



ALPHA OMEGA
INSTRUMENTS

SERIES 850

Rack Mounted Thermoelectric Cooler Controller



FEATURES

Complete Digital Programmability

Exceptional Control Stability

PID Control

Advanced Auto-Tuning

Dual Digital Displays

Versatile Rack Mounting

Optional GPIB, RS-232, & RS485

BENEFITS

Ensures maximum control with an easy to use front panel interface.

Provides long term temperature stability of $<0.002^{\circ}\text{C}$.

Obtain tight temperature control with quick response and fast settling time.

Automatically adjusts the critical operating parameters for enhanced performance.

Simultaneously displays setpoint and actual temperature for on-the-spot assessment.

Versatile design provides systems rated to deliver 300 watts and higher!

Enhances the instrument's versatility.

SYSTEM DESCRIPTION

The Series 850 TEC Controller, like its bench-top counterpart the Series 800 TEC Controller, represents a significant advance in the state-of-the-art of thermoelectric cooler (TEC) controllers. It's no secret that in the past, thermoelectric cooler controllers required a significant amount of hands-on operation to provide satisfactory performance, particularly when variations in the load and/or environmental conditions existed. The Series 850 Thermoelectric Cooler Controller utilizes advanced control technology in combination with auto-tuning capabilities to provide unprecedented performance.

Ease of Use

The eloquence of the Series 850 Thermoelectric Cooler Controller is its ease of use. Unlike some thermoelectric cooler controllers that have cluttered front panels with redundant controls,

the Series 850 Thermoelectric Cooler Controller features a user friendly front control panel. The control panel contains four switches that allows access to the instrument's control settings. In addition, there are two LED digital displays that simultaneously display both actual temperature and setpoint temperature. The Series 850 Thermoelectric Cooler Controller features proportional, integral, and derivative (PID) control that provides exceptionally tight control over a wide temperature range, as well as rapid response to changes in operating conditions. The auto-tuning feature helps to ensure maximum performance over a broad spectrum of operating conditions. Auto-tuning sets the critical PID terms to match the conditions of the application and provides fast response while minimizing overshoot and undershoot. From the users perspective, the need to make frequent manual adjustments has been virtually eliminated. For unique applications, users have the option to manually adjust the instrument's control parameters as desired.

Maximum Versatility

The Series 850 TEC Controller accepts a variety of temperature sensors including three wire 100 ohm RTD's. Use of a three wire RTD helps to eliminate measurement error caused from unaccounted changes in sensor cable lengths. Another feature of the Series 850 TEC Controller is that users can choose to operate in either the bipolar (heat and cool) or unipolar (heat or cool) modes. In the bipolar mode, heating and cooling limits can be set independent of each other helping to ensure that temperature limits are not exceeded. In addition, the Series 850 TEC Controller incorporates current limit adjustment to protect TEC modules from damage due to excess current. And like the temperature limits, current levels for the heat and cool modes can be set independently thus offering maximum protection to TEC modules and peripheral equipment. The front panel contains LEDs to signify when the instrument is in the heat or cool mode.

Power.....and more Power!

The Series 850 Thermoelectric Cooler has six standard output power ratings:

- 30 watts2 A @ 15 VDC
- 60 watts4 A @ 15 VDC
- 90 watts.....6 A @ 15 VDC
- 120 watts.....8 A @ 15 VDC
- 150 watts.....10 A @ 15 VDC
- 300 watts.....20 A @ 15 VDC

Alpha Omega Instruments has gone beyond the conventional approach to powering TEC's. By collaborating with several of the Company's existing customers, it developed a unique concept of adding supplemental power. Through the use of its' optional Series 850 Power Boost Module (PBM), users can increase the output power of their Series 850 Controller. Depending on the number of PBM's used, the output power of the Series 850 Controller can be doubled, tripled, or even quadrupled. In reality, the additional power available through the PBM's can go into the kilowatts! And, regardless of the number of PBM's used, they along with the Series 850 Controller, are driven from one temperature sensor thus ensuring uniform temperature control. PBM's can even be installed in the field in a matter of minutes.

RS-232C/RS-485, GPIB Communications, and Graphical Software

The Series 850 TEC Controller can be equipped with optional RS-232C, or RS-485 serial communications utilizing the MODBUS protocol, as well as with GPIB. Another option available for RS-232C or RS-485 users is Alpha Omega Instrument's proprietary TecView software that is compatible with most Windows Operating Systems. TecView provides a user friendly graphical interface for remote operation of the Series 850 Controller via a PC. Data storage, formatting for use with spreadsheet programs, programming ramp and soak cycles, ramp to setpoint cycles, etc. can be easily done from a PC using TecView.

High and Low Temperature Alarm

The Series 850 TEC Controller is equipped with a user adjustable temperature alarm relay. The relay can be set as a high alarm, low alarm, or both a high and low alarm. This standard feature is particularly useful if it is critical that certain temperature limits not be exceeded.

Soft Start

The Series 850 TEC Controller is equipped with soft start so that upon power up, potentially dangerous current spikes are eliminated.

Proud History

Some of the companies who have repeatedly chosen Alpha Omega Instruments Corp. include:

- ◆ IBM
- ◆ EG&G
- ◆ JPL
- ◆ Uniliver
- ◆ Raytheon
- ◆ Xerox
- ◆ Wyle Labs
- ◆ NASA Lewis
- ◆ McDonnell Douglas
- ◆ Stanford Univ.
- ◆ Eastman Kodak
- ◆ Hewlett Packard
- ◆ Motorola
- ◆ Honeywell
- ◆ Exxon
- ◆ NIST
- ◆ MIT
- ◆ Los Alamos
- ◆ GE
- ◆ Grumman
- ◆ TI

SPECIFICATIONS

Control Loop	Unipolar or Bipolar, constant current, PID with Autotuning. User can select to use P, or P&I only .
Compliance Voltage	15 VDC
Maximum Output Current	Up to 20 amperes.
Maximum Output Power For Controllers & Power Boost Modules	up to 300 watts.
Temperature Sensors	100 Ω RTD, Types E, J, K, N, and T thermocouples, thermistor, AD590/592, and LM 35/135/335 as well as external voltage and current inputs.
Range of Sensors	Thermistor: 0-100 KΩ and 0-1 MΩ. RTD's, AD590/592, LM 35/135/335, and thermocouples -50 °C to +150 °C (typical). Higher and lower temperatures can be measured depending on the sensor type. Consult factory.
Long Term Stability	<0.002° C
Noise and ripple	< 1 mA
Front Panel Displays	Two 4 digit LED displays-red for actual temperature and green for setpoint temperature.
Display	TEC temperature and setpoint temperature in °C or °F (user selectable) with an RTD, thermocouple, AD590/592, and LM35/135/LM335. For a thermistor the display is in Kohms.
Display Resolution	Thermistor: 0.01 KΩ on 100 KΩ range and 0.1KΩ on 1 MΩ range. For RTDs, thermocouples, AD590/592 and LM135/335 the resolution is 0.1 °C
AC Power	115/230 VAC, 50-60 Hz.
Internal Cooling	Two fans.
Weight	18 pounds maximum (300 watt instrument)
Controller Dimensions	5.2 " Height x 19" Wide x 15.9" Deep
I/O Connections:	TEC, Temperature Sensor, AC Power, PBM and optional RS-232/485 (using MODBUS protocol), and GPIB.
Operating Temperature	0 to 50 °C
Warranty	Two Years

Alpha Omega Instruments reserves the right to change specifications at any time.



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