 4°F (1°F default)
Temperature Offset:	Adjustable 1°F – 4°F

WIRE REQUIREMENTS

Figure 1 and the table show the number of wires that must be available at the thermostat in stand-alone thermostat systems (i.e. not as part of an Aprilaire® Model 6504 Intelligent Zoned Comfort System). **Figure 1** shows optional connections to both an outdoor temperature sensor and an Aprilaire® Automatic Digital Humidifier Control (ADHC), but only one or the other is necessary. All wire is standard 18-24 gauge thermostat cable.

Figure 1 – Thermostat Wire



Application	# Wires	Diagram (Page)
Single-Stage Furnace/AC	5	1 (9)
Two-Stage Furnace/AC	7	2 (10)
Two-Stage Roof Top Unit	7	3 (11)
Boiler w/AC (2-transformer)	6	4 (12)
Radiant 1st Stage Heat, Furnace 2nd Stage and AC	6	5 (13)
Single-Stage Heat Pump	6	6 (14)
Single-Stage Heat Pump w/Two Stages Aux. Heat	7	7 (15)
Two-Stage Heat Pump	8	8 (16)

When this thermostat is connected to a Model 6504 as shown in **Figure 2,** only one four-wire cable need be run from the thermostat to the Model 6504. Use standard 18-24 gauge thermostat cable.

Figure 2 – Model 6504 Wire



(1) SELECT A MOUNTING LOCATION

If installing the thermostat alone…

- Mount on an interior wall, in a frequently occupied space.
- Keep the thermostat 18" from an outside wall.
- Mount the thermostat approximately 5 feet above the floor. Height requirements are different for compliance with the Americans with Disabilities Act (ADA) – 48" maximum height for forward reach and 54" maximum height for side reach.
- Thermostat can be mounted to a vertical junction box (j-box).
- **DO NOT** mount the thermostat:
  - behind doors, in corners or other dead air spaces.
  - in direct sunlight or near lamps, appliances or other sources of heat.
  - on an outside wall or wall exposed to an unconditioned space (i.e. garage).
  - in the flow path of a supply register, in stairways or near outside doors.
  - on a wall where concealed pipes or ductwork could influence the sensor.
  - near sources of electrical interference such as arcing switch contacts.

If installing an indoor temperature sensor…

- Mount the thermostat where it can be readily accessed. Note that the backlighting illuminates whenever a button is pressed.
- Thermostat can be mounted on a vertical junction box (j-box).
- **DO NOT** mount the thermostat where the operating range temperatures will be exceeded (i.e. attic or unventilated equipment room).
- Mount the sensor in the same location as if installing a thermostat alone.

(2) OPEN THE THERMOSTAT

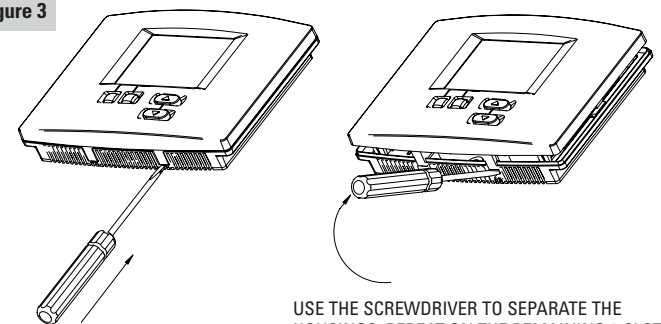
Use your hands to pull the thermostat face off of the base. Separate one side at a time. There are latches on either side of the thermostat.

If needed, the thermostat can be pried from the base by inserting a flat-head screwdriver (see **Figure 3**).

CAUTION

Loss of internal programs may result from static discharge to thermostat circuit board. Avoid touching the circuit board and touch a grounded metal object before handling the thermostat.

Figure 3



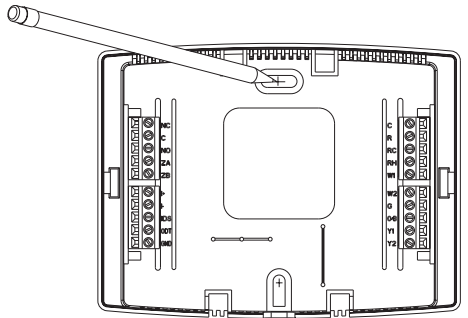
INSERT SCREWDRIVER INTO 1 OF 4 SLOTS (2 ARE ON THE TOPSIDE, 2 ARE ON THE BOTTOM SIDE)

USE THE SCREWDRIVER TO SEPARATE THE HOUSINGS. REPEAT ON THE REMAINING 3 SLOTS. **NOTE:** THE HOUSINGS WILL NOT COMPLETELY SEPARATE. PULL THE HOUSINGS APART WITH YOUR HANDS TO COMPLETELY SEPARATE.

(3) MOUNT THE THERMOSTAT BASE TO THE WALL

1. Place the wire opening in the base over the wire entry hole in the wall. Level the base (for appearance only) and mark the screw locations. See **Figure 4**.
2. Use the supplied screws and wall anchors to mount the thermostat to the wall. It is recommended that wall anchors be used for installation to drywall/sheet rock.
   - Drill a 3/16" hole for wall anchors.
   - Drill a 3/32" starter hole for screws only.
3. For junction box mounting, screws are field supplied. The thermostat can be installed on a vertical j-box.
4. Seal the wire entry hole(s) with caulk, drywall putty or insulation to prevent drafts from inside the wall cavity from affecting thermostat performance.

Figure 4



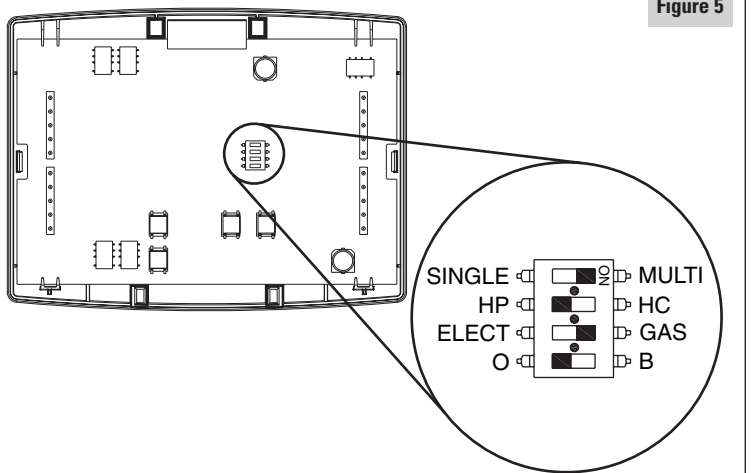
CAUTION

Minimize wire entry hole size and seal the hole – drafts from inside the wall could affect temperature readings.

(4) SET THE CONFIGURATION DIP SWITCHES ON THE THERMOSTAT CIRCUIT BOARD

There are four dip switches located on the back of the thermostat (on the circuit board) that must be set to properly configure the thermostat for operation with the equipment it is to control. **Figure 5** shows the default position for the four switches.

Figure 5



MULTI or SINGLE – When set to single, the second stage outputs (Y2 and W2) do not energize.

- Set to SINGLE for single-stage furnace/AC applications or single-stage compressor heat pump systems.
- Set to MULTI if the furnace or air conditioner is two-stage or if the heat pump has a two-stage compressor.

HEAT/COOL or HEAT PUMP – When set to HP the compressor terminal (Y1) is the first stage output for both heating and cooling.

- Set to HP when installed with heat pumps.
- Set to H/C when installed with furnace/AC systems, roof top units or boiler/AC combination systems.

GAS or ELECT – When set to ELECT, the fan terminal (G) will be energized on a call for heat.

- Set to ELECT when the heat source is electric (such as strip heat).
- Set to GAS when the heat source is fossil fuel (oil, propane, natural gas). For heat pumps, the compressor terminal(s) will de-energize before the auxiliary heat terminal (W1) is energized, thus acting as a fossil fuel kit.

O or B – For heat pumps only, this switch sets whether the O/B reversing valve output is energized during a cooling call or heating call.

- Set to O if heat pump reversing valve is to be energized in cooling.
- Set to B if heat pump reversing valve is to be energized in heating.

STOP! If installing this thermostat as part of a Model 6504 Intelligent Zoned Comfort System, refer to the Model 6504 Installation Manual for wiring and checkout procedures. Continue Model 6504 installation with Step 11 (page 36). If wiring this thermostat directly to the HVAC equipment or standard zone control panel, continue with Step 5.

(5) WIRE THE THERMOSTAT TO THE HVAC EQUIPMENT

WARNING 120 volts may cause serious injury from electrical shock. Disconnect electrical power to the furnace and air conditioner before starting installation. This thermostat is not a 120 volt (line voltage) device.

1. Run a cable with the correct number of wires (see table) from the thermostat to the HVAC equipment.
2. Strip 1/4" of insulation from the end of the wires to be connected to the thermostat.
3. Strip no more insulation than is required to make a sound electrical connection at the HVAC equipment.
4. Wire the thermostat to the HVAC equipment according to the wiring schematic appropriate for your HVAC equipment.

Application	# Wires	Diagram (Page)
Single-Stage Furnace/AC	5	1 (9)
Two-Stage Furnace/AC	7	2 (10)
Two-Stage Roof Top Unit	7	3 (11)
Boiler w/AC (2-transformer)	6	4 (12)
Radiant 1st Stage Heat, Furnace 2nd Stage and AC	6	5 (13)
Single-Stage Heat Pump	6	6 (14)
Single-Stage Heat Pump w/Two Stages Aux. Heat	7	7 (15)
Two-Stage Heat Pump	8	8 (16)

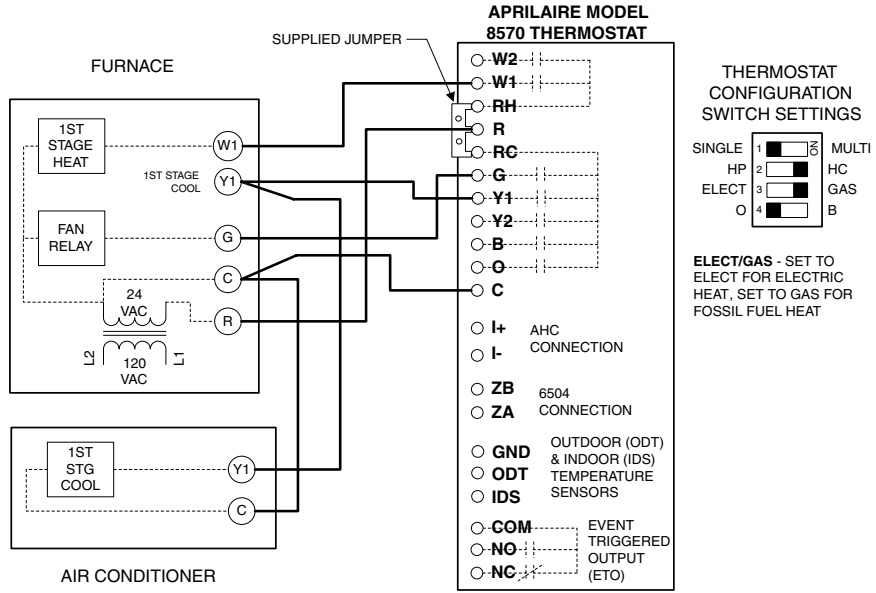


Diagram 1: Single-Stage Furnace and AC

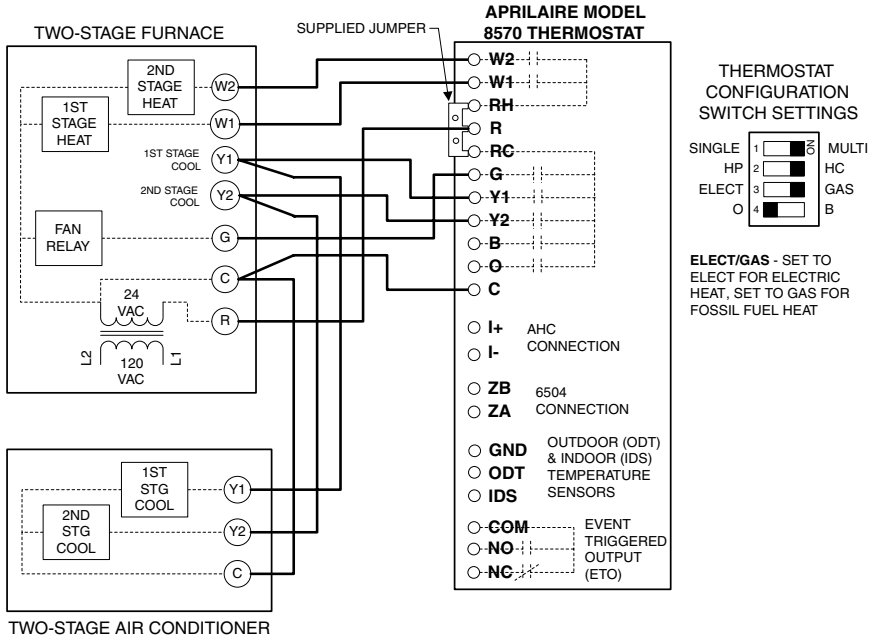


Diagram 2: Two-Stage Furnace and AC

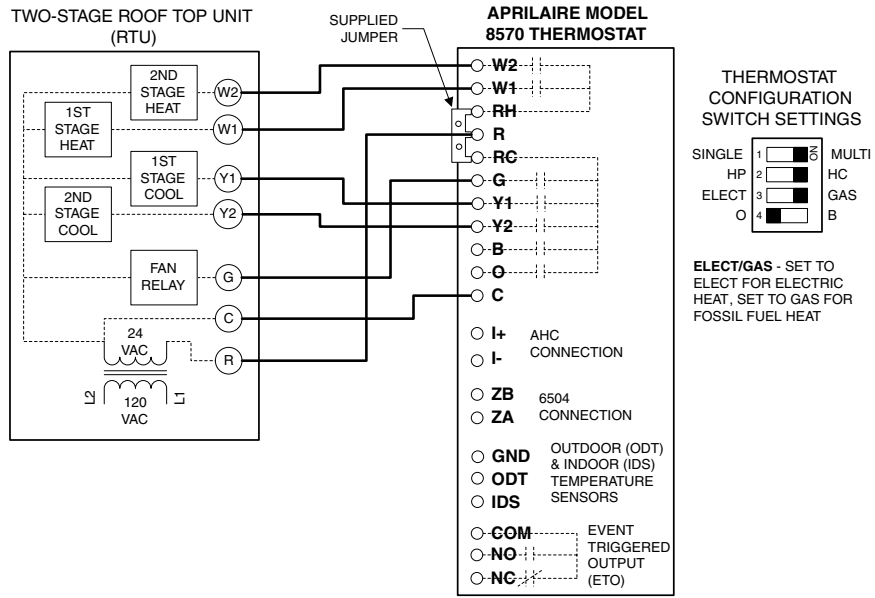


Diagram 3: Two-Stage Roof Top Unit

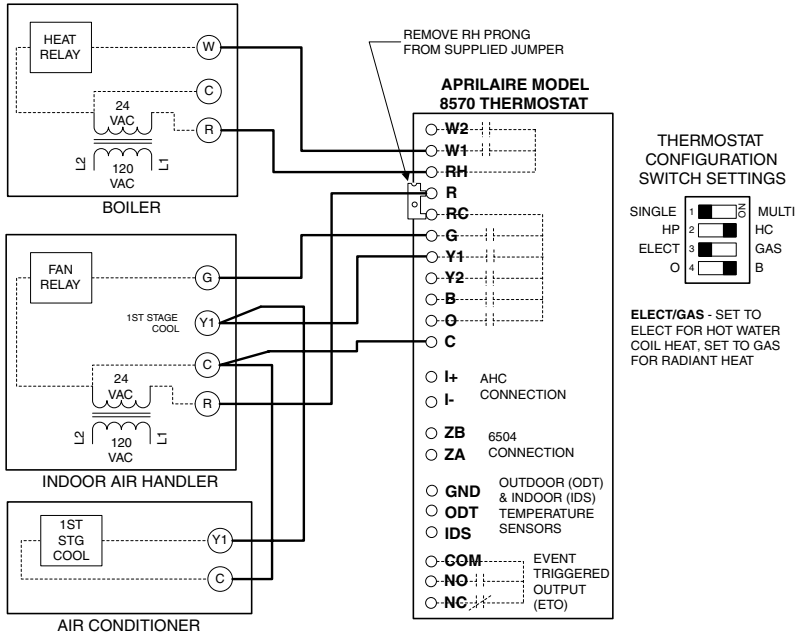


Diagram 4: Boiler with AC

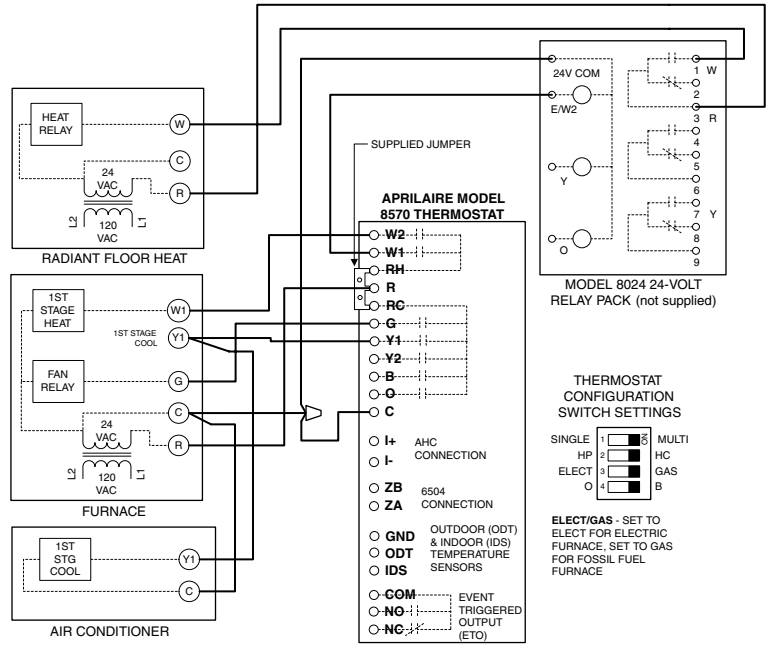


Diagram 5: Radiant Floor 1st Stage Heat with Furnace 2nd Stage Heat and AC

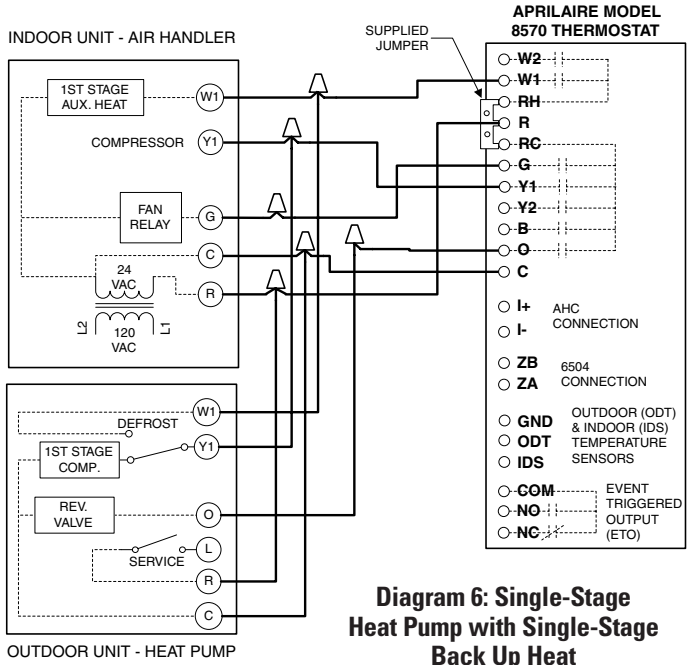


Diagram 6: Single-Stage Heat Pump with Single-Stage Back Up Heat

THERMOSTAT CONFIGURATION SWITCH SETTINGS



SINGLE/MULTI – SET TO SINGLE FOR SINGLE STAGE HEAT PUMP

ELECT/GAS - SET TO ELECT FOR ELECTRIC AUXILIARY HEAT, SET TO GAS FOR FOSSIL FUEL (DUAL FUEL) AUXILIARY HEAT

O/B – SET TO "O" IF HEAT PUMP REVERSING VALVE MUST BE ENERGIZED WHEN COOLING, SET TO "B" IF IT IS TO BE ENERGIZED IN HEATING

AUXILIARY HEAT SET UP

1. WITH THERMOSTAT IN OFF MODE, PRESS AND HOLD THE UP AND DOWN BUTTONS FOR 3 SECONDS TO ENTER THE ADVANCED SETTINGS MENU.
2. SCROLL DOWN AND HIGHLIGHT THE "AUXILIARY HEAT SETUP" OPTION AND PRESS SELECT.
3. HIGHLIGHT "ONE STAGE AUX HEAT" AND PRESS SELECT

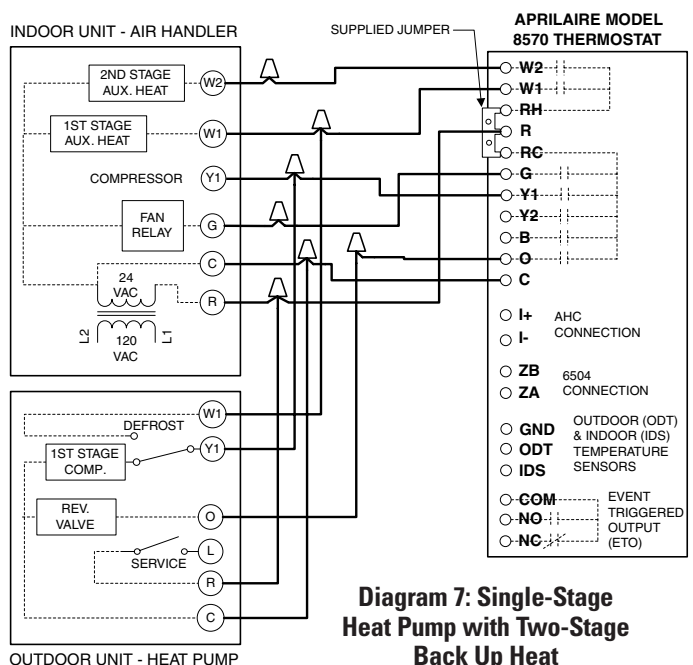
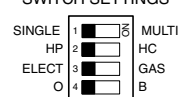


Diagram 7: Single-Stage Heat Pump with Two-Stage Back Up Heat

THERMOSTAT CONFIGURATION SWITCH SETTINGS



SINGLE/MULTI – SET TO SINGLE FOR SINGLE STAGE HEAT PUMP

ELECT/GAS - SET TO ELECT FOR ELECTRIC AUXILIARY HEAT, SET TO GAS FOR FOSSIL FUEL (DUAL FUEL) AUXILIARY HEAT

O/B – SET TO "O" IF HEAT PUMP REVERSING VALVE MUST BE ENERGIZED WHEN COOLING, SET TO "B" IF IT IS TO BE ENERGIZED IN HEATING

AUXILIARY HEAT SET UP

1. WITH THERMOSTAT IN OFF MODE, PRESS AND HOLD THE UP AND DOWN BUTTONS FOR 3 SECONDS TO ENTER THE ADVANCED SETTINGS MENU.
2. SCROLL DOWN AND HIGHLIGHT THE "AUXILIARY HEAT SETUP" OPTION AND PRESS SELECT.
3. HIGHLIGHT "TWO STAGE AUX HEAT" AND PRESS SELECT

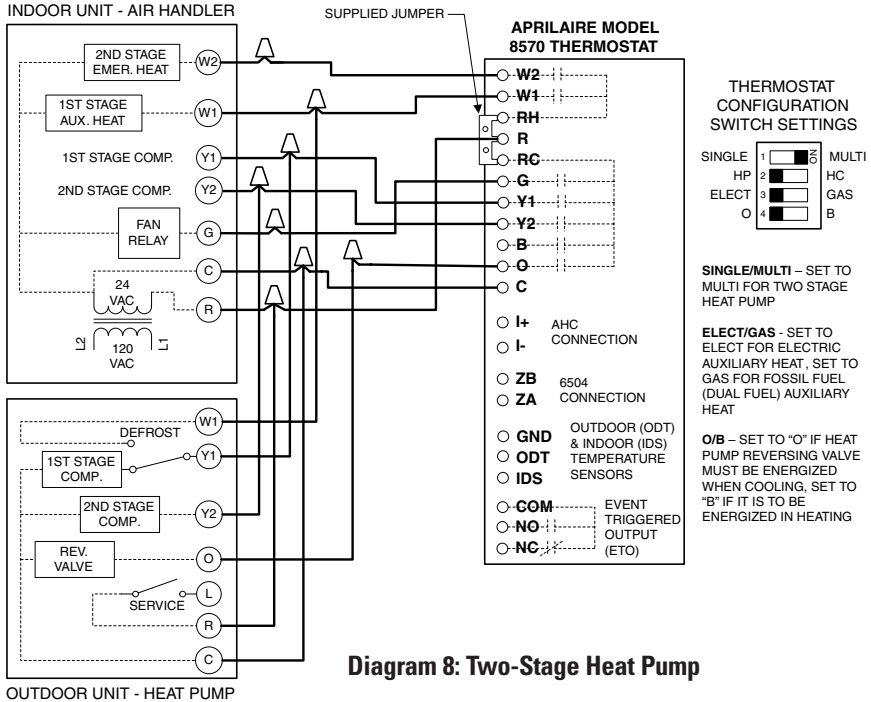


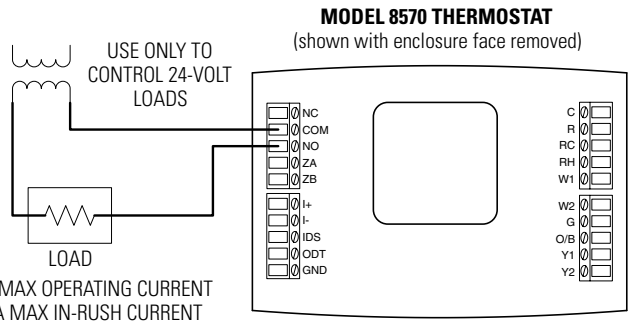
Diagram 8: Two-Stage Heat Pump

(6) OPTIONAL – WIRE THE EVENT TRIGGERED OUTPUT (ETO)

Terminals NO, COM and NC are the Normally Open, Common and Normally Closed outputs, respectively, of a relay that can be used to control auxiliary equipment. When the relay is on, a circuit is complete between NO and COM; when the relay is off a circuit is complete between NC and COM. The relay is programmed to be on or off, with each of the programming events. Examples of where this output might be used include:

- Turn on outdoor ventilation for programming periods of the day when the building is occupied and turn it off when unoccupied.
- Have an electronic air cleaner turn on and off only when the building is occupied to reduce maintenance time/cost.

Figure 6



To ENABLE and program the relay:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold the ▲ and ▼ buttons for 3 seconds. The display will show the ADV. SETTINGS MENU.
3. Scroll down through the menu items and select PROGRAMMABLE OUTPUT.
4. Select ENABLE. The display will then show the program event names, and whether the output is to be ON or OFF during that event.
5. Use the multi-function buttons labeled ◀ and ▶ to toggle between events and highlight the ON/OFF item to change. Use the ▲ and ▼ buttons to change the highlighted item to ON or OFF.
6. Repeatedly press ▶ until DONE is highlighted, where the multi-function buttons are labeled CANCEL and SAVE. Press SAVE to save the values set, or press CANCEL to return to the PROGRAMMABLE OUTPUT menu.

To DISABLE the relay:

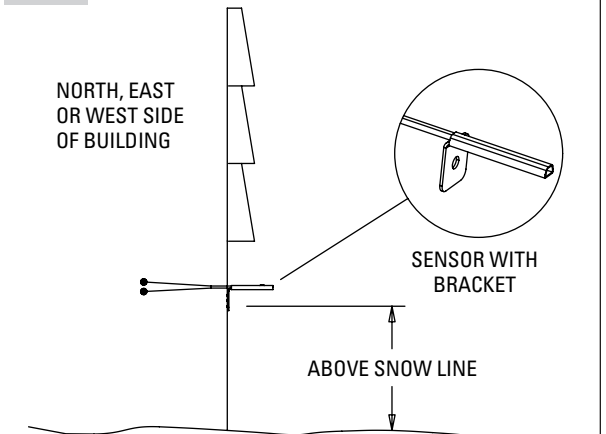
1. Make sure the thermostat is in the OFF mode.
2. Press and hold the ▲ and ▼ buttons for 3 seconds. The display will show the ADV. SETTINGS MENU.
3. Scroll down through the menu items and select PROGRAMMABLE OUTPUT.
4. Select DISABLE. The display will then return to the ADV. SETTINGS MENU.

(7) OPTIONAL – INSTALL AN APRILAIRE MODEL 8052 OUTDOOR TEMPERATURE SENSOR

Note: If an ADHC is to be installed, do not wire an outdoor temperature sensor– see Step 8. The ADHC uses its own outdoor temperature sensor, which can be read by the thermostat.

1. Mount the outdoor temperature sensor (see **Figure 7**).
   - Locate on the North side of the building if possible. East and West are acceptable locations as long as the sensor will not be exposed to direct sunlight.
   - Mount above anticipated snow line.
   - Mount at least 3 feet away from exhaust vents and condensing units.
   - Maximum wire length from sensor to thermostat is 300 feet.
   - Under a soffit or under a wall overhang are recommended areas for mounting the sensor.

Figure 7



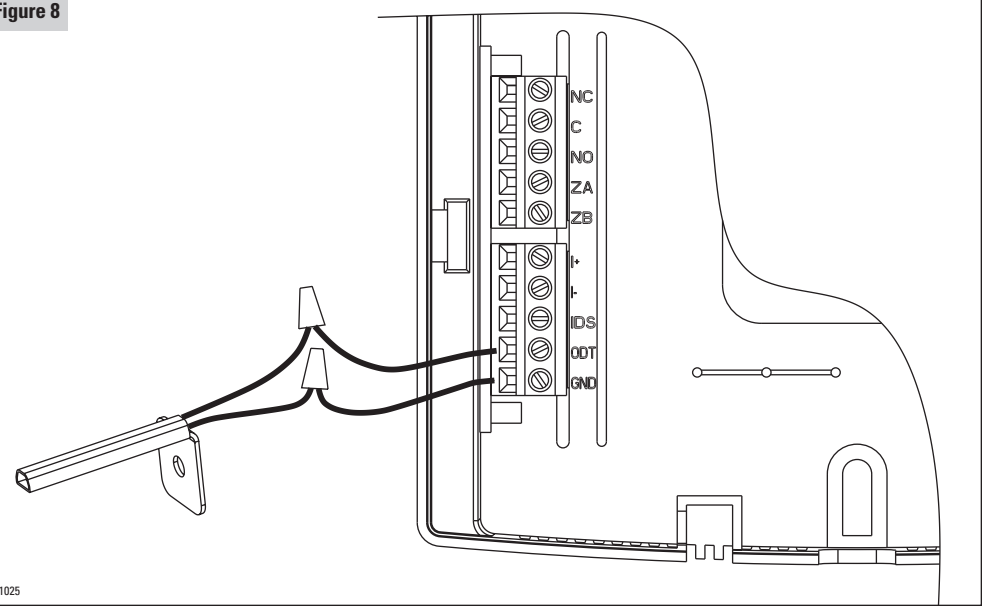
2. Run a 2-wire cable from the sensor to the thermostat.

CAUTION Do not run the wire along side line voltage (120 VAC) or higher lines as this can cause erratic readings.

3. Take a resistance measurement before connecting to the ODT and CIR GND terminals to verify the sensor is properly installed. Measure the wires at the thermostat to account for wire splices.
   - Use an ohmmeter to measure the resistance (kΩ) of the sensor. The resistance reading will depend on the outdoor temperature (see table).
4. Wire the sensor to the thermostat (see **Figure 8**).
   - Strip 1/4" of insulation from the two sensor wires.
   - Connect the sensor wires to the ODT and CIR GND terminals of the thermostat. The wiring is not polarity sensitive, so either wire can be connected to either thermostat terminal.

OUTDOOR TEMPERATURE (°F)	RESISTANCE (kΩ)
-30	230.6
-20	163.8
-10	117.6
0	85.4
10	62.6
20	46.3
30	34.6
40	26.1
50	19.9
60	15.3
70	11.9
80	9.4
90	7.4
100	5.9

Figure 8



(8) OPTIONAL – INSTALL AN AUTOMATIC DIGITAL HUMIDIFIER CONTROL (ADHC)

Note: The ADHC uses its own outdoor temperature sensor, which is read by the thermostat. If an ADHC is to be installed, do not wire an outdoor temperature sensor to the ODT terminal of the thermostat.

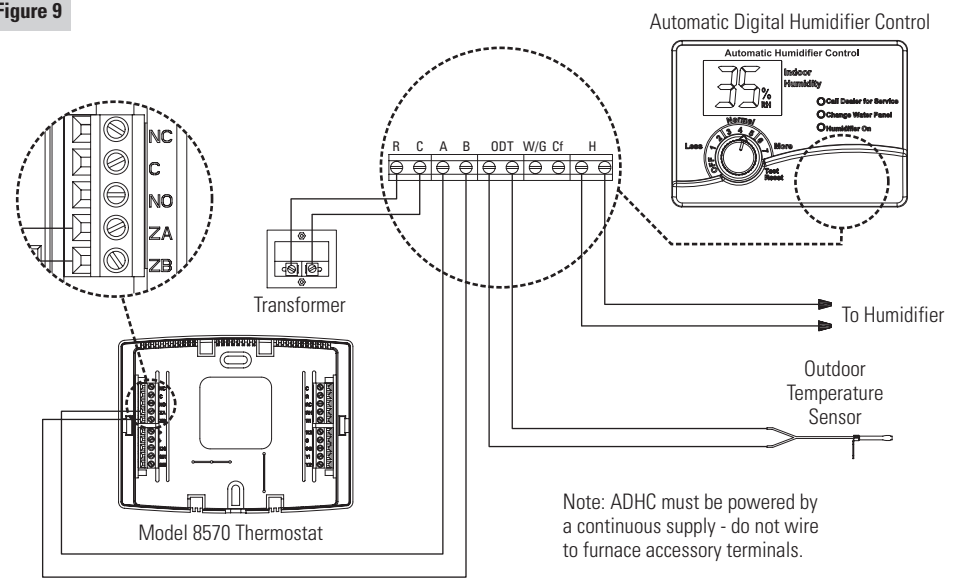
1. Mount the ADHC and its outdoor temperature sensor.
   - Follow the directions provided with the ADHC except **do not mount the ADHC temperature sensor in a fresh air intake. The temperature sensor must be mounted outside to provide a precise temperature reading.**
   - Maximum wire length from ADHC to thermostat is 300 feet.
   - The ADHC must have constant power. **DO NOT power the ADHC through furnace accessory terminals. DO NOT use a Model 50 Current Sensing Relay.**
   - NOTE: Operating the ADHC in Manual Mode will result in the outdoor temperature shown on the thermostat to always be 20°F.

CAUTION Do not run the wire along side line voltage (120 VAC) or higher lines as this can cause erratic readings.

2. Run a 2-wire cable from the ADHC to the thermostat.
3. Wire the ADHC to the thermostat (see **Figure 9**).
   - Strip 1/4" of insulation from the ends of the wires.
   - Connect the A terminal of the ADHC to the ZA terminal of the thermostat.
   - Connect the B terminal of the ADHC to the ZB terminal of the thermostat.
4. You will need to power up the thermostat to verify the connection. Refer to step 7 of THERMOSTAT START UP on page 28.
5. After completing the thermostat installation, you will also need to verify proper operation of the ADHC – see ADHC installation instructions for details on how this is done.

WARNING Improper installation may cause serious injury from electrical shock. Do not power up humidifier before completing the thermostat installation.

Figure 9



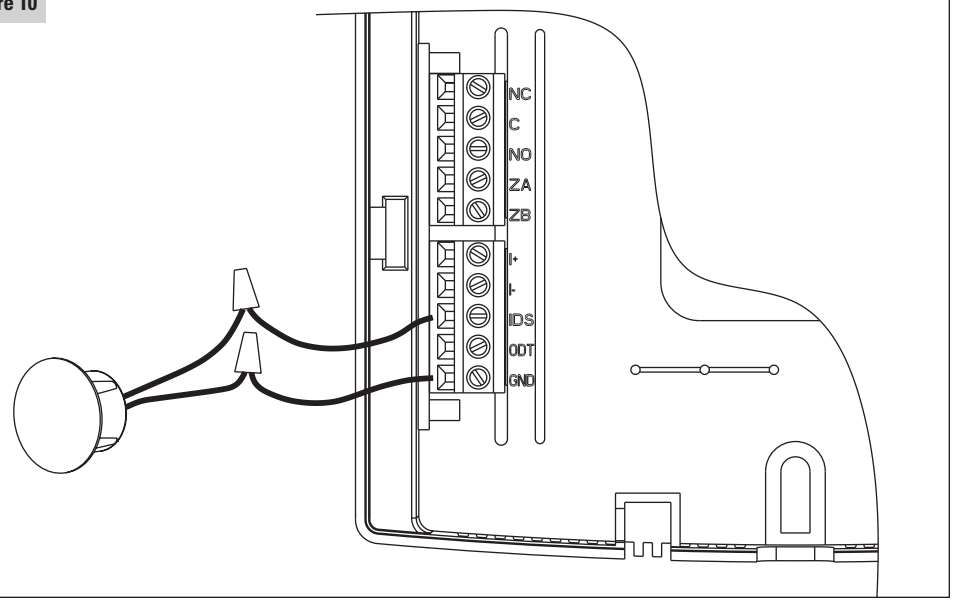
(9) OPTIONAL – INSTALL AN APRILAIRE MODEL 8051 FLUSH MOUNT OR 8053 SURFACE MOUNT TEMPERATURE SENSOR

1. Mount the indoor temperature sensor.
   - Locate the sensor as you would locate a thermostat.
   - Maximum wire length from sensor to thermostat is 300 feet.
   - Follow the installation instructions provided with the sensor.
2. Run a 2-wire cable from the sensor to the thermostat.

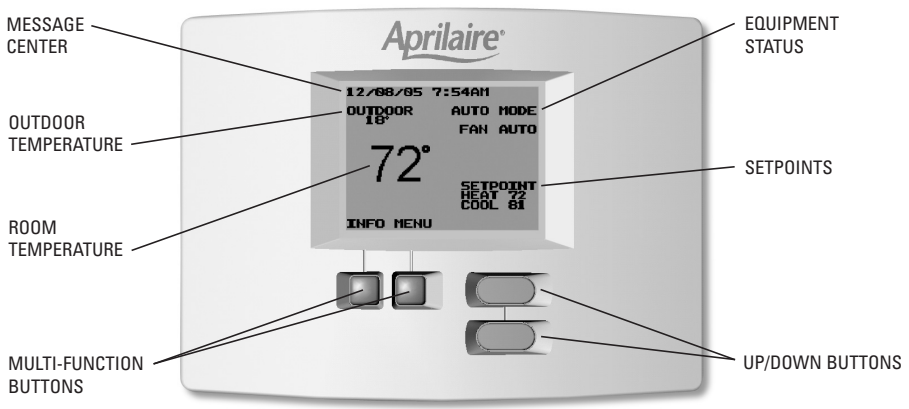
CAUTION Do not run the wire along side line voltage (120 VAC) or higher lines as this can cause erratic readings.

3. Take a resistance measurement before connecting to the IDS and CIR GND terminals to verify the sensor is properly installed.
   - Use an ohmmeter to measure the resistance (kΩ) of the sensor. The resistance reading will depend on the indoor temperature (see table from OUTDOOR SENSOR installation section on page 20).
4. Wire the sensor to the thermostat (see **Figure 10**).
   - Strip 1/4" of insulation from the two sensor wires.
   - Connect the sensor wires to the IDS and CIR GND terminals of the thermostat. The wiring is not polarity sensitive, so either wire can be connected to either thermostat terminal.

Figure 10



(10) THERMOSTAT STARTUP – STAND ALONE APPLICATIONS



NOTE: Refer to the Owner's Manual for thermostat operating instructions.

1. PLACE THE THERMOSTAT ON THE BASE.
2. TURN ON POWER TO THE HVAC SYSTEM.
3. THERMOSTAT SET UP – HEAT ONLY OR COOL ONLY APPLICATIONS

   Skip this step if the thermostat is to control both heating and cooling.

   1. Make sure the thermostat is in the OFF mode.
   2. Press and hold the ▲ and ▼ buttons for 3 seconds. The display will show the ADV. SETTINGS MENU.
   3. Scroll down through the menu items and select CONTROL SET UP.
   4. Use the ▲ and ▼ buttons to highlight either HEAT ONLY or COOL ONLY.
   5. Press BACK to return to the ADV. SETTINGS MENU, then EXIT to return to the Operating Display.
4. THERMOSTAT SET UP – SET NUMBER OF AUXILIARY HEAT STAGES

   Only for single stage heat pump systems. In the Heat mode, control up to three stages of heat.

   1. Make sure the thermostat is in the OFF mode.
   2. Press and hold the ▲ and ▼ buttons for 3 seconds. The display will show the ADV. SETTINGS MENU.
   3. Scroll down through the menu items and select AUXILIARY HEAT SETUP.
   4. Use the ▲ and ▼ buttons to highlight either ONE STAGE AUX HEAT or TWO STAGE AUX HEAT.
   5. Press BACK to return to the ADV. SETTINGS MENU, then EXIT to return to the Operating Display.
5. VERIFY OUTDOOR TEMPERATURE SENSOR CONNECTION (if optional outdoor temperature sensor installed).
   - If an outdoor temperature sensor has been installed and is operational, an outdoor temperature will appear on main display.

6. CHECK FAN OPERATION

1. Turn on the fan (set to ON).
   - The thermostat G terminal will energize and the system blower will start. The Fan Status on the display will show "FAN ON."
2. **If an ADHC has been installed, allow the fan to operate for no less than 40 seconds.** If an ADHC is not part of this installation, you can turn the fan off at any time. A humidity value can be displayed only after at least 40 seconds of blower run-time to ensure the humidity reading is representative of the room air.
3. Turn the fan off (set to AUTO).

7. VERIFY ADHC CONNECTION (if optional Automatic Digital Humidifier Control installed).

1. Ensure that the ADHC has power (the green status light on the ADHC should be on) and make sure the ADHC is functioning properly – see ADHC installation procedure for start up and diagnostics.
2. From the Main Screen, press the "INFO" button.
   - The outdoor temperature and relative humidity will be displayed for five seconds after which the contact screen will be displayed.
3. Press the BACK button to return to the Main Screen.
   - When the humidifier is operating, the message "HUMIDIFIER ON" appears at the message center, alternating with the time and date and any other currently active messages.

TROUBLESHOOTING – ADHC CONNECTION

Symptom	Cause
No RH display, no outdoor temperature display	Miswiring – Check wire colors to verify A at ADHC is connected to ZA at thermostat and B is connected to ZB.
	ADHC power source – When wired to the Model 8570 thermostat, the ADHC must be wired to a continuously ON power source. Use voltmeter to verify presence of 24VAC (nominal) at ADHC.
	ADHC not operating correctly – check red diagnostic light on ADHC.
No RH display, outdoor temperature OK	No valid reading available – run fan for at least 40 seconds.
RH display, outdoor temperature @ 20°F	ADHC set for manual mode of operation. Wire an outdoor sensor to the ADHC or wire an outdoor sensor to the thermostat.
No display, weak text in display, or too dark of a display	Readjust contrast of display to an optimum level. See "Adjust Contrast" Section 7.8 in the Owner's Manual.

8. CHECK HEATING OPERATION

Notes:

- **To avoid the minimum on and off times during system checkout, always start and end the check out procedure in the OFF mode.**
- **Do not operate heat pumps in the heating mode at high outdoor temperatures for extended periods of time.**

1. Set the thermostat to the OFF mode.

2. Set the thermostat to the HEAT mode.
   - With the O/B configuration setting in the B position (ON), the O/B terminal will be on in the Heat mode. In the O position (OFF), the O/B terminal will not be on in the Heat mode.

3. Raise the temperature setting above the room temperature to activate the desired stages of heating. The mode display will change from "HEAT MODE" to "HEATING", which will flash, when the thermostat is calling for heat. Fifteen (15) seconds must elapse between each stage. Verify the correct outputs are on according to the configuration settings shown below:

Configuration Settings	Single/Multi	Multi	Multi	Single	Single	Multi	Multi	Single		Single	
	HP/HC	HC	HC	HC	HC	HP	HP	HP		HP	
	Elect/Gas	Elect	Gas	Elect	Gas	Elect	Gas	Elect		Gas	
	Aux. Ht. Stages							1	2	1	2
Outputs Energized	1st Stage Heat	W1 G	W1	W1 G	W1	Y1 G	Y1 G	Y1 G	Y1 G	Y1 G	Y1 G
	2nd Stage Heat	W1 W2 G	W1 W2	W1 W2 G	W1 W2	Y1 Y2 G	Y1 Y2 G	Y1 W1 G	Y1 W1 G	W1	W1
	3rd Stage Heat					Y1 Y2 W1 G	W1 G		Y1 W1 W2 G		W1 W2

TROUBLESHOOTING – HEATING OPERATION

Symptom	Cause
Thermostat does not call for heat	Minimum-off times. Change the mode to OFF first, then change the mode to HEAT and make a call for heat.
Heating does not come on at all	RH terminal not connected – see wiring diagrams.
	Heating equipment power not on.
Auxiliary Heat does not come on	High Balance point limit – set balance point to OFF during system checkout.
	Number of Auxiliary Heat stages not set correctly. See Step 4 of Thermostat Start Up (page 27).
Fan stays on after heat call	Furnace plenum sensor keeps fan on – normal.
	Blower Extension for humidifier operation. Verify that the message "HUMIDIFYING" appears at the message center, alternating with the time and date and any other currently active messages.
Fan comes on before heat starts, or Fan does not come on with heat	Change position of ELECT/GAS dip switch – ELECT for electric heat systems (fan on with heat call) or to GAS for fossil fuel systems where the fan is controlled internally by the heating equipment.
Cooling comes on instead of heat	O/B dip switch not set properly. See Step 2, page 30.
	Miswiring – check wire colors at thermostat and HVAC equipment.
Takes longer than 15 seconds for auxiliary heat to come on after compressor heat.	SINGLE/MULTI dip switch set incorrectly – set to SINGLE for single-stage compressor systems.

9. CHECK COOLING OPERATION

Notes:

- **To avoid the minimum on and off times during system checkout, always start and end the check out procedure in the OFF mode.**
- **Do not operate air conditioning at low outdoor temperatures. Refer to equipment manufacturer recommendations for safe operating temperatures.**

1. Set the thermostat to the OFF mode.
2. Set the thermostat to the COOL mode.
   - With the O/B configuration setting in the O position (OFF), the O/B terminal will be on in the Cool mode. In the B position (ON), the O/B terminal will not be on in the Cool mode.
3. Lower the temperature setting below the room temperature to activate the desired stages of cooling. The mode display will change from "COOL MODE" to "COOLING", which will flash, when the thermostat is calling for cooling. Fifteen (15) seconds must elapse between each stage. Verify the correct outputs are on according to the configuration settings shown below:

<table>
<tr><td rowspan="4">Configuration Settings</td><td>Single/Multi</td><td>Single</td><td>Multi</td></tr>
<tr><td>HP/HC</td><td colspan="2" rowspan="3">The same outputs come on regardless of how these are set.</td></tr>
<tr><td>Elect/Gas</td></tr>
<tr><td>Aux. Ht. Stages</td></tr>
<tr><td rowspan="2">Outputs Energized</td><td>1st Stage Cool</td><td>Y1, G</td><td>Y1, G</td></tr>
<tr><td>2nd Stage Cool</td><td></td><td>Y1, Y2, G</td></tr>
</table>

TROUBLESHOOTING – COOLING OPERATION

Symptom	Cause
Thermostat does not call for cooling	Minimum-off times. Change the mode to OFF first, then change the mode to COOL and make a call for cooling.
Cooling does not come on at all	RC terminal not connected – see wiring diagrams.
	Cooling equipment power not on.
Heat comes on instead of cooling	O/B dip switch not set properly. See Step 2, page 32.
	Miswiring – check wire colors at thermostat and HVAC equipment.

10. CHECK EMERGENCY HEAT OPERATION **(Heat Pumps Only)**

Notes:

- **To avoid the minimum on and off times during system checkout, always start and end the check out procedure in the OFF mode.**

1. Set the thermostat to the OFF mode.
2. Set the thermostat to the EMERGENCY HEAT mode.
   - With the O/B configuration setting in the B position (ON), the O/B terminal will be on in the Emergency Heat mode. In the O position (OFF), the O/B terminal will not be on in the Emergency Heat mode.
3. Raise the temperature setting above the room temperature to activate Emergency Heat. The mode display will change from "EHEAT MODE" to "HEATING", which will flash, when the thermostat is calling for heat. Fifteen (15) seconds must elapse between each stage. Verify the correct outputs are on according to the configuration settings shown below:

<table>
<tr><td rowspan="4">Configuration Settings</td><td>Single/Multi</td><td colspan="2" rowspan="2">The same outputs come on regardless of how these are set.</td></tr>
<tr><td>HP/HC</td></tr>
<tr><td>Elect/Gas</td><td>Elect</td><td>Gas</td></tr>
<tr><td>Aux. Ht. Stages</td><td colspan="2">The same outputs come on regardless of how these are set.</td></tr>
<tr><td rowspan="2">Outputs Energized</td><td>1st Stage Emer. Heat</td><td>W1, G</td><td>W1</td></tr>
<tr><td>2nd Stage Emer. Heat</td><td>W1, W2, G</td><td>W1, W2</td></tr>
</table>

TROUBLESHOOTING – EMERGENCY HEAT OPERATION

Symptom	Cause
Thermostat does not call for heat	Minimum-off times. Change the mode to OFF first, then change the mode to EMERGENCY HEAT and make a call for heat.
Emergency Heat does not come on at all	RH terminal not connected – see wiring diagrams.
	Heating equipment power not on.
Fan comes on before heat starts, or Fan does not come on with heat	Change position of ELECT/GAS dip switch – ELECT for electric heat systems (fan on with heat call) or to GAS for fossil fuel systems where the fan is controlled internally by the heating equipment.

(11) CUSTOMIZE THE APPLICATION SETTINGS

1. PROGRAMMABLE OR NON-PROGRAMMABLE

This thermostat can be configured as a programmable or non-programmable thermostat. Four choices are available:

4-Residential — This setting is best for homeowners where there are regularly scheduled, long periods of time during any day where the house is not occupied, such as when everyone is at school or work. In the program, there will be four scheduled temperature changes per day (events) labeled Wake, Leave, Return and Sleep.

2-Residential — This setting is best for homeowners who have no long periods of time during the day when the home is unoccupied. In the program, there will be only two scheduled temperature changes per day (events) labeled Day and Night.

2-Business — This setting is best for businesses that are occupied during business hours and not occupied during non-business hours. In the program, there will be only two scheduled temperature changes per day (events) labeled Occupied and Unoccupied.

0-Non Programmable — This setting is best when having the temperature setting change with the time of day is not desired. The Program option in the menu is not available when this setting is selected. To change the temperature, simply use the Up and Down arrow buttons.

1. Make sure the thermostat is in the OFF mode.
2. Press MENU button to show the MAIN MENU.
3. Scroll down through the menu items and select SETTINGS.
4. In the SETTINGS MENU, scroll down through the menu items and select EVENTS PER DAY.
5. **To cancel,** press the BACK button. This will return you to the SETTINGS MENU.
6. **To change,** use the ▲ or ▼ button to scroll to the desired setting.
7. **To finish** and return to the SETTINGS MENU, press the SELECT button.

2. DIFFERENTIALS

Determines the temperature above/below the temperature setting at which the heating or cooling equipment will turn on. For example, a heat temperature setting of 70°F with a differential of 2° will result in the equipment turning on and off to maintain the temperature between 68°F and 70°F. If the second stage differential is also 2°, the second stage would be used to ensure the temperature did not drop below 66°. The default setting for the first stage and second stage differential is 1°.

To change the differential settings:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "SET DIFFERENTIAL" and press the SELECT button.
   – If the thermostat SINGLE/MULTI dip switch is set for MULTI, two differentials will appear, if set for SINGLE, only one will appear.
4. **To cancel**, press the BACK button. This will return you to the ADV. SETTINGS MENU.
5. **To change** the first stage differential, press the ▲ and ▼ button to raise or lower the setting. To change the second stage differential, press the SELECT button.
6. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button after the value(s) have been set.
   – **For heat pumps** – the auxiliary heat differential(s) are set separately after the number of auxiliary heat stages is selected. See **Diagrams 6-8** on pages 14-16 for auxiliary heat set up instructions.

3. OFFSET

All thermostats are factory calibrated to be accurate to within ±1° of true temperature. An offset is available to allow for agreement with field temperature measuring instruments. The value set will be added to the temperature sensed by the thermostat. The result will be displayed on the thermostat and will be used as the control value.

To change the offset:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "SET OFFSET" and press the SELECT button.
4. **To cancel**, press the BACK button.
5. **To change** the offset value, press the ▲ or ▼ button to raise or lower the setting between –4° and +4° (°F or °C).
6. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button.

4. DEADBAND

This is the number of degrees (in either °F or °C) that the heat setting must be lower than the cool setting. The thermostat will automatically adjust the temperature setting not being changed to maintain this difference.

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ button for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Scroll down through the menu items and select SETTINGS.
4. Use the ▲ or ▼ button to highlight "DEADBAND" and press the SELECT button.
5. **To cancel,** press the BACK button. This will return you to the SETTINGS MENU.
6. **To change,** use the ▲ or ▼ button to scroll to either 2° or 5°.
7. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button.

5. PROGRESSIVE RECOVERY

Progressive Recovery causes the thermostat to bring on the heating/cooling equipment before the programmed event start time, in order for the temperature to be at the programmed value by the programmed time. The feature can be turned on or off. When turned off, the heating/cooling equipment will not begin bringing the space temperature to the programmed value until the start of the event.

To turn Progressive Recovery on or off:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "PROGRESSIVE RECOVERY" and press the SELECT button.
4. **To cancel**, press the BACK button
5. **To change** whether Progressive Recovery is on or off, press the ▲ or ▼ button to highlight either ON or OFF.
6. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button.

6. BALANCE POINTS (HEAT PUMPS ONLY)

This feature is only available when the thermostat has been configured to operate heat pumps (see SET THE CONFIGURATION DIP SWITCHES on page 6) and only when an outdoor temperature is available to the thermostat. Outdoor temperature can come from an ADHC or from an outdoor temperature sensor.

The low balance point is the outdoor temperature at or below which the thermostat will lockout the compressor(s) – only auxiliary heat will be used to satisfy heating demands. The high balance point is the outdoor temperature at or above which the thermostat will lockout the auxiliary heat – only compressor heat will be used to satisfy heating demands. Emergency heat operation is unaffected by the high balance point.

To change the balance points:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "SET BALANCE POINTS" and press the SELECT button.
4. **To cancel**, press the BACK button. This will return you to the ADV. SETTINGS MENU.
5. **To change the low balance point**, press the ▲ or ▼ button to raise or lower the temperature value (range is -10°F to 35°F and OFF).
6. **To change the high balance point**, press the SELECT button, then press the ▲ or ▼ button to raise or lower the temperature value (range is 40°F to 80°F and OFF).
7. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button after the value(s) have been set.

Important time saver: If the thermostat is installed as part of a Model 6504 Intelligent Zoned Comfort System, the balance points only need to be changed at one thermostat. The Model 6504 will share the new settings with all connected thermostats.

7. INPUT DEALER CONTACT INFORMATION

During thermostat operation, the two multi-function buttons are labeled INFO and MENU. When the INFO button is pressed, the thermostat will display the humidity and temperature sensed by the ADHC (if an ADHC has been installed), then the thermostat will display any monitor messages and dealer contact information. At installation, the contact information is blank and only the thermostat model number appears. You have the option of inputting this contact information with the name and number of your company. Three twenty (20) character lines are available for your company name and contact info.

To change the contact information:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "INPUT DEALER INFO" and press the SELECT button. This enters Line 1.
4. **To cancel**, press the BACK button. This returns to the ADV. SETTINGS MENU. You must be at the first position when pressing the BACK button to return to the ADV. SETTINGS MENU.
5. **To go back a character**, press the BACK button.
6. **To enter a character**, use the ▲ or ▼ buttons to scroll through the available characters. Press the SELECT button to enter the character.
7. **To finish Line 1 and go to Line 2**, repeatedly press SELECT, filling all remaining characters with spaces, then press SELECT again.
8. **Repeat to fill Line 2 and Line 3.**
9. **To finish**, press the SELECT button after entering the 20th character of the third line.

8. BLOWER EXTENSION FOR HUMIDITY CONTROL

If the heating equipment has not run long enough to allow the humidifier to meet the humidity demand, the thermostat will continue the blower after a heat call. One second before the thermostat turns off the heating terminal(s), the fan terminal will be energized thus extending blower operation. If the fan terminal was on as part of the heat call it will remain on, if it was not on it will be turned on. The thermostat will operate the blower for no less than 5 minutes after the heat call and not more than 15 minutes. This will allow the humidifier to continue to put moisture in the air to satisfy the humidity demand. This feature can be enabled or disabled and can only be used when an ADHC is part of the installation.

Note: To take full advantage of this feature, the humidifier must be plumbed to hot water.

To enable blower extension:

1. Make sure the thermostat is in the OFF mode.
2. Press and hold both the ▲ and ▼ buttons for 3 seconds.
   – The display will show the ADV. SETTINGS MENU.
3. Use the ▲ or ▼ button to highlight "BLOWER EXTENSION" and press the SELECT button.
4. **To cancel**, press the BACK button
5. **To change** whether Blower Extension is enabled (on) or disabled (off), press the ▲ or ▼ button to highlight either ON or OFF.
6. **To finish** and return to the ADV. SETTINGS MENU, press the SELECT button.

9. MONITORS – AIR FILTER, SERVICE HUMIDIFIER, UV LAMP, SERVICE HVAC

The thermostat monitors time and can display scheduled reminders for the user to service their humidifier, change their filter and UV lamps, and to remind the user to schedule an HVAC system maintenance check. All monitors are strictly time based, so setting a filter monitor to three months will result in the change reminder being displayed in three months, regardless of how much the HVAC system has run in that period. All monitors can also be turned off for installations where one or more of the components may not be installed. When the thermostat has verified that a monitor setting has been reached, a message is displayed on the thermostat (at the message center location where date and time are normally displayed) and the label for the multi-function button normally labeled INFO changes to CALL DEALER.

To set humidifier, filter, UV and HVAC service reminder schedules:

1. Press the MENU button.
2. Use ▲ or ▼ button to highlight SETTINGS, then press the SELECT button. Press the BACK button to cancel.
3. Use ▲ or ▼ button to highlight MONITORS, then press SELECT. Press BACK to cancel.
4. Use ▲ or ▼ button to highlight the monitor you wish to set (AIR FILTER, SERVICE HUMIDIFIER, UV LAMP or SERVICE HVAC) then press the SELECT button. Press the BACK button to cancel.
5. Use ▲ or ▼ button to highlight the amount of time you wish to set then press the SELECT button. Press the BACK button to cancel.
6. Pressing the SELECT button, after setting the schedule, takes you back to the MONITORS screen.
   - To set additional reminder schedules return to step 3.
   - To finish, press the BACK button three times to return to normal operation.

To reset an active monitor:

1. Press the CALL DEALER button.
2. Press the RESET button.
3. This will reset the monitor and return you to the Main Screen.

Important: When an ADHC is installed with the thermostat, either directly or as part of a Model 6504 Intelligent Zoned Comfort System, the service humidifier monitor will automatically be set to AUTO. AUTO is not a choice unless an ADHC is present. Set to AUTO, the ADHC will initiate "service humidifier" based on humidifier type and run time.

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