



**Advanced Test Equipment Rentals**  
**www.atecorp.com 800-404-ATEC (2832)**

## **THERMONICS T-2500SE**



**PRECISION  
TEMPERATURE  
FORCING  
SYSTEM**

***THERMONICS***

A Test Enterprises Company

**FAST  
ACCURATE  
RELIABLE  
TEMPERATURE  
TESTING**

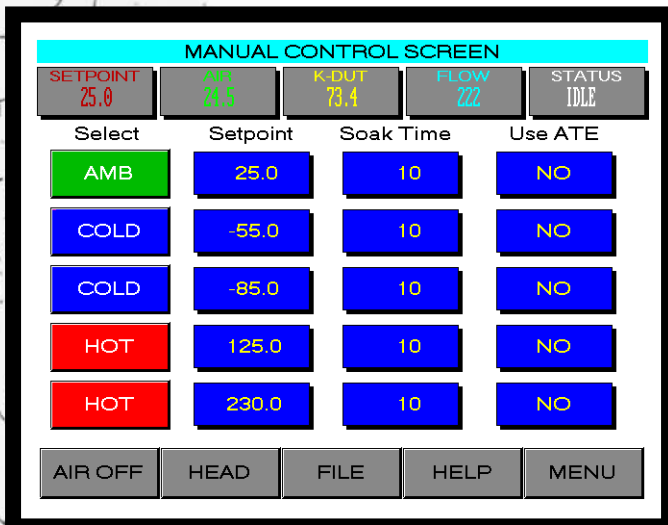
**A** leader in temperature testing technology, *Thermonics, sets a higher standard for performance and value with the T-2500SE precision temperature forcing system. Designed with speed, accuracy and reliability as essential design criteria, the T-2500SE provides the most advanced temperature testing capability available. The system transitions air temperature between +125C and -55C in as little as 4 seconds and has a wide temperature range of -90C to +225C; encompassing the requirements of both production and engineering environments. Field-proven, single-stage mechanical refrigeration eliminates the need for liquid nitrogen or any other consumable refrigerants.*

### Intelligent Touch-Screen Interface

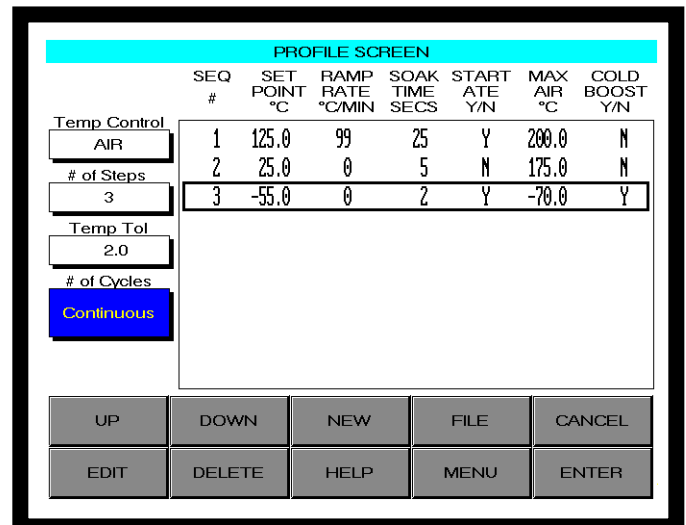
An intelligently designed, multi-color touch-screen makes the system easy to set up and operate. The temperature setpoint, air temperature, DUT (device under test) temperature, airflow rate, and current system status display continuously facilitating instant status. A variety of menus enable the operator to change parameters by touching the desired selections. In addition, a password protection feature makes it possible for the test engineer to determine operator accessibility to key software segments.

### Sophisticated Temperature Cycling

Complex temperature profiles are easily set up on the touch screen. Temperature profiles can be saved and recalled for use or exported to 3.5" diskette. Data entered can be as simple as two temperatures and soak times, or as complex as a 99-step cycle - each with a unique temperature, soak time, or ramp rate. The T-2500SE may be used for temperature cycling per MIL STD-883C for thermal stressing of semiconductor devices.



Manual Control Screen



Profile Setup Screen



## T-2500SE on Autotester Load Board

### Precise Temperature Control

A patented, proprietary temperature control algorithm provides the most accelerated and precise temperature control of any available temperature forcing system. Physical integration to the DUT is accomplished with the interface kit which includes thermal caps and a shroud assembly. Coupled with the system's high airflow - and cold boost feature, test temperatures are achieved efficiently and economically; making the T-2500SE the optimal system for testing semiconductor packages, hybrids, modules, MCMs, PCBs, and small subassemblies. Examples of typical semiconductor packages that the system can accommodate include PLCC, DIP, LCC, PGA, SOP, QFP, and others. Custom thermal fixtures are available to provide a controlled temperature environment for testing larger modules.

### Full ATE Compatibility

Remote operation of the system is accomplished with RS-232C and IEEE-488.2 interfaces. A library of remote communication commands enable easy configuration, monitoring, and actuation of critical setup and operating parameters; such as temperature set points and soak times; from any remote computer or terminal. A standard ATE interface providing start test, end of test, and class signals is provided to assure full ATE compatibility which includes the ability to communicate with all main ATE and Rack and Stack test systems.

### Easy PM and Calibration

Thermonics' Precision Temperature Forcing Systems are field proven for durability, performance and reliability. The system can be relied upon for use in around-the-clock production environments. Maximum up time is achieved with a modular design that promotes quick and easy implementation of preventive maintenance activities. Calibration of the system is facilitated by a series of software screens that guide you through the procedure in a systematic manner. In addition, diagnostics screens that report system malfunctions in an easy to understand format assist with servicing of the system.



## Optional Systems

T-2500E provides a lower cost solution with an economical, easily-adjusted arm. The system has a temperature range of -80C to +225C, and air temperature transitions between +125C and -55C in 10 seconds. Vertical motion of the arm is motorized and horizontal motion is manual.

T-2500BE replaces the arm with a basic output hose. This system is ideal for use in applications that incorporate the use of custom test fixtures.

Models T-2500IX and T-2500IX/M, which can achieve cold temperatures of -100C and -130C, respectively, are ideal for test applications that require extremely low temperatures.

The T-2500IX/M uses liquid nitrogen to facilitate cooling and is an optimal solution for large power dissipating devices in the 50 to 100W range.

## Efficient Air Dryer

To ensure the use of clean, dry air a built-in air dryer removes water vapor and particles from the compressed air source. This heatless air dryer lowers the dew point of the source air to approximately -80C.

## World-Wide Service and Support

Service is available around the world. Whether you're the U.S.A., Asia, or Europe, your system can be serviced quickly and efficiently by a qualified technician. Telephone support is always available from the factory.

## CE Certification

For use in Europe, CE certification is provided.



*Conductive Thermal Caps*

## High Productivity

The wide temperature range of -90C to +225C, in conjunction with the rapid transition rate, can quickly and accurately bring devices to test temperature.

Optional LN<sub>2</sub> injection can further increase productivity when testing large devices at extreme low temperatures.

## DUT Sensor

The case temperature of the DUT can be determined with the use of the DUT sensor (K-type or T-type). This feature makes it possible to control the temperature of the DUT to within  $\pm 1C$  of the desired temperature setpoint. In addition, an advanced temperature control algorithm assures the DUT is stabilized at temperature quickly.

## Thorough Documentation

Comprehensive, easy to read Users and Maintenance Manuals are provided with the T-2500SE. These manuals provide information on operation of the system, routine preventive maintenance, and service.

## Further Information

For additional information on this new product, call a Thermonics Sales Representative today!

**(408) 542-5900**



Fully-Motorized Arm

## ESD Protection

Grounding of all surfaces and air pathways prevents the development of electro-static discharge (ESD) which can damage sensitive semiconductor components.

## Optional Air Ionizer

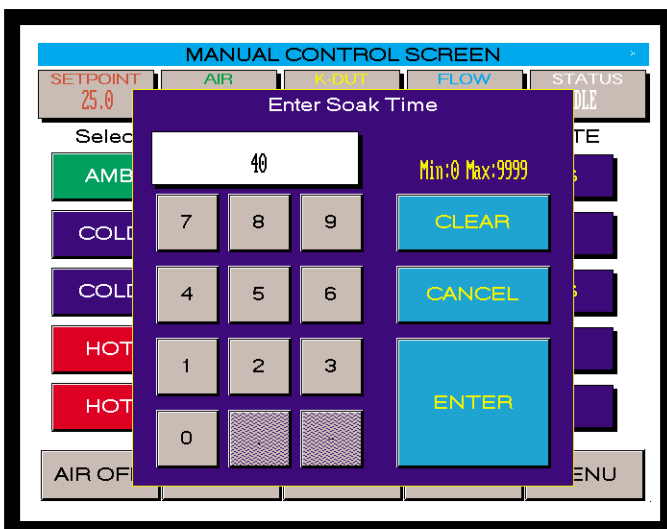
ESD protection can be further enhanced by inclusion of the optional air ionizer. The ionizer provides an ion balance that prevents a charge from developing in the air stream and removes charges from non-conductive surfaces. Conductive silicon rubber thermal caps and insulation sheets are also available.

## Integrated Thermal Test Head and Motorized Arm

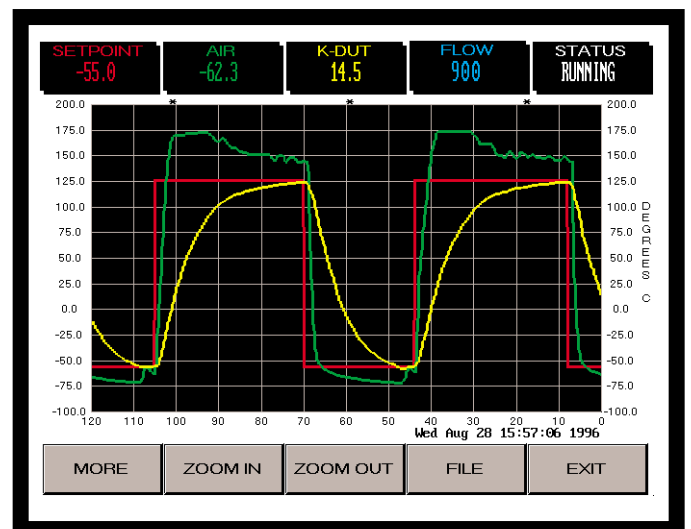
Provides a strong support for adapting the thermal test head to the DUT. The positive action, quick adjust arm has several degrees of freedom that enable it to be positioned in a wide range of horizontal and vertical positions. The combination of electro-mechanical and pneumatic action of this assembly ensures precise, stable and repeatable placement of the thermal fixture over the DUT. Heated purge air is provided to keep the test interface free of frost or moisture when operating at cold temperatures. Ambient purge air prevents overheating of test electronics when testing at hot temperatures.

## On-Screen Graphics

Numerical representations of the DUT, air and set-point temperatures continuously display. A screen that presents the data in graphical form similar to a chart recorder is provided at the touch of a key. Logged data can be stored and recalled.



Numeric Keypad



Scrolling Graph Screen

# T-2500SE SPECIFICATIONS

The model T-2500SE PTFE is designed to comply with the following specifications. The system has been factory tested to verify conformance.\*

## FEATURES

- Fast temperature response time
- Temperature range of -90C to +225C
- Environmentally safe
- Fully grounded
- Small footprint
- Fast DUT temperature stabilization time
- Color LCD display with touch-screen, operator interface
- Flexible ATE communications
- Sophisticated system self diagnostics
- ±1C accuracy with 0.1C readout
- Motorized support arm
- High air flow rate
- Frost free operation
- Graphical display of temperature response

## GENERAL DESCRIPTION

**Method of Cooling:** Forced air with single-stage mechanical refrigeration and multi-stage self-cooling heat exchanger. Non-CFC based refrigerants are used - environmentally safe.

**Method of Heating:** Forced air with in-line air heaters.

**Operator Interface:** Color LCD display, menu-driven touch-screen with software menu selections. Software contains system self diagnostics. Uses graphical software to select system menus such as operating mode, and to set system parameters such as temperature setpoint or flow rate.

**Data Communications:** Interfaces to ATE systems. Contains IEEE-488.2, RS-232C, Standard Tester Interface, and Printer ports. Software communication parameters are configurable to accommodate varying systems.

## SYSTEM FEATURES

**Temperature sensor:** Device Under Test (DUT), K-type and T-Type thermocouples. Also, K-type thermocouple for air temperature.

**Controller:** An 80X86, MS-DOS based microcomputer.

**Fail safes:** Snap-disc thermostats, air flow sensors and thermocouples. Over-temperature limit of 245C.

## TEMPERATURE PERFORMANCE

	Range (°C)	Accuracy (°C)	Stability (°C)	Displayed Resolution (°C)	Transition** Time (sec)
T-2500E	-80—225	±1.0	±0.3	0.1	10
T-2500SE	-90—225	±1.0	±0.3	0.1	4
T-2500BE	-80—225	±1.0	±0.3	0.1	120
T-2500IX	-100—225	±1.0	±0.3	0.1	4
T-2500IX/M	-130—225	±1.0	±0.3	0.1	10

Maximum cold specifications are for room ambient temperature of 77°F (25°C), or lower, using 60Hz power. Cold temperature specifications are degraded 5°C for 50Hz operation. \*\*Transition time is between +125°C and -55°C; air temperature measured at air output nozzle. Measured in temperature cycle mode after system stabilization with a 10-second soak time, or less, at each temperature.

## ENVIRONMENTAL REQUIREMENTS

Ambient Temperature Range: 15°C to 28°C  
Relative Humidity: 20 - 65%

## POWER REQUIREMENTS

Volts	Hertz	Phases	Amps
208—230	50/60	1Ø	20

## AIR INPUT REQUIREMENTS

**Pressure:** 80-110 PSIG (5.7 - 7.8 Kg/Cm<sup>2</sup>)

**Flow Rate:** 18 SCFM (8.6 liters/sec)

**Dew Point:** Less than 10C at 80 PSIG (5.7 Kg/Cm<sup>2</sup>)

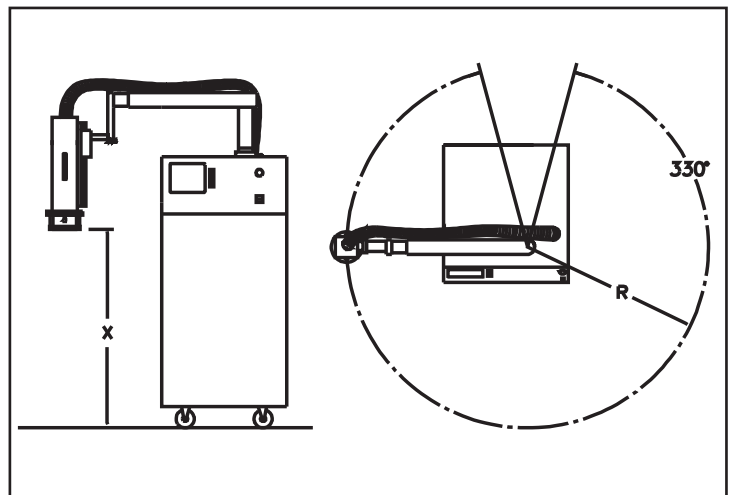
**Quality:** Clean air; free of oil, moisture and particles

## AIR FLOW

200 to 900 SCFH (1.6 to 7.6 liters/sec.). Flow is under software control.

## PHYSICAL CHARACTERISTICS

Height (in/cm)	Width (in/cm)	Depth (in/cm)	Weight (lbs/kgm)
55/139	25/63	28/71	350/160



	Min (in/cm)	Max (in/cm)
X	27/69	44/112
R	34/86	48/122



1288 Reamwood Ave.  
Sunnyvale, California 94089-2233  
Phone: (408) 542-5900  
Fax: (408) 542-5910  
E-Mail: info@thermonics.com  
URL: http://www.thermonics.com

**THERMONICS**  
A Test Enterprises Company