

Alerts and Delta T Diagnostics with the Prestige® 2.0 IAQ Thermostat

INSTALLATION INSTRUCTIONS

MOUNTING LOCATIONS

Refer to the guidelines below and Fig. 1–5 for mounting locations of the Discharge and Return Air Temperature Sensors.

Discharge Air Temperature Sensor Mounting Location

1. Mount the Discharge Air Temperature Sensor on the supply duct in a location where the air is mixed well. Mount the Discharge Air Temperature Sensor out of sight of the A-Coil/Heat Exchanger when possible. See Fig. 1.
2. When possible, mount the Discharge Air Temperature Sensor upstream of a Steam Humidifier, a Fan Powered Humidifier or a Dehumidifier that is ducted to the supply. See Fig. 2–3.
3. If space does not allow a Discharge Air Temperature Sensor upstream of a Steam Humidifier or Fan Powered Humidifier, mount the Discharge Air Temperature Sensor downstream of the Humidifier. See Fig. 2. When setting the Delta T Limits (see “Set Delta T Limits” on page 5), be sure to consider the affect that the humidifier has on Delta T.
4. If a Bypass Humidifier is installed, the Discharge Air Temperature Sensor can be mounted downstream or upstream of the Bypass Humidifier. Mounting the sensor downstream of the Bypass Humidifier is the preferred location, because the air is mixed well. See Fig. 4–5.

Return Air Temperature Sensor Mounting Location

1. Install the Return Air Temperature Sensor on the return duct in a location where the air is mixed well. Mount the Return Air Temperature Sensor downstream of a Bypass Humidifier, Dehumidifier or Ventilator. See Fig. 1–5.

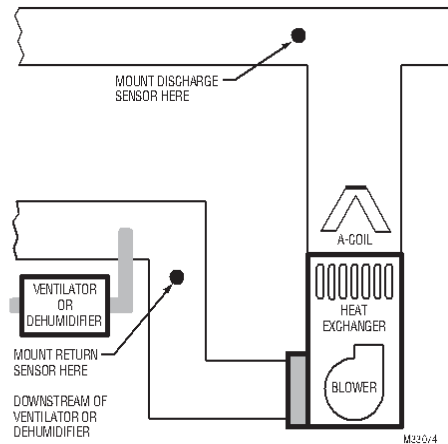


Fig. 1.



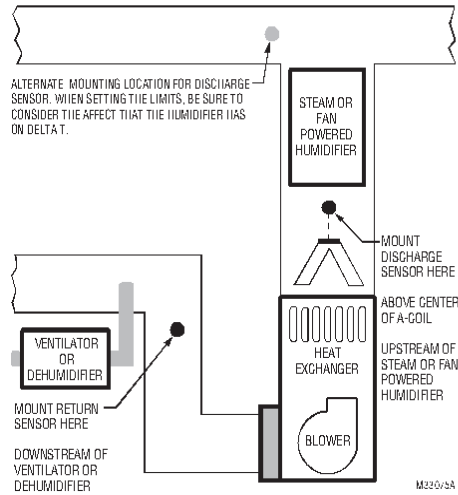


Fig. 2.

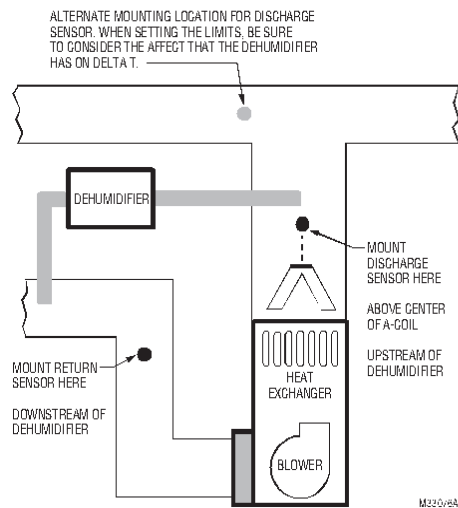


Fig. 3.

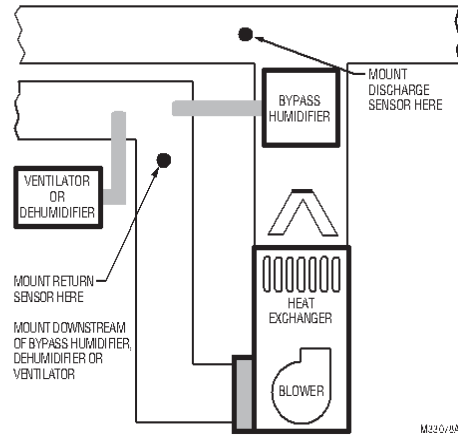


Fig. 4.

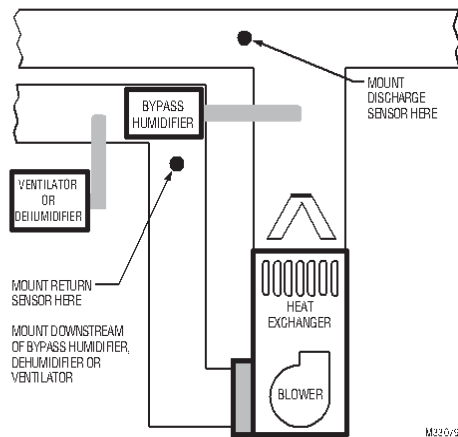


Fig. 5.

INSTALLATION

Use the following steps to mount the Discharge/Return Air Sensors:

1. Attach plastic cover to the sensor probe.
2. Drill 1/4-inch hole for the sensor probe and mount it to the ductwork with enclosed screws (see Fig. 6).
3. Connect wires to S1 or S2 terminals at the EIM.
4. Configure the S1 or S2 terminals in the Installer Setup at the thermostat.

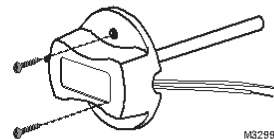


Fig. 6. Mounting Discharge/Return Air Sensor.

ALERTS AND DIAGNOSTICS

The Prestige thermostat uses alerts and diagnostics to provide greater comfort and efficiency. Alerts and diagnostics can notify customers when maintenance or service is needed, and display your contact information to make it easy for them to reach you.

Delta T Diagnostics

If discharge and return air sensors are installed, the thermostat can track system performance over time. It measures this as "Delta T." The thermostat monitors Delta T and displays an alert on the home screen when the system exceeds the limits you set.

Delta T Diagnostics tells you if the system is performing above or below expected standards which would normally go unnoticed, and may cause unnecessary energy use. It can also detect and warn about problems early, before heating or cooling equipment fails.

The thermostat will measure and record Delta T of the system for each stage you test. This information can be used to set the proper Delta T fault limits of the system. When the system operates outside those limits multiple times (see "Advanced Options for Delta T Diagnostics" beginning on page 6), an alert is recorded in the log. If configured to do so, the system will then display an alert to the homeowner, along with your contact information.

Before You Set Up Delta T Diagnostics

Refer to the information below for tips on installation and setup of Delta T Diagnostics.

1. Refer to Fig. 1–5 for the placement of the Discharge and Return Air Sensors.
2. In gas or oil forced air systems, Delta T will continue to rise for several minutes even after Delta T begins to stabilize. Be sure the Maximum Delta T Limit is set higher than the expected stable Delta T. See Fig. 7.

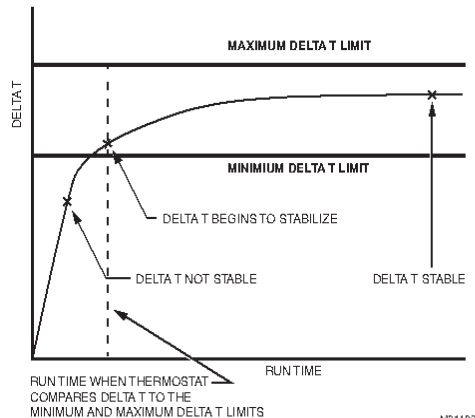


Fig. 7.

3. Delta T can be affected by indoor and outdoor conditions for heat pumps and cooling systems. Consider the total range of normal performance when setting the Delta T Limits.

For example, in cooling, you might have a Delta T of 20 °F when the outdoor humidity is 50% and a Delta T of 16 °F when the outdoor humidity is 85%.

You can either set Limits further apart and monitor Delta T during all indoor and outdoor conditions or set Limits closer together and turn off diagnostics during certain indoor and outdoor conditions (see "Advanced Options for Delta T Diagnostics" beginning on page 6).

For example, you can set limits closer together and then turn off diagnostics when outdoor temperature is above 90 degrees and outdoor humidity is above 85%.

4. Verify the filter is clean and all the registers are open before running an equipment test.
5. Select a Run Time when Delta T begins to stabilize during the equipment test.
6. Set Minimum and Maximum Delta T Limits based on what you consider to be unacceptable performance from the heating and cooling equipment.

NOTE: When the system operates below the Minimum Limit or above the Maximum Limit multiple times (Table 1), an alert is recorded in the log. If configured to do so, the thermostat will display an alert to the user, along with your contact information.

7. Delta T Diagnostics is only for non-zoned forced air systems.
8. The thermostat does not provide Heat or Cool Delta T Diagnostics when it is set to control an Economizer module (ISU 2220).
9. The thermostat cannot be setup for Heat Delta T Diagnostics when the thermostat is used with an external fossil fuel kit (ISU 2190).

Setting up Alerts and Diagnostics

1. Set up the Return and Discharge Air Sensors by selecting the check boxes on the screen. These sensors are used to measure Delta T.

Fig. 8.

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2. Select the terminals that are wired to the Discharge and Return Air Sensors (terminals S1 and S2 at the EIM).

IMPORTANT

Be sure to select the correct terminals for the discharge and return air sensors. For example, if the return air sensor is wired to S1, select S1 (see Fig. 9) for the return air sensor.

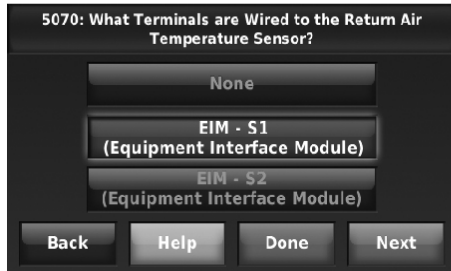


Fig. 9.

3. Select the Discharge and Return Air Sensor Type (10K).

IMPORTANT

10K sensors must be used for Delta T Diagnostics.

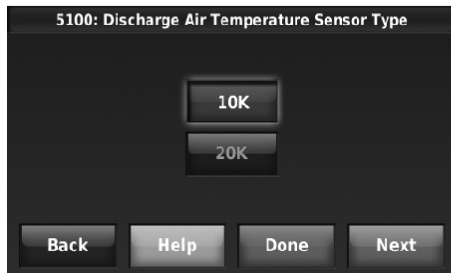


Fig. 10.

4. Turn on the Heat and Cool Delta T Diagnostics. Default is On.



Fig. 11.

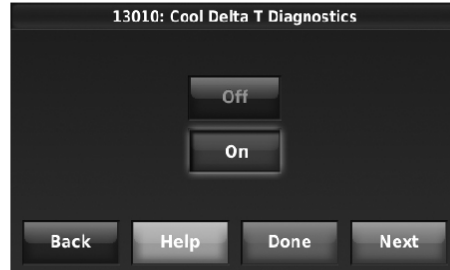


Fig. 12.

5. For Air-to-Air Heat Pumps, press the up/down arrows to set the maximum time duration of a defrost cycle. Default is 10 minutes. Delta T is not monitored during a defrost cycle. Check the heat pump documentation for the defrost cycle time.

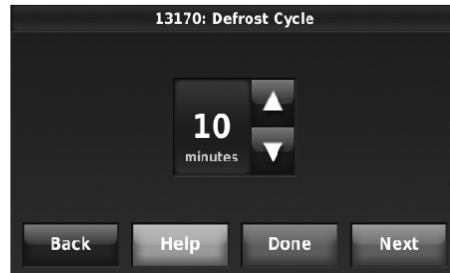


Fig. 13.

6. When you have completed the Installer Setup, you will be asked to finish setting up Diagnostics.

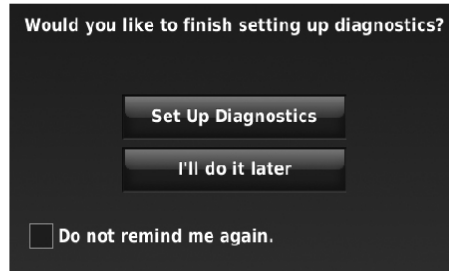


Fig. 14.

7. If you press **Set Up Diagnostics**, you will enter the Equipment Test. See "Run a Test for Each Stage" beginning on page 5.
8. If you press **I'll do it later**, you will be reminded to finish setting up diagnostics the next time you exit installer setup. You can also finish setting up diagnostics by following the procedure in "If You Decide to Set Up Diagnostics Later".

After Delta T Diagnostics Setup is complete, the thermostat will detect typical failures such as no heating or no cooling and performance related issues that are typically caused by a dirty air filter, blocked registers, loss of refrigerant, dirty a-coil, frozen a-coil, cracked heat exchanger, dirty burners, etc.

If You Decide to Set Up Diagnostics Later

When you are ready to set up diagnostics, follow these steps:

1. From the Home screen, press MENU.
2. Scroll down and press Installer Options.
3. Enter the passcode and press Done (see Note).

NOTE: The passcode is the date code printed on the back of the thermostat or press MENU > Dealer Information to find the date code.

4. Press Set Up Diagnostics.

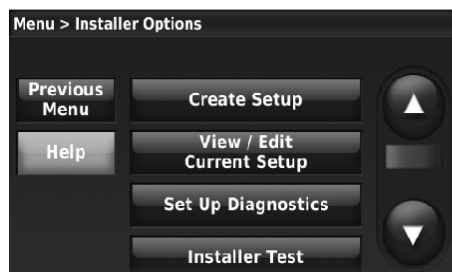


Fig. 15.

5. Proceed to "Run a Test for Each Stage".

Run a Test for Each Stage

Follow these steps to run a test for each stage in the HVAC system.

1. Turn on stage 1.



Fig. 16.

2. For each stage you test, wait until Delta T begins to stabilize, then turn on the next stage (if present). See Fig. 17 for an example.

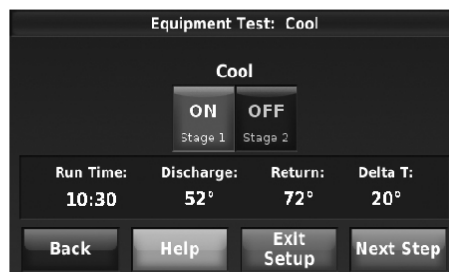


Fig. 17.

3. Press Next Step after Delta T stabilizes for the last stage. The thermostat saves the Delta T and Run Time Data for each stage you test and is displayed on the next screen.

NOTE: The thermostat only saves test data for stages that run 1 minute or longer.

Set Delta T Limits

1. Press Stage 1 to set the limits and run time (see Fig. 18). Use the saved test data located in the upper right corner of the screen to set the Delta T Minimum and Maximum Limits and the Run Time (see Fig. 19).

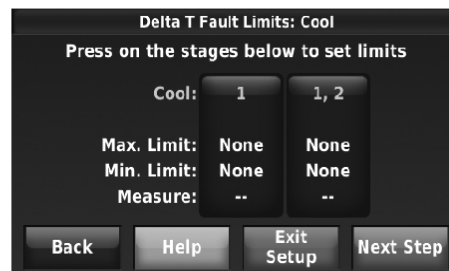


Fig. 18.

2. Press the up or down arrows to set the Minimum and Maximum Limits and the Run Time.

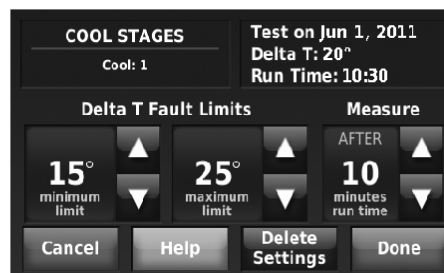


Fig. 19.

3. Set appropriate Minimum and Maximum Delta T Limits based on the reading from the equipment test and what you consider to be unacceptable performance from the heating and cooling equipment.

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4. When setting the run time, select a setting based on when Delta T began to stabilize during the equipment test. In the example shown in Fig. 17 and 19, Delta T began to stabilize in about 10-11 minutes.
5. Set the limits and run time for all stages of cooling using steps 1-4 above.
6. Repeat steps 1-5 above for Heating.
 - only when indoor temperature is within a certain range (ISUs 13050, 13090, 13130; Default: Always)
 - only when indoor humidity is within a certain range (ISUs 13060, 13100, 13140; Default: Always)
 - only when outdoor temperature is within a certain range (ISUs 13070, 13110, 13150; Default: Always)
 - only when outdoor humidity is within a certain range (ISUs 13080, 13120, 13160; Default: Always)

After Delta T Diagnostics Setup is Complete

The thermostat will measure Delta T after the specified run time, and compare Delta T to the minimum and maximum limits for each valid cycle. If the system operates below the minimum limit or above the maximum limit multiple times (see Table 1), an alert is recorded in the Alerts Log. If configured to do so, an alert is displayed to the user (Display Delta T Alerts to User, ISU 13190). The user is alerted by default. For example, if 10 of the last 15 cycles have the same fault, an alert is logged and the user is alerted.

Advanced Options for Delta T Diagnostics

To set Advanced Options for Delta T Diagnostics, select Yes at ISU 13015. Then the following advanced options are displayed:

- Delta T Alert Sensitivity (ISU 13180; Default: 3)
- Display Delta T Alerts to User (ISU 13190; Default: Yes)
- Allow Delta T Diagnostics:
 - during humidification (ISU 13020; Default: Yes)
 - during dehumidification (ISU 13030; Default: Yes*)
 - during ventilation (ISU 13040; Default: Yes)

* Default is Yes for Dehumidifiers and A/C with High Speed Fan. The thermostat does NOT allow Delta T diagnostics during dehumidification if it is setup for A/C with Low Speed Fan, Hot Gas Bypass, or Reheat.

The Delta T Alert Sensitivity is set on a scale of 1-5 at ISU 13180 (1 is the least sensitive; 5 is the most sensitive):

Table 1. Delta T Alert Sensitivity (ISU 13180).

Setting	Alert is logged and user is alerted if
1	10 of the last 15 valid cycles have the same fault, or 25 of the last 30 valid cycles have the same fault.
2	10 of the last 15 valid cycles have the same fault, or 20 of the last 30 valid cycles have the same fault.
3 (Default)	5 of the last 5 valid cycles have the same fault, or 10 of the last 15 valid cycles have the same fault, or 15 of the last 30 valid cycles have the same fault.
4	5 of the last 5 valid cycles have the same fault, or 8 of the last 15 valid cycles have the same fault, or 15 of the last 30 valid cycles have the same fault.
5	3 of the last 5 valid cycles have the same fault, or 8 of the last 15 valid cycles have the same fault, or 10 of the last 30 valid cycles have the same fault.

Automation and Control Solutions

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69-2678EFS-03 M.S. Rev. 10-11
Printed in United States