

Troubleshooting Guide for Installers and Call Center

Single PCB model 800

Required Tools:

1. Clip on Ammeter/voltmeter
2. #2 Phillips screw driver
3. Needle nose pliers
4. Slip joint pliers
5. 2.25" c-clamp (or equivalent device to override canister door switch)
6. ½" and 7/16" open end wrenches
7. 2" 18 gage wire stripped at both ends
8. 1/8" by 2 ½" flat head screw driver
9. 5/16" nut driver
10. Model 80 steam humidifier replacement canister

Note: Identify the symptom to be analyzed prior to shutting down the humidifier for troubleshooting. Turning off or disconnecting power will reset all lights and may impede the troubleshooting effort.

Identify the Problem:

1. Humidifier doesn't turn on. See sections **System Setup Verification**, and **Using Lights to Troubleshoot # 1**
2. No or low humidity with no abnormal lights. See sections **System Setup Verification** and **Verify Operation**.
3. Solid red service light. See sections **System setup Verification** and **Using Lights to Troubleshoot # 5**.
4. Flashing red service light. See sections **System setup Verification** and **Using Lights to Troubleshoot # 4**.
5. Solid yellow steam light. See sections **System setup Verification** and **Using Lights to Troubleshoot # 2**.
6. Solid red fill light. See sections **System setup Verification** and **Using Lights to Troubleshoot # 3**.
7. Moisture in or outside of the duct. See **Moisture in the Duct** section

Control Panel Light Explanation

1. On/Off – Solid Green, indicates humidifier is turned On. **See Using Lights to Troubleshoot** section 1.
2. On/Off – Flashing Green, indicates power is restored to humidifier originally in the On state. Flashes for one minute then remains solid green.
3. Fill – Solid Green, indicates fill valve is open.
4. Fill – Solid Red, humidifier is shut down for fill fault. **See Using Lights to Troubleshoot** section 3.

5. Steam – Solid Green, humidifier is operating with a call for humidity.
6. Steam – Solid Yellow, humidifier has been operating for 1 week but has not reached full capacity. **See Using Lights to Troubleshoot** section 2.
7. Drain – Solid Green, Humidifier is in a drain cycle or humidifier drained for end of season due to no humidity call for 72 hours, light will stay on for 24 hours. Humidifier will resume normal operation with a humidity call. Drain Valve is energized for 30 minute.
8. Drain – Flashing Green, Flashes for 15 seconds before humidifier goes into a 4 minute drain cycle. The humidifier is adding cold water during this time to cool the hot water draining from the canister during the drain cycle.
9. Service – Flashing Red, Sensed amperage is 75% of the maximum amperage recorded for 24 hours and the humidifier has been operating for greater than 168 hours. **See Using Lights to Troubleshoot** section 4.
10. Service – Solid Red, humidifier is shut down for overcurrent fault. When sensed amperage is 120% of nominal the humidifier will enter the over-current fault. The humidifier will perform a tempered drain for 5 seconds, 10 seconds and 15 seconds sensing the amperage between each drain. If the over-current condition is cleared after any of the drains, the humidifier will continue normal operation. If the overcurrent condition is not cleared after the 15 second drain, the humidifier will shut off and display the solid red service light. **See Using Lights to Troubleshoot** section 5.

System Setup Verification:

1. Verify Humidifier is installed according to all relevant local codes.
2. Verify electrical power is supplied to the Humidifier from 120, 208 or 240VAC on a dedicated breaker per local codes.
3. Verify water supply tubing is properly attached to a cold water pipe, not leaking, and saddle valve has pierced the pipe and is fully open.
4. Verify Aprilaire Model 62 humidifier control is installed and wired properly per installation instructions.
5. Verify Aprilaire Model 62 humidifier control is not in the Test Reset position or the OFF position.

NOTE: If a control other than the supplied Aprilaire Model 62 humidifier control is used, verify it uses a dry contact On/Off signal. **Do not apply 24 volts to the humidistat terminals of the Model 800.**
6. Verify the canister is properly seated with the O-ring in its groove (no leaking or scale buildup at the drain valve/canister junction).
7. Verify the steam hose slopes down and away from the duct toward the humidifier or a tee and drain trap with no low spot or sags in the hose. A minimum slope of 2" per foot is recommended.
8. If drain tees and water traps are installed, verify water traps have proper air gap and are full of clean water.
9. Verify hose clamps on steam hose at the canister and dispersion tube are tight by pulling lightly on the steam hose.
10. Verify drain hose is properly attached with no kinks or obstructions.

11. If condensate pump is installed:
 - a. Verify discharge line installed per manufacturer's directions.
 - b. Verify condensate pump is rated for at least 140°F water.
 - c. Verify sump is clean and free of debris or hard water build up.
 - d. Check condensate pump function by engaging the float.
12. If Humidifier is OFF:
 - a. Remove the canister door and override the interlock switch with a small c-clamp.
 - b. Verify internal wiring per **Appendix A**.
 - c. Turn humidifier ON; ensure the On/Off green LED is lit. Humidifier will not produce steam unless there is a call for humidity.

Using Lights to Troubleshoot

1. On/Off Green Light not on, humidifier is Off and/or power is not supplied. If humidifier will not power up when On/Off button is depressed:
 - a. Check reset switch on transformer. If it is tripped, reset it (75 VA transformer only).
 - b. Check the breaker at the power supply to the humidifier.
 - c. Verify humidifier is properly wired to line voltage.
 - d. Check LED (D8) on circuit board (4" from the bottom of the board) is glowing green, if not illuminated and power is supplied to the humidifier check for 24V at the transformer terminals by removing the connector at P4, **see Appendix A**, and inserting a volt meter into the connector on the transformer. Check continuity of the fuse.
 - i. If the fuse is open, replace with a 5 amp slow blow 5X20mm barrel fuse.
 - ii. If 24V is present but LED does not light, replace circuit board (Part Number 5530). If there is voltage other than 24V, remove power to the humidifier at the circuit breaker and move the jumper wire to the correct terminal on the PCB.
 - ii. If 24V is not present then check input power to the transformer by checking voltage between L1 and L2/N on connector P5, **see Appendix A**. If input power is correct, replace transformer, if no input power to the transformer, check line power wiring.
 - iii. Transformer Part Numbers:
 - 1) Model 800 and Model 801 (40VA): 5529.
 - 2) Model 865 and Model 866 (75VA): 5306.
 - e. If control board LED is on, but On/Off Light will not energize when On/Off switch is depressed. Replace Membrane switch (Part Number 5532).

2. Yellow Steam Light: humidifier has been operating for 1 week but has not reached full capacity. The humidifier is making steam and is working to get to full capacity due to low water conductivity, boiling action concentrates minerals in the canister (the more minerals in solution, the higher the amperage and therefore output). To help speed this up:
 - a. Set the HVAC system thermostat fan to constant fan or use the blower activation feature on the Aprilaire Model 62 humidifier control. This allows the humidifier additional operating time to run as needed to provide humidity.
 - b. Increase the humidity setting on the control (do not over humidify the home as damage can occur from condensation).
 - c. If available, plumb to softened water. Sodium does not precipitate out of solution easily, this allows the water conductivity to rise quickly compared to Calcium in hard water. Expect to see more drain cycles as a result with softened water.
 - d. Wire humidifier to 240VAC.
NOTE: Canisters should be changed every season. If the canister has not been changed, capacity will be significantly reduced or inoperable.
3. Solid Red Fill Light: indicates humidifier had a fill fault, humidifier is shut down. The humidifier will try to fill for 50 minutes, if the high water pin has not been tripped or the humidifier has not reached nominal amperage, the humidifier will shut off. 30 minutes into the fill fault (prior to shutting off) the humidifier will rapidly cycle the fill and drain valves to try to dislodge any sediment blocking the valves.
 - a. Verify saddle valve pierced the pipe header and is fully open.
 - b. Ensure yellow high water pin sensor wire is firmly installed on canister post and both black electrode wires are installed and fully seated.
 - c. If all wires are attached, check operation of the fill valve. See the **Verify Operation** section below.
 - d. Verify the steam hose does not have sags or low spots, water will condense and pool in these areas causing backpressure which will cause the humidifier to fill due to low level in the canister.
4. Flashing Red Service Light: indicates sensed amperage is 75% of the maximum amperage recorded. The humidifier must operate for 168 hours (1 week) and have had its amperage drop to 75% of the maximum amperage recorded.
 - a. Verify amperage with a clamp on ammeter through multiple fill cycles. See **Verify Operation** section below.
 - i. For 11.5 amp operation, humidifier will fluctuate between 10.3 and 12.7 amps.
 - ii. For 16.0 amp operation, humidifier will fluctuate between 14.4 and 17.6 amps.
 - b. If amperage is within the correct operating band, depress the On/Off button to shut the humidifier down which will reset the PCB memory.
 - c. If amperage is below the correct operating band, depress the On/Off button to shut the humidifier down allowing the humidifier to fully drain, and then replace the canister (Part Number 80).
5. Solid Red Service Light, humidifier is shut down for overcurrent fault. This typically happens when the canister or drain valve is plugged with minerals; the humidifier cannot maintain the proper conductivity through drain operations.
 - a. Remove and rinse canister.
 - b. Clean sediment out of the drain valve.
 - c. Replace canister and start humidifier (see the **Verify Operation** section).
 - d. If red service light persists replace the canister (Part Number 80), as the canister has reached the end of its operating life.
6. Erratic light behavior (i.e. no lights while humidifier is on or multiple lights coming on at one time) or humidifier shuts down for no reason; replace the membrane switch (Part Number 5532).
 - a. Verify steam hose fit on canister.
 - b. Check for evidence of leaks.

Verify operation:

1. Turn the humidifier off and allow it to fully drain before moving on, this will take about 5 minutes.
2. Remove canister door and electrical access panel.
3. Clip the ammeter on one of the black electrode wire.
4. Remove the wires from the two humidistat terminals and install a jumper. **Do not apply 24 volts to the humidistat terminals of the Model 800.**
5. Use the small c-clamp to override the canister door safety switch.
6. Turn the HVAC system thermostat fan to constant fan.
7. Turn the steam humidifier On. If humidifier fails to turn On, verify power at the input power terminal block
8. The canister will fill to the high water pin and begin to heat water to make steam.
9. If the humidifier does not begin to fill within 15 seconds:
 - a. Ensure the two black electrode wires and high water pin sensor (yellow wire) on the top of the canister are attached and fully seated.
 - b. Remove the high water pin sensor wire from the canister port on the top of the canister
 - i. If the humidifier begins filling, reinstall the high water pin, turn the humidifier Off to allow it to fully drain, and then replace the canister (Part Number 80).
 - ii. If the humidifier does not begin to fill in five seconds, shut the humidifier Off and remove the humidistat jumper installed in step 4:
 - 1) Verify that the saddle valve is fully open.
 - 2) Remove the yellow high water pin sensor wire from the top of the canister. Place one of the electrical access panel door screws into the red connector at the end of the high water pin sensor wire. **WARNING – care should be taken when performing this step as the screw is has live electricity.**
 - 3) Turn the humidifier on.
 - 4) Touch the screw to the copper ground lug on the electrical panel for 5 seconds, the Service light should illuminate red.
 - 5) If the Service light does not turn on remove power at the circuit breaker and replace the current sensing board (Part Number 4982).
 - c. Verify fill valve operation by removing the yellow fill valve leads at the bottom of the PCB (**See Appendix A**) and energizing the fill valve coil with 24VAC. If valve does not audibly click open, replace fill valve (Part No. 5309).
10. Monitor amperage during filling and operation.
 - a. Amperage will increase as water level increases and as temperature in the canister rises. When water starts to touch the electrodes, the amperage should increase slowly from 0

to approximately 5 amps. As the water in the canister heats, amperage should continue to increase though less rapidly.

- b. If canister is used, and there is no increase in amperage as the canister fills, drain the humidifier and replace the canister (Part No. 80).

11. Check for water outside of the canister.

- a. Drain valve/canister joint – Replace drain valve O-ring (Part Number 5258).
- b. Fill lines - Verify spring clamps and fill valve compression fittings are tight.

12. Check for steam leaks at the canister/steam hose joint.

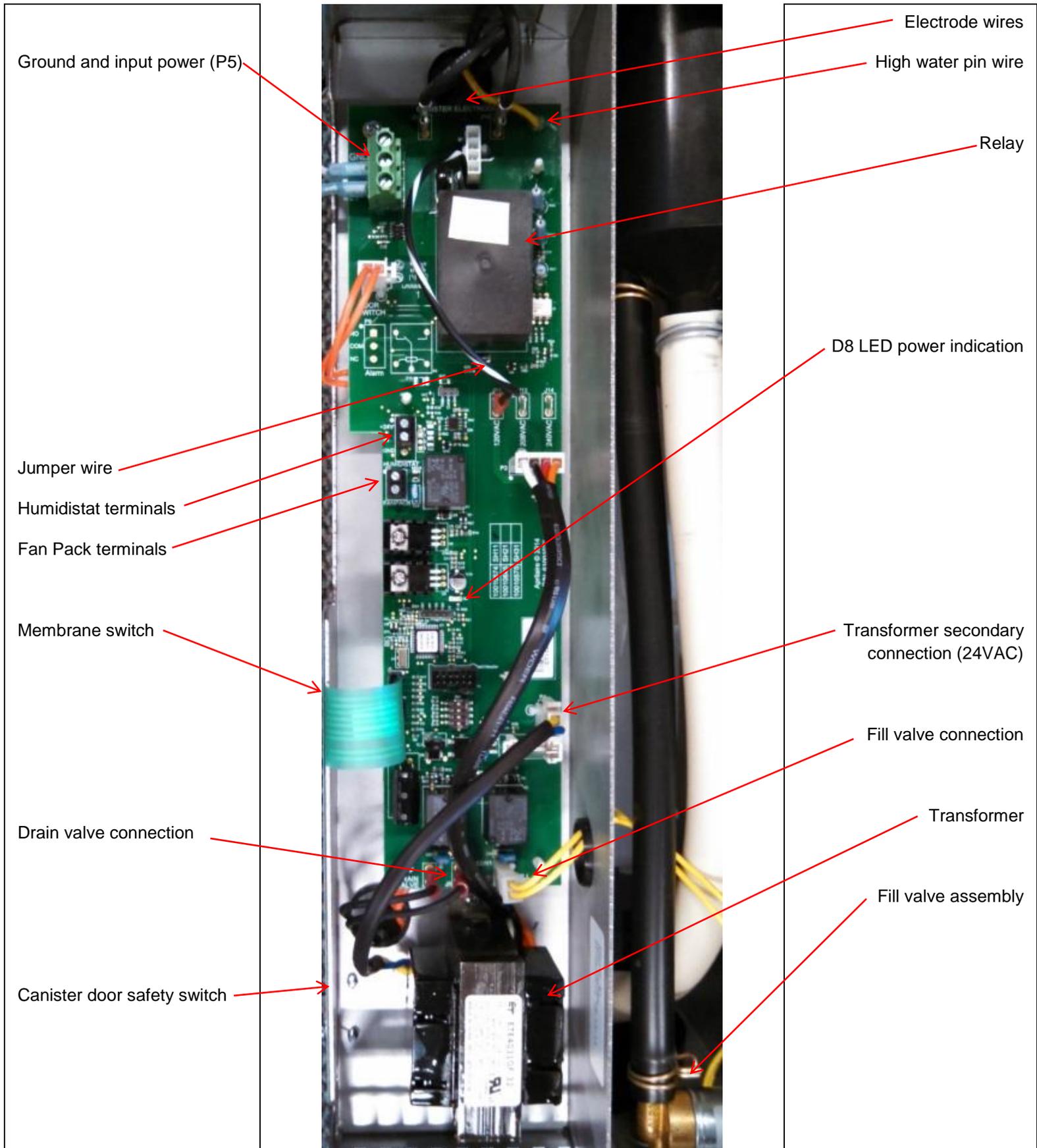
Moisture in the duct

1. Verify absorption distance for voltage and amperage setting. Many factors contribute to absorption distance. See table 2 in the Installation & Maintenance Instructions.
 - a. Verify plenum temperature, air velocity and humidity level
 - b. Ensure Aprilaire Model 62 humidifier control is properly installed
 - c. Install a high humidity switch in series with the humidifier and Aprilaire Model 62 humidifier control to prevent over humidification in the duct.
2. If the steam dispersion tube is mounted on a horizontal duct run, verify the dispersion tube is low in the duct, at least 4" from the top of the duct. On vertical runs center the dispersion tube on the duct.
3. Verify the steam hose slopes down and away from the duct toward the humidifier or a tee and drain trap. A minimum slope of 2" per foot is recommended.
4. Verify the steam dispersion tube is mounted with the "Tubelets™" facing up.

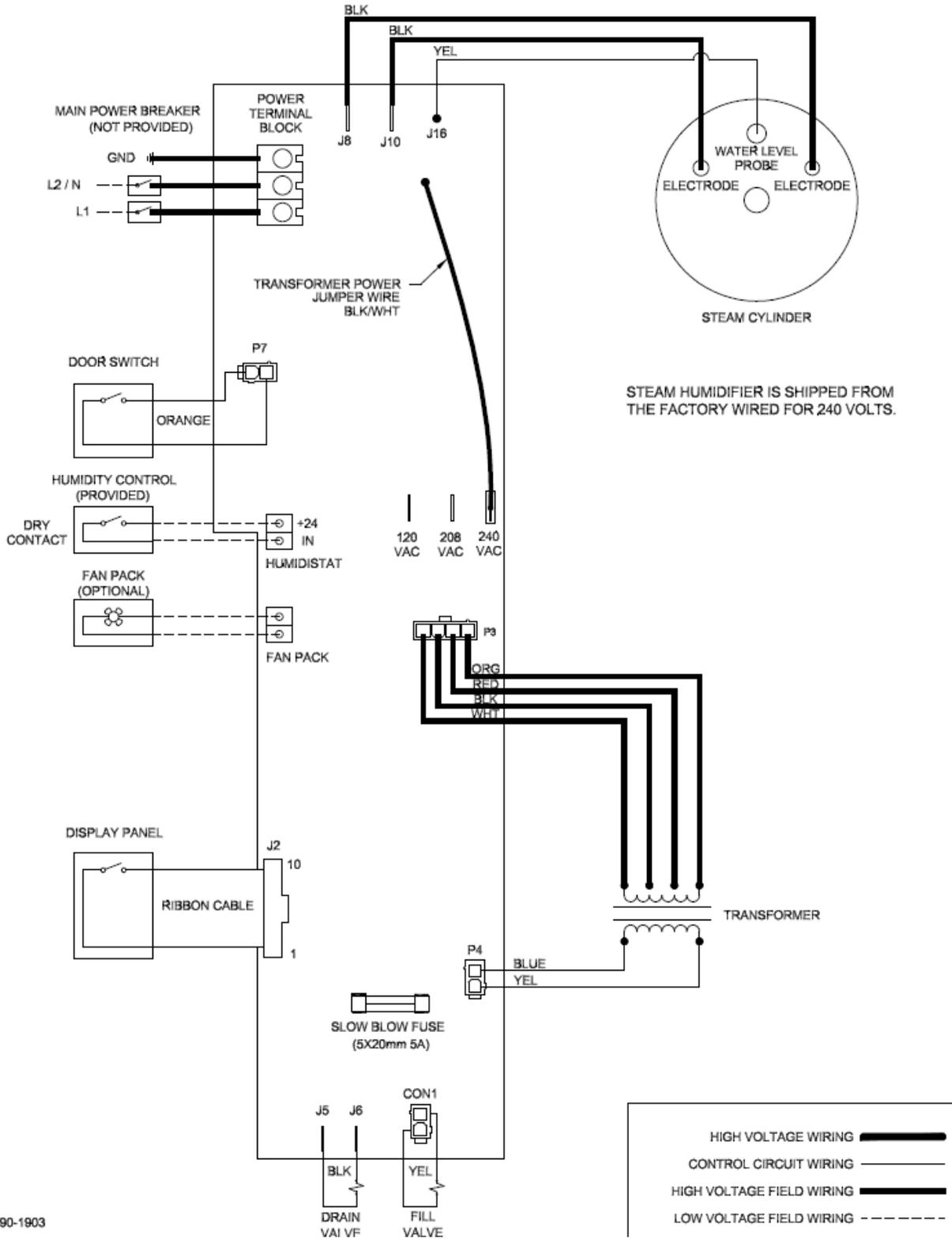
Water Chemistry

1. The minerals contained in the supply water dictate how the humidifier operates and plays a large role in the life of the canister. Water quality and mineral content varies dramatically across the country, following the guidelines below will help determine what water type to use.
 - a. Softened water, whether with sodium chloride or potassium chloride will allow the humidifier to come to full capacity faster, and the canister will last longer. There will be more frequent drain cycles and a higher potential for foaming both resulting in more water usage.
 - b. Hard water minerals, calcium and Magnesium, combine with bicarbonate and carbonate ions and drop out of the water when heated, this reduces the ions in the water causing a slower start up and scale formation in the canister reducing canister life. Using hard water will drain less than soft water; this uses less water and energy and gives a more constant steam output.
2. Check with the local water utility to see if orthophosphates or polyphosphates are used. These chemicals are used to control corrosion and sequester lead in piping systems. Phosphates will insulate the electrodes in the canister causing the canister life to be significantly degraded. Do not install the humidifier if phosphate levels are above 1ppm (or 1mg/L).

Figure 1 Electrical panel



Appendix A - Wiring Diagram



90-1903

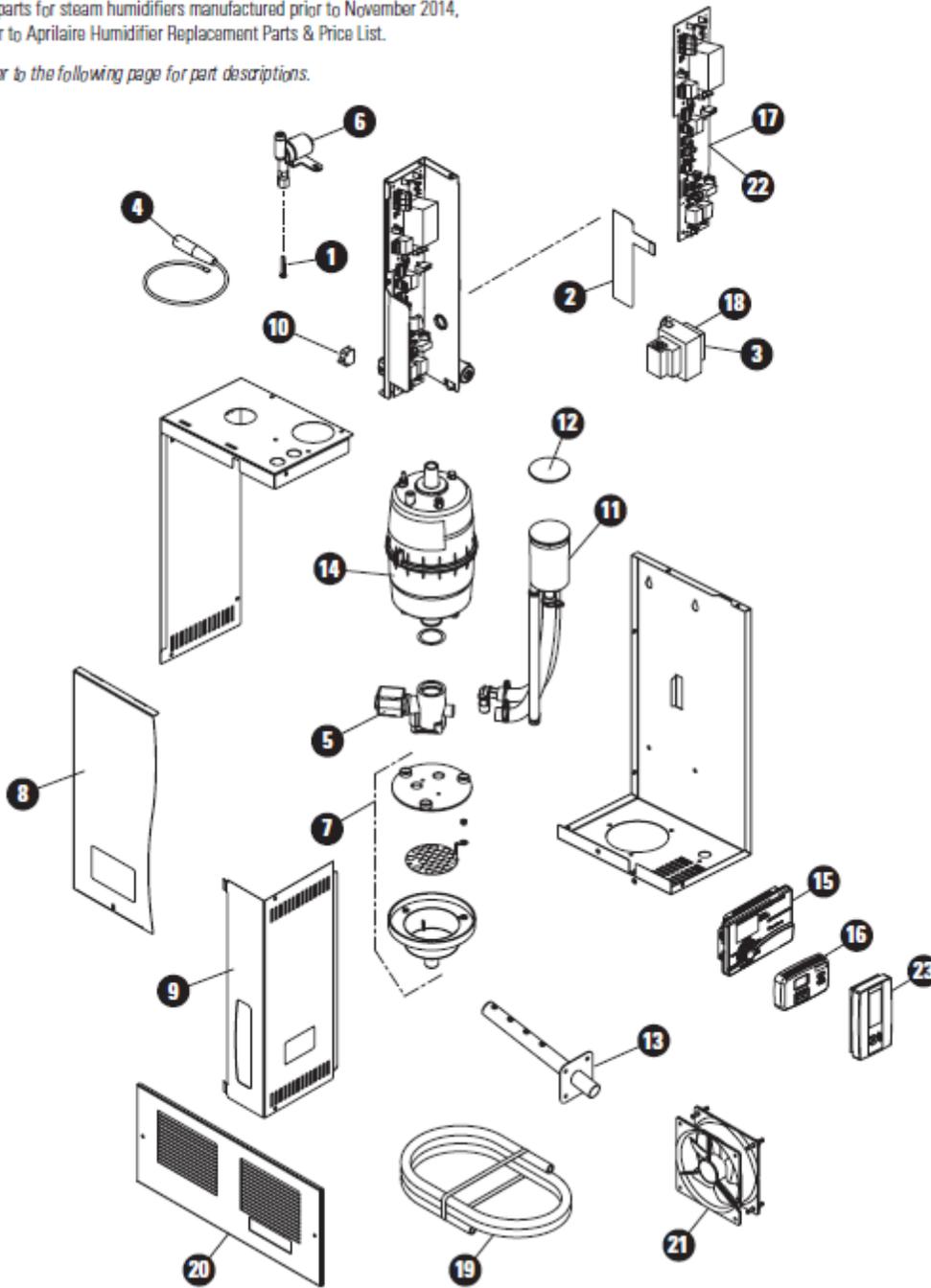
Appendix B – Parts List

REPLACEMENT PARTS

Parts are shown for Model 800/865 humidifiers manufactured after November 2014.

For parts for steam humidifiers manufactured prior to November 2014, refer to Aprilaire Humidifier Replacement Parts & Price List.

Refer to the following page for part descriptions.



30-1381

REPLACEMENT PARTS (CONTINUED)

Item No.	Part No.	Description
1	4004	Fill Valve In-line Strainer
2	5532	Membrane Switch
3	5306	Universal Transformer, Model 865, 866 (75 VA)
4	4978	Electrode Wire (1)
5	4983	Drain Valve
6	5531	Fill Valve
7	4985	Drain Cup Assembly
8	4986	Front Panel & Screw
9	4987	Electrical Access Panel & Screws
10	4988	Safety Interlock Switch
11	5590	Fill Cup and Hoses
12	4990	Fill Cup Cap
13	4991	Steam Dispersion Tube & Screws
14	80	Steam Canister and O-Ring
15	62	Automatic Digital Control for Model 800
16	65	Digital Manual Humidistat

Item No.	Part No.	Description
17	5530	Control Board, Model 800, 865
18	5529	Universal Transformer, Model 800, 801 (40 VA)
19	4997	Condensate Tubing with Wire Ties
20	4998	Fan Pack Grille
21	4999	Fan Pack Fan
22	5554	Modulating Control Board, Model 801, 866
23	63	Automatic Digital Modulating Control (ADMC) for Model 801/866
	4001	Saddle Valve
	4028	Drain Trap & Tee
	4592	Airflow Proving Switch
	4594	High Humidity Limit Switch
	4851	Blower Activation Relay (Optional for use with manual humidistats)
	4856	Condensate Pump (Rated for 160°F)
	4973	Steam Hose (6 ft.) & Clamps
	4974	Drain Hose (10 ft.) & Clamps