Model HUMCRSTM3134, HUMXXSTM3034, HUMXXSTM3134
Steam Humidifiers

Steam Humidifier

Installation & Maintenance Instructions

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READ AND SAVE THESE INSTRUCTIONS

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SAFETY

⚠ CAUTIONS & WARNINGS

Failure to follow this caution may result in personal injury.

Use care and wear appropriate Personal protection equipment when handling parts or equipment and when installing or servicing steam humidifier. See safety procedures below.

ATTENTION INSTALLER

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.

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.

EXCESS HUMIDITY

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

MATERIALS LIST

MATERIALS FURNISHED

Humidifier
Manual Humidifier Control
Dispersion tube
Steam hose (6 feet)
Blower Activation Relay
7/8" I.D. drain tubing (10 feet)
Hose clamps
Saddle valve
Mounting screws

NOT FURNISHED

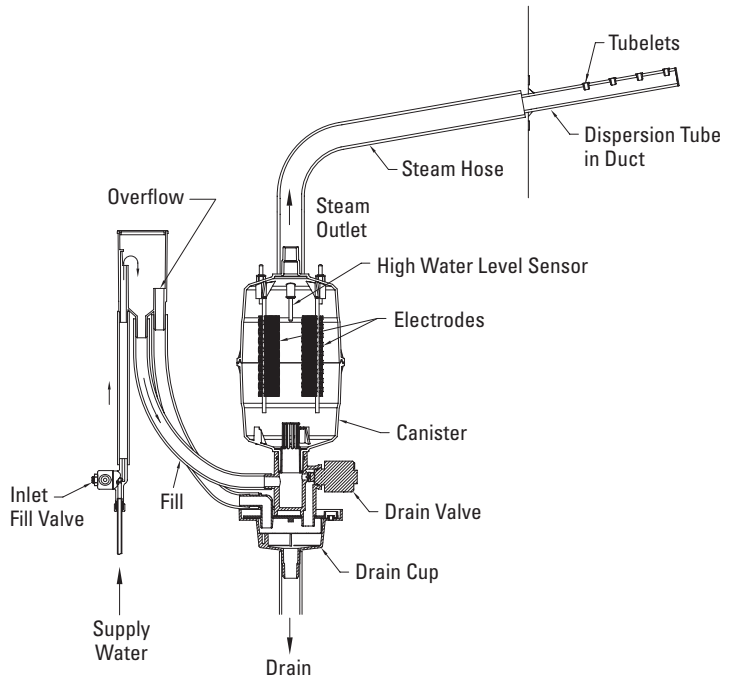
Main power disconnect switch
Wiring
1/4" O.D. supply water tubing
Boards for mounting (if required)

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



WATER QUALITY

Minerals that are naturally found in water cause the water to be electrically conductive. Water conductivity is measured in micro Siemens per centimeter (uS/cm). Mineral content, also described as "water hardness" is usually measured in grains per gallon. Because of the variety of minerals that are found in water, there is no direct correlation between water hardness and conductivity, but generally the higher the mineral content, the higher the conductivity.

The Steam Humidifier is designed to operate on water with conductivity between 125 and 1,250 uS/cm. This correlates loosely with water with hardness between 3 and 36 grains/gallon. Water that is considered "hard" and also softened water work well in the humidifier. The humidifier will make steam when plumbed to low-conductivity water but it takes longer to reach nominal capacity.

With low conductivity water, it may take the humidifier one week or more of operation to reach rated capacity, especially if it is wired to operate on 120 volts. When operating on 208/240 volts, the humidifier usually will reach nominal capacity within a few hours, even with lower conductivity water.

As water in the canister boils and turns into steam, minerals are left behind. Minerals remaining in solution increase the conductivity of the water. Minerals also deposit onto the submerged portions of the electrodes rendering those areas ineffective. As this occurs, the level of water in the canister rises to expose uncoated electrode surface.

There are benefits and trade-offs to consider when the application allows a choice between hard and softened water:

Hard water: The benefit of hard water is less frequent draining and filling than with soft water, which results in better energy and water efficiency and more consistent steam output. However, canister replacement could be more frequent with hard water, because mineral deposits coat the electrodes. The harder the water, the more frequent the need for a new canister.

Softened water: The benefit of softened water is longer canister life (depending on water chemistry) than with hard water, because softened water does not coat the electrodes nearly as much as hard water. However, softened water ions stay in solution to much higher concentrations than hard water ions. This requires more frequent draining and filling, which results in lower energy efficiency, higher water consumption and less consistent steam output.

TABLE 1 – Water Quality Guidelines

Conductivity (uS/cm) of water connected to humidifier	Estimated grains/gallon (prior to any water softening)	Hardness (prior to any water softening)	Canister behavior	Solution
0-125	0-3	Naturally Soft	Humidifier does not function.	Installation not recommended.
125-300	3-9	Naturally Soft	Long start up time.	Power with 208/240VAC, use constant fan to decrease time to reach full capacity.
300-500	9-15	Slightly Hard	Optimal performance range.	Use either hard or softened water.
500-640	15-20	Moderately Hard		
640-840	20-25	Hard		
840-1250	25-36	Very Hard	Shortened canister life due to mineral build up.	Use softened water.
above 1250	36	Extremely Hard	Canister performance degrades quickly.	Installation not recommended.

Note: If softened water is not available, or if non-softened water will be used in the humidifier, use this table to estimate the conductivity of the water delivered to the humidifier. Take the appropriate actions as necessary. Using softened water is generally acceptable unless the water is extremely conductive. The conductivity of softened water is usually slightly higher than the conductivity of the hard water entering the softener. For softened water, use a conductivity test together with the table above if there is a concern that the water may be too conductive. The manufacturer is not responsible for failures due to misapplication of the product using water that is unsuitable for this technology.

SEQUENCE OF OPERATION

When the humidifier control detects RH below the set point, and provided the humidifier is turned on and the HVAC system blower is operating, the controller in the humidifier energizes the electrodes and measures the current flowing through the water. The controller adjusts water level in the canister via a fill valve and a drain valve to maintain current at either 11.5 or 16.0 amps. The operating water level in the canister depends on the mineral content of the water which determines conductivity.

If the blower activation relay is installed, the humidifier control will turn on the HVAC blower when a call for humidity is made.

SPECIFICATIONS & DIMENSIONS

This humidifier is able to produce steam at various capacities depending on the voltage and current applied. The unit can be wired to use an input voltage of 120, 208 or 240 Volts and input amperage can be set to 11.5 or 16.0 amps by changing a dip switch on the control circuit board (see the **ELECTRICAL POWER WIRING & SHUT OFF SWITCH** section on page 13). Configure the unit appropriately for the application (see **Table 2** for capacity specifications).

TABLE 2 – Humidifier Capacities and Recommended Home Sizes

Amperage	Voltage	Maximum steam capacity (gal/day)	Maximum recommended home size in ft²*		
			Tight	Average	Loose
11.5	120V	11.5	2,500 sq ft	1,500 sq ft	1,000 sq ft
	208V	20.5	4,500 sq ft	2,500 sq ft	1,500 sq ft
	240V	23.3			
16.0	120V	16.0	3,500 sq ft	2,000 sq ft	1,500 sq ft
	208V	30.0	6,000 sq ft	4,000 sq ft	2,500 sq ft
	240V	34.6			

**Assumes 8 ft ceiling height, adjust as necessary for higher ceilings. For homes with multiple furnaces/air handlers a humidifier should be installed on each.*

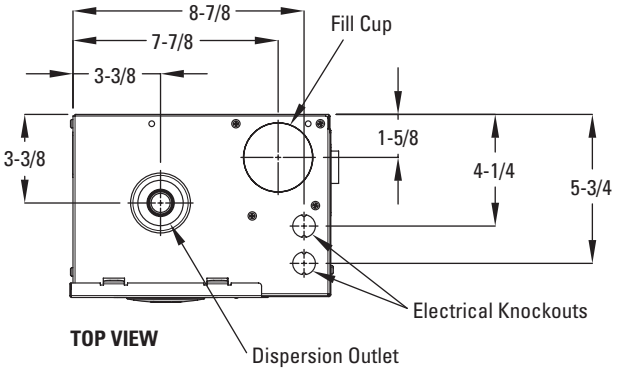
Humidifier Shipping Weight: 28 lbs

Humidifier Operating Weight: 23 lbs**

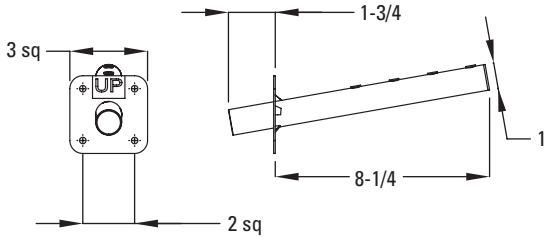
***As minerals precipitate, unit weight can increase to approximately 30 lbs.*

SPECIFICATIONS & DIMENSIONS (CONTINUED)

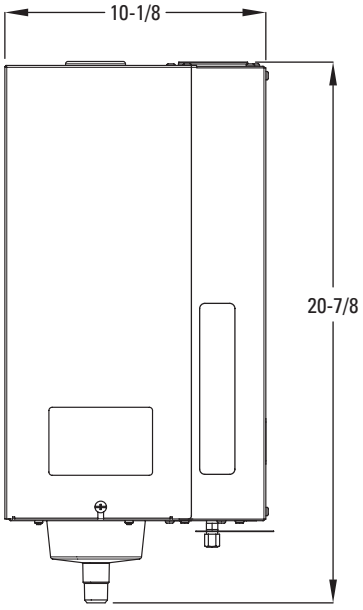
Figure 2 – Humidifier & Dispersion Tube Dimensions (inches)



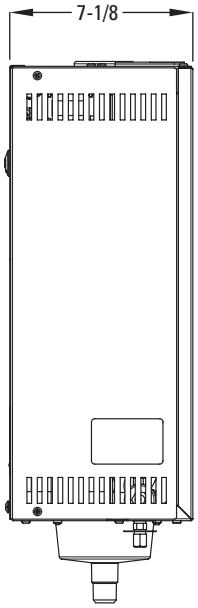
TOP VIEW



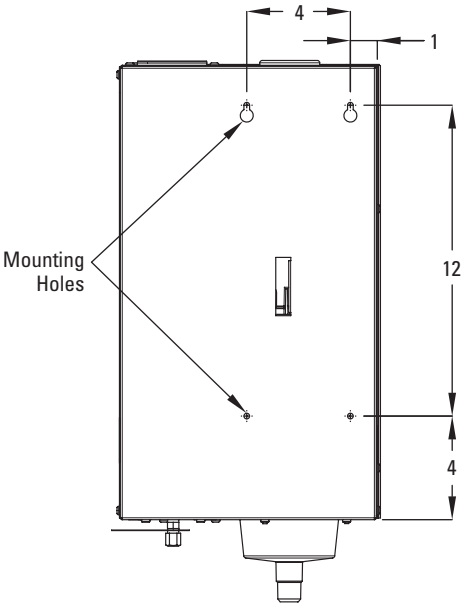
STEAM DISPERSION TUBE



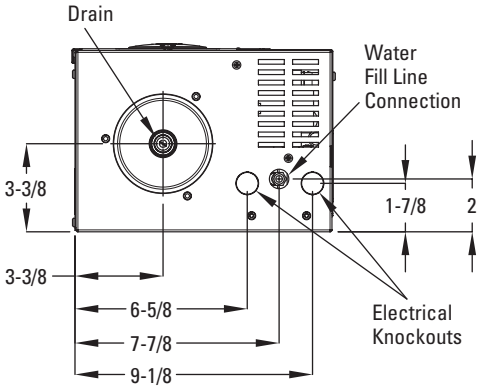
FRONT VIEW



SIDE VIEW



BACK VIEW



BOTTOM VIEW

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INSTALLATION INSTRUCTIONS

CHOOSING A LOCATION

DISPERSION TUBE LOCATION

When choosing a location for the dispersion tube three things must be considered: Location in duct, elevation with respect to the humidifier, and distance from humidifier to dispersion tube.

Duct Location and Absorption Distance

Absorption distance, the unobstructed straight line distance needed for steam to be fully absorbed, is dependent on air velocity, air temperature and relative humidity in the duct. **Determine absorption distance based on the lowest duct temperature, lowest air velocity and highest humidity that the system will see.** The dispersion tube must be located in a straight section of duct far enough upstream of any obstructions or bends in the duct. Use **Table 3** to determine the appropriate absorption distance.

Operation during AC calls is not recommended because of the potential for condensation in the ductwork. Configure controls to lock out the humidifier during AC calls and use the blower activation feature to allow the humidifier to run with the blower only.

The dispersion tube must be mounted with the plate on a vertical surface with the tube angled up as shown in **Figure 3**. The steam tubelets must face up regardless of the airflow direction in the duct. The plate is labeled "UP"to indicate proper orientation. On horizontal duct runs install the dispersion tube low in the duct, on vertical runs center the tube on the duct.

If the dispersion tube is mounted on insulated ductwork, make sure insulation is not more than 2" thick at tube location to prevent insulation from blocking first steam outlet.

Note: If dispersion tubes for two humidifiers are installed in one duct, double the dispersion distances. If three dispersion tubes are installed, triple the dispersion distance. Position dispersion tubes so one does not discharge directly onto another.

⚠ CAUTION

Each humidifier requires its own steam hose and dispersion tube. Do not connect steam hoses from more than one humidifier together. Back-pressure from one humidifier can lower the water level in the canister in the other humidifier and cause operational problems.

Do not install the dispersion tube in a duct with greater than 2 in. wg static pressure. High duct pressure can cause back-pressure in the canister which can result in unstable unit operation.

Do not mount humidifier in a location where operating ambient temperatures exceed 140°F or where freezing temperatures may occur.

TABLE 3 – Absorption Distance (Minimum distance from dispersion tube downstream to any obstruction or bend in duct)

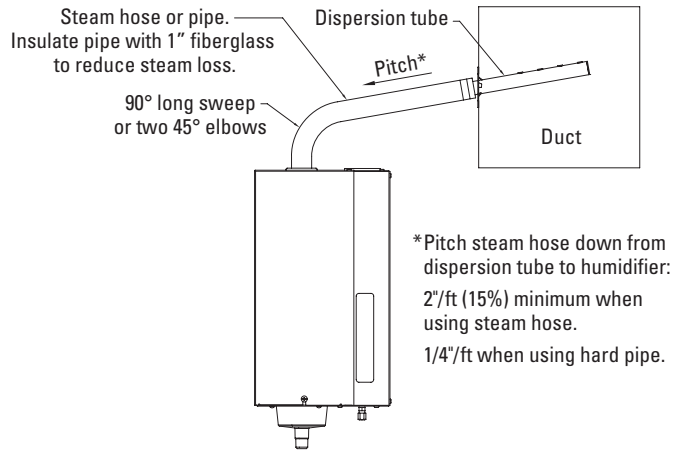
Humidifier Output (gal/day)	Airflow Velocity*	70°F & 30% RH Setpoint	70°F & 45% RH Setpoint	65°F & 45% RH Setpoint	45°F & 45% RH Setpoint
Up to 16.0	300 fpm	13″	19″	23″	30″
	600 fpm	6″	10″	12″	18″
	1200 fpm	3″	5″	6″	13″
	1800 fpm	2″	3″	4″	10″
20.5 – 25.0	300 fpm	15″	23″	28″	45″
	600 fpm	6″	12″	13″	26″
	1200 fpm	5″	6″	7″	19″
	1800 fpm	3″	4″	5″	16″
25.0 – 35.0	300 fpm	24″	31″	36″	60″
	600 fpm	17″	22″	26″	48″
	1200 fpm	12″	15″	18″	25″
	1800 fpm	10″	13″	15″	20″

*Velocity in feet per minute = Duct airflow volume in cubic feet per minute / duct area in square feet.
Example: 1,200 cfm through 16″ x 12″ duct = 1,200/(12 x 16/144 sq. in./sq ft.) = 1,200/1.333 = 900 fpm

Elevation

The preferred location for the dispersion tube is higher than the humidifier so that the steam hose has a constant downward slope of at least 2″ per foot from the dispersion tube to the humidifier. If hard pipe is used, the slope can be 1/4″ per foot. With the constant downward slope, any condensation that forms in the steam hose will drain back into the steam canister. See **Figure 3**.

FIGURE 3 – Prefered Dispersion Tube Mounting: Above Humidifier



Elevation (continued)

If the dispersion tube must be mounted below the humidifier or if the steam hose needs to run up and over an obstruction, a drip tee with drain trap, must be installed as shown in **Figure 4**. When using the Fan Pack, adding Part #5389 close to the humidifier outlet can help prevent noise from gurgling as shown in **Figure 5**.

NOTICE

CONTROL CONDENSATE FLOW AND COLLECTION

Failure to follow steam pipe recommendations in this manual can result in reduced or erratic performance, increased noise and condensate in the duct.

Distance from Humidifier to Dispersion Tube

The capacity of the humidifier is reduced by the length of the steam hose or pipe due to condensation. The maximum recommended length of steam hose is 6 feet. Use hard pipe insulated with 1" insulation rated for 212°F or higher for lengths greater than 6 feet. **Table 4** provides humidifier capacity with various lengths of steam hose and pipe. If 6-foot steam hose does not reach from humidifier to dispersion tube, splice in 1" copper pipe using 3/4" x 1" reducing couplings as shown in **Figure 6**.

FIGURE 6

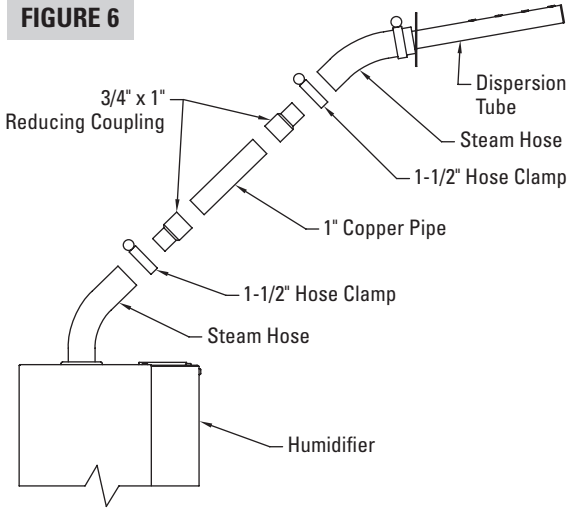


FIGURE 4 – Alternate Dispersion Tube Mounting: Below Humidifier

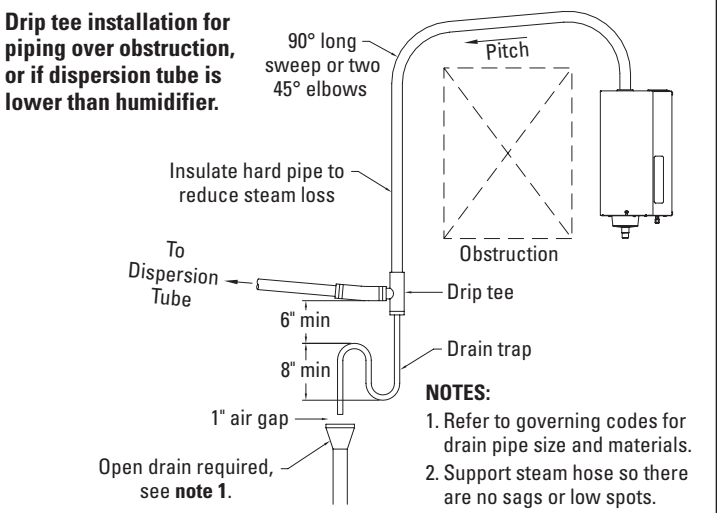


FIGURE 5

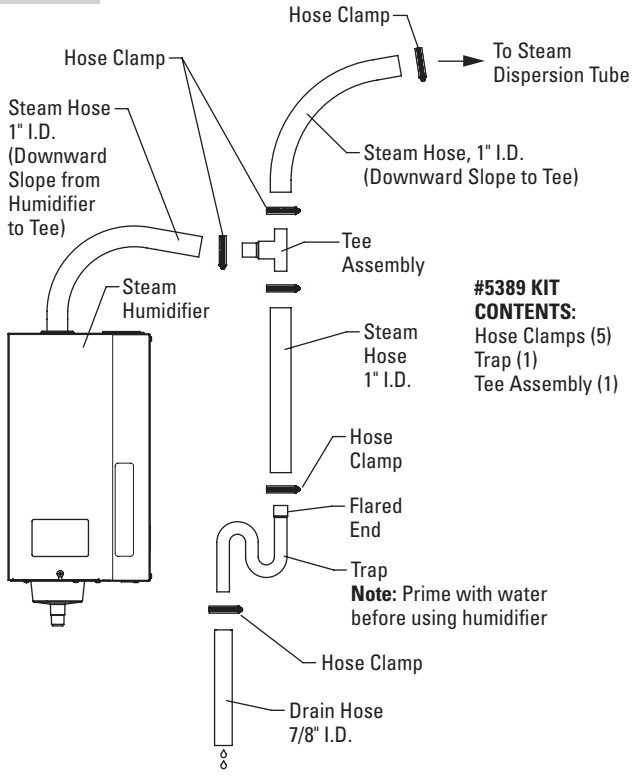


TABLE 4 – Steam Humidifier Capacity in Gallons/Day

Steam Hose or Insulated Pipe Length	120 Volts				208 Volts				240 Volts			
	11.5 Amps		16.0 Amps		11.5 Amps		16.0 Amps		11.5 Amps		16.0 Amps	
	Steam Hose	Insulated Pipe	Steam Hose	Insulated Pipe	Steam Hose	Insulated Pipe	Steam Hose	Insulated Pipe	Steam Hose	Insulated Pipe	Steam Hose	Insulated Pipe
< 2 ft.	11.5	11.5	16.0	16.0	20.5	20.5	30.0	30.0	23.3	23.3	34.6	34.6
2 ft.	11	11	15.5	15.5	20	20	29	29.5	23	23	34	34
4 ft.	10	11	14.5	15.5	19	20	28	29.5	22	23	33	34
6 ft.	9	11	13.5	15	18	20	27	29	21	22	32	33
8 ft.		10		14		19		28		22		33
10 ft.		10		14		19		28		22		33
12 ft.		10		14		19		28		22		33
14 ft.		9		13		18		27		21		32
16 ft.		9		13		18		27		21		32
18 ft.		9		13		18		27		21		32
20 ft.		9		13		18		27		20		31

HUMIDIFIER

Do not mount humidifier in a location where ambient operating temperature exceeds 140°F or where freezing temperatures may occur. Extreme temperatures may cause the humidifier to leak which can damage furnishings or structure.

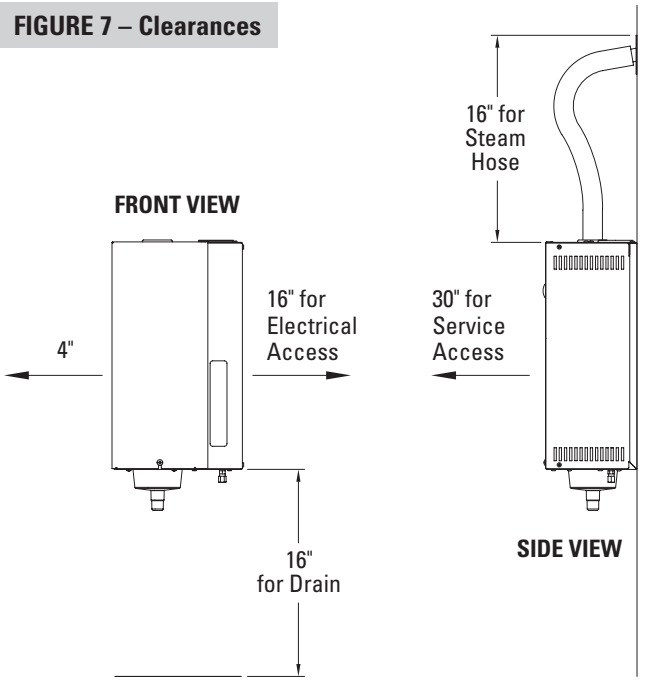
Mount humidifier in a location that allows access for servicing, and clearance to remove front panel for replacing the canister and side panel for access to the electrical components during installation. See **Figure 7** for minimum clearances around humidifier.

The humidifier should be mounted as close to the dispersion tube as possible. **Table 4** shows how capacity is reduced as the distance between the humidifier and dispersion tube increases. If the humidifier is mounted on the duct directly below the dispersion tube, allow space for a bend in the steam hose. Allow a minimum of 2" of steam hose to extend straight out of the humidifier before beginning any bends; this will help ensure a tight connection with the top of the canister.

The humidifier can be mounted to a wood surface, or to sheet metal ductwork if it is structurally stable. Do not mount humidifier to fiber duct board. Sound isolation may be desired when mounting to sheet metal ductwork.

The humidifier must be mounted to a vertical surface and must be mounted level in the upright position.

FIGURE 7 – Clearances



INSTALLATION INSTRUCTIONS (CONTINUED)

PREPARE HUMIDIFIER FOR MOUNTING

Unpack carton. Open front panel by removing screw and lifting panel up and away from humidifier. Disconnect three wires from top of canister by pulling straight up. The two large wires are the electrode conductors. The smaller wire is connected to the high water level sensor. Remove canister by pulling it up and out of drain assembly. Remove two screws on right side of humidifier and lift side panel off housing to expose electrical compartment.

INSTALL STEAM DISPERSION TUBE

Make sure steam dispersion tube is mounted higher than the humidifier so that condensate that forms in the tube runs back into the canister. If the dispersion tube cannot be mounted higher than the humidifier or if the steam hose must extend up from the humidifier then down to the dispersion tube due to an obstruction, a drip tee and drain trap system must be installed as shown in **Figure 4**.

Drill a 1-1/4" diameter hole in a vertical surface of the duct at the location chosen for the dispersion tube. Position the dispersion tube so it is angled up, regardless of airflow direction. UP is stamped on the mounting bracket to aid in proper installation. Secure with four sheet metal screws provided.

MOUNT HUMIDIFIER

Secure humidifier to sturdy wall using screws provided, or to sheet metal duct. Humidifier weighs 23 lbs. with full canister. Make sure mounting system will support weight. If mounting to stud frame wall, install two spanner boards to studs and fasten humidifier to spanner boards. Make sure humidifier is mounted plumb.

INSTALL STEAM HOSE

Six feet of steam hose is provided with the humidifier. If the steam hose must be cut, use a hacksaw. If additional length is required, use 1" O.D. metal or copper pipe. **Do not use PVC pipe for steam line.** Insulate pipe with 1" thick insulation rated for 212°F or higher to reduce steam loss. See **Table 4** for humidifier capacity at various lengths of steam hose and pipe.

Use the steam hose provided. Other hoses may have impurities which can cause foaming in the canister. Foaming can cause water level inaccuracies and reduced steam production. When using pipe, remove all traces of residual materials used to connect the pipe to prevent foaming.

Verify that the O-ring is in place in the slot in the drain assembly. Dampen the O-ring with water, then reinsert canister. (Do not use oil, grease or any lubricant besides water.) Rotate the canister so the caution label is visible.

Attach steam hose to dispersion tube and then to top of canister using hose clamps provided. Make sure steam hose has a constant slope of at least 2" per foot between the dispersion tube and the humidifier. Any and every low spot in the steam hose or pipe must have a drip tee and drain trap. Fill drain trap with water before making final connections. Support the steam hose in multiple locations over its span to prevent sagging.

Attach and fully seat the electrode conductors (interchangeable) and the high water level sensor wire.

SUPPLY WATER

Plumb the humidifier to cold, hard or softened water. **Do not use hot water because unheated supply water is used to cool water drained from the humidifier.** Do not use demineralized or reverse osmosis water. For proper operation, supply water pressure must be between 25 psi and 120 psi. Hard or softened water may be used provided it has conductivity between 125 µS/cm and 1250 µS/cm.

Supply water piping must be free of oils, lubricants, solder flux and other contaminants, which can cause foaming.

Install the saddle valve according to the instructions printed on the bag. Run 1/4" copper tubing from the saddle valve to the humidifier. Connect it to the fill valve. Double wrench to prevent leaking and damage to valve.

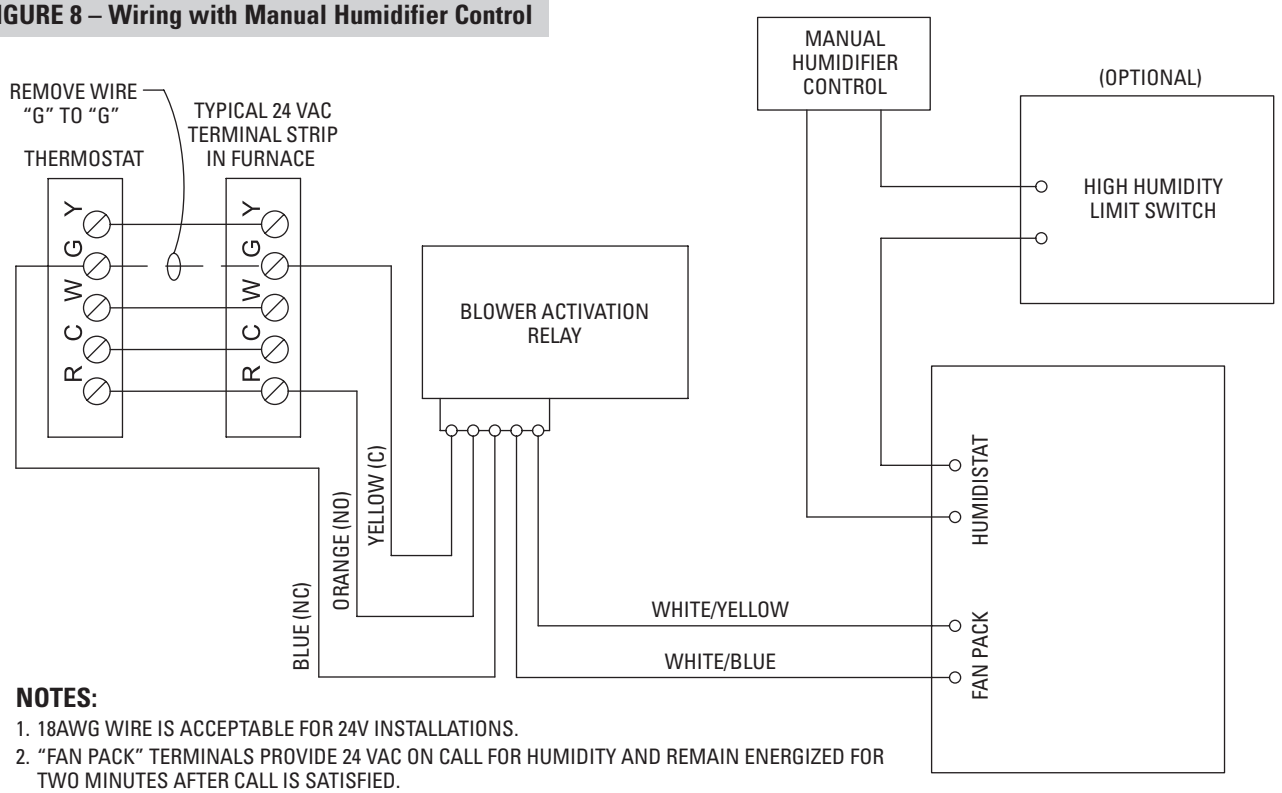
Note: Adding an inline particulate filter can increase canister life in areas with high levels of suspended solids. DO NOT use filters that release scale inhibitors, filters of this type can significantly decrease canister life.

CONTROL WIRING

The control circuit operates on 24VAC. Install manual humidifier control and blower activation relay as shown in **Figure 8**. See **Figure 8A** for wiring Humiditrac humidifier control.

If protection from over-humidification is desired, install optional high humidity limit switch at least 4 feet downstream of the dispersion tube.

FIGURE 8 – Wiring with Manual Humidifier Control



NOTES:

1. 18AWG WIRE IS ACCEPTABLE FOR 24V INSTALLATIONS.
2. "FAN PACK" TERMINALS PROVIDE 24 VAC ON CALL FOR HUMIDITY AND REMAIN ENERGIZED FOR TWO MINUTES AFTER CALL IS SATISFIED.

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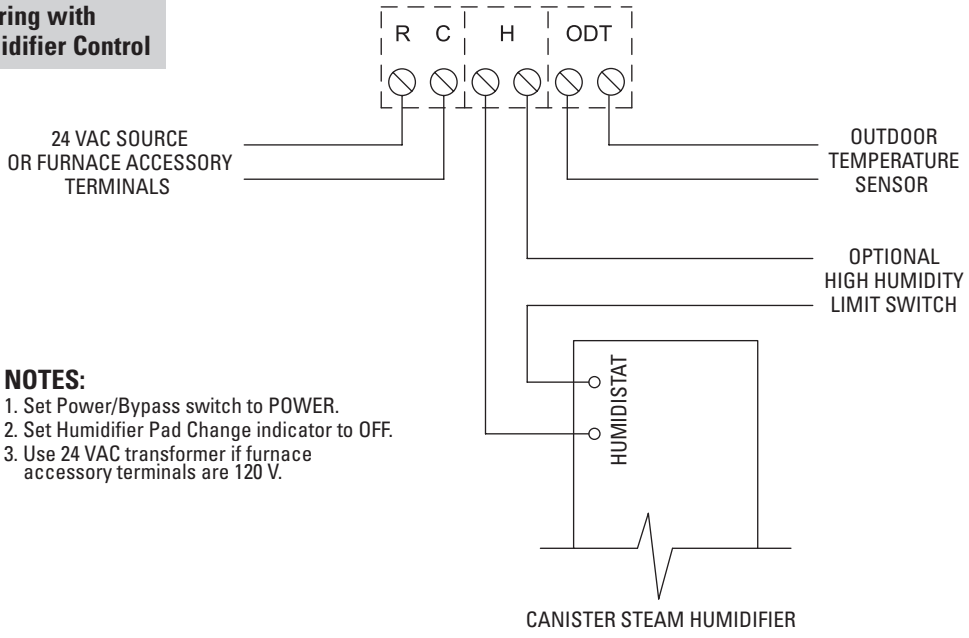
FIGURE 8A – Wiring with Humiditrac Humidifier Control



NOTES:

1. Set Power/Bypass switch to POWER.
2. Set Humidifier Pad Change indicator to OFF.
3. Use 24 VAC transformer if furnace accessory terminals are 120 V.

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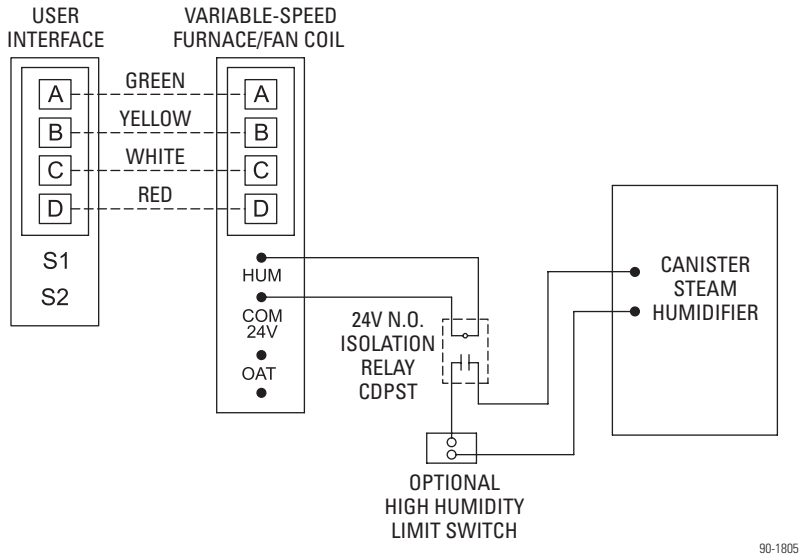
INFINITY/EVOLUTION CONTROL WIRING

The Steam Humidifier produces internal 24VAC in order to energize control circuits. For this application, a 24VAC N.O. Isolation Relay (DPST) part number HN61KQ120 available through Totaline, MUST be used to prevent mixing the internal humidifier power with the indoor equipment transformer. Applying 24VAC isolation relay coil to furnace or fan coil HUM and COM terminals will allow the Infinity/ Evolution Control to automatically energize the HUM output during a call for humidification. The N.O. relay contacts will be used to energize the humidifier. See **Figure 8B** for wiring Infinity/Evolution control.

FIGURE 8B – Wiring with Infinity/Evolution Control



DRAIN LINE

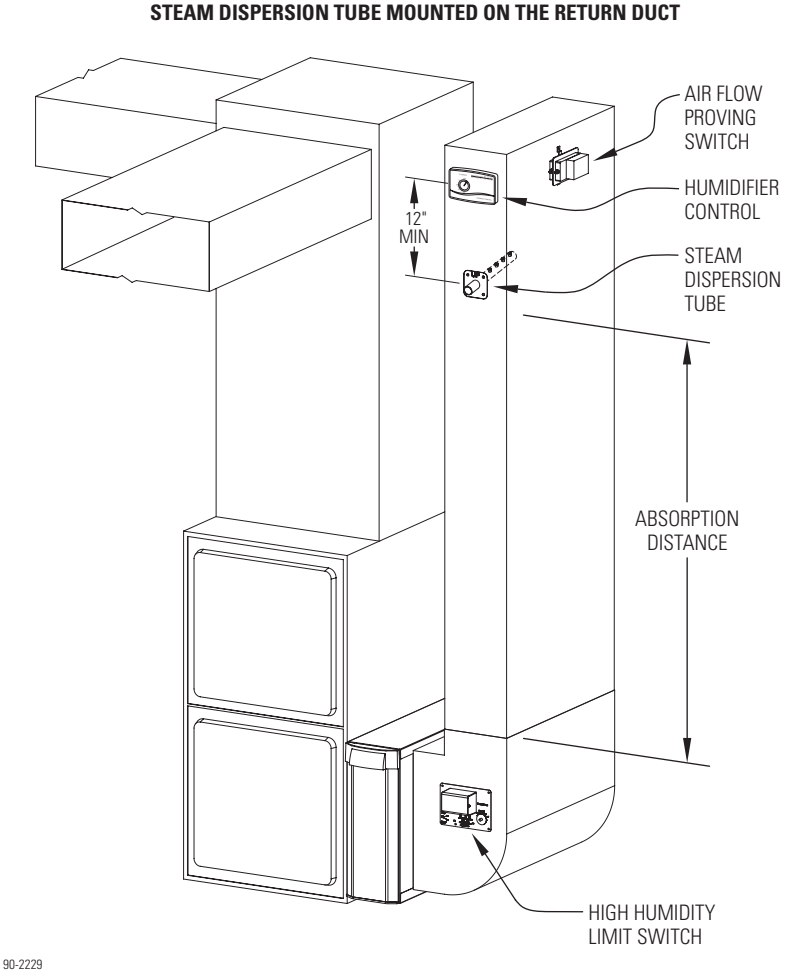
Attach the 7/8" I.D. drain tubing provided to the drain assembly at the bottom of the humidifier. Secure with the hose clamp provided. Do not over tighten.

Make sure the drain line has a constant downward slope from the humidifier to the drain and is not kinked or blocked.

If floor drain is not available, use condensate pump (Part #5392) to route water to a suitable drain. Provide at least 16 inches for of drain line between the steam humidifier and the condensate pump.

Note: The humidifier uses cold water to temper drain water to less than 140°F.

FIGURE 9 – Mounting of Humidifier Control



ELECTRICAL POWER WIRING & SHUT-OFF SWITCH

⚠ CAUTION

Only qualified electrical personnel should perform field wiring procedures. Improper wiring or contact with energized circuits can cause property damage or severe personal injury.

All wiring must be installed in accordance with all governing electrical codes and with the wiring diagram provided inside the front panel.

Do not loop power wiring.

Do not use aluminum wire.

A safety grounding system that meets all governing electrical codes is required. The ground connection must be made with solid metal to metal connections. Ground wire must be the same size as the power wiring.

With factory settings, the Steam Humidifier draws 11.5 amps +/- 10%. Use a minimum 20 amp dedicated circuit when installing to operate at 11.5 amps. The Steam Humidifier can be set to draw 16.0 amps +/- 10% by repositioning dip switch #1 on the control circuit board (see **Figure 10**). When set to 16 amps, use a minimum 25 amp dedicated circuit. For both applications, size wire according to local codes.

The Steam Humidifier is shipped from the factory wired for 240 VAC operation, but it can operate on 120, 208 or 240 VAC. **If using 120V or 208V, move the black/white jumper wire to the proper tab on the control circuit board.** See **Figures 11, 12, 13**.

WIRING INSTRUCTIONS

Install disconnect switch (not provided) between line power source and humidifier.

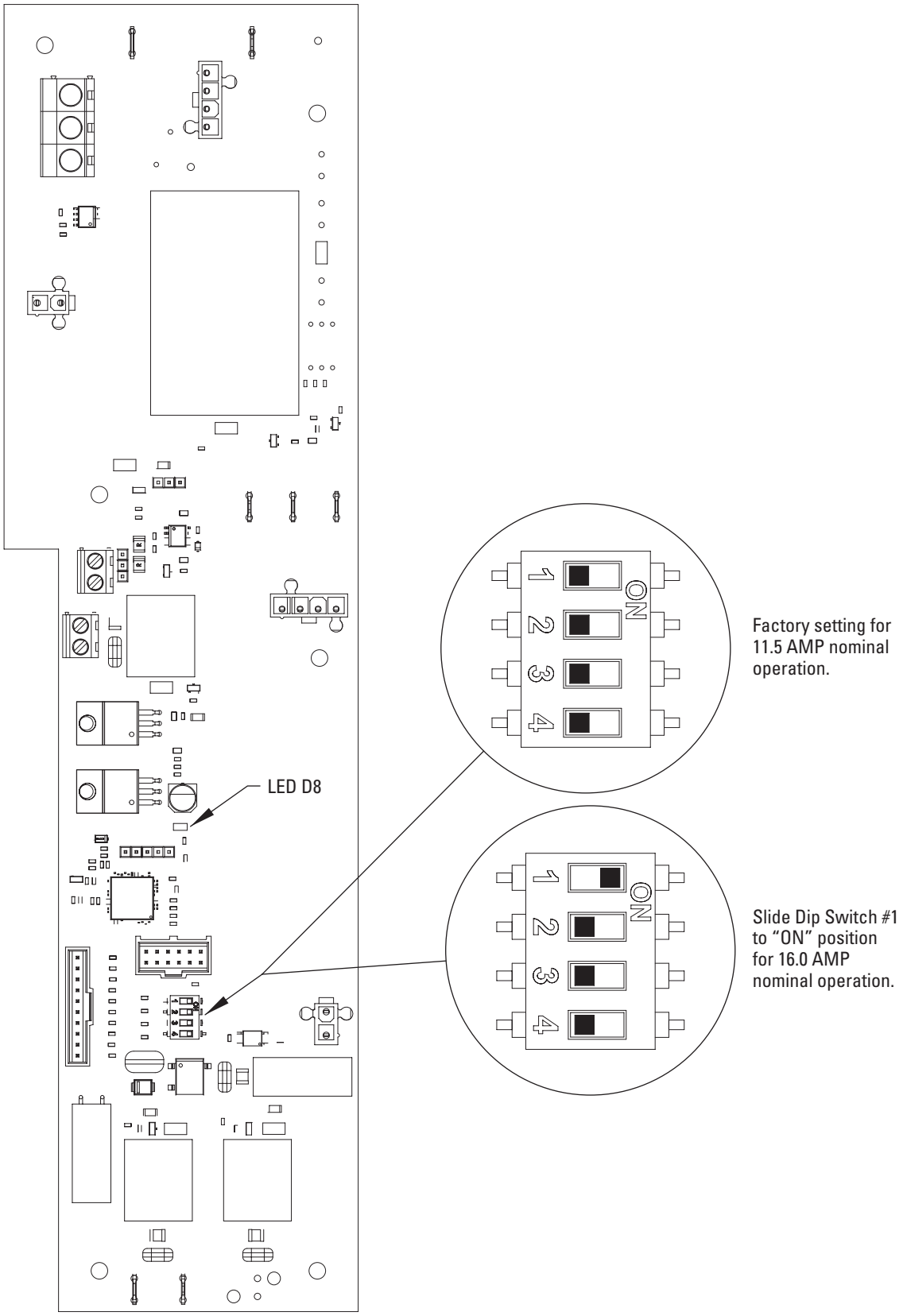
Knock-outs for power wiring and low voltage control circuit wiring are provided.

Connect power and ground wiring as shown in appropriate wiring diagram.

- 240 VAC – **Figure 11**
- 208 VAC – **Figure 12**
- 120 VAC – **Figure 13**

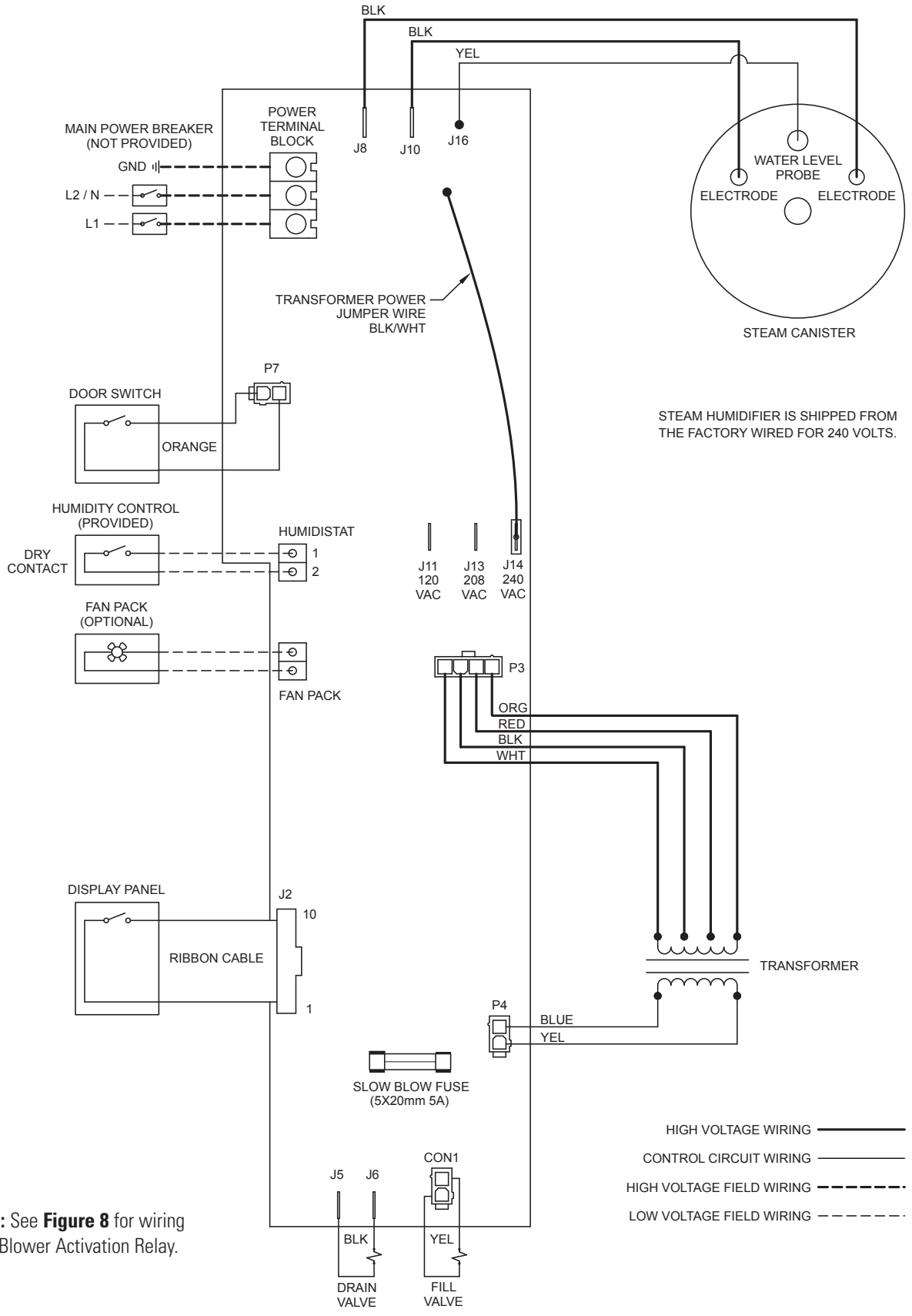
Do not run high voltage power lines over internal circuit boards.

FIGURE 10 – Control Circuit Board with Dip Switches



90-1959

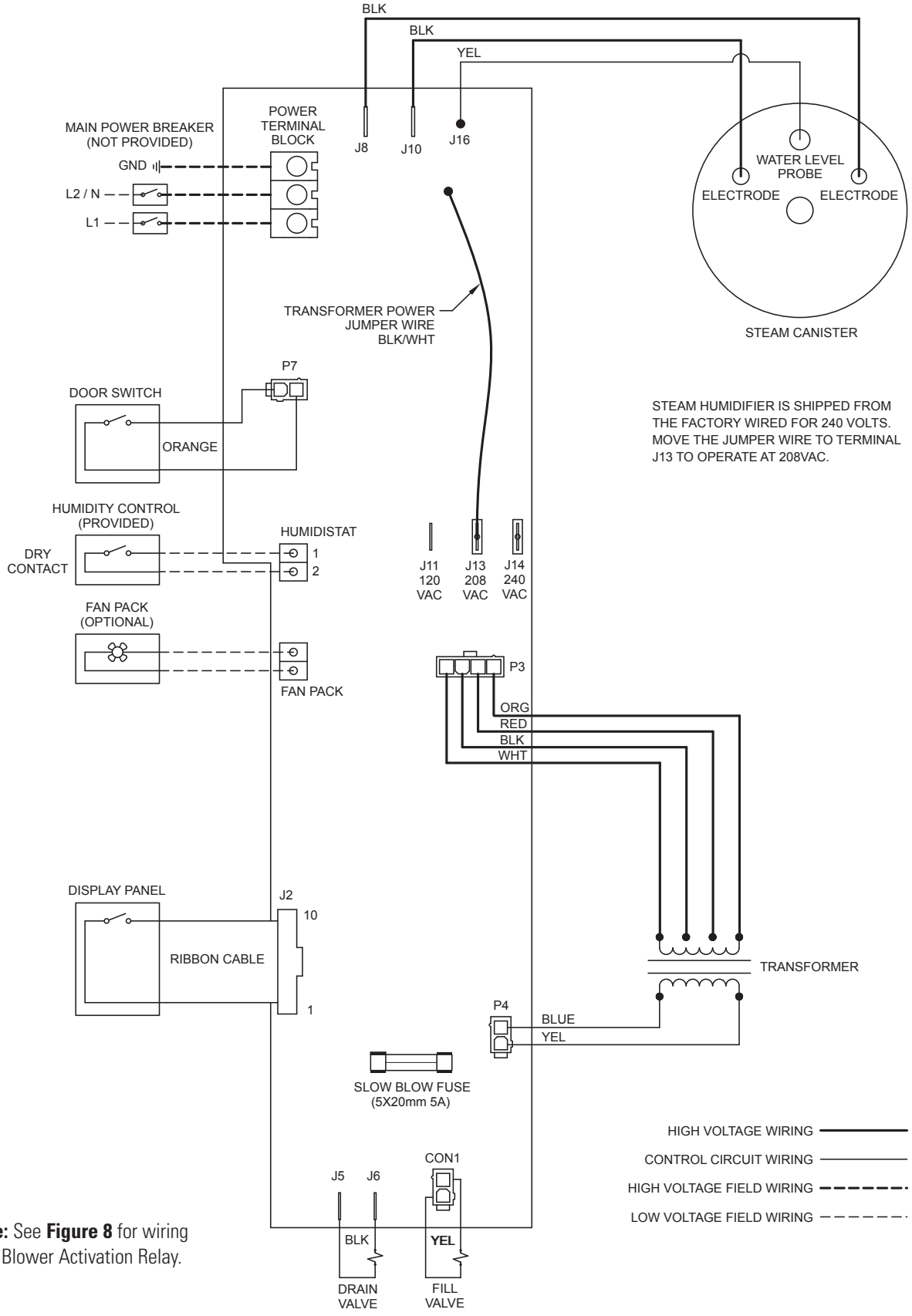
FIGURE 11 – 240 VAC Wiring Diagram



Note: See **Figure 8** for wiring with Blower Activation Relay.

90-1903

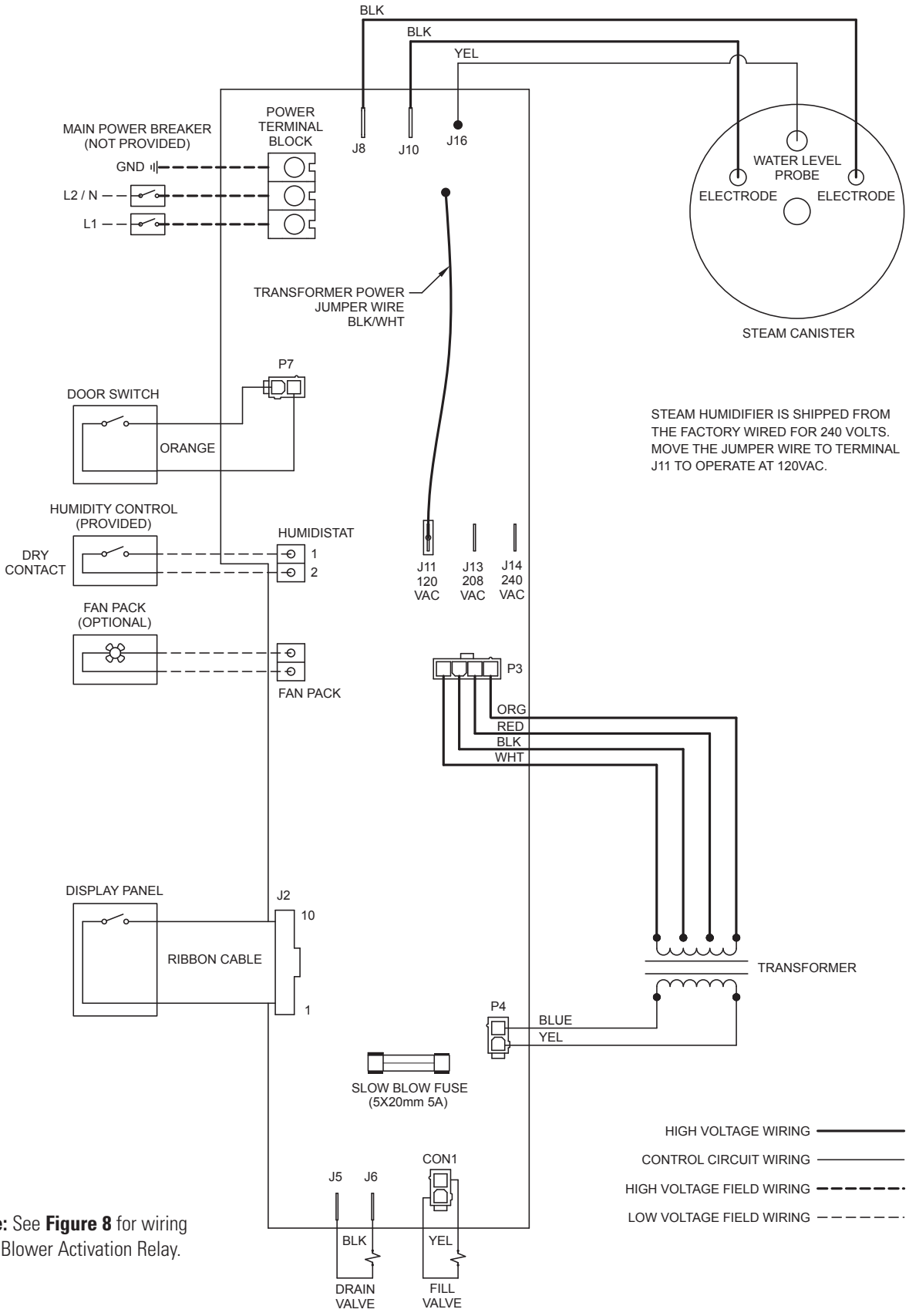
FIGURE 12 – 208 VAC Wiring Diagram



Note: See **Figure 8** for wiring with Blower Activation Relay.

90-1904

FIGURE 13 – 120 VAC Wiring Diagram



Note: See **Figure 8** for wiring with Blower Activation Relay.

90-1905

START-UP PROCEDURE

1. Once the supply water, drain, steam hose, electrical power and control wiring connections are complete, make sure canister is fully seated into drain valve and three wire connectors on top of canister are secure. (High water probe wire and two interchangeable electrode wires.)
2. Attach side panel and front door.
3. Open saddle valve allowing water to flow to humidifier. Check for leaks.
4. Turn humidifier control knob to OFF.
5. Close main power switch energizing humidifier.
6. Press On/Off button on humidifier. The **On/Off** light will illuminate green.
7. Make sure the HVAC blower is operating and adjust the humidifier control dial up to initiate a call for humidity.

   The **Steam** light will illuminate green indicating a call for humidity and the **Fill** light will illuminate green indicating the fill valve is open allowing the canister to fill. You should also hear the water flowing. **If water flows down drain while humidifier is filling, check for kinks in hoses and make sure O-ring is properly seated in groove in drain valve.**
8. Once the **Fill** light turns off, to verify that the humidifier will drain properly, press the On/Off button to turn humidifier off. You may hear the fill valve open allowing cold water to flow into the canister to cool the water in the canister. The **Drain** light will flash green for 15 seconds then turn green for four minutes while the canister drains. Once the **Drain** light turns off, the drain cycle is complete.
9. Set humidifier control to proper level.
10. Press On/Off button to turn humidifier on.

OPERATING MODES

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

During fill cycles, the **Fill** light illuminates green.

When the humidifier is turned on, any time the control sends a call for humidity, the **Steam** light illuminates green.

Any time the drain valve is activated, 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 the humidifier to generate steam at the rated capacity. If the conductivity of the water is low, it may take a week or more for the humidifier to generate steam at the rated capacity. The rated capacity is achieved when the humidifier is detecting a nominal current of either 11.5 or 16.0 amps between the electrodes. If the humidifier has not reached capacity after 168 hours of operation, the **Steam** light will illuminate yellow on a call for humidity. The humidifier will continue to operate with a yellow **Steam** light, and may satisfy the humidity requirements. Once rated capacity is reached, the **Steam** light will illuminate green.

The internal controller adjusts water level in the canister to maintain the nominal current between the electrodes. As minerals build up on the electrodes, their effectiveness decreases, so the controller will increase the water level to submerge more of the electrode surface. When the water has reached the high level probe in the canister and the internal controller no longer detects nominal current, the **Service** light will flash red indicating that the canister needs to be replaced.

If the humidifier attempts to fill the canister and cannot, the drain and fill valves will pulse on and off for four seconds to dislodge minerals which may be blocking the drain valve ports. The **Drain** and **Fill** lights will flash on and off when this occurs.

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

The humidifier does not need to be turned off at the end of the humidification season. If 72 hours elapses without receiving a call for humidity, the canister will automatically drain. The **Drain** light will remain lit for 24 hours. This may also occur during periods of inactivity during the humidification season. The humidifier will resume normal operation when a call for humidity is made.

SHUT DOWN PROCEDURE

To turn humidifier off, push On/Off button once. Humidifier will begin its four-minute drain cycle. Fill valve will open to temper drain water. The **Drain** light will flash green for 15 seconds then turn green for four minutes while the canister drains. Once the **Drain** light turns off, the drain cycle is complete and the humidifier is off.

DISPLAY PANEL

Green lights indicate normal operation.

Yellow **Steam** light indicates humidifier is operating at less than rated capacity.

Flashing red **Service** light indicates canister is near the end of its life and should be replaced if the humidity in the space cannot be maintained.

Solid red lights indicate humidifier has shut down and requires service.

Disconnecting power to humidifier resets internal timers.

TABLE 5 – Display Panel

Indicator	Light	Function
 On/Off	**Off**	Humidifier is turned off or power is disconnected.
	Solid green	Humidifier is turned on.
	Flashing Green	Humidifier is preparing to turn on. Occurs if power to humidifier was turned off when humidifier was on. Humidifier turns on after light flashes for one minute.
 Fill	**Off**	Fill valve not energized.
	Solid Green	Fill valve is energized, filling or replenishing canister with water. (During drain cycle when fill valve is open allowing cold water into canister to temper drain water, the **Fill** light does not illuminate.)
	Flashing Green	Fill and drain valves are pulsing to dislodge mineral deposits from drain. Flashes 10 times in 4 seconds. Occurs if high water probe detects water during drain cycle.
	Solid Red	Humidifier cannot fill canister. Humidifier stops operating. Occurs after fill valve has been energized for 40 minutes and high water probe does not detect water.
 Steam	**Off**	Humidifier is not producing steam
	Solid Green	Humidifier is turned on and receiving a call for humidity from the control.
	Solid Yellow	Humidifier is producing steam but at less than the rated capacity. Occurs if humidifier has operated for 168 hours and has not reached nominal current.
 Drain	**Off**	Drain valve not energized.
	Solid Green	Drain valve is energized, allowing water to drain from canister.
	Flashing Green	Humidifier is preparing to drain. Flashes for 15 seconds indicating fill valve is open allowing cold water into canister.
 Service	**Flashing Red**	Canister has reached end of life. Humidifier continues to operate but at reduced capacity. Occurs after humidifier has operated for 168 hours plus another 24 hours at less than 75% of the maximum operating current level between electrodes.
	Solid Red	Humidifier is not operating and requires service.

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.

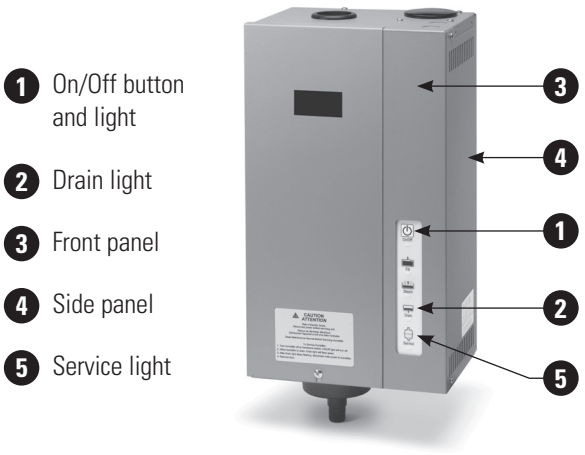
INSPECT HUMIDIFIER WHEN SERVICING

- Replace canister and O-ring annually
- 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**)

SERVICE SHUTDOWN PROCEDURE

1. Press **On/Off** button to turn humidifier off (see **FIGURE 14**).
2. Allow humidifier to drain.
3. When the green **Drain** light (see **FIGURE 14**) 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 14 – Steam Humidifier



CANISTER REPLACEMENT AND DRAIN VALVE SERVICE

Use only genuine replacement part number 8045HUM.

1. Remove front panel (see **FIGURE 14**).
2. Pull three wires off posts on top of canister (two electrode wires and one water level probe wire, shown in **FIGURE 15A** and **FIGURE 15B**).
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 16A**)

FIGURE 15A – Two Circuit Boards

FIGURE 15B – One Circuit Board

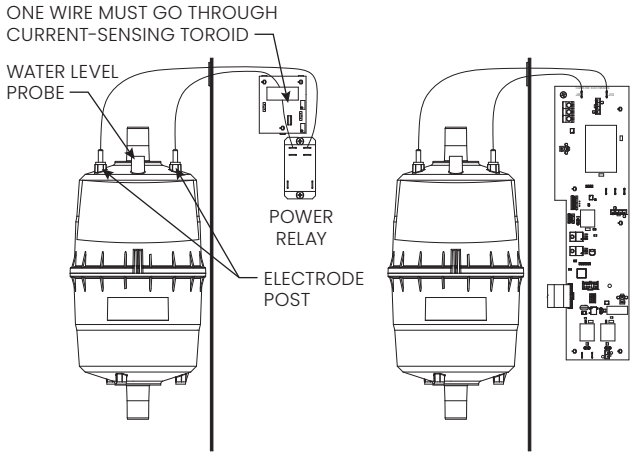
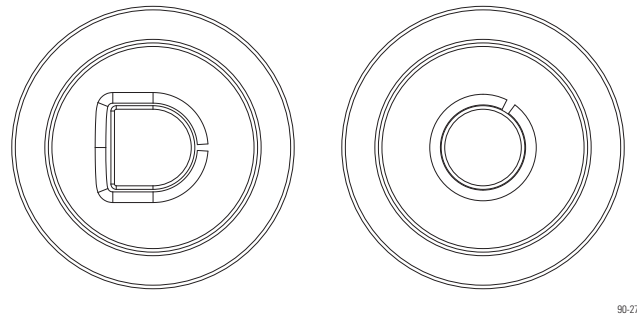


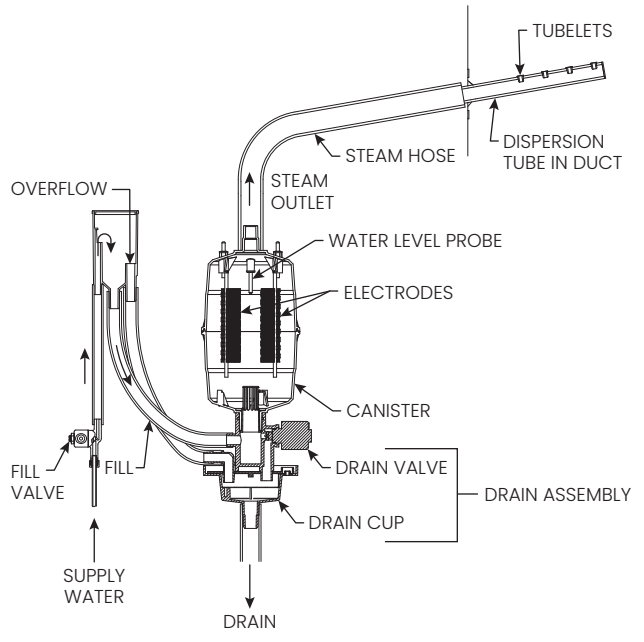
FIGURE 16A – "D" Shaped Connector

FIGURE 16B – "O" Shaped Connector



4. Loosen hose clamp at top of canister. Slide steam hose off top of canister (see **FIGURE 17**).
5. Slide canister up and out of drain assembly (see **FIGURE 17**). 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 17**).
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.
12. Make sure strainer is inserted into bottom of new canister.
13. Insert new canister into drain assembly (see **FIGURE 17**).
14. Slip steam hose over top of canister and tighten hose lamp (see **FIGURE 17**).
15. Reconnect the electrode wires and water level probe wire to the posts on top of the canister (see **FIGURE 15A** and **FIGURE 15B**). 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 17 – Fill & Drain System and Canister



ELECTRODE WIRE REPLACEMENT

1. Remove front panel (see **FIGURE 14**).
2. Remove side panel (see **FIGURE 14**).
3. Remove the electrode wires (see **FIGURE 15A** and **FIGURE 15B**).
   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 16B**). **Do not use replacement wires with "D" shape connectors** (see **FIGURE 16A**).
5. Attach the new electrode wires (see **FIGURE 15A** and **FIGURE 15B**).
   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 15A**). 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 17**).
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 17**).

RESTORE UNIT TO SERVICE

1. Replace side panel if removed (see **FIGURE 14**).
2. Replace front panel (see **FIGURE 14**).
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 14**).
8. Check system operation and inspect all plumbing connections and piping for signs of cracks or leaks.

TROUBLESHOOTING GUIDE

⚠ CAUTION

Contact with electrical circuits can cause property damage, personal injury or death. Service and Troubleshooting must be performed by qualified electrician.

For general operational problems, check to make sure humidifier is installed correctly.

TABLE 6 – Troubleshooting Guide

Problem	Possible Cause	Action
General operating problems. Humidifier will not turn on or turn off.	Field-wired terminal connections.	Verify L1, N/L2 and ground connections are properly wired and appropriate voltage is present.
		Check HUMIDISTAT and (if used) FAN PACK terminal connections are tight and properly wired.
		HUMIDISTAT terminals must be connected to an on/off device.
		Check wiring connections and settings on Accessory items such as high limit switch and airflow proving switch.
	Internal connections.	Check electrode and high water probe connections on the top of the canister.
		Make sure ribbon cable from membrane switch is securely plugged into control circuit board.
		Make sure black/white wire is attached to terminal that matches input voltage.
	No power to humidifier.	Check main power supply and switch.
		Ensure breaker is sized appropriately for the amperage draw.
		Check for proper voltage across L1 and N/L2 terminals.
	Humidifier not turned on.	Make sure front cover is attached to engage safety interlock switch. Press On/Off button.
		Make sure ribbon cable from membrane switch is not damaged and is securely plugged into the control circuit board.
	No power to 24 volt control circuit.	Check fuse on PCB (replace with 5 amp slow burn fuse if necessary).
		With humidifier energized, check that LED light D8 is energized on the circuit board. If the LED is lit, replace the membrane switch, if not, replace the circuit board.
Steam light does not turn on.	Call for humidity not being received.	Check humidistat wiring and setting. (Do not leave humidistat in TEST mode.)
		Check wiring and settings of high RH limit switch and airflow proving switch.
Water is leaking from humidifier.	Loose plumbing connections.	Check water supply connection at fill valve inlet. Tighten as needed.
		Check internal hose clamp connections. Reposition clamps and tighten as needed.
		Check steam hose connection on top of canister. Tighten clamp as needed.
	Hoses are blocked.	Check internal hoses and eliminate kinks or blockage.
	Drain hose is blocked.	Make sure drain hose has constant downward slope and is not blocked.
Water constantly runs down drain.	Debris in drain valve preventing it from closing.	Remove canister and clean debris from drain valve.
	O-ring in drain valve is not properly seated in groove.	Remove canister and check O-ring for damage. Replace O-ring as necessary. Ensure O-ring is properly seated in its groove.
	Water is flowing from fill cup overflow port.	Check internal hoses and eliminate kinks or blockage.
	High static pressure in duct is causing back pressure in canister.	Make sure dispersion tube is not discharging into duct with greater than 2.0 in.wg static pressure.
		Make sure dispersion tube tubelets are pointed up.
Humidifier is filling and water is flowing down drain but **Drain** light is not on.	High static pressure in steam line is causing back pressure in canister.	Install a tee and drain trap in any low points in the steam line. See **Figure 4**.

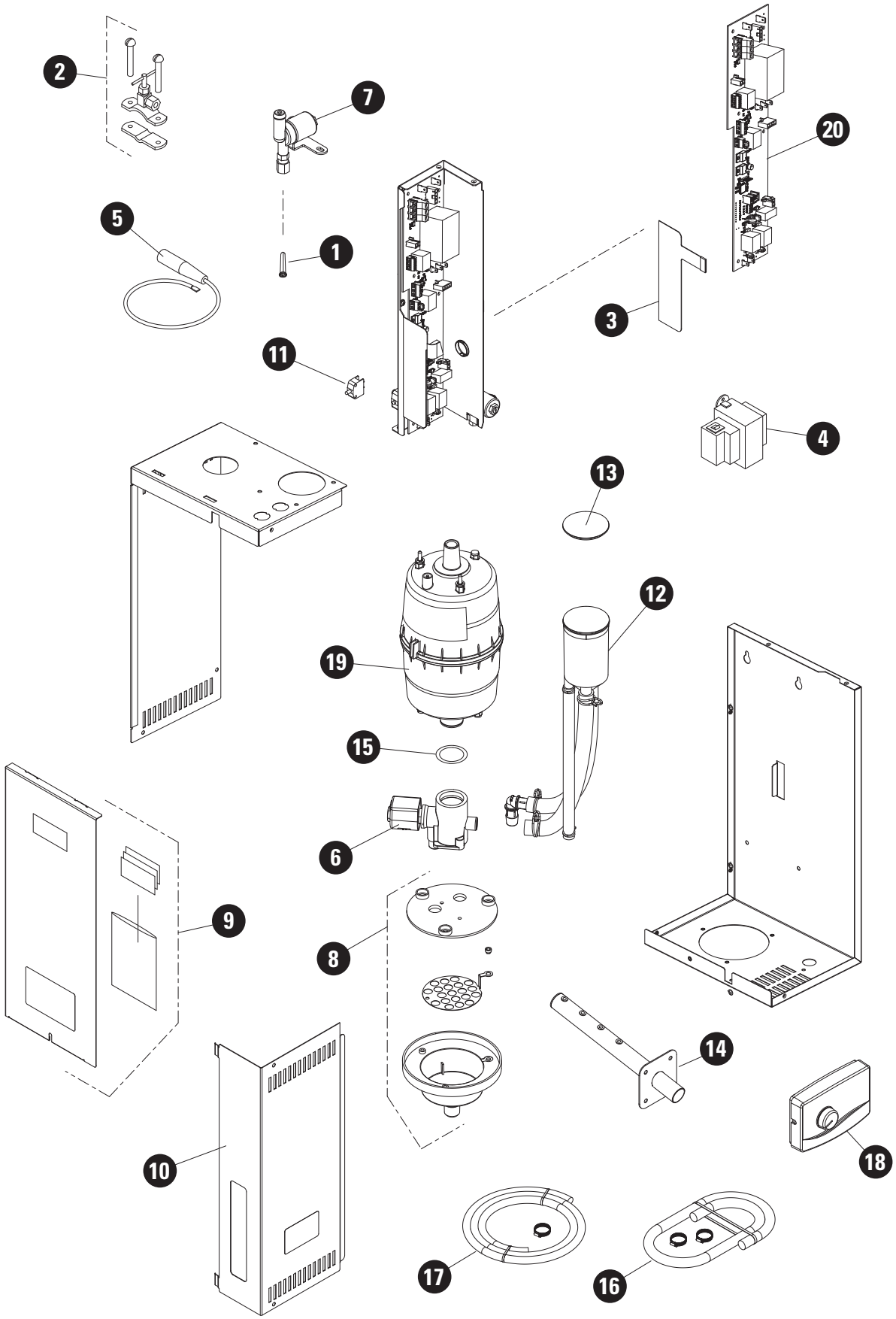
TROUBLESHOOTING GUIDE (CONTINUED)

TABLE 6 – Troubleshooting Guide (continued)

Problem	Possible Cause	Action
Humidifier makes gurgling sound.	Excess condensation in steam hose.	Make sure steam hose has constant downward slope to humidifier or to tees and traps in low spots of hose.
		If hard pipe is used for dispersion system, make sure it is insulated.
Fill valve makes banging sound.	Water hammer from line pressure.	Make sure water supply line does not contact ductwork.
		Install shock arrestor.
		Install section of 1/4" braided fill line. Conform to local codes.
		If water supply pressure is greater than 120 psi, install pressure reducer.
Humidifier will not fill.	Saddle valve not open or pipe not pierced.	Make sure saddle valve is properly installed and the valve is open.
	Hoses are blocked.	Check internal hoses and eliminate kinks or blockage.
Humidifier will not drain.	Debris in drain valve blocking outlet port.	Remove canister and clean debris from drain valve.
Water in duct from dispersion tube.	Dispersion tube installed incorrectly.	Install dispersion tube with tublets facing straight up.
	Impurities in steam hose or pipe causing foaming.	Rinse canister, fill hose and fill cup with clean water.
Service light flashing red before end of humidification season.	Canister full of mineral deposits.	Remove canister and rinse with clean water.
		Plumb humidifier to filtered water.
		Plumb humidifier to softened water.
	Humidifier runs in short cycles (does not reach capacity).	Use Blower Activation Relay Part #5387 (provided) or run constant HVAC fan.
Yellow **Steam** light.	Humidifier operating below rated capacity. (Normal operation for systems plumbed to low conductivity water and systems that operate for short cycles.)	Plumb humidifier to softened water.
		Use Blower Activation Relay Part #5387 (provided) or run constant HVAC fan.
		Operate humidifier on 208/240 volts.
		To determine operating current, attach clamp-on ammeter to one of the electrode wires on top of canister.
		Dissolve one tablespoon of salt into one cup of hot water. Add to the fill cup in 1/4 cup increments until unit operates properly. Yellow **Steam** light will clear after first fill valve cycle at nominal amperage operation. Do not over salt. System will drain and refill with clean water due to over current fault.
Humidifier is not satisfying demand.	Control setting is too low.	Adjust control to higher setting.
	Control mounted in wrong location.	See Installation Instructions with control for correct mounting location.
	Short run times.	Use Blower Activation Relay Part #5387 (provided) or run constant HVAC fan.
	Humidifier capacity limited by input power (120V).	Operate humidifier on 208/240 volts.
		Increase capacity to 16.0 amps. Make sure breaker is appropriately sized.
Excess humidity.	Control setting is too high.	Adjust control to lower setting.
	Control mounted in wrong location.	See Installation Instructions with control for correct mounting location.
Solid red **Fill** light.	Fill valve has been filling for 40 minutes.	Make sure high water pin electrode wire is securely installed.
	High static pressure in the duct is causing back pressure in the duct.	Make sure dispersion tube is not discharging into a duct with greater than 2.0 in.wg. static pressure.
		Make sure dispersion tube tubelets are pointed up.
	Low spot in steam hose collecting water.	Support steam hose along its length ensuring 2" per foot slope from the dispersion tube to the humidifier.
Solid red **Service** light.	Unit senses current 120% above nominal and cannot lower amperage after three drain cycles.	Rinse canister to remove mineral deposits or install a new canister.

REPLACEMENT PARTS

Refer to the following page for part descriptions.



REPLACEMENT PARTS (CONTINUED)

Item No.	Description
1	Fill Valve In-line Strainer
2	Saddle Valve
3	Membrane Switch
4	Transformer with Jumpers
5	Electrode Wire
6	Drain Valve
7	Inlet Fill Valve and Water Feed System
8	Drain Cup Assembly
9	Front Panel, Screw and Nameplates
10	Electrical Access Panel and Screw
11	Safety Interlock Switch
12	Fill Cup and Hoses
13	Fill Cup Cap
14	Steam Dispersion Tube and Screws

Item No.	Description
15	O-Ring for Steam Canister
16	Steam Hose (6 ft.) and Clamps
17	Drain Hose (10 ft.) and Clamps
18	Manual Humidistat
19	Steam Canister and O-Ring
20	Control Board
Other Parts (not shown)	
21*	Drain Trap Assembly
22*	Airflow Proving Switch
23*	High Humidity Limit Switch
24*	Condensate Pump (Rated for 160°F)
25*	Automatic Humidifier Control (Optional)
26*	Blower Activation Relay

**Not shown*

TO ORDER AUTHORIZED FACTORY REPLACEMENT PARTS – Contact your Totaline HVAC Parts Distributor or visit our website at www.totaline.com for a Distributor and Dealer listing.