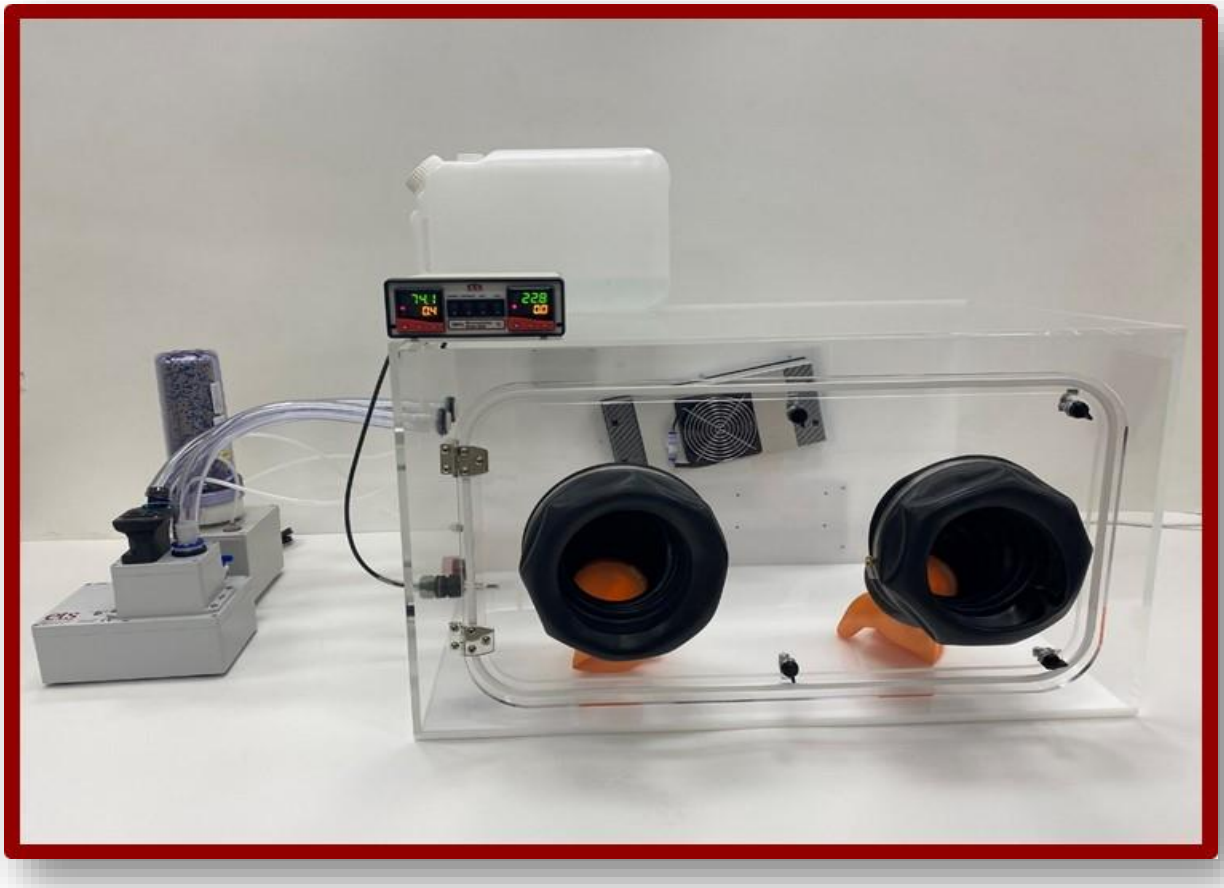
electro-tech systems, inc.



# Medium Size Environmental Chamber

# Model 5507 Operating Manual

# Table of Contents




Products described in this manual are designed and assembled in the U.S.A. by
Electro-Tech Systems, Inc.
700 West Park Avenue
Perkasie, PA 18944

# I. Important Safety Information

**WARNING**

This symbol accompanied by the word “WARNING” calls attention to an act or a condition which can lead to serious personal injury or death of operators and bystanders.

**CAUTION**

This symbol accompanied by the word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. The symbol without any warning text indicates potential damage to device when misused.

This symbol indicates the presence of hazardous AC or DC voltages constituting the risk of electric shock.

This symbol indicates a risk of fire due to improper handling or failure of device. For continued protection against risk of fire, when replacing fuses use only fuses of the specified type and current ratings.

This symbol indicates the danger of an electro-static discharge to which equipment may be sensitive. Observe all precautions for handling electrostatic sensitive devices.

These symbols indicate extreme temperature which can cause burns or frostbite. Avoid contact with surface. Failure to follow precautions may result in moderate to severe injury.

## SAFETY INSTRUCTIONS


The equipment described in this manual is designed and manufactured to operate within defined design limits. Any misuse may result in electric shock or fire. To prevent the equipment from being damaged, 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.** Available dehumidification systems include open loop systems that pump external air into the chamber. If the chamber is not allowed to vent, pressure can build up and cause serious damage to the chamber.

**USE DISTILLED OR DEIONIZED WATER SOURCE FOR HUMIDIFICATION.** Build-up of contaminates on the 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.

# I. Informations Importantes d'inocuite

**WARNING**

Ce symbole accompagné du mot « AVERTISSEMENT »( WARNING) attire l'attention sur un acte ou une condition qui peut entraîner des blessures graves ou la mort des opérateurs et des passants.

**CAUTION**

Ce symbole accompagné du mot « ATTENTION » (CAUTION )indique une situation potentiellement dangereuse qui, si elle n'est pas évitée, pourra entraîner des blessures mineures ou modérées. Le symbole sans texte d'avertissement indique des dommages potentiels à l'appareil en cas d'utilisation abusive.

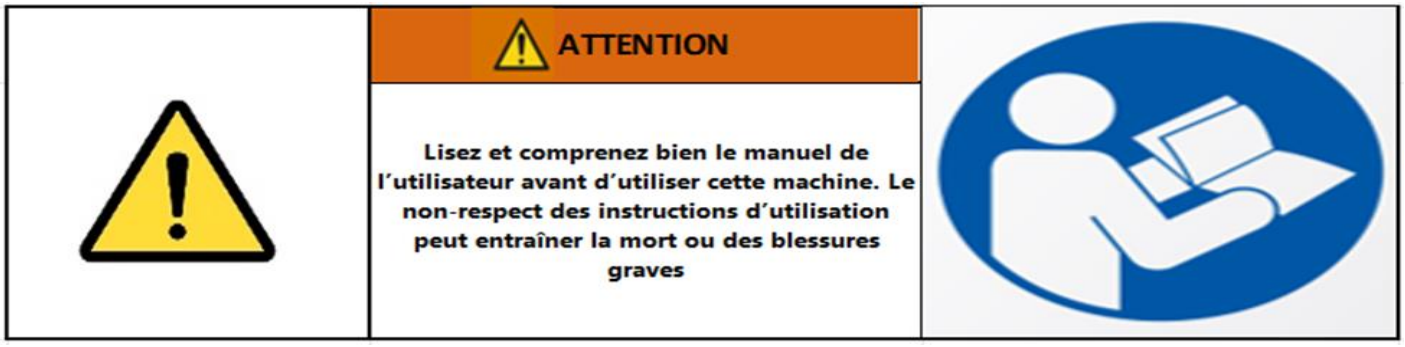
Ce symbole indique la présence d'une climatisation dangereuse ou d'un courant continu constituant le risque de choc électrique.

Ce symbole indique un risque d'incendie dû à une mauvaise manipulation ou à une défaillance de l'appareil. Pour une protection continue contre les risques d'incendie, lors du remplacement des fusibles, utilisez uniquement des fusibles du type et des valeurs nominales spécifiés.

Ce symbole indique le danger d'une décharge électrostatique à laquelle l'équipement peut être sensible. Observez toutes les précautions à prendre pour manipuler les appareils sensibles a l'electicite statique.

Ces symboles indiquent une température extrême qui peut causer des brûlures ou des engelures. Éviter le contact avec la surface. Le non-respect des précautions peut entraîner des blessures modérées à graves.

## CONSIGNES DE SÉCURITÉ




L'équipement décrit dans ce manuel est conçu et fabriqué pour fonctionner dans les limites de conception définies. Toute mauvaise utilisation peut entraîner un choc électrique ou un incendie. Pour éviter que l'équipement ne soit endommagé, les règles suivantes doivent être respectées pour l'installation, l'utilisation et l'entretien. Lisez les consignes de sécurité suivantes avant d'utiliser l'instrument.

## POUVOIR


**CORDON D'ALIMENTATION :** Utilisez uniquement le cordon d'alimentation spécifié pour cet équipement et certifié pour le pays d'utilisation. Si la fiche d'alimentation (secteur) est remplacée, suivez les connexions de câblage spécifiées pour le pays d'utilisation. Lors de l'installation ou du retrait de la fiche d'alimentation, **tenez la fiche, pas le fil.**

**MISE À LA TERRE :** Le cordon d'alimentation fourni est équipé d'une **fiche à 3 broches avec mise à la terre (une fiche avec une troisième broche de mise à la terre).** Il s'agit à la fois d'une fonction de sécurité pour éviter les chocs électriques et d'une exigence pour le bon fonctionnement de l'équipement. Si la prise à utiliser n'est pas compatible avec la fiche à 3 broches, changez la prise ou utilisez un adaptateur de mise à la terre**.**

**FUSIBLES :** Remplacez les fusibles uniquement par des fusibles ayant le courant nominal, la tension et le type spécifié tels que fusion normale, temporisation, etc. **N'UTILISEZ PAS** de fusibles de fortune ou ne court-circuitez pas le porte-fusible. Cela pourrait entraîner un risque d'électrocution ou d'incendie ou endommager gravement l'instrument..

## OPÉRATION

**PRUDENCE**

NE PAS UTILISER AVEC LES COUVERCLES OU LES PANNEAUX RETIRÉS. **Les tensions à l'intérieur de l'équipement consistent en une ligne (secteur) pouvant aller de** 100 à 240 VAC.


**NE PAS UTILISER AVEC DES PANNES D'ÉQUIPEMENT SUSPECTES.** Si une odeur ou de la fumée se dégage, éteignez l'équipement et débranchez-le immédiatement. Le non-respect de cette consigne peut entraîner un choc électrique, un incendie ou des dommages permanents à l'équipement. Contactez l'usine pour plus d'instructions.


**NE PAS UTILISER DANS UNE ATMOSPHÈRE EXPLOSIVE.** L'utilisation de l'équipement en présence de gaz ou de fumées inflammables constitue un danger certain pour la sécurité. Pour les equipement concus pour fonctionnner dans de tels environnement, des dispositifs de sécurité appropriés doivent être utilisés, tels que la purge d'air sec ou de gaz inerte, les barrières de sécurité intrinsèque et/ou les enceintes antidéflagrantes..

**NE PAS EMPÊCHER LA CHAMBRE D'ÉVACUER L'EXCÈS DE PRESSION.** Les systèmes de déshumidification disponibles comprennent des systèmes en boucle ouverte qui pompent l'air extérieur dans la chambre. Si la chambre n'est pas autorisée à s'aérer, la pression peut s'accumuler et causer de graves dommages à la chambre.

**UTILISEZ UNE SOURCE D'EAU DISTILLÉE OU DÉSIONISÉE POUR L'HUMIDIFICATION.** L'accumulation de contaminants sur le transducteur causera des contraintes au transducteur et à l'électronique et entraînera une défaillance prématurée et invalidera la garantie.


**NE PAS UTILISER D'UNE MANIÈRE NON SPÉCIFIÉE OU APPROUVÉE PAR LE FABRICANT.** Une utilisation non approuvée peut endommager l'équipement ou présenter un risque d'électrocution ou d'incendie.Description of Contents

# II. Description of Contents

| Item | Description |
|---|---|
| Environmental Chamber | The Model 5507 is an acrylic (Plexiglas) chamber with dimensions of 34” W x 21.5” D x 20” H. The chamber features a 28” x 14” door opening and non-setting gasket. It is constructed of both clear and white acrylic for enhanced visibility and contrast. The chamber can be purchased with or without front glove ports. |

Compatible Operating Systems available for additional purchase and integration include:

**Model 5000-Series Controller and 556 Sensor**

The Model 5000-Series Microcontroller is a separate unit that utilizes PID control systems to create and hold environmental conditions. The controller monitors temperature and humidity with the Model 556 Sensor and powers relevant operating systems to reach desired conditions.

### Model 5482 Ultrasonic Humidifier

The Model 5482 ultrasonic humidifier is a separate unit which sits outside the chamber. The humidifier accepts distilled or deionized water from a water line or tank and generates humidity on demand to humidify up to 95% RH*. A water tank and tubing are included for use in either open-loop or closed-loop configurations.

### Model 5477-250 Thermoelectric Heater & Cooler

The Model 5476-250 Thermoelectric Heating and Cooling system provides a complete temperature solution. Utilizing Peltier elements and air-to-air conditioning, the thermoelectric can maintain temperatures from 10°C to 50°C at ambient conditions*. A universal voltage power supply and thermal channel controller are included.

### Model 5461 Molecular Sieve Dehumidifier

The Model 5461 Molecular Sieve Desiccant Column is a separate unit which sits outside of the chamber. It utilizes renewable indicating desiccant in a closed-loop configuration to dehumidify to at least 10% RH*. Tubing is included. 115V or 230V Voltage requirements must be specified.

### Model 5465 Dry Nitrogen Gas Dehumidifier

The Model 5465 Dry Nitrogen Valve is a separate unit which attaches to the chamber. It requires a customer supply of nitrogen gas to dehumidify to as low as 5% RH* and includes an over-pressure protection module. The Model 5465 operates in an open-loop configuration. Tubing is included.

*Temperature and Humidity range is valid for the M 5507 chamber with an ambient temperature of 22°C ±3°C and relative humidity of 25% to 70% RH. Lower humidities down to 2-5% RH can be achieved with increased temperatures and/or extended conditioning times.

**Model 5478 Regenerative Desiccant Dehumidifier**

The Model 5478 Self-Regenerating Dehumidifier is a separate unit which sits outside of the chamber. It utilizes a dual-column desiccant recharging mechanism to dehumidify as low 5% RH* without need for maintenance and includes an over-pressure protection module. Operates in an open-loop configuration and requires 50-100 psi house air. Tubing is included. 115V or 230V Voltage requirements must be specified.

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**Gloves**

A pair of rubber gloves for installation in the chamber 8” glove ports.

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*Temperature and Humidity range is valid for the M 5507 chamber with an ambient temperature of 22°C ±3°C and relative humidity of 25% to 70% RH. Lower humidities down to 2-5% RH can be achieved with increased temperatures and/or extended conditioning times.

Visit www.electrotechsystems.com for more.

# III. Set-Up Guide

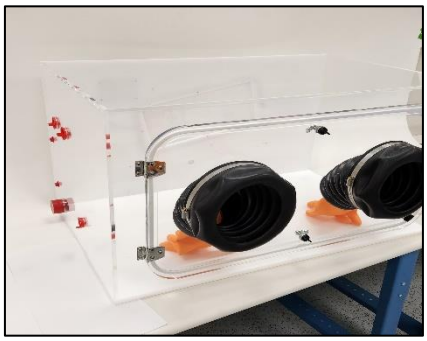
TOOLS NEEDED:

## Part 1: Chamber Unpacking and Initial Setup

### Step 1-1

*Note: DO NOT use any of the chamber fittings or the glove ports as a grip or for leverage. Lift the chamber by gripping around the outside of the chamber.*

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



### Step 1-2

Place the chamber on a clean, level bench area. If ordered with gloves, verify gloves are secured firmly to the chamber ports.

If the unit was ordered with a heating/cooling unit installed, it is recommended to allow for at least 6 inches of open space behind the chamber. Insufficient ventilation will impact heating and cooling performance.

### Step 1-3

Unpack the accessories and applicable operating systems shipped with the chamber.

Operating System connections are located on the left side of the chamber. Place operating systems near the connections.

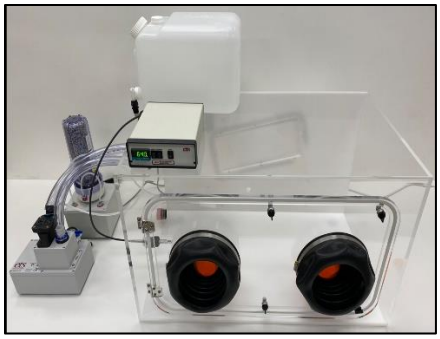
- **Sensor Input**
- **Humidifier Output**
- **Humidifier Return**
- **Dehumidifier Output**
- **Dehumidifier Return**
- **Removeable Hole Plug**

### Step 1-4

Refer to above image and table for color-coded operating system input locations and descriptions. Color codes are also listed alongside compatible operating systems in Section II. Description of Contents. Your chamber will only feature relevant color indicators for purchased operating systems.

## Part 2: Operating System Setup

### Part 2a. Controller: Model 5000-Series Microcontroller with 556 Sensor



**Step 2a-1**

Place the controller in an accessible, convenient location. Ensure all front panel switches are in the off position (0).

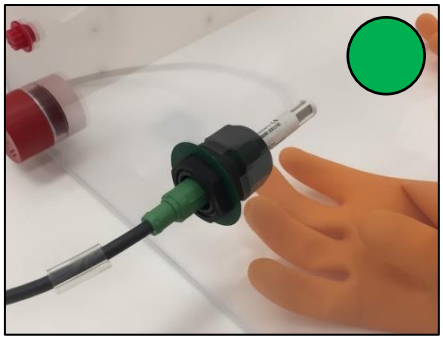

**Step 2a-2**

On the rear of the controller unit, ensure the “POWER” switch is in the off position (0).

Plug the 556 Sensor cable into the “SENSOR” jack.

⚠ *Note: Plugging in the 556 sensor while the controller is powered on may result in damage to the sensor.*

Connect the included AC power cord receptacle into the “POWER IN” jack and the plug into a standard outlet.



**Step 2a-3**

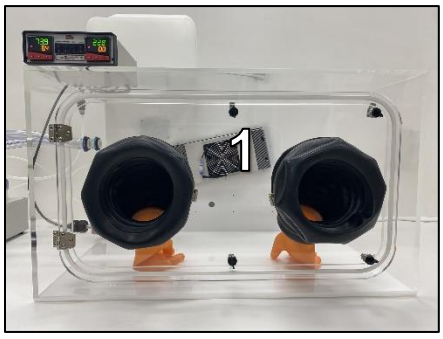
Ensure the sensor and its cable are firmly connected.

Locate the sensor cord grip fitting on the left chamber wall. It features the **GREEN** color-indicator ring.

Loosen the fitting from the inside of the chamber and insert the 556 sensor from the outside.

⚠ Tighten the fitting from the inside to secure the sensor in place. Tighten by hand only, DO NOT use tools.

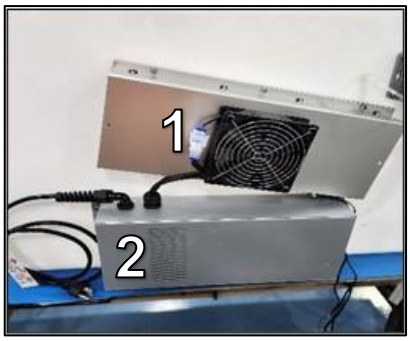
### Part 2b. Heating & Cooling: Model 5476-250 Thermoelectric Heating/Cooling System




**Step 2b-1**

The Model 5476-250 Thermoelectric Heating and Cooling system will be mounted to the chamber if ordered.

The system consists of two components – the Thermoelectric (1), NEMA 1 enclosure box (2). These will be mounted on the rear of the chamber.




**Step 2b-2**

On the rear of the chamber, perform a quick visual check for any disconnected wires.

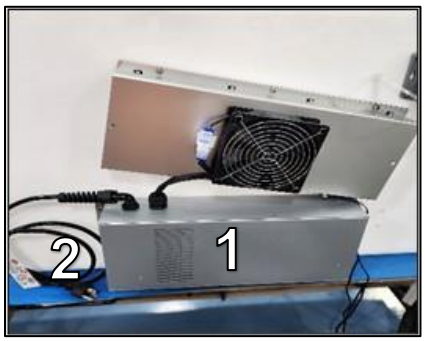
.


**Step 2b-3**

Plug the wall adapters from the Thermal Channel Controller (1) into the rear of the Model 5000-Series Controller unit.

Plug the wall adapter plug labeled “COOL” into the controller “COOL” socket.

Plug the wall adapter plug labeled “HEAT” into the controller “HEAT” socket.

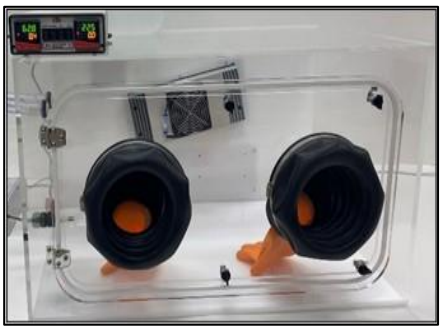



**Step 2b-4**

Locating the NEMA 1 enclosure (Power Supply) (2), plug the AC power cable from the NEMA 1 enclosure into a standard wall outlet.

The thermoelectric fans will turn on after a few seconds.

Note: *The thermoelectric fans act as circulation fans for the system and will turn on when needed during use. The system will only heat and cool upon demand if not the system will switch off until needed.*



**Step 2b-5**

After verifying the fans turn on, the power cord may be unplugged from the AC outlet until the entire setup is complete and the chamber is intended to be used.

---

**Part 2c. Humidification: Model 5482 Ultrasonic Humidifier**

**Step 2c-1**

If ordered, the Model 5482 Ultrasonic Humidifier system is supplied as a standalone unit.

The system consists of a humidifier unit, a 5-gallon water tank, a 10 ft length of 1/4" OD semi-flexible polyethylene tubing, and two 1-1/2 ft lengths of 1” ID flexible PVC tubing.

**Step 2c-2**

Remove the top cap of the water tank to reveal the spigot attachment. Unscrew the spigot to separate the attachment from the cap.

**Step 2c-3**

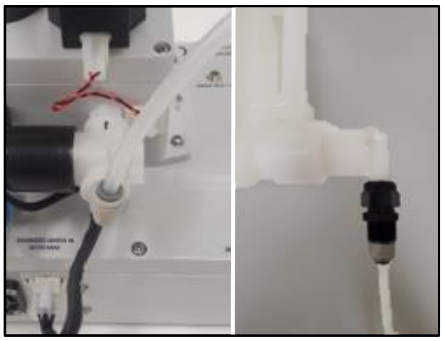
Hand-tighten the spigot attachment onto water tank. DO NOT use any tools, over-tightening the cap will damage the gasket and cause water leakage.

Ensure the water tank tap lever is pointed right in the “OFF” position, as depicted.

**Step 2c-4**

Fill the tank to intended level, up to five gallons, with de-ionized or distilled water only. Hand-tighten the top cap back onto the tank.

Note: *Use of tap water will cause build-up of contaminates and cause stress to the mist-generating elements, which may result in premature failure*



**Step 2c-5**

Place water tank at a height above the humidifier.

Insert 1/4" OD semi-rigid tubing firmly into the "DEIONIZED WATER IN" port on the humidifier.

Cut the tubing to length and insert the other end into the water tank spigot fitting.

Test the connections by gently tugging on the tubing.

Optionally, utilize a water line in place of the water tank. Water line pressure cannot exceed 50 psi.


**Step 2c-6**

Ensure the drain valve on the humidifier unit is set to the "OFF" position with the tap lever turned 90° from the drain valve.

Ensure humidifier is placed on a level surface with no more than 5° tilt.

**Step 2c-7**

Ensure water supply tube is fully inserted on both ends.

Loosen the small white cap on the water tank top cap to allow water to flow freely.

Switch the water tank tap lever to the "ON" position (to the left) for water to begin flowing.


**Step 2c-8**

Apply power to begin filling the water basin. Plug the humidifier three-prong AC line cord into a standard wall outlet to test the functionality of the humidifier.

The humidifier LED turns red while the water fills the unit to an acceptable level. This process should take between 1 to 2 minutes.


**Step 2c-9**

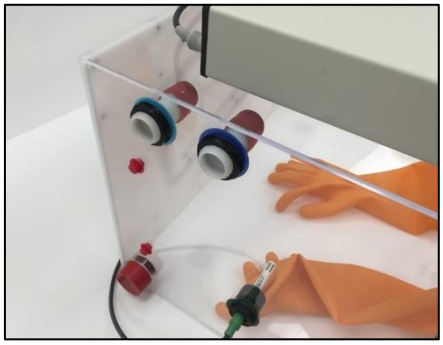
After the water reaches an acceptable level, the LED will turn green to indicate system has enough water to produce humidity.

Mist will begin to be produced and will ooze out of the white barb on the top of the unit.

Unplug the humidifier from the wall outlet.


**Step 2c-10**

Concluding the humidifier function test, plug the three-prong humidifier AC line cord into the “HUMIDIFY” socket on the rear of the controller.

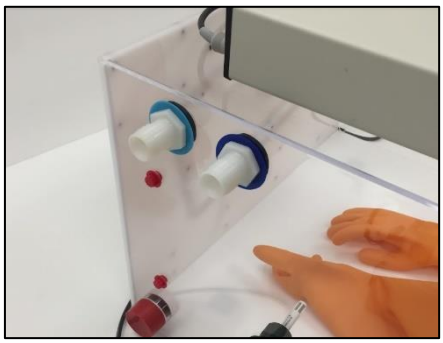


**Step 2c-11**

Locate the two barb fittings on the top-left of the left chamber wall. The barbs are inverted to protect during shipping and must be reversed.

Unscrew the two locknuts and swap the direction of the fittings so that the barbs face outward.

Tighten the set of barbs and locknuts by hand until secured.

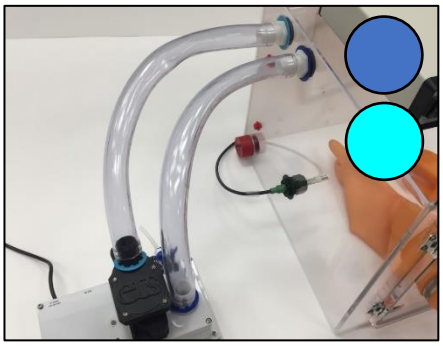


**Step 2c-12**

Ensure the **Light Blue/Cyan** color-indicator ring is on the barb closer to the rear of the chamber.

Ensure the **Blue** color-indicator ring is on the barb closer to the front door of the chamber.

Remove the rubber caps from the chamber barbs and set aside.



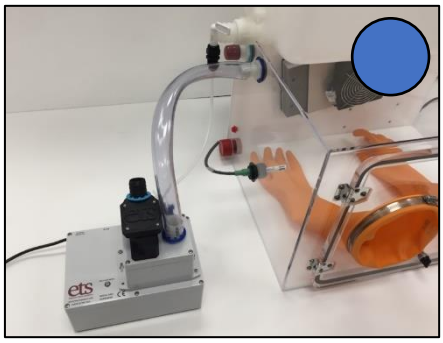
**Step 2c-13**

Connect the two 1.5-foot sections of 1” ID flexible tubing to the humidifier. Connect one tube to the white humidity output barb. The humidity output barb features a **Blue** color-indicator washer.

Connect the other tube to the black air inlet barb. The inlet barb features a **Light Blue/Cyan** color-indicator washer.

Connect the other ends of the tubing to the corresponding chamber input and return barbs. Match the colors from output/inlet on the unit to the input/return on the chamber.

The unit will recirculate and humidify a controlled volume of air within the chamber in this configuration.




**Step 2c-14**

The humidifier can optionally be run in an open-loop configuration, if desired. The unit will pull external air to humify the chamber in this configuration.

Utilize one 1.5-foot section of 1” ID tubing and connect from the white humidity outlet barb, with the **Blue** color-indicator washer, to the chamber hose barb with the **Blue** color-indicator ring.

Place one of the included rubber caps over the remaining **Light Blue/Cyan** color-coded hose barb on the chamber.

The inlet barb on the humidifier with the **Light Blue/Cyan** color-indicator washer, should remain uncapped.

## Part 2d. Dehumidification Systems

Multiple dehumidification operating systems are available for purchase, depending on preference and available lab amenities. Options include the Model 5461 Molecular Sieve, the Model 5465 Dry Nitrogen Valve, and the Model 5478 Regenerating Desiccant System. Information on each of these systems can be found at www.electrotechsystems.com/product-category/environmental-control/operating-systems/. Refer to the following setup steps for only relevant dehumidification systems.

The M 5461 Molecular Sieve Desiccant Column is a closed-loop desiccant-based system. It operates by vacuum-pumping air from the chamber through a desiccant column before it returns to the chamber. This system is self-contained and requires no external resources to operate. It comes with one liter of renewable desiccant.

The M 5465 Dry Nitrogen System is an open-loop system. It operates by injecting dry gas into the chamber to displace any moist air. It requires a separate, customer-supplied nitrogen source (or other dry gas). The M 5465 requires an included over-pressure protection module which monitors the internal pressure of the chamber and cuts power to the gas valve in the event of pressure buildup.

The M 5478 Self-Regenerating Desiccant System is an open-loop system. It is a fully contained system that uses desiccant to dry the chamber without need for maintenance or recharging. It requires a separate, customer-supplied 50-100 psi house air. The M 5478 requires an included over-pressure protection module which monitors the internal pressure of the chamber and cuts power to the gas valve in the event of pressure buildup.

### Dehumidification: Model 5461 Molecular Sieve Desiccant System

**Step 2d-1 (M 5461)**

If ordered, the Model 5461 Molecular Sieve Dehumidifier is supplied as a standalone unit.

The system consists of a desiccant column filled with 1 liter of rechargeable indicating desiccant, one vacuum pump base, and a 10 ft length of 1/4" OD semi-rigid polyethylene tubing.

Additional rechargeable indicating desiccant refills can be purchased separately.

**Step 2d-2 (M 5461)**

Check that the desiccant column contains the Molecular Sieve desiccant, white with blue indication beads.

Observing the bottom lid of the column for the markings, orient the column with the side marked “IN” facing towards the two front fittings on the base. The **Magenta** color-coded fitting should also be facing forwards.

Line up holes on the column lid and column, lid down, onto the four mounting studs of the base.

**Step 2d-3 (M 5461)**

Cut 9” off of the 10 ft length of the semi-rigid tubing.

Push the tubing firmly into the “AIR OUTPUT” fitting with the **Magenta** color-coded ring.

Push the other end of the tubing into the **Magenta** color-coded fitting on the desiccant column.

Tug gently on both ends of the tubing to ensure a good connection.

**Step 2d-4 (M 5461)**

With the rest of the semi-rigid tubing, push one end of the tubing firmly into the “AIR INPUT” fitting with the **Orange** color-coded ring.

Cut the tubing to length and push the other end of the tubing into the **Orange** color-coded fitting on the chamber.

Tug gently on both ends of the tubing to ensure a good connection.

**Step 2d-5 (M 5461)**

With the remaining portion of the semi-rigid tubing, push one end of the tubing firmly into the fitting on the rear side of the desiccant column lid with the **Yellow** color-coded ring.

Cut the tubing to length, if needed, and push the other end of the tubing into the **Yellow** color-coded fitting on the chamber.

Tug gently on both ends of the tubing to ensure a good connection.


**Step 2d-6 (M 5461)**

Plug the three-prong dehumidifier AC line cord into the “DEHUMIDIFY” socket on the rear of the controller.

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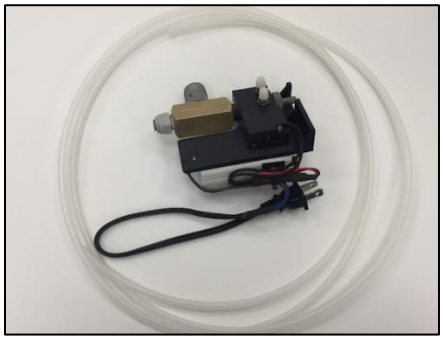
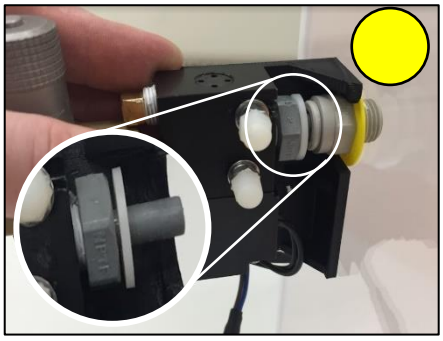
## Dehumidification: Model 5465 Dry Nitrogen Gas System



**Step 2d-1 (M 5465)**

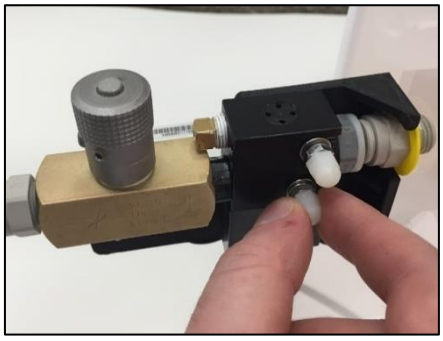
If ordered, the Model 5465 Dry Nitrogen Gas System is supplied as a standalone unit.

The system consists of a gas valve with flow control, an over-pressure monitoring module mounted to the chamber, 6 inches of flexible PVC tubing, and a 10 ft length of 1/4" OD semi-rigid polyethylene tubing.



**Step 2d-2 (M 5465)**

**Ensuring that the white plastic washer is in place on the gray stem fitting**, insert the stem fitting of the M 5465 gas valve into the **Yellow** color-coded fitting on the chamber. Press firmly to secure.



**Step 2d-3 (M 5465)**

Adjust the fitment of the valve so that the support bracket rests against the chamber wall.

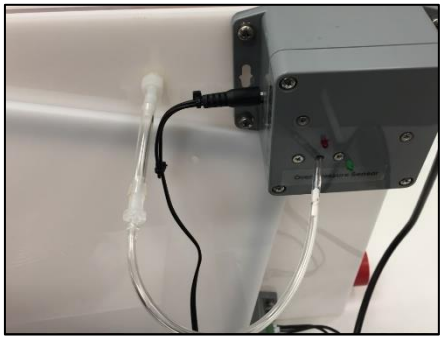
Loosen the two nuts to adjust the position of the bracket. Retighten to secure.


**Step 2d-4 (M 5465)**

Plug the two-prong AC power cable located on the M 5465 valve into the bottom socket on the over-pressure monitor labeled “Valve Power”.


**Step 2d-5 (M 5465)**

Plug the 3-prong AC power cable located on the over-pressure monitor into the “DEHUMIDIFY” outlet of the rear of the controller.

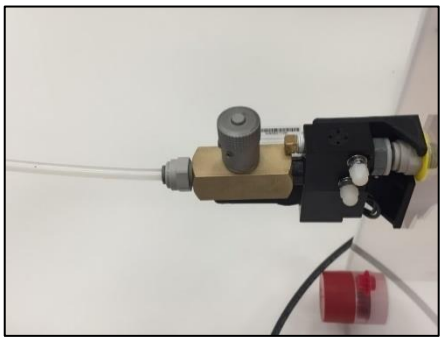


**Step 2d-6 (M 5465)**

Ensure the flexible tubing is securely connected to both the over-pressure module and the chamber hose barb.

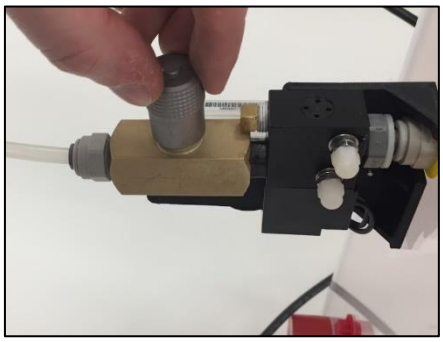
**Step 2d-7 (M 5465)**

Plug AC wall adapter DC barrel jack into the over-pressure monitor DC receptacle. Plug the two-prong AC adapter plug into a standard wall outlet. The wall adapter must be plugged in and powered at all times.



**Step 2d-8 (M 5465)**

Firmly insert one end of the 10 ft length of semi-rigid tubing into the flow regulator side of the M 5465 valve. Cut to length and connect the other end to the dry gas supply.



**Step 2d-9 (M 5465)**

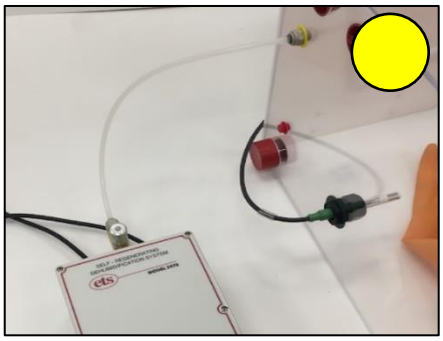
Adjust the flow regulator on the M 5465 to the fully closed position prior to use.

During use, slowly open the valve until gas supply reads 30 CFH of Nitrogen @ 50 psig.

## Dehumidification: Model 5478 Self-Regenerating Desiccant System

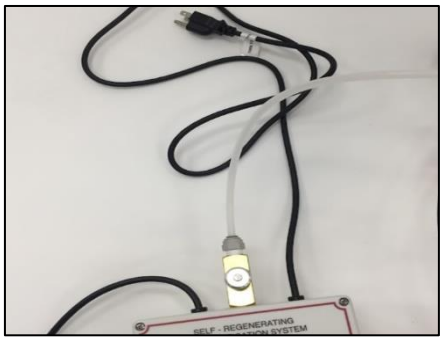
**Step 2d-1 (M 5478)**

If ordered, the Model 5478 Self-Regenerating Desiccant System is supplied as a standalone unit, consisting of the main unit with flow control, an over-pressure module mounted to the chamber, and a 10 ft length of semi-rigid tubing.



**Step 2d-2 (M 5478)**

Firmly insert one end of the 10 ft length of semi-rigid tubing into the M 5478 flow regulator with the **Yellow** color-coded ring, labeled “Air Output”.



**Step 2d-3 (M 5478)**

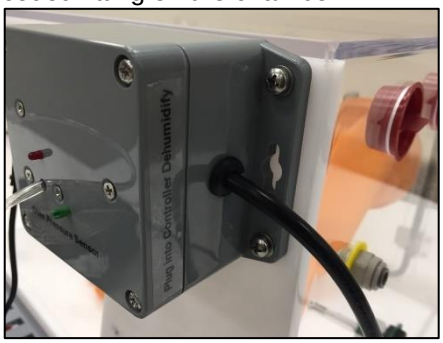
Orienting the M 5478 with the regulator and tubing facing away, connect the 3-prong AC power cable on the right into a standard wall outlet.

Ensure the cable is plugged in and powered at all times

Cut tubing to length and insert the other end into the **Yellow** color-coded fitting on the chamber.

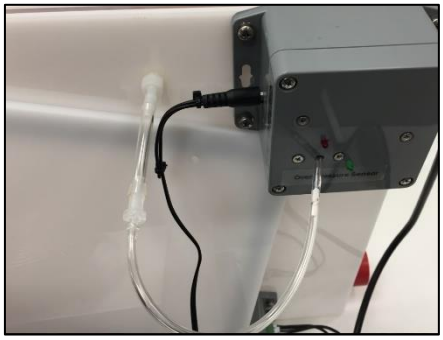

**Step 2d-4 (M 5478)**

Plug the remaining M 5478 3-prong power cable (on the left) into the "Valve Power" socket on the over-pressure monitor.




**Step 2d-5 (M 5478)**

Plug the 3-prong AC power cable located on the over-pressure monitor into the "DEHUMIDIFY" outlet of the rear of the controller.



**Step 2d-6 (M 5478)**

Ensure the flexible tubing is securely connected to both the over-pressure module and the chamber hose barb.


**Step 2d-7 (M 5478)**

Plug AC wall adapter DC barrel jack into the over-pressure monitor DC receptacle. Plug the two-prong AC adapter plug into a standard wall outlet. Ensure the wall adapter is plugged in and powered at all times.


**Step 2d-8 (M 5478)**

With the remaining length of semi-rigid tubing, firmly insert the tubing into the "Air Input" fitting on the top of the M 5478.

⚠ Cut to length and connect the other end to a 50-100 psi compressed air supply. Do not exceed pressure rating.


**Step 2d-9 (M 5478)**

Adjust the flow regulator on the M 5478 to the fully closed position, then open the valve 2-1/2 turns, to the recommended flow rate, prior to use. The flow control valve provides an adjustable 0.2 to 2 SCFM.

# IV. Quick Start Guide

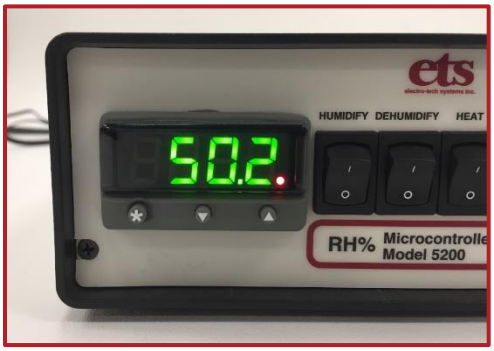

**Step 1 – Turn on Controller**

Verify that the controller and each separate operating system is set up correctly as described in **Section III. Set-Up Guide**.

With the sensor and operating systems plugged into the controller, turn the "POWER" switch on the back of the controller to the ON (I) position.

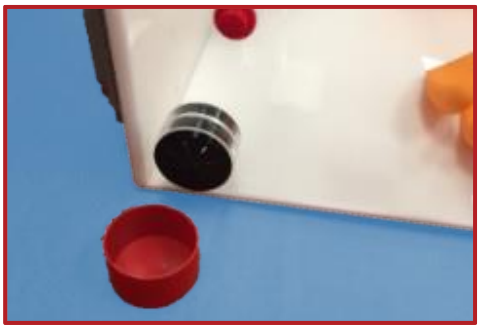

**Step 2 – Set Temperature**

Enter the set point on the ºC side of the controller by pressing and holding the "✱" key and using the "▲" (Increase) and "▼" (Decrease) buttons to adjust to the desired chamber temperature.




**Step 3 – Set Humidity**

Enter the set point on the ºC side of the controller by pressing and holding the "✱" key and using the "▲" (Increase) and "▼" (Decrease) buttons to adjust to the desired chamber humidity.



**Step 4 – Provide Ventilation**

⚠ Dehumidification systems that utilized compressed air or gas require exhaust ventilation. If proper ventilation is not provided, over-pressurization may result in chamber damage or underperforming operating systems.

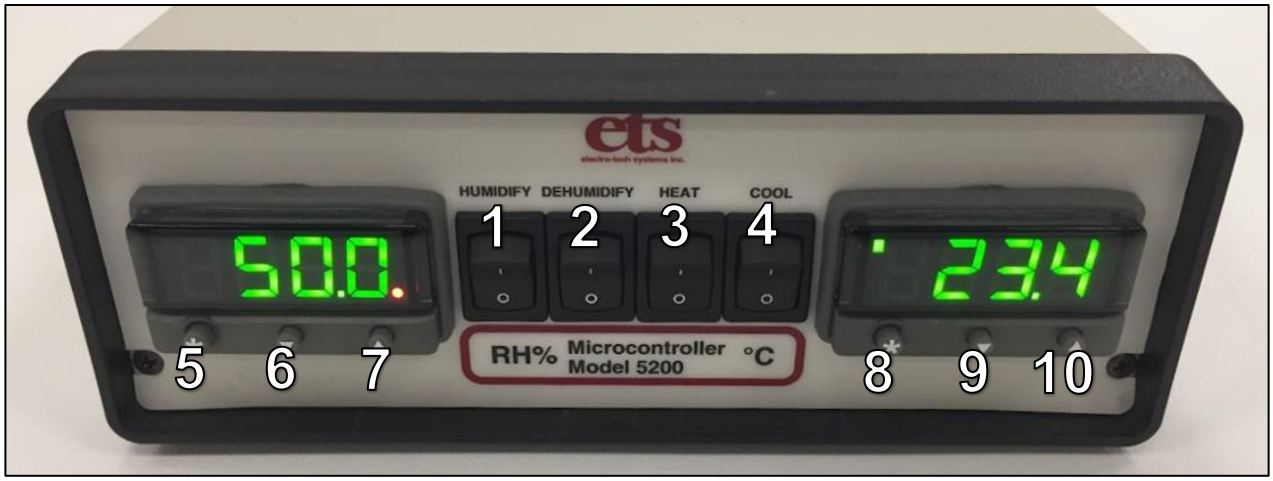
Remove the red cap on the left side of the chamber to expose the cable grommet. The grommet will provide sufficient ventilation, while maintaining internal chamber conditions. Cables may also be fed through.


**Step 5 – Turn on Operating Systems**

On the front of the controller, flip all four operating system switches to the ON (I) position. The controller will begin conditioning the chamber.

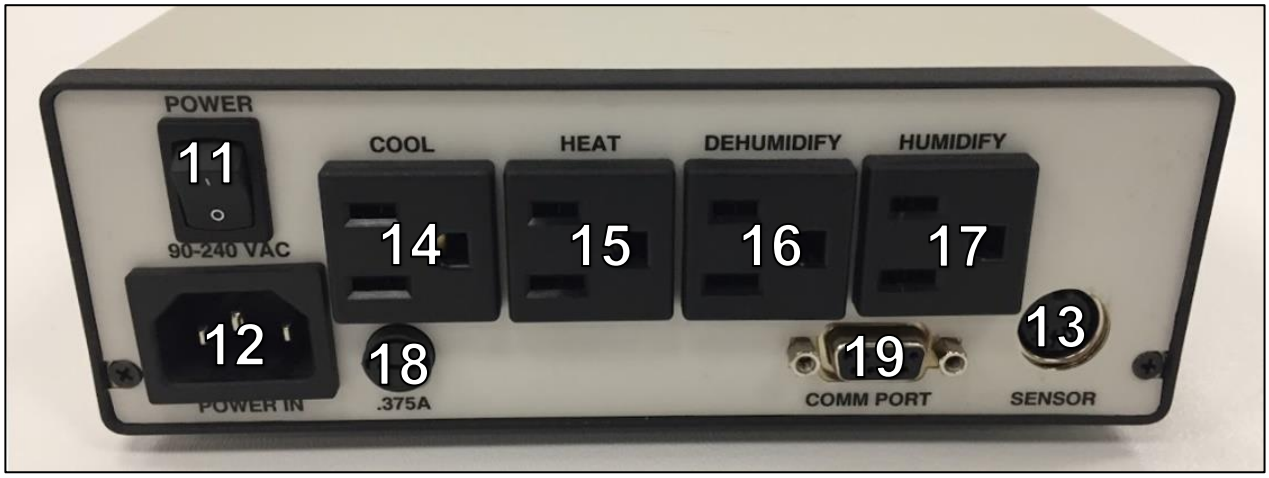
# V. Functionality

**Controller Front View**




| Item | Description | Functionality |
|---|---|---|
| 1 | "HUMIDIFY" Switch | Allows the user to manually enable or disable the Humidification System. Pushing this switch to the ('O') is "Off" |
| 2 | "DEHUMIDIFY" Switch | Allows the user to manually enable or disable the Dehumidification System. Pushing this switch to the ('O') is "Off" |
| 3 | "HEAT" Switch | Allows the user to manually enable or disable the Heating System. Pushing this switch to the ('O') is "Off" |
| 4 | "COOL" Switch | Allows the user to manually disable the Cooling System. Pushing this switch to the ('O') is "Off" |
| 5,6,7 | Humidity Controller Setpoint Buttons | The humidity controller includes a * button and ▲ / ▼ selection arrows to change the humidity setpoint. These buttons are also used to navigate the controller PID settings. |
| 8,9,10 | Temperature Controller Setpoint Buttons | The humidity controller includes a * button and ▲ / ▼ selection arrows to change the temperature setpoint. These buttons are also used to navigate the controller PID settings. |

## Controller Rear View




| Item | Description | Functionality |
|---|---|---|
| 11 | “POWER” Switch | This switch disconnects all power to the controller and going to the chamber operating systems. “I” is on, “O” is off. |
| 12 | “POWER IN” Socket | Connect incoming AC power here. Socket accepts standard IEC power cable. |
| 13 | “SENSOR” Socket | Attach the Model 556 Temperature and Humidity Sensor cable here. |
| 14 | “COOL” Socket | Provides power to cooling system when needed. |
| 15 | “HEAT” Socket | Provides power to heating system when needed. |
| 16 | “DEHUMIDIFY” Socket | Provides power to dehumidification system when needed. |
| 17 | “HUMIDIFY” Socket | Provides power to humidification system when needed. |
| 18 | “.375A” Fuse | Fuse for internal electronics, 3/8 A. |
| 19 | “COMM PORT” | DB9 connector for communications to a computer. |

# VI. Specifications

**Model 5507 Chamber**

| **Mechanical** | |
|---|---|
| Material | Clear and White Acrylic |
| Internal Volume | ~7.726 cu. Ft. (218.7L) |
| Internal Dimensions | 33.29” W x 20.79” D x 19.29”H (84.5cm x 52.8cm x 48.9cm) |
| External Dimensions | 34” W x 21.5” D x 20”H (86.3cm x 54.6cm x 50.8cm) |
| Weight | 82 lbs. (21.7 kg) w/ Full Systems NEMA 1/Thermoelectric, 58 lbs. (25.5 kg) for base chamber |

| **Access** | |
|---|---|
| Front Opening | 28” W x 14” H (71.1cm x 35.5cm) |
| Front Door | 1/2" (6mm) clear acrylic |
| Door Latches | 3/4-Turn latches |
| Door Gasket | 1/4” non-setting silicone |
| Glove Ports (optional) | Pair of 8” (20cm) ports |
| Gloves, pair (optional) | 0.018” (0.5mm) latex, size 10 |
| Cable Pass-Through | 1-1/2” diameter |

| **Connections** (if included) | |
|---|---|
| 1/4" Push-to-connect fitting, 1/4 NPT | Qty. 2 |
| 0.2” to 0.49” OD Compression Fitting, 3/4 NPT | Qty. 1 |
| 1” ID Hose Barb, 1 NPT | Qty. 2 |
| 3/32” ID Hose Barb, 1/8 NPT | Qty. 1 |
| 1 x 1-1/2” Cable Passthrough Grommet, TPU | Qty. 1 |

| **Temperature Heat / Cool** (if included) | |
|---|---|
| Thermoelectric System | Model 5477-250 |
| Temperature Max. | 55°C |
| Temperature Min. | 10°C |
| Temp. ramp 22°C to 10°C typ. | < 60 minutes |
| Temp. ramp 22°C to 50°C typ. | < 60 minutes |

| **Humidification** (if included) | |
|---|---|
| Ultrasonic Humidifier | Model 5482 |
| RH% Max | 100% |
| RH% ramp 50% to 90% typ. | < 10 minutes |

| **Dehumidification** (if included) | |
|---|---|
| Molecular Sieve Desiccant | Model 5461-115V, or Model 5461-230V |
| Dry Gas Valve | Model 5465 |
| Regenerating Desiccant | Model 5478-115V, or Model 5478-230V |
| RH% Min. | 5% (10% with M 5461) |
| RH% ramp 50% to 10% typ. | < 60 minutes |

| **Control** (if included) | |
|---|---|
| Model 5100 Controller | 3300 Single Display Control, Single ramp/soak cycle |
| Model 5200 Controller | 9500 Dual Display Control, Multiple ramp/soak cycle |
| Displays | LED 0.4”, Setpoint and present reading |
| Display Resolution | 0.1 %RH / 0.1 °C |
| Sensor | Dual Temperature and RH 0-100 %RH, -40 to +55°C |
| Sensor Accuracy, RH% | ±2.0% RH at 20°C and 0-90% RH<br>±3.0% RH at 20°C and 90-100% RH |
| Sensor Accuracy, Temp. | Temp: ±0.2°C at 20°C |

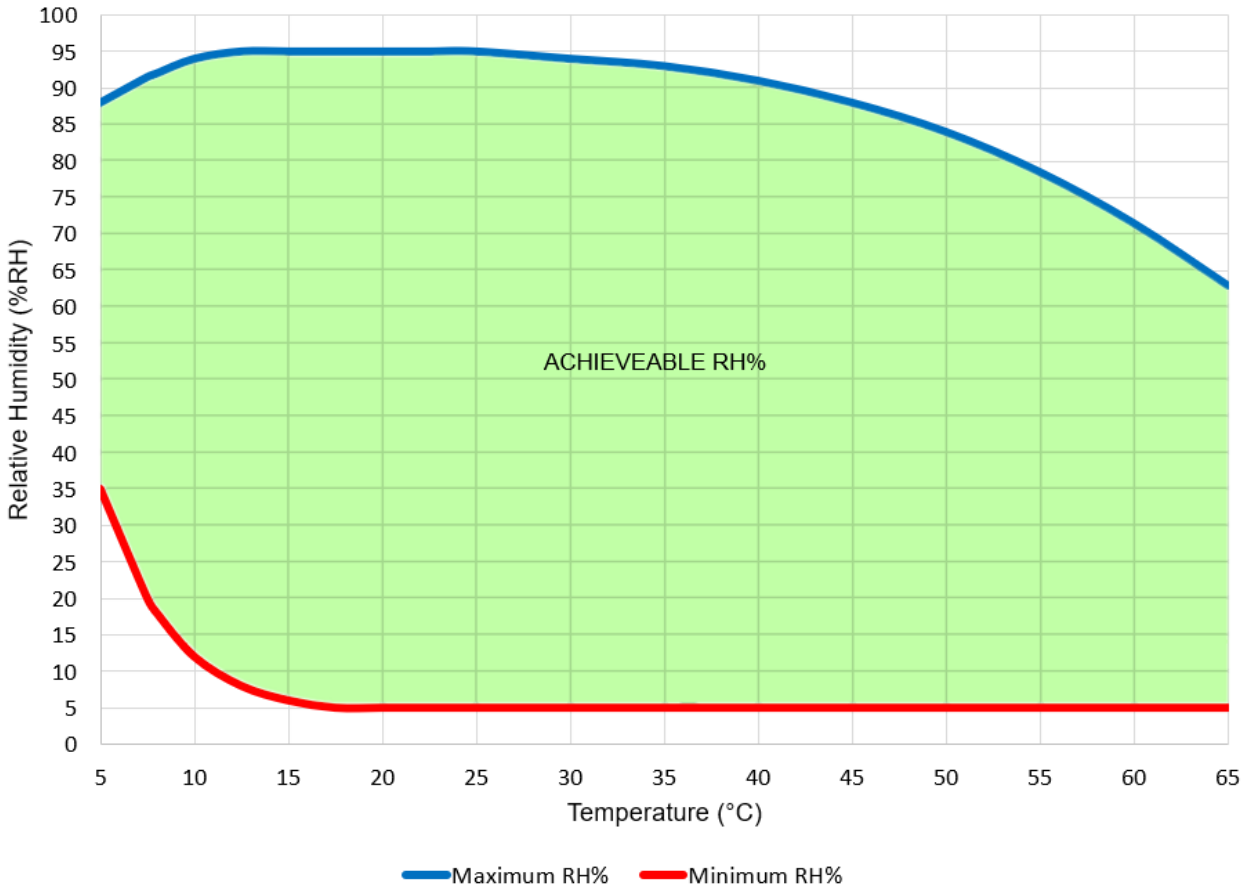
| **Power** (for full operating system options) | |
|---|---|
| Voltage | 115 VAC @ 8 Amps, or 230 VAC @ 4 Amps, 50 / 60Hz, Single Phase |

Notes:

Chamber performance of 10°C to 50°C and 5% to 95% RH is valid at ambient conditions. Ambient conditions consist of 22°C ±3°C and 25% to 70% RH. Higher or lower temperatures and humidities may be reached by adjusting ambient conditions, conditioning chamber for extended periods, or by utilizing combinations of operating systems (low humidity is easier at higher temperatures, etc.).

The Model 5477-250 Thermoelectric Heating and Cooling system has a cooling ΔT of up to 15°C for cooling and 45°C for heating.

The entire humidity range cannot be obtained at all temperatures due primarily to dew point considerations. The graph below depicts an approximation of achievable relative humidity at varying temperatures.



# VII. Repair and Maintenance

## Calibration

For consistency of performance, annual manufacturer conducted calibration is required. ETS recommends the Model 5000-Series controller and Model 556 Sensor 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 it is first necessary to obtain a RMA number, please call 215-887-2196 or email service@ets2.com

## Preventive Maintenance

The humidification system utilizes a pair of ultrasonic transducers that has an estimated lifespan of at least 3000 hours of run time 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, use an appropriate water supply (deionized water or distilled water) and perform regular preventive maintenance after **every 500 hours** of operational use.

⚠ Any time the humidifier is not being used for more than a week, drain the water completely out of the basin.

⚠ Accessory filters have limited lifespan. It is recommended to replace the filter regularly to avoid degradation in humidification capability or contamination (e.g. mold). In closed-loop, high-humidity conditions, filters may become oversaturated with moisture and resist the flow of air. It is recommended to replace over-saturated filters. Filter lifespan is highly variable based on each specific application, however, to maximize the humidification capability of the Model 5482 it is recommended to replace the in-line filter **monthly**.

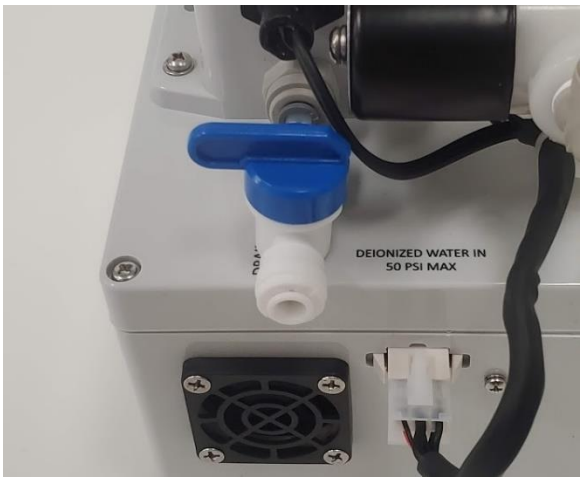
### Humidification System Preventive Maintenance


**Step 1 – Power OFF and Drain the Basin**

Unplug the humidifier AC line cord from the “HUMIDITY” AC outlet of the controller.

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 with the tap lever turned parallel to the shutoff valve inlet and outlet and wait until draining is complete.

| | |
|---|---|
|   | **Step 2 – Flush out the Basin**<br><br>Empty the small drain container. Plug the humidifier AC line cord into a wall AC outlet to ensure constant power to the unit.<br><br>Turn the 5-gallon water tank valve to the “ON” position to let fresh deionized water from the tank flush out contaminates in the basin through the drain valve for at least 2 minutes. |
|  | **Step 3 (Optional) – Replace Accessory Filter**<br><br>If utilizing humidifier accessory filters, replace filters monthly at most. Certain applications will require more frequent replacements.<br><br>Dispose of old filter. |
|   | **Step 4 – Return System to Operation**<br><br>Turn the drain valve to the “OFF” position with the shutoff valve tap lever turned 90° from the valve inlet and outlet.<br><br>Refer to **Section III. Set-Up Guide** and **Section IV. Quick Start Guide** to return the humidifier to standard operation. |

# Repair

To return equipment to ETS for calibration 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.