Ultrasonic Humidification System

Model 5462
&
Model 5472

OPERATING MANUAL

6/30/06

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1.0 GENERAL

Many applications require a small enclosed area, such as a glovebox, to be maintained at a relative humidity that is above ambient. The Model 5462 and Model 5472 Humidification Systems utilize ultrasonic technology to create a fine, room temperature mist for humidifying enclosures. Both models are capable of producing full saturation (at room temperature) in enclosures up to 20 cubic feet.

2.0 DESCRIPTION

The Model 5462 and Model 5472 operate in similar fashion. Applying power to the unit causes the submerged ultrasonic transducer to oscillate, producing a fine mist. An air-moving device forces the mist out of the humidifier, through a 1" plastic tube and into the enclosure. A 4", 110 cfm fan is provided, it should be run continuously to circulate the moist air throughout the chamber. All ETS Chambers have fan(s) already installed.

Model 5462

Model 5472

3.0 SET-UP (General)

NOTE

In addition to the following procedure, the customer must provide a *vent* on the chamber or the humidifier will not work. The humidifier operates by displacing the dry air within the chamber. If the dry air cannot escape, the moist air will not be blown in. Many enclosures are not airtight and may not need additional venting. For those that do, a small ½" hole in the corner opposite the humidifier input barb should suffice.

1. Install the ½" NPT x 1" Hose barb on the chamber.

   A. Determine the minimum height at which the barb can be installed.

      I. Place the humidifier next to the chamber.

      II. Measure up 6" from the top of the output barb on the humidifier.

      III. Mark the chamber at that height. That is the minimum height at which the barb can be installed. Mounting the barb lower may cause the humidifier to function improperly.

      IV. For a chamber and humidifier placed on the same level surface, the installation height should be approximately **18"**.

   B. Drill a .825" hole at the previously determined location and install the barb. The threaded portion will go inside the chamber and be held in place with the ½" NPT nut. The barb will be outside the chamber. (If the humidifier is being used with an ETS Chamber, the barb is already installed.)

2. Place the humidifier a minimum of 12" away from the chamber.

3. Cut the 1" I.D. tubing to the appropriate length, then slide the tubing over each 1" barb.

   NOTE

   Condensation will form inside the transfer tubing when the humidifier is in use. The condensation must be allowed to drain back into the humidifier. If there are any slack or dips in the tubing, water will accumulate and block the airflow.

4. Place the fan inside the chamber.

   Direct the airflow toward the humidity sensor. A strong air current will prevent condensation from forming on the sensor, which will produce false readings. If there is no AC power in the chamber, it may be necessary to drill a hole to pass the power cord to the outside (this hole must be sealed after the cord is installed). The fan can run continuously for all chamber conditions.

5. Plug in the humidifier.

   A. If an ETS Automatic Humidity Controller (Model 5100 or Model 5200) is being used to control the humidity, **plug the humidifier into the AC outlet on the rear of the unit labeled INCREASE.**

   B. If no controller is being used, then plug the unit into a standard AC outlet of appropriate voltage.

NOTE

230 VAC Model 5462 Systems : The 230 VAC version of the Model 5462 must be operated with the provided 230 VAC to 115 VAC step-down transformer *ONLY!!!* Plug the transformer into a 230 VAC outlet (or 230 VAC humidity controller output), then plug the humidifier into the 115 VAC side of the transformer. NEVER plug the humidifier directly into a 230 VAC outlet, the humidifier is meant for operation at 115 VAC only.

The Model 5472 is available as 115 VAC or 230 VAC, 50/60 Hz The voltage must be specified at the time of purchase.

The circulating fan is supplied at the appropriate voltage, 115 VAC or 230 VAC.

4.0 MODEL 5462

The Model 5462 Ultrasonic Humidifier is a direct replacement for the ETS Model 562 or 5612 Ultrasonic Humidifier.

4.1 SET-UP

1. Fill the water tank. **Distilled or Deionized water ONLY!!**

   Remove the water tank from the humidifier unit and inspect it for small cracks or any other damage that may have occurred during shipping (a small crack will allow air to enter the tank, which can cause the water to overflow the basin and possibly damage the unit). After inspection, fill the tank ¾ full with distilled or deionized water ONLY (user provided).

NOTE: Using tap water will destroy the ultrasonic transducer and the associated electronics. Tap water will also cause a white dust to form on all surfaces (including the humidity sensor, which will also be destroyed).

2. Replace the tank on the humidifier unit.

   The water will automatically drain from the tank into the basin and stop when the basin is full. If the tank is not put on properly, or the humidifier is not on a level surface, water may continue to flow after the basin is full. If this happens, remove the top immediately, check for problems and try again. If the problem persists, contact ETS.

3. Turn on the humidifier POWER switch.

   (If used with an ETS Automatic Humidity Controller, see “Humidifying” in the Controller manual.) The power indicator light will turn on immediately and the internal blower will begin moving. When the basin is full, the automatic water level switch will provide power to the ultrasonic transducer. When this happens, the unit will begin producing a fine mist.

4. Rotate the MIST INTENSITY on the POWER switch.

   This control determines how fast the water is converted from a liquid to a mist. For most applications, set the control at mid-point (II - position). Rotating the knob 1 place, counter-clockwise (I – position) will produce a finer mist. When operating at high temperatures or in large enclosures, set the knob at maximum (II) for best results.

   At this point the humidifier should be running properly, blowing a fine mist into the chamber.

4.2 OPERATION

After following the above set-up procedure, the Model 5462 Ultrasonic Humidifier should be operating properly. The humidifier should perform well for a long time if the following precautions are observed:

1. Always run the humidifier directly to the chamber.

Never attempt to combine the humidifier output with another air or gas source. Any back-pressure in the humidifier system will cause the water mist to be forced into the electronics compartment, which may damage the humidifier.

2. **Always provide a vent on the chamber being humidified.**

   A chamber without a vent will cause back-pressure, which could damage the humidifier. Also, if another pressurized source is being introduced in the chamber, the vent will allow both the humidifier and other source to operate properly. Without a dedicated vent, the other pressurized source will use the humidifier as a vent. This will cause the mist to back up into the electronics compartment.

3. **Never place the humidifier inside the chamber.**

   The fans and electronics will become exposed to the wet air and will quickly fail. Always operate the humidifier outside the chamber and attach it with the supplied 1” tubing.

4. **Never immerse the humidifier for filling or cleaning.**

5. **Clean the ultrasonic transducer frequently and thoroughly.**

   Any dirt or particle build-up on the transducer will cause stress to the electronics. Once the electronics overheats and stops working, the entire humidifier must be replaced. Frequent cleaning will allow the electronics to work normally for many years.

6. **Use distilled or deionized water only.**

5.0 MODEL 5472

The Model 5472 Ultrasonic Humidifier, shown in Figures 5.0-1 and 2, is a premium version of the Model 5462 Ultrasonic Humidifiers. The Model 5472 has many features not found in the Model 5462.

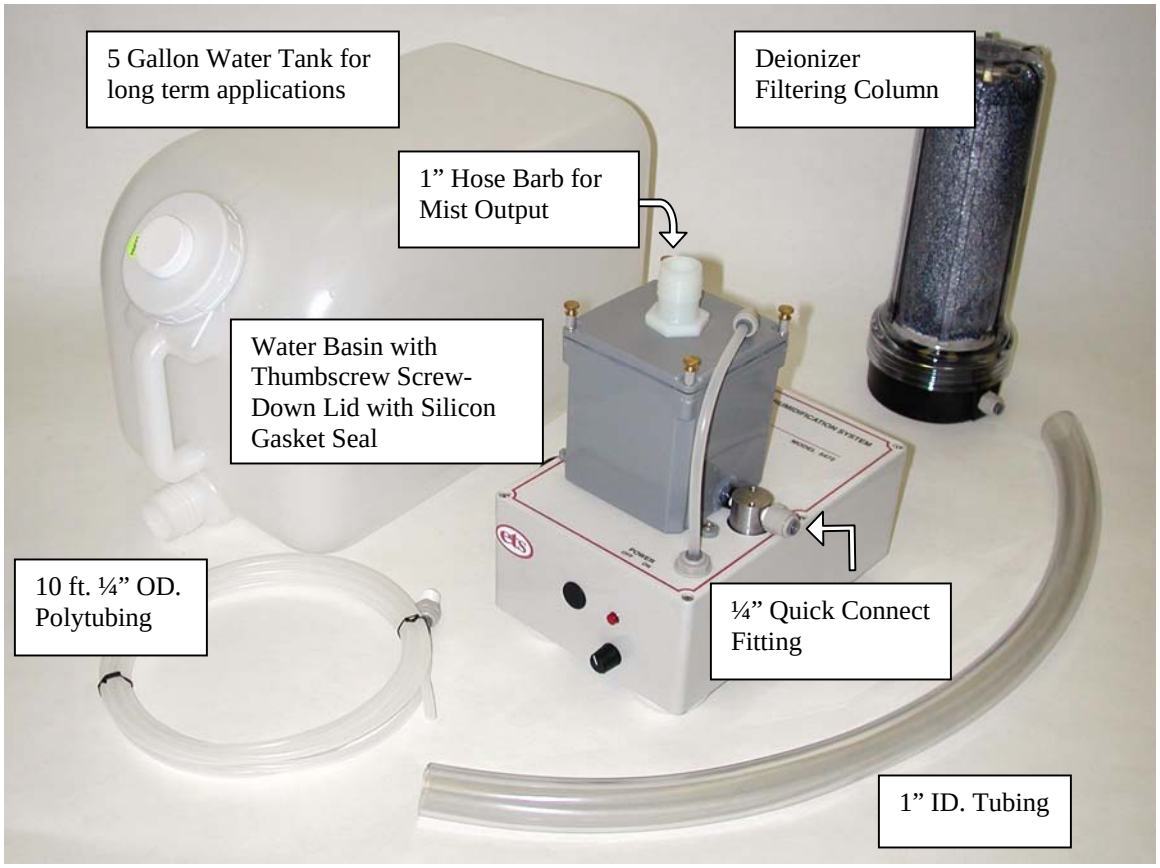

Figure 5.0-1

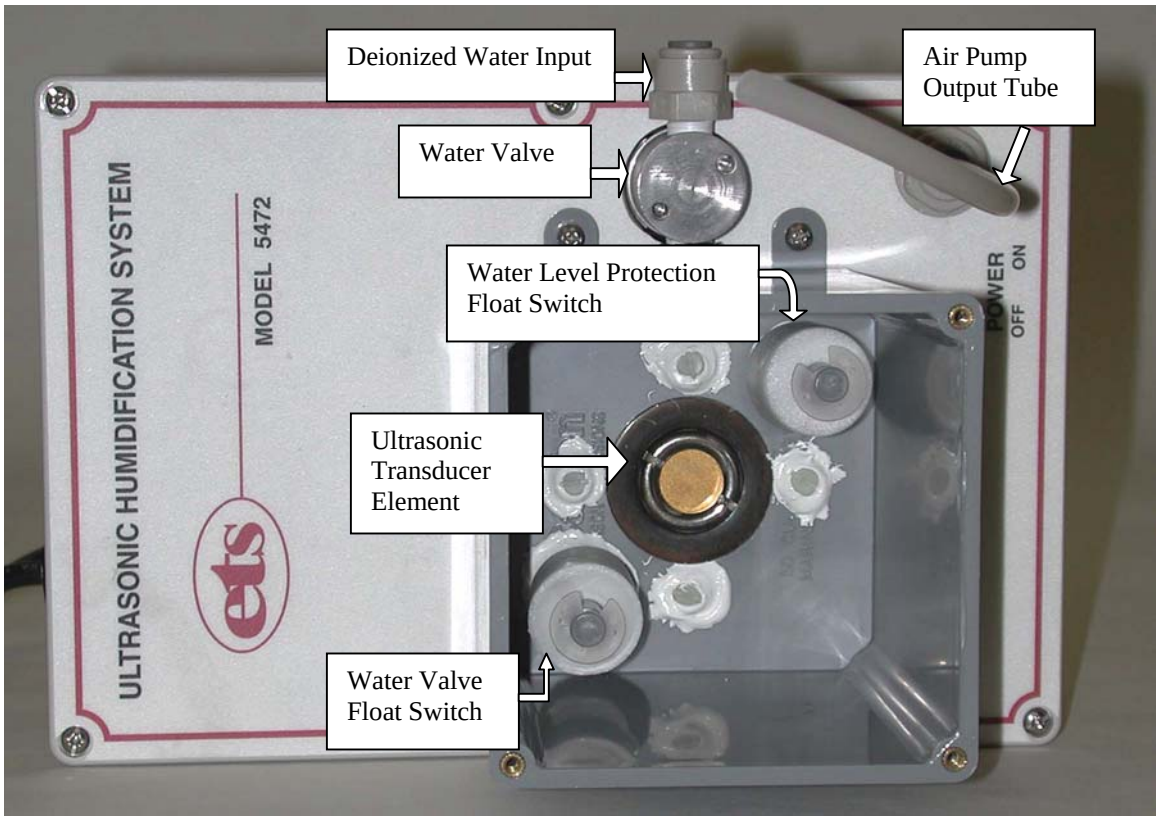

Figure 5.0-2

5.1 SET-UP

The Model 5472 Humidifier may be operated using a water tank or directly from a faucet without a tank. **Use Distilled or Deionized water ONLY!!** A water de-ionizing column is included, suitable for up to 100 psig. (NOTE: The life of the deionizing column will be greatly increased by using a carbon block water filter in line with the deionizer.) When the deionizing resin is depleted, it will change from dark to light in color. When it is ¾ light, it must be replaced.

5.11 ***Using the Water Tank***

1. Attach the water de-ionizing column to a faucet.
   The faucet should go to the side marked “IN”.

2. Run the outlet tube to the 5-gallon water tank.

3. Turn on the water.

   The water flow rate through the purifier should not exceed 8 oz. every 25-30 seconds. Water will pass at up to 10 gallons per hour.

NOTE

Do not increase the flow rate! The amount of purification that can be performed on the water is in direct proportion to how long it takes the water to flow through the column.

Slow flow rate = highly purified water.
Fast flow rate = poorly purified water.

4. Fill the tank with the amount of water that can be used in 1-2 weeks of normal operation at the required operating conditions.

   Different conditions will consume different amounts of water. Leaving water in the tank longer than 1-2 weeks is not recommended. Always refresh your water supply to prevent the growth of bacteria and other things that will degrade the water quality. **NEVER** add anti-bacterial growth treatment to this water, it will damage the humidifier.

5. Attach the provided plastic faucet to the water tank.

   The faucet has a ¼" O.D. tubing quick-connect fitting attached to the outlet.

6. Make sure the faucet is closed, then push the ¼" O.D. tubing into the quick connect fitting.

7. Place the water tank output at least 12" above the humidifier water input.

   This is a gravity-feed system that requires the source tank to be above the humidifier. Also, air must be allowed to enter the 5-gallon tank or water will not flow. Simply loosen the cap on top of the tank to allow air to enter.

8. Turn on the humidifier POWER switch.

   (If using with an ETS Automatic Humidity Controller, see "Humidifying" in the Controller manual.) The power indicator light will turn on immediately and the internal air pump will begin operating. When the basin is full, the automatic water level switch will activate the ultrasonic transducer. Then, the unit will begin producing a fine mist.

5.12 ***Using the Tap Water System***

1. Attach the water de-ionizing column to a faucet.
   The faucet should go to the side marked “IN”.

2. Turn on the water.
   Find the proper flow rate before attaching to the humidifier.

   The water flow rate through the purifier should not exceed 8 oz. every 25-30 seconds. Water will pass at up to 10 gallons per hour.

   NOTE

   Do not increase the flow rate! The amount of purification that can be performed on the water is in direct proportion to how long it takes the water to flow through the column.

   Slow flow rate = highly purified water.
   Fast flow rate = poorly purified water.

3. Turn on the water.

   Set the flow rate to the pre-determined amount. **DO NOT OPERATE THE HUMIDIFIER WITH THE FAUCET 100% OPEN.** High flow rates will cause the humidifier to overfill and possibly damage the unit. The humidifier consumes very little water; a low flow rate will be sufficient to keep the unit full.

4. Turn on the humidifier POWER switch.

   (If using with an ETS Automatic Humidity Controller, see “Humidifying” in the Controller manual.) The power indicator light will turn on immediately and the internal air pump will begin operating. When the basin is full, the automatic water level switch will activate the ultrasonic transducer. When that happens, the unit will begin producing a fine mist.

5.2 OPERATION

After completing the above set-up procedure, the Model 5472 Ultrasonic Humidifier should operate properly.

5.2.1 Features

This humidifier operates in the same manner as the Model 5462. The principal difference between the two systems is as follows:

1. The Model 5472 uses a small, linear air pump to force the mist into a chamber instead of the small blower fan used in the Model 5462. The pump can withstand substantially more backpressure than the blower fan. This enables the humidifier to operate efficiently with very little chamber venting.

2. The water and mist cannot come in contact with any electronic components, which can happen in the Model 5462. The electronics are completely isolated from any contact with the water in the Model 5472.

3. The Model 5472 can be modified to use compressed air or an inert gas as the propulsion source instead of the air pump. The 5472 can also be modified for to be a close-loop system. Contact ETS for details.

4. The Model 5472 uses an electronic float switch to control the water level, minimizing the chances of any water overflow from the unit. A second electronic float switch acts as a water sensor to protect the Ultrasonic Transducer.

NOTE: If the 5472 Ultrasonic Transducer turns on without water it will cause damage to the Transducer Element. For replacement Transducer Elements contact ETS for details.

5. The Model 5472 includes a water deionizing column as a standard feature.

5.22 Operating Precautions

The Model 5472 should operate reliably if the following precautions are observed:

1. **Always run the humidifier directly to the chamber.**

   Never attempt to combine the humidifier output with another air or gas source.

2. **Always provide a vent on the chamber being humidified.**

3. **Never place the humidifier inside the chamber.**

   The wet air inside the chamber may damage the air pump and the humidifier electronics. Always operate the humidifier outside the chamber using the supplied 1" tubing.

4. **Never immerse the humidifier for filling or cleaning.**

5. **Clean the ultrasonic transducer frequently and thoroughly.**

   Any dirt or particle build-up on the transducer will cause stress to the electronics. Once the electronics overheat and stop working, the humidifier must be replaced. With frequent cleaning, the electronics should operate reliably for many years.

6. **Use distilled or deionized water only.**

6.0 MAINTENANCE & CLEANING (Model 5462 & 5472)

1. Always unplug the unit before cleaning.

2. Empty the unit of all water.
   Disconnect (or remove) water tank or tap water source.

3. **Clean the surface of the transducer using distilled vinegar** and a soft, clean cloth.

   This is very important. If the transducer is not kept clean, it will fail. Using distilled or deionized water keeps the build-up to a minimum, but cleaning cannot be ignored.

   NOTE

   Do not use any tools with metal parts or sharp edges to clean the transducer. Scratching the transducer may cause fatal damage to the unit.

   To clean thick or heavy deposits, pour a small amount of vinegar into the humidifier until the transducer surface is completely covered. Let stand for 30-60 minutes. Wipe clean with a soft cloth. If further cleaning is needed, a soft, plastic bristle brush may be used to gently clean the transducer surface.

4. Never leave water in the humidifier or water tank when the humidifier is not in service.

   Always empty all water and thoroughly dry all parts of the humidifier when it is to be stored or taken out of service for any period longer than one week. Do not seal the water tank in storage. Leave the top off to allow the air to completely dry the tank. Any residual moisture will encourage bacterial growth.

5. Never clean any parts of the humidifier with water above 120°F.

6/30/06

WARRANTY

Electro-Tech Systems, Inc. warrants its equipment, accessories and parts of its manufacture to be and remain free from defects in material and workmanship for a period of one (1) year from date of invoice and will, at the discretion of Seller, either replace or repair without charge, F.O.B. Glenside, similar equipment or a similar part to replace any equipment or part of its manufacture which, within the above stated time, is proved to have been defective at the time it was sold. All equipment claimed defective must be returned properly identified to the Seller (or presented to one of its agents for inspection). This warranty only applies to equipment operated in accordance with Seller's operating instructions.

Seller's warranty with respect to those parts of the equipment which are purchased from other manufacturers shall be subject only to that manufacturer's warranty.

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ETS must be notified before any equipment is returned for repair. ETS will issue an RMA (Return Material Authorization) number for return of equipment.

Equipment should be shipped prepaid and insured in the original packaging. If the original packaging is not available, the equipment must be packed in a sufficiently large box (or boxes if applicable) of double wall construction with substantial packing around all sides. The RMA number, description of the problem along with the contact name and telephone number must be included in formal paperwork and enclosed with the instrument. Round trip freight and related charges are the owner’s responsibility.

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