Residential Steam Humidifier

Model HUMCRSTM3134, HUMXXSTM3034, HUMXXSTM3134 Residential Steam Humidifier

Owner's Manual

Includes Safety & Operating Instructions

READ AND SAVE THESE INSTRUCTIONS

TABLE OF CONTENTS

SAFETY

⚠ CAUTION

ATTENTION

Read this manual before installing. This product must be installed by qualified HVAC and electrical contractors and in compliance with local, state, federal, and governing codes. Improper installation can cause property damage, severe personal injury, or death as a result of electric shock, burns, or fire.

Read all cautions and instructions.

Read this manual before performing service or maintenance procedures on any part of the system. Failure to follow all cautions and instructions could produce the hazardous situations described, resulting in property damage, personal injury, or death.

Failure to follow the instructions in this manual can cause moisture to accumulate, which can cause damage to structure and furnishings.

EXCESS HUMIDITY

Do not set humidity higher than recommended. Condensation may cause damage.

⚠ WARNING

HOT SURFACES AND HOT WATER

This steam humidification system has extremely hot surfaces. Water in steam canister, steam pipes, and dispersion tube can be as hot as 212°F (100°C). Discharged steam is not visible. Contact with hot surfaces, discharged hot water, or air into which steam has been discharged can cause severe personal injury. To avoid severe burns, follow procedures in this manual when performing service or maintenance procedures on any part of the system.

DISCONNECT ELECTRICAL POWER

Disconnect electrical power before installing supply wiring or performing service or maintenance procedures on any part of the humidification system. Failure to disconnect electrical power could result in fire, electrical shock, and other hazardous conditions. These hazardous conditions could cause property damage, personal injury, or death.

Contact with energized circuits can cause property damage, severe personal injury, or death as a result of electrical shock or fire. Do not remove access panels until electrical power is disconnected.

Follow the shutdown procedure in this manual before performing service or maintenance procedures on any part of the system.

ELECTRICAL SHOCK HAZARD

If the humidifier starts up responding to a call for humidity during maintenance, severe bodily injury or death from electrical shock could occur. Follow the procedures in this manual before performing service or maintenance procedures on this humidifier.

EXCESSIVE SUPPLY WATER PRESSURE

Supply water pressure greater than 120 psi may cause the humidifier to overflow.

SHARP EDGES

Sharp edges may cause serious injury from cuts. Use care when cutting plenum openings and handling ductwork.

INTRODUCTION

Thank you for your recent steam humidifier purchase. We appreciate your business and are pleased to add your name to our growing list of customers. You have invested in the highest quality equipment available.

Your humidifier will require periodic maintenance to assure continued consistent performance. See page 10.

Please take a few minutes and read this booklet. This will familiarize you with the benefits you will receive from the humidifier and help you understand the routine maintenance that will be required.

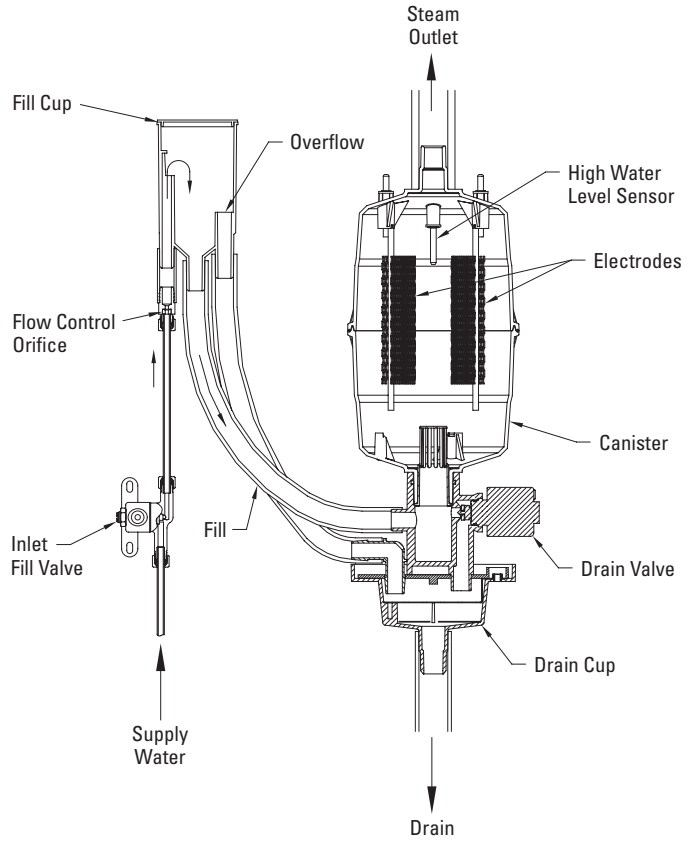
Replacement Steam Canisters are available from your installing contractor. Use only genuine replacement part number 8045HUM.

PRINCIPLES OF OPERATION

The Steam Humidifier delivers humidity in the form of steam to the conditioned space via the HVAC system duct. The humidifier generates steam by energizing two electrodes that extend into a canister of water. Current flowing between the electrodes causes the water to boil, creating steam. Water is introduced to the humidifier through a fill valve to a fill cup located in the top of the cabinet. The fill cup serves as an overflow reservoir and provides an air gap between the humidifier and water source. The steam canister is filled from the bottom. The canister is seated in a drain cup assembly which includes a drain valve. The drain and fill valves work together to maintain water level in the canister to deliver the rated steam capacity based on the electrical conductivity of the water and to temper drain water. See **Figure 1** for representation of fill and drain system and canister.

Steam is delivered into the airstream through a dispersion tube mounted in the HVAC system ductwork. Openings in the dispersion tube are fitted with "tubelets™" which extend into the center of the tube. The design of the dispersion tube and tubelets distribute steam over a wide area in the duct and direct any condensed moisture back into the steam hose.

FIGURE 1 – Fill and Drain System and Canister



SEQUENCE OF OPERATION

When the Humidifier Control detects humidity below the set point, and provided the humidifier is turned on and the indoor unit blower is operating, the internal controller in the humidifier energizes the electrodes and measures the current flowing through the water between them. The controller adjusts water level in the canister via a fill valve and a drain valve to maintain a constant current. The operating water level in the canister depends on the mineral content of the water which determines conductivity.

A relay is provided with the humidifier that will allow the control to turn on the indoor unit blower when a call is made for humidity.

INSTALLATION OPTIONS AND EFFECT OF WATER CHARACTERISTICS

Your Steam Humidifier can be installed to operate on 120 volts, 208 volts or 240 volts using 11.5 or 16.0 amps. The higher the voltage and amperage the higher the potential output.

Amperage	Voltage	Maximum steam capacity (gal/day)
11.5	120V	11.5
	208V	20.5
	240V	23.3
16.0	120V	16.0
	208V	30.0
	240V	34.6

It may take several days for the humidifier to reach rated capacity depending on the input voltage and the electrical conductivity of the water. 120 volt systems take longer to reach rated capacity than 240 volt systems. The humidifier should always be plumbed to cold water but the water can be softened or unsoftened. "Hard" water, which has a high mineral content, and softened water generally have higher conductivity than naturally soft water. Systems plumbed to higher conductivity water will reach capacity sooner than systems plumbed to low conductivity water. As the humidifier operates, minerals build up in the canister, which increases the conductivity of the water. With a new canister, allowing the humidifier to operate continuously (along with the indoor unit blower) will allow it to reach rated capacity in the shortest amount of time.

OPERATING MODES

When the humidifier is powered and turned on, the "On/Off" light is illuminated green.

When the canister is being filled or replenished with water, the "Fill" light illuminates green.

When the canister is being drained, the "Drain" light illuminates green.

During initial start up with a new canister, the humidifier may run through a series of fill/drain cycles until the conductivity of the water is in a range that allows normal operation. During this time, the "Steam" light illuminates green. If the humidifier cannot produce steam at the rated level after trying for 168 hours, the "Steam" light illuminates yellow. The humidifier continues to operate in this state until the rated output is reached.

The conductivity of naturally soft water, hard water, and softened water changes as the water heats up, but the internal controller adjusts the water level to maintain a nominal current between the electrodes. Over the life of the canister, minerals that build up on the electrodes will reduce their effective surface area and affect the resistance between them. The operating water level will increase with use until it reaches the high water level probe. At that point, the "Service" light will flash red indicating that the canister needs to be replaced. The humidifier will continue to operate but with reduced output.

When the humidifier begins a drain cycle, the fill valve opens to introduce cold water into the canister. This is done to prevent hot water from entering the drain. The drain valve remains open for four minutes to allow all water to drain from the canister.

Any time power is disconnected or humidifier is turned off, the internal timer for start-up and drain cycles is reset.

If the humidifier has operated 168 hours without a drain cycle, the drain valve will open and drain the canister. Normal operation will continue.

If the humidifier is operating and a power failure occurs, once power is restored, the "On/Off" light will flash green for one minute, then the humidifier will turn on.

END OF SEASON/PERIOD OF INACTIVITY SHUT-DOWN

If the humidifier does not receive a call to operate in 72 hours, the humidifier controller drains the canister. The drain light will remain on until there is a humidity call or 24 hours has elapsed. The humidifier will resume normal operation when a call for humidity is made.

DISPLAY PANEL

TABLE 1 – Display Panel

Indicator	Light	Function
 On/Off	**Off**	Humidifier is turned off or not receiving power.
	Solid Green	Humidifier is turned on.
	Flashing Green	Humidifier is preparing to turn on. Occurs if power is disconnected, then restored with switch ON. Flashes for one minute.
 Fill	**Solid Green**	Normal Operation. Fill valve is energized allowing water to flow into canister via fill cup. (Does not illuminate when tempering water during drain cycle.)
	Flashing Green	Fill and Drain Valves are pulsing to dislodge mineral build-up in canister. Flashes 10 times in four seconds.
	Solid Red	Fault Mode. Indicates canister needs water but cannot fill. Humidifier shuts down. (Occurs if high water probe does not detect water after fill valve is energized for 40 minutes.)
 Steam	**Solid Green**	Normal Operation. Humidistat is calling for steam and humidifier is operating.
	Solid Yellow	Humidifier is operating but is not delivering steam at rated capacity. Occurs if humidifier has operated for 168 hours at less than rated capacity due to low water conductivity. Light will turn green once water conductivity increases and humidifier is delivering rated capacity.
 Drain	**Flashing Green**	Humidifier is preparing to drain. (Fill valve is open tempering water in canister.) Occurs when humidifier is turned off, at end of season drain (72 hours with no operation) and during forced drain down (168 hours of operation with no drain activity.)
		Fill and Drain Valves are pulsing to dislodge mineral build-up in canister. Flashes 10 times in four seconds.
	Solid Green	Drain valve is energized and open, draining canister. Valve remains energized for four minutes.
		Indicates end of season shut-down. Occurs if humidifier does not receive call for humidity in 72 hours. Light remains on for 24 hours.
 Service	**Flashing Red**	Canister has reached the end of its life and needs to be replaced. Occurs after humidifier has operated for at least 168 hours and for an additional 24 hours at a current level below 75% of the maximum operating current. Humidifier continues to operate, but at reduced capacity.
	Solid Red	Operational problem with humidifier. Humidifier shuts down. Occurs when unit detects over-current which can be caused by failure to drain or other system failures. Call your heating and air conditioning dealer for service.

HUMIDIFIER CONTROL & OPERATING INSTRUCTIONS

The control provided with your humidifier is mounted either in your return air duct or on a wall in the living space. The control has a set of contacts which close when the RH is below the set point. That signal tells the humidifier to energize the electrodes in the canister to generate steam, provided the indoor unit blower is on. If the blower activation relay is installed, a call for humidity will turn on the indoor unit blower.

It is important to anticipate changes in outdoor temperature and adjust the setting accordingly to avoid excessive condensation when outdoor temperature is low. For example, with an outdoor temperature of 20°F the correct setting will be 35%. If the temperature is expected to fall to 0°F that evening, then merely reduce the setting to 25% several hours prior to the temperature change.

See **Table 2** for the recommended settings. These settings, which are based on years of research, represent a compromise between humidity levels that would be most desirable for comfort and humidity levels that are suitable for protection of your home and to avoid condensation on your windows. For example, a wintertime indoor humidity of 50% may be considered ideal for comfort, but unfortunately, it probably would result in condensation, which can cause damage to your home. Observing the recommended humidity levels on your Humidifier Control is an important safeguard. Condensation of water on the inside surface of windows in the form of fogging or frost is usually an indication of too much humidity. This same condensation can occur in other areas in your home, possibly resulting in damage.

TABLE 2 – Outdoor Temperature/Indoor 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%

CHECK THE HUMIDIFIER OPERATION

Turn the control knob to the maximum RH setting. Make sure that the water saddle valve is open and that the humidifier is on. The indoor unit blower must be running for the humidifier to function. Once humidifier operation is verified, reduce the Humidifier Control setting to the recommended inside humidity, depending on the outside temperature.
If using the automatic humidifier control model number KUAWC0101COR, DO NOT LEAVE IN TEST MODE AS HUMIDIFIER WILL NOT OPERATE.

ADDITIONAL INFORMATION

Be sure to keep fireplace dampers closed when not in use. They provide an excellent escape route for heat, as well as humidity.

On occasion, indoor moisture producing activities such as clothes drying, cooking, showers, etc., may raise the humidity level higher than it should be, even though the humidifier is not operating. Telltale indications are condensation or frost on cold surfaces such as windows, doors, walls, etc. If such condensation persists for several hours, your home should be ventilated to dissipate the potentially damaging excess moisture.

MAINTENANCE

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect main electrical power to the humidifier at the circuit breaker and drain the water from unit before servicing. Hot surface inside.

NOTICE

- Service should be performed by an HVAC technician.
- Use only genuine replacement parts.

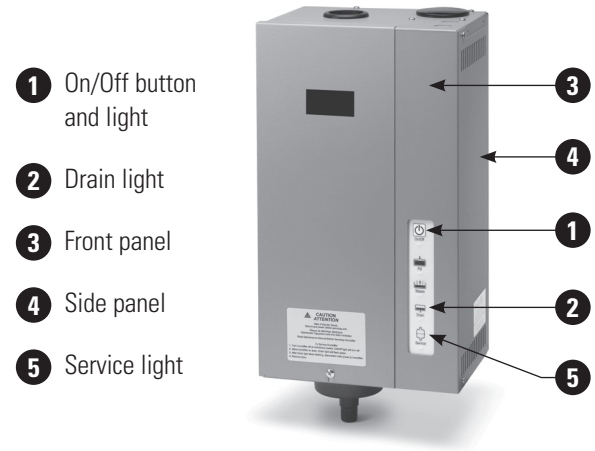
INSPECT HUMIDIFIER WHEN SERVICING

- Replace the canister annually and when prompted by the "Service" light
- Clean drain valve and fill valve screen annually
- Replace electrode wires every 3 years or more frequently as needed (see step 3 of **CANISTER REPLACEMENT AND DRAIN VALVE SERVICE**)
- Inspect humidifier at approximately 500 hour intervals or several times during the humidification season.

SERVICE SHUTDOWN PROCEDURE

1. Press **On/Off** button to turn humidifier off (see **FIGURE 2**).
2. Allow humidifier to drain.
3. When the green **Drain** light (see **FIGURE 2**) stops flashing, disconnect main electrical power to humidifier at the circuit breaker.
4. Allow the unit to cool.
5. Shut off water supply to unit.

FIGURE 2 – Steam Humidifier



CANISTER REPLACEMENT AND DRAIN VALVE SERVICE

Use only genuine replacement part number 8045HUM.

1. Remove front panel (see **FIGURE 2**).
2. Pull three wires off posts on top of canister (two electrode wires and one water level probe wire, shown in **FIGURE 3A** and **FIGURE 3B**).

3. Inspect the two electrode wires (see **ELECTRODE WIRE REPLACEMENT** section for detailed instructions).

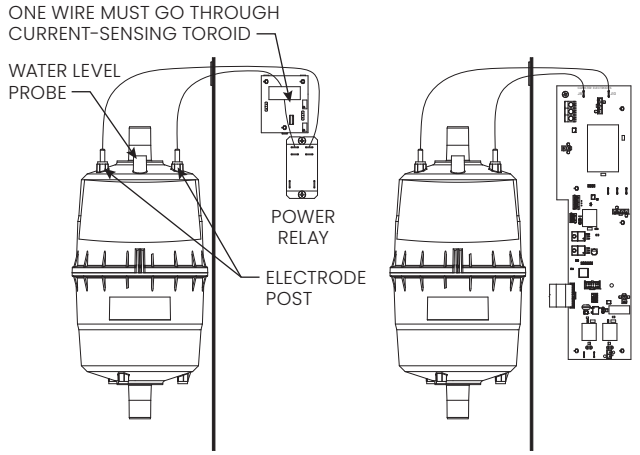
   Replace them if they are:

   - Not tightly fitting
   - Damaged
   - Over 3 years old or age is unknown
   - Have D shaped connectors (see **FIGURE 4A**)

4. Loosen hose clamp at top of canister. Slide steam hose off top of canister (see **FIGURE 5**).
5. Slide canister up and out of drain assembly (see **FIGURE 5**). Discard old canister.
6. Remove O-ring from drain assembly using small screwdriver. Discard old O-ring.
7. With your finger, swirl the fluid/precipitate mixture in the bottom of the drain valve reservoir (see **FIGURE 5**).
8. Using a sponge or paper towels, soak up the water in the reservoir. If necessary, use a wet/dry vacuum to remove residue.
9. Clean the inside of the drain port (where coil projects out) by gently swabbing with a bent cotton swab or other soft implement.
10. Rinse the drain valve reservoir with clean water and vacuum as necessary.
11. Insert new O-ring (O-ring is provided with Model 8045HUM canister) into slot in drain assembly. Dampen O-ring with water before inserting canister. Do not use oil, grease, or any lubricant besides water.

FIGURE 3A – Two Circuit Boards

FIGURE 3B – One Circuit Board



12. Make sure strainer is inserted into bottom of new canister.
13. Insert new canister into drain assembly (see **FIGURE 5**).
14. Slip steam hose over top of canister and tighten hose lamp (see **FIGURE 5**).
15. Reconnect the electrode wires and water level probe wire to the posts on top of the canister (see **FIGURE 3A** and **FIGURE 3B**). Electrode wires are interchangeable and can be placed on either of the two electrode posts on top of the canister. **Ensure connectors are fully seated.**

FIGURE 4A – "D" Shaped Connector

FIGURE 4B – "O" Shaped Connector

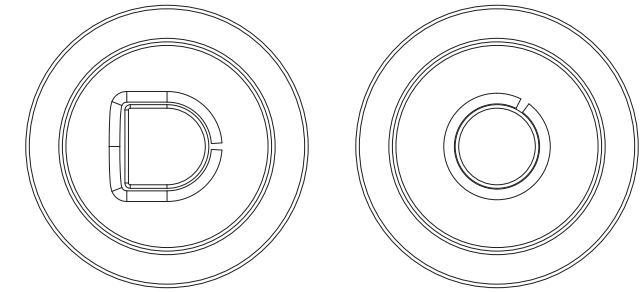
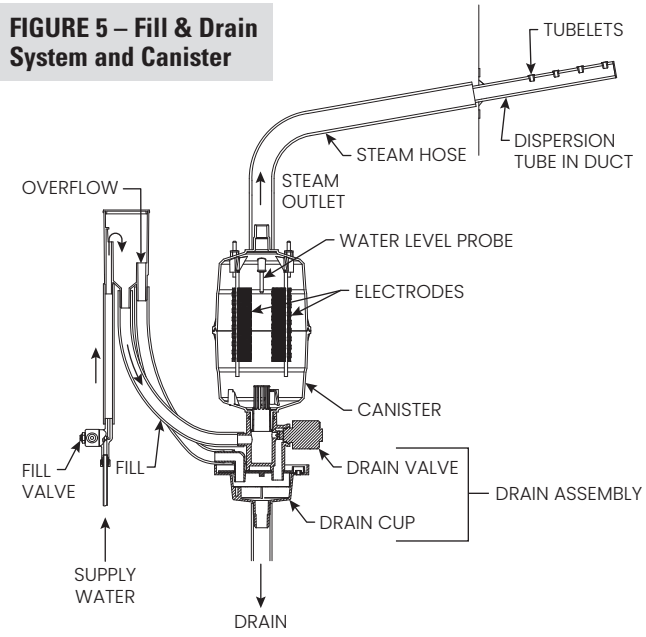


FIGURE 5 – Fill & Drain System and Canister



ELECTRODE WIRE REPLACEMENT

1. Remove front panel (see **FIGURE 2**).
2. Remove side panel (see **FIGURE 2**).
3. Remove the electrode wires (see **FIGURE 3A** and **FIGURE 3B**).
   a. For units with one circuit board: Use needle nose pliers to pull the spade connectors off spade terminals J8 and J10 on the circuit board.
   b. For units with two circuit boards: Use needle nose pliers to pull the spade connectors off the spade terminals on the power relay.
4. Ensure the two replacement electrode wires (Part #5372) have "O" shape connectors (see **FIGURE 4B**). **Do not use replacement wires with "D" shape connectors** (see **FIGURE 4A**).
5. Attach the new electrode wires (see **FIGURE 3A** and **FIGURE 3B**).
   a. For units with one circuit board: Use a pair of needle nose pliers to attach the spade connectors to the spade terminals J8 and J10 on the circuit board. Electrode wires are interchangeable and can be placed on either of the two terminals.
   b. For units with two circuit boards: Use a pair of needle nose pliers to attach the connectors to the spade terminals on the power relay. **One wire, either one but not both, must go through current-sensing toroid** (see **FIGURE 3A**). Electrode wires are interchangeable and can be placed on either of the two terminals.

FILL VALVE SERVICE

1. Disconnect water supply line from fill valve inlet (see **FIGURE 5**).
2. Remove in-line strainer from the fill valve inlet port using a #8 or #10 sheet metal or wood screw with a minimum length of 0.5".
3. Clean or replace in-line strainer (Part #4358).
4. Reconnect water supply line to fill valve inlet (see **FIGURE 5**).

RESTORE UNIT TO SERVICE

1. Replace side panel if removed (see **FIGURE 2**).
2. Replace front panel (see **FIGURE 2**).
3. Inspect drain hose to make sure it is not blocked and has constant downward slope. Clean or replace if necessary.
4. Inspect and clean condensate pump (if used).
5. Inspect steam hose to make sure it has no low spots and has constant upward slope from humidifier to dispersion tube in duct. If dispersion tube is mounted below humidifier, inspect drip tee and drain trap.
6. Restore main electrical power to humidifier at circuit breaker.
7. Turn humidifier on and verify green **On/Off** light is illuminated (see **FIGURE 2**).
8. Check system operation and inspect all plumbing connections and piping for signs of cracks or leaks.

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