

## READ AND SAVE THESE INSTRUCTIONS

# HE420A Steam Power Humidifier

### INSTALLATION INSTRUCTIONS

## APPLICATION

The HE420A Steam Power Humidifier uses a thermal fan interlock control to provide humidification for the whole house. The steam power humidifier is designed to work with high efficiency furnaces and heat pumps.

## INSTALLATION

### IMPORTANT

*This product is for residential applications only and must be installed by a qualified HVAC contractor. Failure to comply could invalidate the product warranty, or result in serious injury or electrocution.*

## SELECT LOCATION AND MOUNT

### **!** WARNING

**Electrocution, Heavy Equipment and Chemical Hazard.**  
**Can cause death, blindness, water damage to home and heater failure.**

- Do not cut into any air conditioning or electrical line.
- Wear safety glasses when cutting or drilling.
- Mount the humidifier in a level position to avoid water damage and heater failure.
- Reinforce duct as necessary to ensure stability.

There are three typical ways of mounting the steam humidifier. See Fig. 1, 2, and 3. Be sure to select a location where the humidifier can be plugged in without an extension cord. The preferred installation location is on the warm air side of the furnace. If that location is not possible, the humidifier should be mounted a minimum of 6 ft (1.8m) upstream from the furnace filter. Depending on the location selected, additional duct reinforcement may be necessary because the humidifier weighs 18 lb when filled with water.

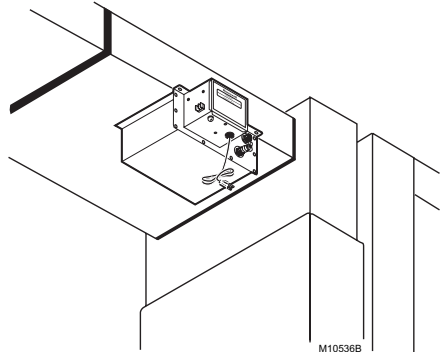


Fig. 1. Mount humidifier horizontally under duct using mounting bracket.

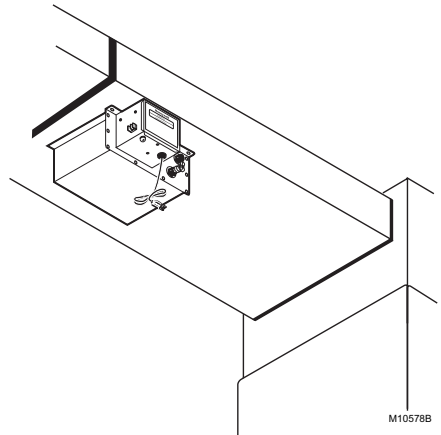
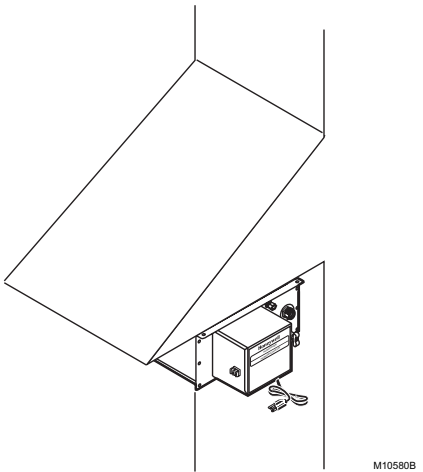


Fig. 2. Mount humidifier horizontally under duct.





**Fig. 3. Mount humidifier horizontally under duct extension using mounting bracket.**

**CAUTION**

**Steam Condensation, Fire and Freezing Water Hazard.**

**Can cause failure of fan or limit control or result in water damage to home.**

- Do not install the humidifier where the sidewalls of the return air duct are constructed of wood (i.e. floor joist).
- Do not install the humidifier where the temperature is lower than 32°F (0°C) or higher than 200°F (93°C).
- For all installation configurations, the mounting area must be strong enough to support the humidifier's weight when it is full of water (approximately 18 lbs.), and to hold the humidifier in a level position for safe, reliable operation. Otherwise, additional duct reinforcement will be necessary.
- If the installation includes exposed insulated materials, a section of the ductwork must be removed and replaced with rigid metal duct extending at least 6 feet downstream from the humidifier.
- Mount the unit at least 4-to-6 feet after the plenum transition. Avoid sudden turns or transitions in the ductwork in the immediate area downstream from the humidifier.

There are three possible mounting procedures:

- horizontally under at least a 10 in. (254 mm) wide duct using the mounting bracket (preferred mounting);
- horizontally under a reinforced duct;
- horizontally under a duct extension using the mounting bracket.

Decide which mounting is appropriate and follow those mounting instructions.

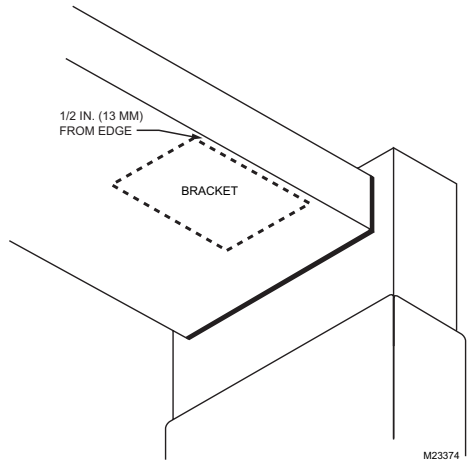
**Mount Horizontally Using Mounting Bracket (Preferred Mounting Method)**

**IMPORTANT**

*The duct must be at least 10 in. (254 mm) wide to use this mounting method.*

The duct is strongest when using the bracket mounting method because the least amount of duct reinforcement is required because of the bracket location. See Fig. 1. However, in some installations, reinforcement may still be necessary to help support the weight of the humidifier and keep the humidifier level.

1. Position the bracket 1/2 in. (13 mm) from the edge of the duct and trace around the bracket. See Fig. 4.
2. Once the outline has been traced, remove bracket.



**Fig. 4. Position bracket to duct edge.**

3. Drill a 3/8 in. (10 mm) hole within the center portion of the bracket.
4. Use tin snips to cut around the outline of the bracket.

**IMPORTANT**

*Follow the dotted line carefully.*

5. Remove the sheet metal.
6. Use two 8-32 screws and nuts to attach the mounting bracket (L shaped with six holes) to the top/front surface of the humidifier. The humidifier is now ready for mounting.

**NOTE:** Position the humidifier so the upward protrusion of the U is on the side toward the reservoir.

**IMPORTANT**

*Do not mount the humidifier until the water level is adjusted. See the Plumbing section.*

7. Slide the flanges of the humidifier reservoir into the mounting bracket until the reservoir's front flange comes into contact with the edge of the duct.
8. Secure the humidifier to the duct with three no. 8 sheet metal screws.

## Mount Horizontally On Reinforced Duct

This horizontal mounting method usually requires duct reinforcement to support the weight of the humidifier and keep it level. The mounting bracket is not used. See Fig. 2.

1. Position the bracket to the bottom of the duct in the desired location. Be sure the bracket is level.
2. Once the outline has been traced, remove bracket.
3. Drill a 3/8 in. (10 mm) hole within the center portion of the bracket.
4. Use tin snips to cut around the outline of the bracket.
5. Remove the sheet metal.

### IMPORTANT

*Do not mount the humidifier until the water level is adjusted. See the Plumbing section.*

6. Slide the flanges of the humidifier reservoir into the mounting bracket.
7. Secure the humidifier to the duct with two no. 8 sheet metal screws.

## Mount Horizontally On Vertical Duct

Horizontal mounting on a vertical duct requires the installation of a duct extension. Additional duct reinforcement may also be necessary to help support the weight of the humidifier and keep it level. See Fig. 3.

Create and install the duct extension. Follow the steps in the Mount Horizontally Using Mounting Bracket section to complete installation.

## WIRING

All wiring must comply with local codes and ordinances. For complete wiring instructions, refer to the manual "Wiring Instructions for High-Capacity Steam Humidifiers" packaged with your HE420A humidifier.

## PLUMBING THE HUMIDIFIER

### ! CAUTION

#### Chemical Hazard.

**Can cause damage to environment or air conditioning system.**

Do not use any refrigerant line connected to an air conditioner.

Be sure to install the chlorine removal filter (provided) to prevent humidifier corrosion.

NOTE: Either hard or soft water can be used in the humidifier.

### IMPORTANT

*Use only copper tubing to plumb the humidifier.*

1. Locate the cold water pipe closest to the humidifier.
2. Install the saddle valve connector.
3. Use the valve instructions to install the valve (provided). The valve is self-piercing when installed on copper pipe.

### IMPORTANT

*Position the valve so water flows from the top or side to reduce the chance of clogging the valve with minerals.*

*Lightly clean the copper tubing ends with fine sandpaper before making any connections. Do not use any line connected to an air conditioner.*

4. Install the chlorine removal filter.
5. Place the brass compression nut over the copper tubing.
6. Slide the brass ferrule over the tubing.

NOTE: Do not overtighten the compression nut. Moderate tightness prevents leaking.

7. Insert the tubing into the valve fitting and tighten the compression nut.
8. Flush the copper tubing to remove any debris that can cause problems at the float valve.
9. Route the tubing to the humidifier float valve, keeping the tube away from sharp edges.
10. Connect the remaining end of the tubing to the humidifier float valve.
11. Open the saddle valve so that the water flows slowly and gently into the water pan.

## SET THE WATER LEVEL



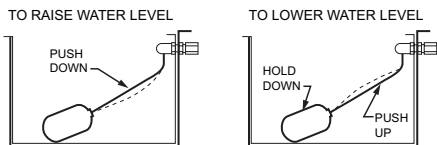
### CAUTION

#### Flooding Hazard.

**Inadequate support of the float arm can lead to valve seat damage resulting in water leakage.** Support the float arm during adjustment.

Adjust the humidifier water level prior to mounting.

1. Set the humidifier reservoir on a level surface.
2. Attach the water feed line and allow the unit to fill until the float valve shuts off the incoming flow of water. The water level should be between 2-1/4 in. (57 mm) and 2-1/2 in. (64 mm) deep. If water level is correct, skip to step 4.
3. Adjust the water level in small increments. Raise the water level by pushing down on the center of the float arm. Lower the water level by pressing the float down with one hand and pulling up on the center of the float arm with the other hand. See Fig. 5.
4. Verify the water level by removing enough water to allow the float valve to automatically fill and shut off the water.



M10581A

Fig. 5. Adjusting the water level.

## FINISH MOUNTING AND PLUMBING THE HUMIDIFIER

1. Mount the humidifier as instructed in the Select Location and Mount section.
2. Route the tubing to the humidifier float valve.

### IMPORTANT

*Keep the tubing away from sharp edges.*

3. Connect the remaining end of the tubing to the humidifier float valve.
4. Open the saddle valve so the water flows slowly into the water pan.
5. Check the compression fittings at the saddle valve and the float valve. Tighten the fitting slightly to stop any leakage.
6. Connect the overflow provision of the humidifier to a suitable waste drain.

NOTE: 3/8 in. (9.525 mm) I.D. tubing can be easily attached to the overflow fitting.

7. Support the drain line at several locations to prevent kinks. Be sure to provide support near any heat source.
8. Use a male 1-1/2 in. NPT fitting (not supplied) to connect the humidifier overflow provision.

## INSTALL THE AUTOMATIC FLUSHING TIMER

Refer to the "Installation Instructions for the Programmable Humidifier Automatic Flushing Timer" for complete instruction.

## INSTALL THE AUTOMATIC HUMIDISTAT CONTROL

For additional humidistat installation instruction, refer to the manual "Wiring Instructions for High-Capacity Steam Humidifiers."

### WARNING

**Electrocution Hazard. Disconnect electrical power to the furnace before beginning installation.**

Sharp edges. Use caution when cutting plenum openings and handling ductwork

### CAUTION

**Do not mount the compensating humidistat on the supply duct or plenum. The unit will not withstand supply temperatures.**

Do not set the humidity so high that condensation forms on windows or walls.

## SELECT LOCATION AND MOUNT

1. Check contents of the humidistat carton. Components include:
  - Automatic humidistat

- Outdoor temperature sensor
  - Sensor shield
  - Manual mode faceplate
  - Mounting bracket
2. Disassemble the humidistat. Pull knob off, then remove the cover by inserting a screwdriver in the slot on the right side of the humidistat.
  3. Mount the humidistat on the COLD AIR RETURN. Select a mounting location at least 6 inches upstream from the fresh air intake ductwork, if applicable.
  4. Select an exterior location to mount the Outdoor Temperature Sensor. Location must meet the following requirements. Incorrect indoor humidity levels will result if these requirements are not met.
    - Mount on North, Northeast or Northwest side of house.
    - Mount at least 3 feet from all exhaust vents.
    - Mount above expected snow line.

NOTE: For manual operation, do not install the outdoor sensor wire.

5. Locate an existing Indoor/Outdoor access hole.
  - Make sure there are no active high-voltage wires in the hole.
  - As an alternative, the sensor can be mounted in the center of a 6-inch fresh air intake duct (must be no farther than 30 inches from the outside wall).

NOTE: If neither configuration is possible, the compensating humidistat can be installed to operate manually. See Installing the Humidistat to Operate Manually, below.

6. Route the sensor wire to the selected location. Run wire between the compensating humidistat and the outdoor sensor lead. If the sensor is outdoors, snap the probe end of the sensor into the sensor shield and attach it to an exterior wall. The probe must be completely covered by the shield.

NOTE: Outdoor temperature sensor wire must not exceed 30 feet in length.



### CAUTION

**Do not run outdoor temperature sensor wire alongside wires carrying high voltage (120 VAC or higher). Do not run the sensor wire through conduit.**

7. Attach the Sensor Wire to the humidistat. Strip the connecting wire 1/4 inch and attach the two internal wires to the terminals labeled "Outdoor Temperature Sensor" on the humidistat.
8. Select a power source. The voltage to the humidistat must be between 22-30 VAC.

NOTE: The compensating humidistat will operate properly only with a continuous power source. A minimum 10 volt amperes is required.

9. Connect the humidistat to the humidifier. Strip the wires used for all the humidistat terminal connections 1/4 inch.
10. Set the humidistat. Consult the compensating humidistat homeowner's manual for proper humidity settings.

## Installing the Humidistat to Operate Manually

1. Locate the three-pin arrangement marked AUTO/MAN protruding from the control board (right of wiring connections).
2. Pull upward to remove the black, two-pin connector from the auto position. Reinstall it in the manual position (on the center and right-hand pins).



### CAUTION

Do not attach sensor wire to the blue wiring connection block.

3. Follow Steps 8 (select a power source) and 9 (Connect the humidistat to the humidifier) to complete the wiring. Apply the manual mode faceplate to the compensating humidistat cover. Reattach the cover to the base and reinstall the knob.

## HUMIDISTAT OPERATING INSTRUCTIONS

With automatic humidity control, you can control your humidifier almost effortlessly, because:

- Once the knob has been set, the humidistat automatically adjusts the indoor relative humidity based on outdoor temperature and your desired humidity level.
- The humidistat calculates the optimal humidity so you don't have the problems associated with indoor condensation.
- The humidistat's temperature condensation capability automatically turns itself on in cold weather, off in warm weather.
- The humidistat's humidity and temperature sensors are solid-state, which means there are no mechanical parts, and no problems associated with dust.

### Automatic Operation

Once the humidistat is installed in the cold air return and internally set to AUTOMATIC, turn the dial to 5 (the standard humidity control setting).

Allow the humidity to stabilize for at least two days (home size, furnace efficiency, and personal comfort preference may affect the length of time necessary). At that point, you may reset the dial to 6 for more humidity, or 4 for less humidity. Continue adjusting the dial until you reach your optimal indoor humidity level, and leave the dial in this position.

Remember that in AUTO mode, the dial is not showing relative humidity, but your preferred humidity setting based on Table 1.

Table 1. Humidity Settings.

Dial Position	Outdoor Temperature °F					
	-10	0	10	20	30	40
1	10%	10%	10%	15%	20%	25%
2	10%	10%	15%	20%	25%	30%
3	10%	15%	20%	25%	30%	35%

Table 1. Humidity Settings.

Dial Position	Outdoor Temperature °F					
	-10	0	10	20	30	40
4	15%	20%	25%	30%	35%	40%
5	20%	25%	30%	35%	40%	45%
6	25%	30%	35%	40%	45%	45%
7	30%	35%	40%	45%	45%	45%

### Manual Operation

For MANUAL operation, apply the manual mode decal to the faceplate. Once the unit is installed in the cold air return and internally set to MANUAL, turn the dial to the expected outdoor temperature. The corresponding optimal humidity level has been calibrated for you. For example, by setting the dial to an anticipated 20°F, the humidistat automatically maintains the indoor relative humidity in the safe, comfortable 35% range (see Table 2 below).

Table 2. Recommended Relative Humidity.

Outside Temperature	Recommended RH
+40°F	45%
+30°F	40%
+20°F	35%
+10°F	30%
0°F	25%
-10°F	20%
-20°F	15%

In extreme cold weather, relative humidity must be reduced to prevent condensation on windows and interior surfaces. Otherwise, the excess moisture will eventually cause damage to your home.

### Additional Features

- When outdoor temperature exceeds 50°F (10°C), the humidistat will function in Test mode only.
- When indoor relative humidity exceeds 45%, the humidistat will not operate.
- Test Mode—Manual test the humidistat by turning the knob to the far right. The unit will energize the internal relay for one minute, allowing you to confirm proper operation.
- Manual Off—In Manual mode, turn the humidistat OFF during warm months by turning the knob to the far left. (This is not necessary in Automatic mode.)

## HUMIDISTAT CHECKOUT

### IMPORTANT

If conditions exceed 50°F or 45 percent relative humidity, it may be necessary to perform this test.

1. To conduct a system test, ensure that 24 VAC is applied to the 24 VAC terminals of the compensating humidistat.
2. Reattach the humidistat cover and knob to the base.
3. Rotate the knob on the humidistat clockwise to the "Test" position.

- a. If set up correctly, the humidifier will begin operating. In "Test" mode, the humidistat will operate for approximately one minute.
  - b. If the humidifier does not activate properly in "Test" mode, refer to Appendix A.
4. Set the humidistat. Refer to Humidistat Operating Instructions for detailed instruction on initial settings.
- a. If home is occupied, set the knob to "5", or for manual operation, set the knob to 35%.
  - b. If home is vacant, turn the knob to counterclockwise to "Off."

## INSTALL THE SAFETY CONTROL SHUTOFF

Refer to the manual "Wiring Instructions for High-Capacity Steam Humidifiers" (page 11) for complete instruction on installing the Safety Control Shutoff.

## CHECK THE HUMIDIFIER OPERATION

After installation is complete, use the following steps to check the humidifier operation:

1. Turn on the humidifier water supply.
2. Be sure the humidifier has power and then plug in the humidifier.
3. Turn the Humidity Control to the Test position.

NOTE: If relative humidity is above 45% in the home, or the outdoor temperature is above 50°F, a jumper may need to be placed across the humidistat's OUT terminals to perform this checkout.

4. Check that the furnace blower comes on to circulate the moist air. The blower may take as long as fifteen minutes to start.
5. Refer to the Humidity Control owner's manual for operation.

## APPENDIX A

Table 3. Compensating Humidistat Troubleshooting Guide.

PROBLEM	SOLUTION	NOTES																																										
Humidifier does not operate in "Test" mode.	<ul style="list-style-type: none"> <li>Confirm the outdoor temperature sensor is connected to the correct terminals on the humidistat. (For manual operation, ensure the jumper pins are positioned correctly.)</li> <li>Check wiring diagram (Figure 1) for correct installation.</li> <li>Check the voltage at the humidistat "24 VAC" terminals. (Should be 22-30 VAC.)</li> <li>Ensure the control knob has not been left in the "Test" position.</li> </ul>																																											
Humidifier only operates in "Test" mode.	<ul style="list-style-type: none"> <li>Check the resistance of the sensor by removing the leads from the humidistat terminals and measuring the resistance across the wires with an ohmmeter. Compare the reading to the temperature/resistance chart (right).</li> <li>For automatic applications, make sure the outdoor temperature sensor is mounted completely outside the house (i.e. not recessed into the hole) on the North, Northeast or Northwest side, away from direct sunlight. And is mounted at least 3 feet away from all exhaust vents.</li> <li>If the outdoor temperature sensor is mounted in the fresh air intake duct, make sure the probe is no further than 30 inches from an outside wall.</li> </ul>	<p><b>Temp/Resistance Chart</b></p> <table> <tbody> <tr> <td>100°F</td> <td>6000 ohms</td> <td>38°C</td> </tr> <tr> <td>90°F</td> <td>7500 ohms</td> <td>32°C</td> </tr> <tr> <td>80°F</td> <td>9500 ohms</td> <td>27°C</td> </tr> <tr> <td>70°F</td> <td>11,500 ohms</td> <td>21°C</td> </tr> <tr> <td>60°F</td> <td>14,000 ohms</td> <td>16°C</td> </tr> <tr> <td>50°F</td> <td>18,000 ohms</td> <td>10°C</td> </tr> <tr> <td>40°F</td> <td>23,000 ohms</td> <td>4°C</td> </tr> <tr> <td>30°F</td> <td>28,500 ohms</td> <td>-1°C</td> </tr> <tr> <td>20°F</td> <td>37,000 ohms</td> <td>-7°C</td> </tr> <tr> <td>10°F</td> <td>46,500 ohms</td> <td>-12°C</td> </tr> <tr> <td>0°F</td> <td>61,500 ohms</td> <td>-18°C</td> </tr> <tr> <td>-10°F</td> <td>78,500 ohms</td> <td>-23°C</td> </tr> <tr> <td>-20°F</td> <td>105,500 ohms</td> <td>-29°C</td> </tr> <tr> <td>-30°F</td> <td>135,000 ohms</td> <td>-34°C</td> </tr> </tbody> </table> <p><b>Notes:</b> In automatic applications, if the outdoor temperature is greater than +50°F (+10°C) or less than -32°F (-35.6°C), the compensating humidistat will not operate (except in "Test" mode).</p> <p>In both automatic and manual applications, if the relative humidity in the home is higher than the knob setting, the humidistat will not operate. Similarly, the humidistat will not operate if the indoor RH exceeds 45%.</p>	100°F	6000 ohms	38°C	90°F	7500 ohms	32°C	80°F	9500 ohms	27°C	70°F	11,500 ohms	21°C	60°F	14,000 ohms	16°C	50°F	18,000 ohms	10°C	40°F	23,000 ohms	4°C	30°F	28,500 ohms	-1°C	20°F	37,000 ohms	-7°C	10°F	46,500 ohms	-12°C	0°F	61,500 ohms	-18°C	-10°F	78,500 ohms	-23°C	-20°F	105,500 ohms	-29°C	-30°F	135,000 ohms	-34°C
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Humidifier operates constantly.	<ul style="list-style-type: none"> <li>Check the humidistat setting. If the RH in the home is less than the knob setting, the humidifier will operate until the humidity level is higher than the knob setting.</li> <li>In "Test" mode, verify that the humidifier will shut off after approximately one minute.</li> <li>Check the resistance of the sensor.</li> <li>See previous Problem/Solution, regarding outdoor temperature sensor mounting locations.</li> <li>Turn the humidistat "OFF" and observe whether the humidifier turns off. If operation continues, check Figure 1 wiring diagram. Remove the wires from the humidistat's "OUT" terminals. If humidifier continues to operate, check the humidifier.</li> </ul>																																											
Humidifier or compensating humidistat "chatters" or clicks on and off rapidly.	<ul style="list-style-type: none"> <li>Use a voltmeter to check for steady 22-30 VAC.</li> <li>Make sure the outdoor temperature sensor wiring does not run alongside the wires carrying high voltage (120 VAC or higher).</li> </ul>																																											
Furnace or heat pump blower system runs continuously; condensation is building up in ductwork.	<ul style="list-style-type: none"> <li>It may be necessary to make a setting change on the furnace or heat pump board to prevent the blower from shifting down to lowest idling speed.</li> <li>Consult the furnace/heat pump operating manual or contact the manufacturer for procedures to prevent low air flow.</li> </ul>																																											

## APPENDIX B

Table 4. Safety Control Relay (SCR) Operation and Troubleshooting Guide.

Condition	Cause	Action Required
SCR LED shows rapid series of red, green, and yellow lights, followed by no LED display.	Condition Normal. SCR processor is powering up and checking internal operation.	No action required.
Humidifier won't operate. No SCR LED display.	Problem! SCR circuit is not closing or humidistat is not calling for humidity.	Check SCR power; check humidistat operation. If humidity is about 45% or outdoor temperature is above 50°F, the humidifier won't operate unless the humidistat is set to Test mode.
Humidifier operates. SCR LED shows continuous yellow.	Condition Normal. This is a test phase. SCR will wait 30 minutes to detect furnace blower operation. If the furnace blower is detected, the system will function properly.	No action required.
Humidifier won't operate. SCR LED shows continuous red.	Problem! During the 30 minute test phase, the SCR failed to detect the furnace blower and turned the humidifier off.	Turn the humidistat off, then on again, to reset the system. Although unlikely to occur, this failure/reset process can occur twice before further action is necessary.
Humidifier operates. SCR LED shows continuous green.	Condition Normal. All systems (furnace, humidistat, humidifier and SCR) are operating properly.	No action required.
Humidifier won't operate. SCR LED shows flashing red.	Problem! The SCR failed to detect the furnace blower for the third time and, as a safety precaution, has locked out the humidifier. This is an indication that some aspect of the system (furnace, humidistat, humidifier or SCR) has malfunctioned.	Contact your HVAC contractor ASAP to check out and repair the system.*

\* Before the SCR can be reset, the system must be checked and repaired by a licensed contractor. To reset the SCR, insert a rigid, small-diameter object (e.g. paperclip) into the smallest hole in the face of the SCR, next to the green connector block. This, too, should be performed by an HVAC contractor.

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