Thermoelectric Cooling System

Model 5473 –

- ☐ 150W (510 BTU/hr.)
- ☐ 200W (680 BTU/hr)
- ☐ 300W (1020 BTU/hr)
- ☐ 400W (1360 BTU/hr)

Operating Manual

7/07/06

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Model 5473–150W-400W

OPERATING INSTRUCTIONS

1.0 GENERAL

The Model 5473 Series of solid state, thermoelectric cooling systems, shown in Figure 1.0-1, utilize the Peltier effect to reduce the temperature of a large heat sink. One or more 110 cfm fans circulate the air within a sealed chamber through the heat sink to continuously reduce the temperature. Very precise temperatures can be maintained with this system using an ETS Model 5100 or 5200 Series Microprocessor Controller.

Figure 1.0-1 Series 5473-150W Thermoelectric Cooling systems

The standard Model 5473 is the Model 5473-150W with a cooling capacity of 510 BTU/hr (150 Watts/hr). The Models 5473-300W units are available which incorporates 2, 5473-150W with a cooling capacity of 1020 BTU/hr. 5473-200W units and 5473-400W (2 - 5473-200Ws) to provide higher (up to 1360 BTU/hr) cooling capacities, respectively.

These systems are best suited for maintaining precise ambient temperatures inside an enclosed chamber. For an uninsulated, 15 cu. ft. chamber, fabricated from 0.375" (10 mm) acrylic, these coolers can reduce the temperature by 5, 10 and 18 °F (3, 5 and 10 °C) respectively.

Heat load, insulation and chamber size will ultimately determine the level of cooling that can be obtained.

2.0 COOLING SYSTEMS SET-UP

1. All Model 5473 Thermoelectric Cooling Systems operate in the same manner. The Model 5473s use an external DC Power Supply. While the type of Power Supply and location of the Supply does not affect operation, it is noted for maintenance purposes.

2. The Thermoelectric System is an integral part of the chamber that usually protrudes through the rear wall, but also may be installed on top or side.

3. The Thermoelectric Cooler is a solid state heat pump. It is virtually maintenance free, with no filters to change. The only moving parts are the fans. As air inside the chamber is drawn through the interior heat sink by the internal thermoelectric fan (this fan is separate and different form the chamber circulation fans), heat is removed from the air and conducted through the thermoelectric modules to the exterior heat sink. The heat is removed from the exterior heat sink and dissipated into the atmosphere by one or more external fans. **DO NOT BLOCK AIRFLOW TO THE REAR OF THE UNIT.** The hot air must be allowed to dissipate.

Increased hot side temperature = Decreased cooling effect.

3.0 OPERATION

1. Plug the AC Line Cord from the Power Supply into the "DECREASE" outlet of a Temperature controller. (Thermo-Electric Cooler and Power Supply are mounted and wired in Models 5518 & 5532.) Turn on the "DECREASE" switch located on the front panel of the Temperature Controller.

2. Set the Temperature Controller set-point to a value below the ambient temperature (Refer to **Controller Operation** in the respective Controller Operating Manual).

   When the microprocessor tells the Cooler to activate, the red LED on the Microprocessor will light. Inside the chamber, the thermoelectric cooler will begin to cool and the fans will begin moving.

3. The microprocessor will determine the amount of cooling needed to maintain the desired set-point. If less than full Cooling Power is needed the Controller will provide pulses of power to the Heating system to compensate.

4. Refer to the section titled **Programming** in the Microprocessor Temperature Controller Operating Manual for more information on the Microprocessor programming.

4.0 SPECIFICATIONS AND PERFORMANCE

All cooling capacity figures are based on a room ambient temperature of 73 °F (23 °C).

All figures are expressed as a ΔT. ΔT expresses the difference in temperature from room ambient (73°F).

Example: 73 °F - 63 °F = ΔT of 10 °F

1. The Model 5473 Thermoelectric Cooler will remove up to 510 - 1360 BTU/hr (150 - 400 Watts/hr) from the Chamber. For example:

   A. In a *non-insulated* Chamber with an 510 BTU/hr unit
      ΔT = 10°F (5.5 °C).

      In a *non-insulated* chamber with a 1360 BTU/hr unit
      ΔT = 18°F (10°C).

   B. In a Chamber, using appropriate *insulation*, the ΔT may be increased an additional 10-15 °F (5.5-8.3 °C), depending on the thickness and quality of the insulation.

Contact ETS for details about insulating the chamber.

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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.

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 of 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 and 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 which it may produce and 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.

WARNING

WOODEN CRATES MUST NOT BE USED. PACKAGING OF DELICATE INSTRUMENTS IN WOODEN CRATES SUBSTANTIALLY INCREASES THE CONTENT’S SUSCEPTIBILITY TO SHOCK DAMAGE. DO NOT PLACE INSTRUMENTS OR ACCESSORIES INSIDE OTHER INSTRUMENTS OR CHAMBERS. ELECTRO-TECH SYSTEMS, INC. WILL NOT ASSUME RESPONSIBILITY FOR ADDITIONAL COST OF REPAIR DUE TO DAMAGE INCURRED DURING SHIPMENT AS A RESULT OF POOR PACKAGING.