electro-tech systems

Compact Environmental Chamber

ETS Model 5503

Operating Manual

Contents

Revision History:

Revision A: Released 2020-12-30 Reformatted.

Revision B: Released 2021-03-02 Improved photos.

Products described in this manual are designed and assembled in the U.S.A. by

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I. Important Safety Information

SAFETY INSTRUCTIONS

The equipment described in this Manual is designed and manufactured to operate within defined design limits. Any misuse may result in injury, electric shock, or damage to the equipment. For safe operation, the following rules should be observed for installation, use, and maintenance. **Read the following safety instructions before operating the instrument.**

POWER

POWER CORD: Use only the power cord specified for this equipment and certified for the country of use. If the power (mains) plug is replaced, follow the wiring connections specified for the country of use. When installing or removing the power plug, **hold the plug, not the cord.**

GROUNDING: The power cord provided is equipped with a **3-prong grounded plug (a plug with a third grounding pin).** This is both a safety feature to avoid electrical shock and a requirement for correct equipment operation. If the outlet to be used does not accommodate the 3-prong plug, either change the outlet or use a grounding adapter.

FUSES: Replace fuses only with those having the required current rating, voltage and specified type such as normal blow, time delay, etc. **DO NOT** use makeshift fuses or short the fuse holder. This could cause a shock or fire hazard or severely damage the instrument.

OPERATION

CAUTION

DO NOT OPERATE WITH COVERS OR PANELS REMOVED. Voltages inside the equipment consist of line (mains) that can be anywhere from 100-240VAC.

DO NOT OPERATE WITH SUSPECTED EQUIPMENT FAILURES. If any odor or smoke becomes apparent, turn off the equipment and unplug it immediately. Failure to do so may result in electrical shock, fire or permanent damage to the equipment. Contact the factory for further instructions.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE: Operating the equipment in the presence of flammable gases or fumes **constitutes a definite safety hazard**. For equipment designed to operate in such environments the proper safety devices must be used such as dry air or inert gas purge, intrinsic safe barriers and/or explosion-proof enclosures.

DO NOT IMPEDE THE CHAMBER FROM VENTING EXCESS PRESSURE. Humidification and dehumidification systems may be open loop systems that pump external air into the chamber. If the chamber is not allowed to vent, pressure could build up and cause serious damage to the chamber.

USE DISTILLED OR DEIONIZED WATER SOURCE FOR HUMIDIFICATION. Build-up of contaminates on the humidifier transducer will cause stress to the transducer and electronics and resulting in premature failure and invalidate the warranty.

DO NOT USE IN ANY MANNER NOT SPECIFIED OR APPROVED BY THE MANUFACTURER: Unapproved use may result in damage to the equipment or present an electrical shock or fire hazard.

II. Description of Contents

The Models 5503 Chamber:

Item	Description
Chamber	The Model 5503 is a clear acrylic chamber, dimensions 24”W x 15”D x 18”H, and includes a 12” x 12” access door with a ¼-turn latch and non-setting gasket.

Available Operating Systems and Options (Must be explicitly ordered.):

Controller and Sensor	Series 5000 control unit with display and switches sits outside the chamber and connects to a Model 556 RH and T sensor which mounts in the chamber wall. If your system includes a Controller, refer to the Controller Operating Manual for details.
Thermoelectric Cooler	Model 5473 Thermoelectric unit and its power supply are mounted in the rear of the chamber. A power cord for Cooling is attached.
Electric Heater Panel	Model 5474 Resistive heater panel mounted in the rear of the chamber. A red indicator light denotes power applied to the heating element. Power cords for Heating, Fan, and Duplex Outlet are included. Power must be specified as 115 VAC or 230 VAC. For 115 VAC, the outlet is GFCI.
Humidifier	Model 5482 ultrasonic humidifier is a separate unit which sits outside the chamber. A water tank and tubing are included.
Desiccant Dehumidifier	Model 5461 Molecular Sieve Desiccant dehumidification system is a separate unit which sits outside the chamber. Tubing is included.
Regenerating Dehumidifier	Model 5478 dual column regenerative desiccant dryer is a separate unit supplied with tubing. Connects to house air supply at 50-100 psi.
Ports & Gloves	Two 6” Glove Ports with gloves installed.

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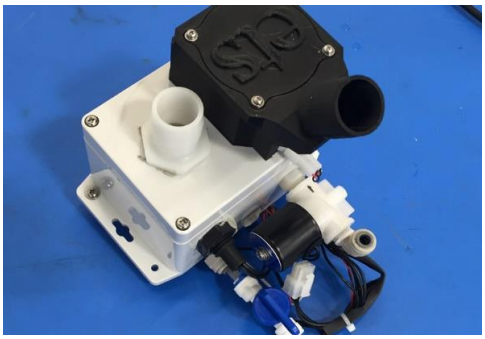
Series 5000 Controller with Model 556 Temperature and Humidity sensor

Model 5503 Chamber (shown without glove ports)

Model 5474 Electric Heater Panel with Fan and Duplex Outlet



Model 5482 Humidifier

Model 5461 Desiccant Dehumidifier

Model 5473 Thermoelectric Cooler

Model 5478 Regenerating Dehumidifier

Model 5503 with
Ports & Gloves

III. Setup Guide

Part 1: Environmental Chamber Unpacking and Setup

Step 1 – Unpack and inspect

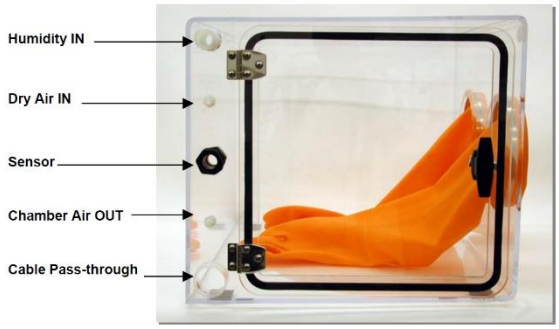
NOTE: When handling the chamber DO NOT use any of the fittings or the door handle as a grip or for leverage. Lift the chamber by placing your hand all the way into the glove port and grabbing hold of the chamber wall or gripping around the outside of the chamber.

Unpack the Control Unit and inspect for visible damage. If no damage is observed then proceed to the next step.

Step 2 – Set the chamber in place

Place the chamber on a clean, level bench area.

If the unit was ordered with a heating/cooling unit installed, it is recommended to allow for 2 feet of open space behind the chamber for ventilation. Less space will impact heating/cooling performance.



Step 3 – Arrange components

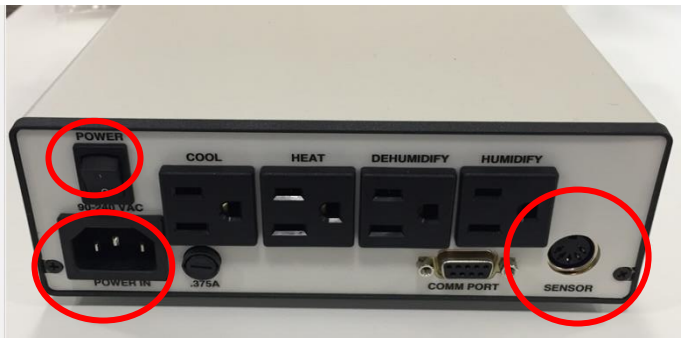
Connections for humidity and gas are on the left side of the chamber to the left of the door. Place component systems near the connections.

Part 2: Connection and Setup of the System

NOTE: Your equipment may look different from these photos, or items may not be included.

Step 1 – Ports and Gloves

If Glove Ports are included, verify that the gloves are smoothly wrapped onto the ports with thumbs facing upward, and the clamps are firmly holding them in place.

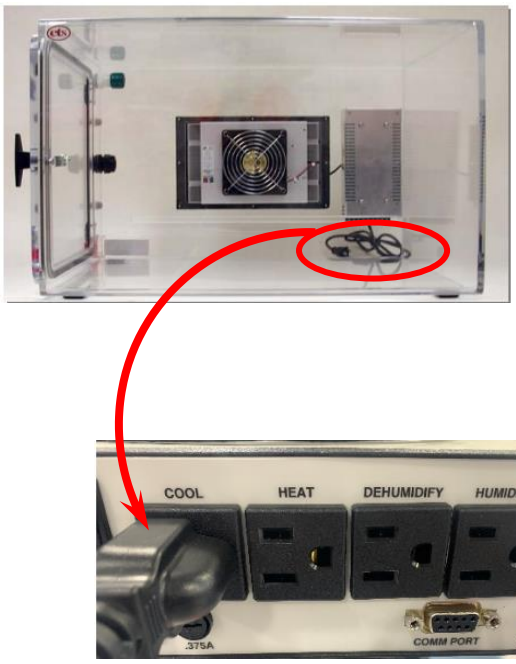


Step 2 – Controller – 5000 series

- Place the controller in a convenient location, and switch all front panel switches to the OFF (0) position.
- Turn controller around to reveal the connections.
- Switch the POWER switch to OFF (0).
- Plug the 556 sensor into the SENSOR jack
- Connect the AC power cord to POWER IN, and plug the cord into AC Power.

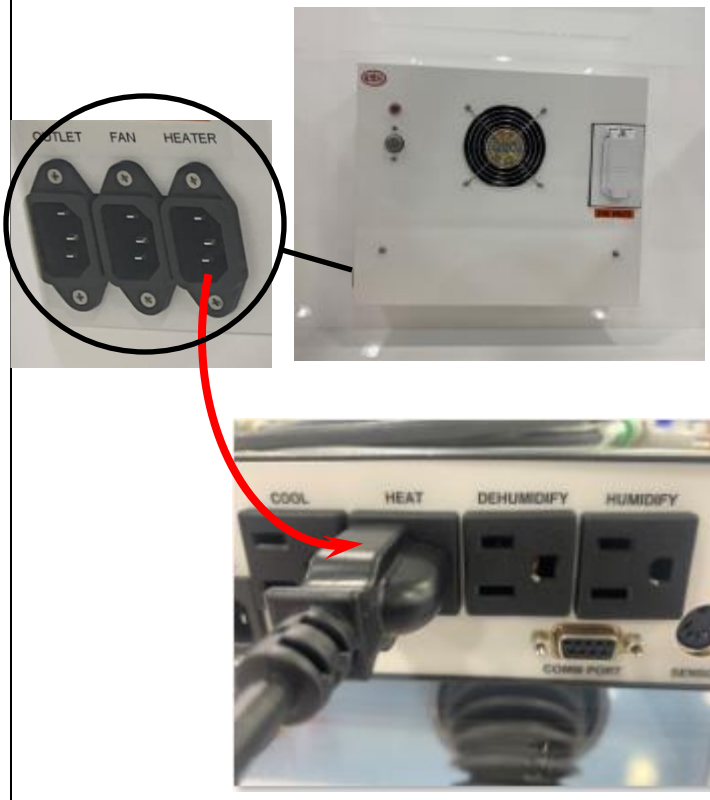
Step 3 – Sensor - Model 556

- Ensure that the sensor and its cable are firmly connected together.
- Loosen the ¾" fitting located to the left of the chamber door and insert the sensor from outside.
- Position the sensor as shown and tighten the fitting nut by hand only - Do not use tools



Step 4 – Connect Thermoelectric Cooler.

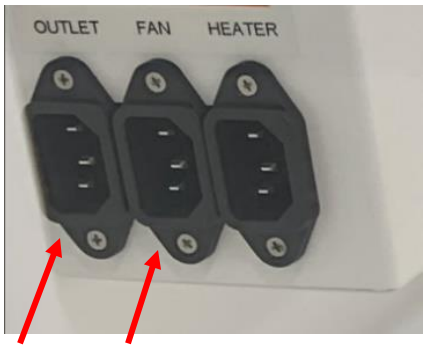
- If the chamber includes a Thermoelectric Cooling unit, locate the power cord or cords attached to the power supply unit and plug it into the Controller COOL plug.



Step 5 – Connect Heater Panel

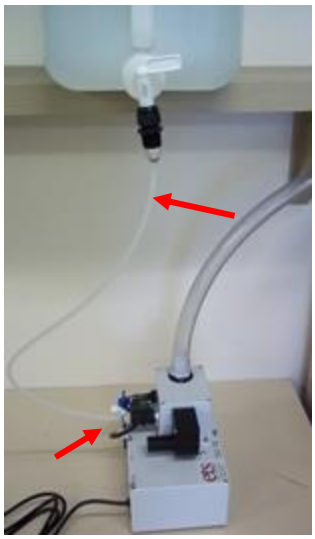
- If the chamber includes a Heater Panel, connect a power cord from the plug labeled HEATER on the left side of the panel and plug it into the connector labeled HEAT on the Controller.

- Route this cord to the controller temperature section and plug it into the receptacle labeled HEAT.



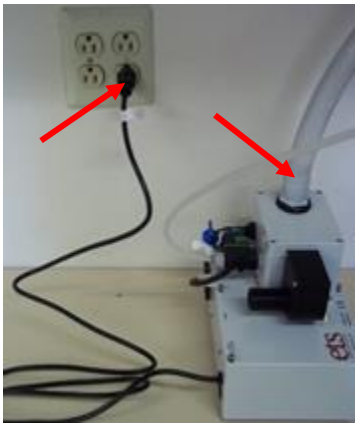
Step 6 - Connect Fan and Outlet

- Adjacent to the Heater power connection are the power input plugs for the Fan and the Outlet. These are labeled on the left side of the heater panel.
- Connect power cables to these inputs and plug them directly into AC outlets.



Step 7 – Humidifier Model 5482 – Set up Water Source

- With tank dispensing valve OFF (right), fill the water tank with 4 gallons of de-ionized water.
- Position the tank above the base unit and be sure the base unit is on a level surface.
- Connect the water feeding tube as shown, inserting tubing firmly into connectors
- Turn tank dispensing valve to ON (left)
- Loosen the small white cap on the top of the tank to allow air to flow and pressure to relieve.



Step 8 - Humidifier – Base unit startup run

- Insert 1" diameter mist tube in the top fitting on the base unit.
- Plug the three-prong AC line cord into an outlet for a startup test.
- LED will turn RED as basin fills, 1 to 2 mins.
- LED will turn GREEN and mist will begin.
- After 3 seconds, mist output will increase to maximum level.
- Disconnect the AC cord.

Step 9 – Humidifier – Connect to chamber.

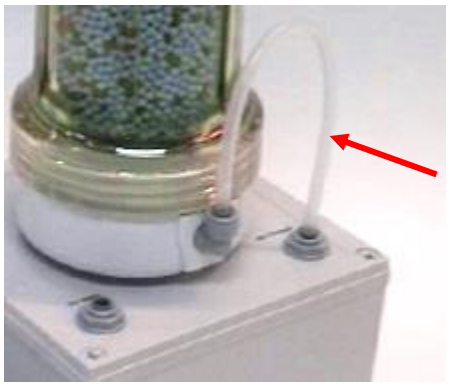
- Plug the AC cord into the “Humidity Increase” socket of the controller.
- Insert 1” mist tubing from top of humidifier to chamber 1” fitting.
- Set a set point by holding down the “*” key on the controller and using the increase//decrease (▲//▼) buttons to enter the desired humidity.
- Switch the front panel Humidify switch to ON. The controller will request humidification as needed.

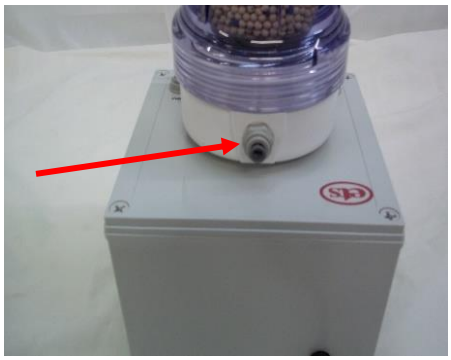
Consult the Operating Manual for the 5482 Humidification System for more details.

Step 10 – Dehumidifier Model 5461 Setup

- Desiccator column should be filled with Molecular Sieve desiccant, white with blue indication pellets.

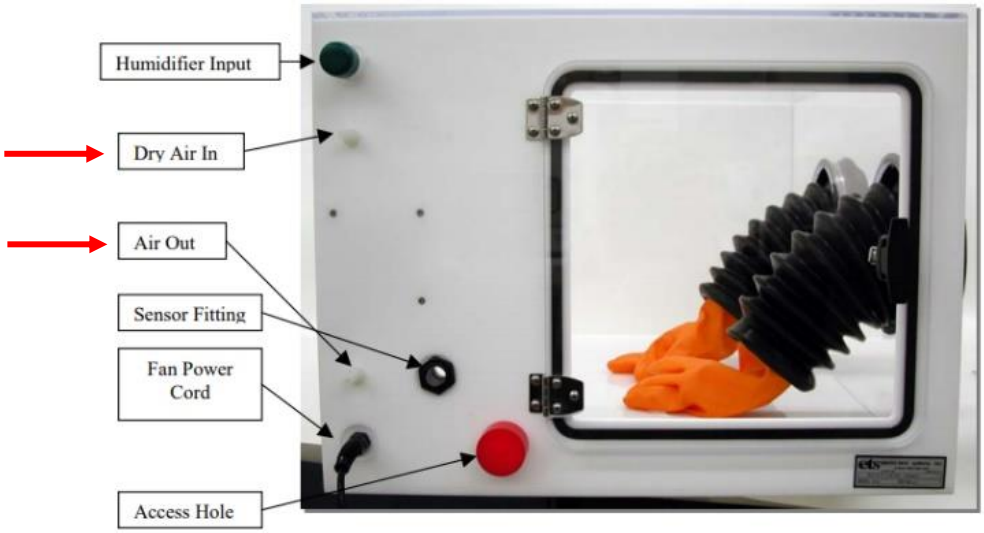
- Place the desiccator column, lid down, onto the 4 mounting studs of the base. The side marked “IN” should face forward. Marking is on the bottom of the column.





Step 11 – Dehumidifier Air Path.

- Connect the 9” tubing from the Air Output fitting on the base unit to the “IN” 90º fitting on the column.
- Cut tubing to length and connect from the Chamber Air Out fitting to the Model 5461 Air Input fitting.
- Cut tubing to length and connect from the 5461 Air Output fitting to the Dry Air In fitting on the Chamber.
- Check that all tubing is pushed firmly into the fittings for a good seal.

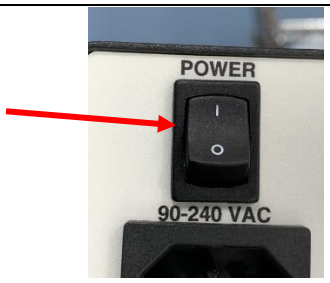


Step 12 - Connect to Controller.

- Plug the AC cord into the Humidity Decrease or Dehumidify socket of the controller.
- Set a set point by holding down the "*" key on the controller and using the increase // decrease (▲//▼) buttons to enter the desired humidity.
- Switch the front panel Dehumidify switch to ON. The controller will request dehumidification as needed.

Consult the Operating Manual for the 5461 Dehumidification System for more details.

IV. Quick Start Guide

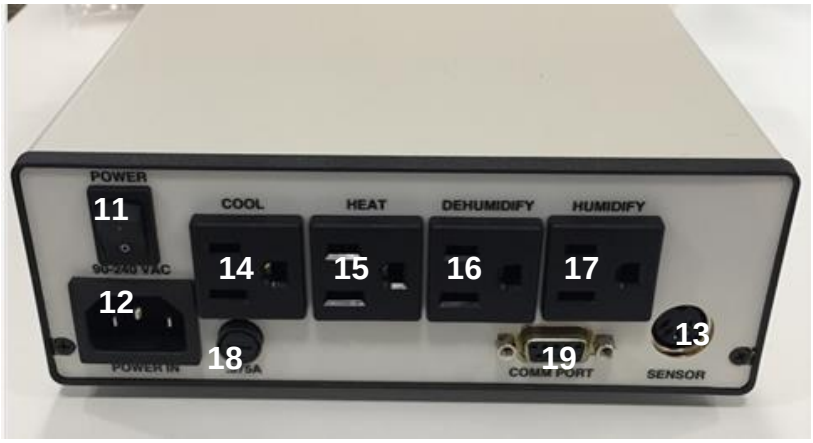
Quick Start Guide	
	**Step 1 –** Turn on Power • Verify that the system is set up as described in the previous section. • Turn POWER to ON (I = on).
	**Step 3 –** Set Temperature Enter your set point by pressing and holding the * key and using increase/decrease (▲//▼) buttons to adjust to your desired temperature.
	**Step 4 –** Set Humidity Enter your set point by pressing and holding the * key and using increase/decrease (▲//▼) buttons to adjust to your desired humidity.
	**Step 4 –** Turn on Operating Systems Flip operating system switches to the ON position (I = on) except those operating systems not needed to achieve the setpoint (e.g. no cooling is needed if a high temperature is selected).

V. Functionality

Controller Front Panel:

Item	Description	Functionality
1	RH – INCR Switch	Allows the user to manually disable the Humidification System. Pushing this switch to the (‘0’) is “Off”
2	RH – DECR Switch	Allows the user to manually disable the Dehumidification System. Pushing this switch to the (‘0’) is “Off”
3	TEMP – INCR Switch	Allows the user to manually disable the Temperature Heating System. Pushing this switch to the (‘0’) is “Off”
4	TEMP – DECR Switch	Allows the user to manually disable the Temperature Cooling System. Pushing this switch to the (‘0’) is “Off”
5,6,7	HUMIDITY CONTROLLER Buttons	The temperature controller includes a * button along with down and up arrows (▲//▼) to allow selecting and changing the setpoint and other settings.
8,9,10	TEMPERATURE CONTROLLER Buttons	The humidity controller includes a * button along with down and up arrows (▲//▼) to allow selecting and changing the setpoint and other settings.

Controller rear view:



Item	Description	Functionality
11	POWER Switch	This switch disconnects all power going to the Chamber Systems. “I” is “ON”, “O” is “OFF”. NOTE: If the controller is a 5100 model, the power witch is on the front panel.
12	POWER IN Socket	Connect incoming AC power here.
13	SENSOR Socket	Attach the Model 556 Temperature and RH Sensor here.
14	COOL Socket (TEMP. DECREASE)	Provides power to cooling system when needed.
15	HEAT Socket (TEMP. INCREASE)	Provides power to heating system when needed.
16	DEHUMIDIFY Socket (RH DECREASE)	Provides power to dehumidification system when needed.
17	HUMIDIFY Socket (RH INCREASE)	Provides power to humidification system when needed.
18	FUSE	Fuse for internal controller electronics, .375A
19	COMM PORT	DB9 connector for communications to a computer

VI. System Performance

5503 Standard		
MECHANICAL (Dimensions in inches)		
Material		Clear Acrylic
Internal Volume (May be reduced by installed equipment)		3.5 cubic feet 98 liters
Internal Dimensions (WDH)		23.5 x 14.5 x 17.5 inches 60 x 37 x 45 centimeters
External Dimensions (WDH)		24 x 15 x 18 inches 61 x 38 x 46 centimeters
Weight		27 lbs 12.25 kg
ACCESS		
Door is ½" clear acrylic, ¾ -turn latches, non-setting gasket.		
Front Equipment Door		(None)
Left Sample Door		12 x 12 inches 30.5 x 30.5 centimeters
Glove Ports (Optional):		2 x 6 inches
Gloves (Optional)		2 x 6 inches, .018 latex
CONNECTIONS		
1-1/2" Cable pass through		1
1/4" quick disconnect		2
3/4" compression fitting		1
1" hose barb		1
CONTROLLER ETS Model 5100 or Model 5200		1 or 2 Control Units installed
ETS 9500P,Control Unit, dual display, standard		Multiple ramp/soak, displays setpoint and present reading
ETS 3300 Control Unit, single display, optional		Single ramp/soak, displays present reading, Push to read setpoint.
Displays		Bright LED 0.4"
Display Resolution:		0.1 %RH / 0.1 °C
SENSOR		
Sensor: Dual Temperature and RH		0-100 %RH, -40 to +60 C
Sensor Accuracy RH		±2.0% RH at 68° F (20° C) and 0-90% RH, ±3.0% RH at 68° F (20° C) and 90-100% RH
Sensor Accuracy, Temp		Temp: ±0.4° F (±0.2° C) at 20° C

Cooling (if included)		Thermoelectric, Model 5473
Temp lowest		10 C
Heating (if included)		Resistive heater panel, Model 5474
Fan		Integral Heat Distribution Fan
Electrical Outlet		Duplex outlet with cover
Temp Highest		50 C
Humidification (if included)		Ultrasonic Humidifier, Model 5482
RH% highest		95 %RH
Dehumidification (if included)		Desiccant drying system, Model 5461
RH% lowest		5 %RH
Power (For full heat/cool/humidify/dehumidify system)		Specify 115 VAC or 230 VAC
		115 VAC @ 8 Amps, or
		230 VAC @ 4 Amps,
		50 / 60Hz, Single Phase

VII. Maintenance and Calibration

Calibration

For consistency of performance Annual manufacturer conducted calibration is required.

ETS recommends the Model 5503 system be calibrated annually. Only the controller and sensor need to be returned for calibration. Do NOT return the chamber.

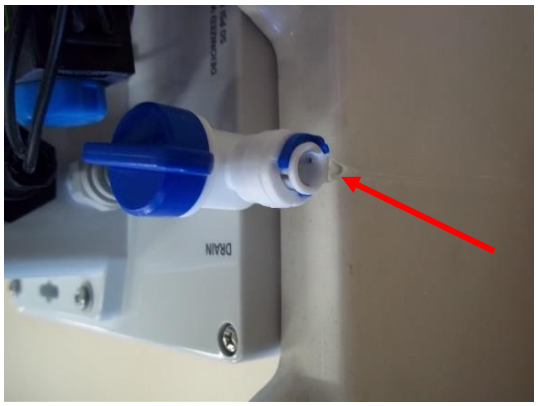
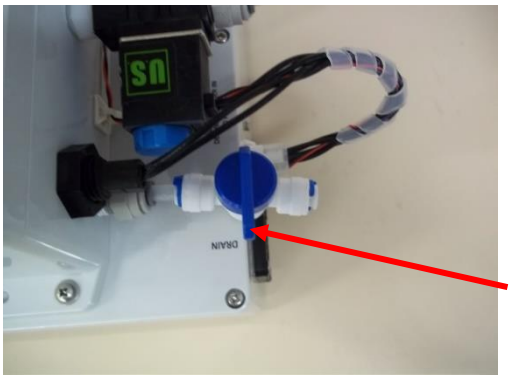
To return equipment to ETS for calibration or repair it is first necessary to obtain a RMA number, please call 215-887-2196 or email service@ets2.com

Preventative Maintenance

Humidification System

The humidification system utilizes an ultrasonic transducer that has an estimated lifespan of 3000 hours after which it may need to be replaced. The ultrasonic transducer is not user replaceable. Please contact ETS for assistance with repair/replacement. To maximize the life of the transducer, utilize an appropriate water supply (deionized water or distilled water) and perform regular preventative maintenance after every **300 hours** of operational use.

Humidification System Preventive Maintenance	
POWER OFF	**Step 1 – Turn off power** Unplug the AC line cord from the AC outlet of controller to remove power from the humidifier.
	**Step 2 – Prepare and drain the basin** The water will need to be drained out of the basin first. First, place the unit above a small container at the end of the drain valve to collect drained water. Turn the drain valve to ON position [tap turned parallel to the valve body]. Wait for the water to stop flowing before proceeding.
	**Step 3 – Turn on power** Empty the small container, and place back until the drain; leave the drain valve open. Plug the AC line cord in a wall AC outlet to apply constant power to the humidifier.

 	**Step 4 – Flush out contaminates from the basin** Turn the 5-gallon water tank valve to the “ON” position to let fresh water from the tank flush out contaminates in the basin through the drain valve for 2 minutes.
	**Step 5 – Return the System to operation** Turn the drain valve to the “OFF” position [tap turned to 90° from the valve body]. Review the “Setup Guide” and “Quick Start Guide” to return the humidifier back into operation again.

Repair

To return equipment to ETS for repair it is first necessary to obtain a RMA number, please call 215-887-2196 or email service@ets2.com

VIII. Warranty

Limited Warranties. Seller warrants that all goods manufactured and delivered hereunder shall (a) conform to any samples, drawings, specifications or other written documents provided to Seller by Buyer, or approved by Buyer to Seller and (b) be free from all defects in workmanship and material. Buyer's sole remedy against Seller for breach of either of the specifically mentioned warranty shall be the repair or replacement, at Seller's sole option, of the defective workmanship or material. Seller expressly disclaims all other warranties, express and/or implied, including but not limited to those of merchantability and fitness for a particular purpose. In no event shall Seller be liable, under either warranty or otherwise, to Buyer in excess of the purchase price of the products paid to Seller by Buyer. In no event shall Seller be liable for any loss or damage arising directly or indirectly from the use of the product or for consequential or incidental damages. Seller's specified warranties will expire and lapse (i) for renewable items (such as gloves, iris ports and desiccants), sixty (60) days from date of shipment and (ii) for all standard equipment and otherwise nonrenewable items, one year from date of shipment.