



# Desiccant / Pump Dehumidification System

Model 5461

Operating Manual

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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 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.**

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.** The humidification and dehumidification systems are 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 contaminants on the transducer will cause stress to the transducer and electronics and resulting in premature failure and invalidate the warranty.

**IF YOUR UNIT INCLUDES OPTIONAL LIQUID NITROGEN COOLING CAPABILITIES, REVIEW ALL SAFETY INFORMATION IN THE LIQUID NITROGEN SAFETY ADDENDUM.**

**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

Included:

| Item                               | Qty. | Description   |
|------------------------------------|------|---|
| Model 5461 Dehumidification System | 1    | The Model 5461 Dehumidification System is housed in a 7" W x 7" L x 5" H plastic enclosure with vibration isolating feet. |
| MS desiccant column                | 1 L. | Molecular sieve 20% indicating.   |
| Tubing section 1                   | 9"   | Tubing, 1/4" o.d., short piece of tubing on column  |
| Tubing section 2                   | 10'  | Tubing, 1/4" o.d.   |
| 1/4" NPT QC                        | 2    | Quick Connect fittings (Included with stand-alone unit)   |

Available from ETS:

|                       |    |                                 |
|-----------------------|----|---------------------------------|
| Replacement Desiccant | 1L | Molecular Sieve 20% indicating. |
|-----------------------|----|---------------------------------|

### III. Set-Up Guide

**NOTE: A 230 VAC system must be used with a Controller configured for 230 Volts.** The pump will be fitted with a standard North American 3-prong plug to fit into the DECREASE outlet on the rear panel.

When used with most ETS 5500C Series Controlled Environment Chamber, input / output fittings and circulating fans will already be installed. For other installations it is recommended that a 32-110 cfm fan(s) be installed to evenly distribute the air within the chamber.



#### Step 1 – Mount Desiccator Column

Place the desiccator column, lid down, onto the mounting studs on top of the Model 5461 enclosure.

The side of the column lid marked “IN” (90° fitting) should face forward. The Output fitting should face the rear.



**Step 2 -** Connect the short piece of ¼” OD tubing to the Air Output fitting on the box, to the right of the column. Connect the other end of the tube to the 90° “IN” fitting on the desiccant column.



**Step 3** - Cut to length and connect a piece of tubing between the chamber output fitting and the Model 5461 Air Input Fitting.

Connect a second piece of tubing from the Column Output Fitting to the return fitting on the chamber.

Make sure that all tubing is pushed all the way into the bottom of the fitting to avoid leaks.



**Step 4** - Plug the unit power cord into the DECREASE or DEHUMIDIFY outlet on the rear of the Model 5100, or 5200 Humidity Controller.



**Step 5 – Set Humidity**

Set your set point by pressing and holding the \* key and using increase/decrease buttons to adjust to your desired humidity.



**Step 6 – Turn on Operating Systems**

Flip the dehumidify operating system switch to the on position (I = on).

The system is now ready to dehumidify the chamber.

To remove tubing - Push down on the fitting collar and pull up on tube.

## IV. Operation

- Air is drawn (from the chamber) into the input hose barb (mounted to the lid), passed through the pump and comes out through the fitting on the opposite side of the lid.
- The fitting is attached to the column with a short length of tubing. The air passes through the tubing, into the “IN” fitting on the column lid.
- The air is forced to the bottom of the column. It then passes through the desiccant as it returns to the “OUT” fitting on the column lid.
- The dried air is then sent back to the chamber.
- Both input and output have filter pads to cut down on desiccant dust.

## V. Description and Specifications

The Model 5461 Desiccant Dehumidification System is a closed loop system, designed to reduce the relative humidity within a sealed chamber to less than 10%. When used with an Automatic Humidity Controller, such as the ETS Model 5100 or Model 5200 Microprocessor Humidity Controllers, the chamber may be maintained to within  $\pm 0.1\%$  RH of the set-point.

A clear plastic column filled with 1 Liter of renewable Molecular Sieve (“MS”) desiccant is mounted to the top of the enclosure. The desiccant removes moisture from the air. The dried air is forced back into the chamber by small, quiet linear air pump mounted inside the enclosure.

Twenty percent (20%) of the MS granules are indicating granules, visible as the blue granules in a fresh system. These turn to gray when the MS material has adsorbed its full capacity of water. At this point, the MS needs to be renewed or replaced. The column is easily removable for replacing the desiccant. See Section VII for instructions. The desiccant can be renewed approximately ten (10) times before having to be replaced.

### SPECIFICATIONS

- The average flow rate from the unit is 0.54 cfm (15 lpm).
- The air is dried to a dewpoint of  $-100^{\circ}\text{F}$ .
- Capacity for water vapor up to 100 grams.
- Power – 115 VAC/60 Hz, 0.35 Amps, or 230 VAC/50 Hz, 0.18 Amps
- Desiccant Column is safe for working pressures up to 100 psig.
- Contents: 1 Liter of Molecular Sieve Desiccant.
- Connections are for  $\frac{1}{4}$ ” OD tubing.
- Plastic cap is fitted with “O-Ring” gasket.
- Desiccant coil spring is made of cadmium plated steel.

## VI. Maintenance and Calibration

### Calibration

No manufacturer conducted calibration is required.

### Maintenance & Repair

To return equipment to ETS for maintenance it is first necessary to obtain a RMA number, please call 215-887-2196 or email [service@ets2.com](mailto:service@ets2.com)

## VII. Desiccant

### CHANGING THE DESICCANT

1. Disconnect the tubing from both sides of the column.
2. Lift the column straight up and off of the box.
3. Turn the column over, lid up, and slowly unscrew the lid.
4. Remove the metal retainer, O-ring, and spring on top of the desiccant.
5. Pour out old desiccant, refill, tapping the column gently on a table to help settle the desiccant.
6. Replace the metal retainer, O-ring, and spring. Tighten lid.
7. Replace the column onto the box and reconnect tubing.

### RENEWING THE DESICCANT

The desiccant can be renewed approximately ten (10) times before having to be replaced. The granules should be removed from the drying column and spread evenly, one granule deep on a tray. The desiccant should then be heated for approximately one (1) hour at about 400° F (200° C), or until all the indicating granules turn from gray to blue. The material should be allowed to cool in an airtight container before refilling the plastic column.



## VIII. 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. ETS will, at its discretion 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 that are purchased from other manufacturers shall be subject only to that manufacturer's warranty.

The Seller's liability hereunder is expressly limited to repairing or replacing any parts of the equipment manufactured by the manufacturer and found to have been defective. The Seller shall not be liable for damage resulting or claimed to result from any cause whatsoever.

This warranty becomes null and void should the equipment, or any part thereof, be abused or modified by the customer or if used in any application other than that for which it was intended. This warranty to replace or repair is the only warranty, either expressed or implied or provided by law, and is in lieu of all other warranties. The Seller denies any other promise, guarantee, or warranty with respect to the equipment or accessories and, in particular, as to its or their suitability for the purposes of the buyer or its or their performance, either quantitatively or qualitatively or as to the products that it may produce. The buyer is expected to expressly waive rights to any warranty other than that stated herein.

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.