

Model 8800 Universal Communicating Thermostat



Safety & Installation Instructions

READ AND SAVE THESE INSTRUCTIONS

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INSTALLATION

INSTALLATION LOCATION RECOMMENDATIONS

Thermostat should be mounted:

- On an interior wall, in a frequently occupied space.
- Approximately 5' above floor.
- At least 18" from outside wall.
- Thermostat can be mounted to a vertical junction box.

Do not mount thermostat:

- Behind doors, in corners or other dead air spaces.
- In direct sunlight, near lighting fixtures, or other appliances that give off heat.
- On an outside or unconditioned area wall.
- In the flow of a supply register, in stairwells, or near outside doors.
- On a wall with concealed pipes or ductwork.

THERMOSTAT MOUNTING

- 1. Remove the rear mounting plate from the thermostat.
- 2. Pull wires through the opening on the back of the thermostat.
- 3. Position and level the mounting plate of the thermostat on wall and mark the hole locations with a pencil.
- 4. Drill 1/4" holes and insert supplied anchors (drywall only).
- 5. Place mounting plate over anchors, insert and tighten screws.
- 6. Seal wire entry holes to prevent drafts affecting temperature readings.

OUTDOOR TEMPERATURE SENSOR (OPTIONAL)

Outdoor temperature can be measured by attaching an 8052 sensor to the S1 and S2 terminals. The outdoor sensor must be enabled in the installer setup menu.

recommended).

Above snow line.

• Using less than 300' of wire.

• Do not route wires along 120 VAC lines.

lines.

In heat pump mode the outdoor temperature sensor can be used to efficiently utilize an air source heat pump:

- When the outdoor temperature is less than the Low Balance Point, the heat pump will be locked out and only auxiliary heating will be used.
- When the outdoor temperature is higher than the High Balance Point, the auxiliary heating will be locked out and only the heat pump will be used to provide heating.



Outdoor temperature sensor should be mounted:

On side of building out of direct sunlight (north side

At least 3' away from exhaust vents and condensing

INSTALLATION

REMOTE TEMPERATURE SENSOR (OPTIONAL)

A remote temperature sensor can be used if the thermostat is to be mounted in a concealed location. A 8051 flush mount or 8053 surface mount remote temperature sensor can be attached to the T1 and T2 terminals and mounted in a recommended area. The remote sensor must be enabled in the installer set-up menu, and once enabled will override the thermostat's internal temperature sensor.

Remote temperature sensor should be mounted:

- On an interior wall, in a frequently occupied space.
- Approximately 5' above floor.
- At least 18" from outside wall
- Using less than 300' of wire.

Do not mount remote sensor:

- · Behind doors, in corners or other dead air spaces.
- In direct sunlight, near lighting fixtures, or other appliances that give off heat.
- On an outside or unconditioned area wall.
- In the flow of a supply register, in stairwells, or near outside doors.
- On a wall with concealed pipes or ductwork.
- Near 120 VAC lines.



POWER & RESET OPTIONS

The thermostat is a 24VAC powered device with a battery back-up for the clock.

The thermostat has a memory backup that saves the thermostat settings in case of a power interruption. The system settings will be retained but the clock will reset after 90 seconds with no battery or AC power.

The reset button located under the battery cover can be used to reset the thermostat to factory defaults. The system settings will also be reset to default.



INSTALLATION

WIRING TERMINAL



Wire specifications:

18-24 gauge thermostat wire CAT-5 or equivalent for communication terminals

Installation notes:

- Ensure power at the HVAC equipment is off.
- Loosen screw terminals, insert stripped wire and re-tighten.
- Push the excess wire back into the opening and plug the wall opening to prevent drafts.

Note: If the HVAC system was installed before the automation system, the HVAC installer may have powered the thermostat connecting a wire to the C terminal and installing a jumper wire from the R terminal to RH or RC. When used with an automation system, the R and C terminals on the Model 8800 thermostat should only be connected to the same terminals on the 8819 or a dedicated 24VAC transformer. There should be no connection to the R or C terminals coming from the HVAC equipment.

B+ / B- – Receive communication terminal (reference automation system)¹

- **A+ / A-** Transmit communication terminal (reference automation system)¹
- **C** 24VAC Thermostat power (common) from 8819
- R 24VAC Thermostat power (hot) from 8819
- B Reversing valve for heat²
- 0 Reversing valve for cool²
- Y 1st stage cooling / compressor or dehumidifier³
- Y2 2nd stage cooling / compressor
- **G** Fan
- RC 24VAC supply cooling⁴
- RH 24VAC supply heating⁴
- W2 2nd stage heat / auxiliary / E-Heat
- W 1st stage heat / auxiliary / E-Heat / humidifier³
- S1 & S2 outdoor temperature sensor (optional)
- T1 & T2 remote temperature sensor (optional)

RSA & RSB – 8081 or 8082 Support Module communication (half duplex)⁵

¹Refer to Aprilaire HVAC Automation System Installation Manual for communication wiring details.

²O and B terminals are both de-energized when system mode is OFF or in AUTO when the heating and cooling equipment is idle.

³When the unit is configured for humidistat mode.

⁴Jumper between RC & RH is used in single transformer systems (see wiring diagrams).

⁵Refer to Support Module literature for wiring details.

INSTALLATION

CONVENTIONAL HEAT/COOL

SINGLE TRANSFORMER (USE JUMPER WIRE)



TWO TRANSFORMERS (REMOVE JUMPER WIRE)



HEAT PUMP



B+ A+ B- A- C B O Y Y2 G RC RH W2 W R S2 S1 T1 T2 RSB RSA

NOTE: "O" is active in cooling and "B" is active in heating.





NOTE: "O" is active in cooling and "B" is active in heating.

INSTALLATION

HUMIDISTAT



POWERED CONTACT



SETUP & TESTING

EQUIPMENT TYPE SELECTION SWITCH (SW1)

This thermostat has the option of being used in heat pump or heat/cool systems. Switch SW1 located on the back of the thermostat's face is used to select this option. This setting can also be checked in the Installer System Settings under Equipment Type.

Note: Thermostat reboots within 10 seconds after switch position is changed.



INSTALLER SETUP MENU

HOW TO ENTER THE INSTALLER SETUP MENU TO CHANGE SYSTEM SETTINGS:

Press [MODE] to set system to OFF.

Press [MENU] to enter main menu.

Press and hold [SETUP] for seven seconds, **[INSTALL SETUP]** appears.

Press [INSTALL SETUP] to enter installer setup menu.



Press [NEXT] or [BACK] to page through the settings.

Press A or **v** to adjust the setting.

Press [DONE] to save and exit, or **[CANCEL]** to exit without saving.

The thermostat will discard changes and exit if nothing is pressed within 60 seconds.

To reset the installer settings to the default, reset the thermostat by pressing the **[RESET]** button inside the battery cover.

SETUP & TESTING

INSTALLER SYSTEM SETTINGS TABLE

The following table is the list of the settings and their details. Default settings are shown in **bold**. Some settings are only available to thermostats set to heat pump or humidistat mode.

System setting	Description	Factory default setting (bold) and setting range		
00. NETWORK ADDRESS	Network communication address.	1 Address selection of 1 to 64 in steps of 1		
01. NUMBER OF NODES	Total number of thermostats on the network.	64 Selection of 1 to 64 in steps of 1		
02. BAUD RATE	Communication baud rate.	9600 19200		
03. CONTROLLER TYPE	Sets controller to Thermostat or Humidistat.	THERMOSTAT HUMIDISTAT		
04. EQUIPMENT TYPE	Equipment type is set by SW1.	HEAT/COOL HEAT PUMP		
05. CONTROL SETUP	Used to lockout heating or cooling outputs (only available in Heat/Cool mode).	HEAT AND COOL HEAT ONLY COOL ONLY		
06. AUTO CHANGEOVER	Enable or disable Auto changeover mode.	DISABLE ENABLE		
07. NUMBER OF STAGES	Number of stages of equipment.	SINGLE MULTI		
08. AUX HEAT STAGES	Number of stages of auxiliary heat equipment.	ONE TWO		
09. Heat/Cool: FAN CONTROL IN HEATING Heat Pump: AUXILIARY EQUIPMENT TYPE	Heat/Cool: Determines if the thermostat or equipment controls the fan in heating. Heat Pump: Auxiliary Equipment type. ¹	GAS/OIL HEAT (equipment controls fan) ELECTRIC HEAT (thermostat controls fan)		
10. Thermostat: COMPRESSOR MIN OFF TIME 10. Humidistat: DEHUMIDIFIER MIN ON/OFF TIME	Thermostat: Minimum off time for compressor protection. Humidistat: Minimum on/off time for dehumidifier protection.	5 MINUTES 1 to 5 MINUTES		
11. Thermostat: HEATING MIN OFF TIME 11. Humidistat: HUMIDIFIER MIN ON/OFF TIME	Thermostat: Minimum off time for heating. Humidistat: Minimum on/off time for humidifier.	2 MINUTES 1 to 5 MINUTES		
12. EQUIPMENT MIN ON TIME	Minimum on time for heating and cooling.	2 MINUTES 1 to 5 MINUTES		
13. AUTO CHANGEOVER TIME	Minimum time between heating and cooling calls.	4 MINUTES 1 to 5 MINUTES		
14. REMOTE SENSOR	Select if remote sensor is attached at T1 and T2.	NO YES		
15. OUTDOOR SENSOR	Select if outdoor sensor is attached at S1 and S2.	NO YES		
16. CONTROL SENSOR BACKUP	Control sensor failure response.	STOP CONTROL (enter Error Mode)		
17. FIRST STAGE DIFFERENTIAL	1st stage differential.	1°F (0.5°C) 1°F to 9°F (0.5°C to 4.5°C)		
18. SECOND STAGE DIFFERENTIAL	2nd stage differential.	1°F (0.5°C) 1°F to 9°F (0.5°C to 4.5°C)		

If utilizing a fossil fuel auxiliary heat system, set to Gas or Oil Furnace. In this setting, the heat pump will lock out before the fossil fuel auxiliary heat comes on; eliminating the need for a dual fuel kit. If utilizing electric auxiliary heat, set to Electric. In this setting, the heat pump and electric auxiliary heat are allowed to run simultaneously.

SETUP & TESTING

INSTALLER SYSTEM SETTINGS TABLE (CONTINUED)

System setting	Description	Factory default setting (bold) and setting range			
19. THIRD STAGE DIFFERENTIAL	3rd stage differential.	1°F (0.5°C) 1°F to 9°F (0.5°C to 4.5°C)			
20. FOURTH STAGE DIFFERENTIAL	4th stage differential.	1°F (0.5°C) 1°F to 9°F (0.5°C to 4.5°C)			
21. INTEGRAL FACTOR PERIOD	Short period = more cycles per hour (comfort) Long period = less cycles per hour (economical).	2 MINUTES 1 to 5 minutes or "OFF" for proportional control only			
22. LOW BALANCE POINT	Outdoor temperature low balance point (This option is only displayed if the outdoor temperature sensor is enabled).	20°F (-6°C) 10°F to 50°F (-12°C to 9°C) or OFF to ignore			
23. HIGH BALANCE POINT	Outdoor temperature high balance point (This option is only displayed if the outdoor temperature sensor is enabled).	65°F (18°C) 40°F to 85°F (3°C to 30°C) or OFF to ignore			
24. EXTENDED FAN - HEAT	Extends fan operation after heat call ends.	DISABLE ENABLE (90 second extension)			
25. EXTENDED FAN – COOL	Extends fan operation after cool call ends.	DISABLE ENABLE (90 second extension)			
26. PROGRESSIVE RECOVERY	Enable or disable Progressive recovery.	DISABLE ENABLE			
27. DEADBAND	Auto changeover mode dead band.	3°F (2°C) 2°F to 9°F (1°C to 5°C)			
28. HUMIDISTAT MODE	Sets humidity control mode.	HUMIDIFY DEHUMIDIFY AUTO OFF			
29. TEMPERATURE SCALE	Set the thermostat to Fahrenheit or Celsius mode.	FAHRENHEIT Celsius			
30. AUTO DAYLIGHT SAVINGS	Enable or disable auto daylight savings.	OFF MARCH (second Sunday in March to the first Sunday in November) APRIL (first Sunday in April to the last Sunday in October)			
32. CONSTANT BACKLIGHT	Enable constant, low intensity, backlight when 24VAC is present.	DISABLE ENABLE			
33. BACKLIGHT INTENSITY	Backlight intensity as a percentage of full on.	100 PERCENT 0 - 100%			
34. SENSOR OFFSET	Field adjustment of the controlling temperature sensor.	0°: No offset applied -8°F to +8°F (-4°C to +4°C)			
35. PROGRAM FORMAT	Select weekly program format.	7-DAY (Mon, Tue, Wed, Thu, Fri, Sat, Sun) 5/1/1 (weekdays, Saturday and Sunday) 5/2 WEEKDAYS (weekdays and weekends) NON-PROG			
36. EVENT CONFIGURATION	Setting for event naming.	RESIDENTIAL COMMERCIAL			
37. EVENTS PER DAY	Number of program events per day.	FOUR TWO			
38. USER SECURITY SETUP	Enable or disable security setup system variables in the User Setup Screens.	DISABLE ENABLE			
39. SECURITY	Enable or disable security.	DISABLE ENABLE			
40. SECURITY PIN	Security pin code.	#### 4-digit numeric pin			

SETUP & TESTING

INSTALLER SYSTEM SETTINGS TABLE (CONTINUED)

System setting	Description	Factory default setting (bold) and setting range
41. LOCKOUT TYPE	Screen lockout level. (Override lockout by holding [MENU] for 7 seconds).	OFF PARTIAL FULL
42. MODE LOCKOUT	System mode lockout setting.	DISABLE ENABLE
43. FAN LOCKOUT	Fan Mode lockout setting.	OFF TIMED FULL
44. SETPOINT LOCKOUT TYPE	Setpoint lockout setting.	OFF TIME-LIMITED RANGE-LIMITED TIME AND RANGE FULL
45. MAX SETPOINT CHANGE IN LOCKOUT	Select setpoint limits (only available when lockout is set to partial lockout).	+/-5 DEGREES (from current setpoint) ±1° to 20° OFF indicates no setpoint changes or +/-5% RH (from current setpoint) ±1% to 20% OFF indicates no setpoint changes
46. TEMPORARY CHANGE PERIOD	Time-limited lockout temporary change period.	60 MINUTES Selection of 0 to 255 minutes in 5 minute step; 0 indicates no temporary change period.
47. NETWORK OVERRIDE	Network override feature setting.	ENABLE DISABLE
48. DISPLAY REMOTE SENSORS	Enable or disable display of support module monitor (remote) sensor readings.	ENABLE DISABLE
49. AIR FILTER ALARM PERIOD	The period for displaying the "Change Air Filter" message.	OFF 1, 3, 6, 12 MONTHS or "OFF" to disable
50. WATER PANEL ALARM PERIOD	Set number of months until the first reminder is required. The following reminders will occur every 12 months for a flow through humidifier, and 3/9 months for a drainless humidifier.	OFF 1 to 12 MONTHS or "OFF" to disable
51. HUMIDIFIER TYPE	Select humidifier type. Flow through type gives a 12 month reminder, and drainless gives a 3/9 month reminder.	FLOW THROUGH (1 reminder per season) DRAINLESS (2 reminders per season)
52. Dehumidifier Alarm Period	The period for displaying the "Service Dehumidifier" message.	OFF 1 to 12 MONTHS or "OFF" to disable
53. HVAC ALARM PERIOD	The period for displaying the "Service HVAC" message.	OFF 1 to 12 MONTHS or "OFF" to disable

SETUP & TESTING

SYSTEM TEST MENU

The system test menu is used to test a system after installation. The outputs of the thermostat or humidistat can be manually activated to test their function. The instructions below show how to enter the test mode and turn outputs on and off.

HOW TO ENTER THE SYSTEM TEST MENU:

Press [MODE] to set system to off.

Press and hold [FAN] and **[MODE]** for three seconds to enter system test mode. **Note:** Buttons will not be shown in humidistat mode. Press in the same area that the button would be displayed.

The screen of the first test step is displayed:



Test Number	Thermostat System Test
60	Heating equipment test
61	Cooling equipment test
62	Auxiliary equipment test (HP only
63	Fan equipment test

Test Number	Humidistat System Test
70	Humidification equipment test
71	Dehumidification equipment test

The test number is displayed on the upper left, and the output state is displayed in the message center.

Press to turn on the output (01). For multi stage output, **press** again to turn on the 2nd stage (02).

Press 🕶 to turn off all the outputs (00).

 $\ensuremath{\textbf{Press}}$ [BACK] or [NEXT] to change to the next test step.

When the last step is done, **press [NEXT]**. The message "installer test complete" will display. All minimum on and off timers will be reset after returning from system test mode.

Note: Second stage will only be displayed when the thermostat is set to multi-stage mode.

SETUP & TESTING

SYSTEM TEST TABLES

Test 60:	Test 60: Heating Equipment Test											
Button Press	Equipment Type	Stages	Heat Type	w	W2	Y	Y2	G	0	В		
	Lloot Cool		Gas	ON						ON		
1st UP	Heat Cool		Electric	ON				ON		ON		
proce	Heat Pump					ON		ON		ON		
	Heat Cool 2	1										
		2	Gas	ON	ON					ON		
2nd UP		2	Electric	ON	ON			ON		ON		
piess	Hoat Pump	1										
	Heat Pump	2				ON	ON	ON		ON		

Test 61:	Test 61: Cooling Equipment Test									
Button Press	Equipment Type	Stages		w	W2	Y	Y2	G	0	В
1st UP	Heat Cool					ON		ON	ON	
press	Heat Pump					ON		ON	ON	
2nd UP press	Heat Cool	1								
		2				ON	ON	ON	ON	
	Hoot Pump	1								
	Heat Pump	2				ON	ON	ON	ON	

Test 62: Auxiliary Equipment Test (HP only)

Button Press	Equipment Type	Heat Type	w	W2	Y	Y2	G	0	В
1st UP press Heat Pump	Gas	ON						ON	
	Electric	ON				ON		ON	
2nd UP	Lloot Dump	Gas	ON	ON					ON
press	press Heat Pump	Electric	ON	ON			ON		ON

Test 63: Fan Equipment Test								
Button Press		w	W2	Y	Y2	G	0	В
1st UP press						ON		

Test 70: Humidifier Equipment Test								
Button Press		w	W2	Y	¥2	G	0	В
1st UP press		ON				ON		ON

Test 71:	Dehumidifier Equipment Test							
Button Press		w	W2	Y	Y2	G	0	В
1st UP press				ON		ON	ON	

QUICK REFERENCE TO CONTROLS & DISPLAY

HOME SCREEN



NOTE: BACKLIGHT IS ACTIVATED WITH FIRST BUTTON PRESS AND AUTOMATICALLY TURNS OFF.

QUICK REFERENCE TO CONTROLS & DISPLAY

HUMIDISTAT

The Model 8800 has the option of being configured as a humidistat that can control a humidifier and dehumidifier. **Note:** The 8800 is set to operate as a humidistat through the installer setup menu.



MAIN MENU



15

THERMOSTAT FEATURES

- Large touch screen with adjustable backlight.
- · Message center provides feedback and instructions.
- 7 day programmability or separately programmable weekday/weekend schedules.
- Thermostat can be removed from the wall for easy programming (batteries must be installed).
- Front battery door access for fast, easy replacement.
- Displays room temperature, room humidity, temperature setting, and optional outdoor temperature.
- Air filter, humidifier, dehumidifier, and HVAC service indicators.
- Programmable fan control with fan circulation mode.

- Easy to use temperature control can override program schedule at any time.
- Progressive recovery ensures proper temperature at the start of a program event.
- Built in compressor protection prevents damage to your equipment.
- Battery back-up.
- System test mode.
- RS485 communications ready.
- Universal system compatibility.
- Configurable to control a humidifier or dehumidifier.

TROUBLESHOOTING

DISPLAY IS BLANK

- Check circuit breaker and reset if necessary.
- Make sure power switch at heating & cooling system is on.
- Make sure furnace door is closed securely.

TEMPERATURE SETTINGS DO NOT CHANGE

Make sure heating and cooling temperatures are set to acceptable ranges:

- Heat: 40° to 90°F (4° to 32°C)
- Cool: 50° to 99°F (10° to 37°C).

HEATING SYSTEM DOES NOT RESPOND ("HEATING" APPEARS ON SCREEN)

- Check for 24VAC at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the heating equipment to find the cause of the problem.
- Check for 24VAC between the heat terminal (W) and the transformer common. If 24VAC is present, the thermostat is functional. Check the heating equipment to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the heating equipment.

COOLING SYSTEM DOES NOT RESPOND ("COOLING" APPEARS ON SCREEN)

- Check for 24VAC at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the cooling equipment to find the cause of the problem
- Check for 24VAC between the cooling terminal (Y) and the transformer common. If 24VAC is present, the thermostat is functional. Check the cooling system to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the cooling equipment.

FAN DOES NOT TURN ON IN A CALL FOR HEAT

• Check System Setting 09 (Fan Control), to make sure the fan control is properly set to match the type of system (see page 9).

HEAT PUMP ISSUES COOL AIR IN HEAT MODE, OR WARM AIR IN COOL MODE

 Check wiring at the terminal block to confirm the reversing valve is connected to the proper terminal.
O is active in cooling and B is active in heating.

HEAT/COOL BOTH ON AT SAME TIME

- Check SW1 (Equipment Type), to make sure it is set to match the installed heating/cooling equipment (see page 8).
- Check to make sure heating and cooling wires are not shorted together.

HEATING EQUIPMENT IS RUNNING IN COOL MODE

 Check SW1 (Equipment Type), to make sure it is set to match the installed heating/cooling equipment (see page 8).

"HEATING" IS NOT DISPLAYED

- Check Installer System Setting number 05 (Control Setup) is set correctly.
- Change the System Mode to Heat, and set the temperature level above the current room temperature.

"COOLING" IS NOT DISPLAYED

- Check Installer System Setting number 05 (Control Setup) is set correctly.
- Change the System Mode to Cool, and set the temperature level below the current room temperature.

ERROR CODES

If the thermostat enters an error mode, all outputs are turned off. The thermostat attempts to recover every 10 minutes. If the error does not clear, use the reset button. This will return all settings back to factory default.

Error code	Message	Error Description
01		Open temperature sensor circuit
02		Shorted temperature sensor circuit
03	"RH SENSOR ERROR"	Invalid response from the RH sensor
04	"EEPROM ERROR"	Error in permanent memory
05	"SENSOR ERROR"	All controlling support modules are unresponsive and the built-in sensor is not used as a backup option

SPECIFICATIONS

Environment				
Temperature	Operating: 32° to 120°F (0° to 48.9°C) Shipping: -30° to 150°F (-34.4° to 65.5°C)			
Relative humidity	Operating: 5% to 90% R.H. (non-condensing)			

Electrical			
Operating voltage	24VAC (18 – 30VAC)		
Current	Maximum: 2.5A (total), 1.0A (single output) Maximum surge current: 5A		
Battery back-up	AA size alkaline battery x 2		

Thermal				
Outdoor & Remote temperature sensor	Maximum distance: 300 feet			
Room temperature measurement	Display range: 32° to 99°F (0° to 40°C)			
Outdoor temperature measurement	Display range: -20° to 130°F (-30° to 55°C)			
Setpoint temperature range	Heat: 40° to 90°F (4° to 32°C) Cool: 50° to 99°F (10° to 37°C)			
Setpoint humidity range	Humidification: 10% to 90% R.H. Dehumidification: 10% to 90% R.H.			



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