



Trillium US Inc.
E350® Temperature Monitor
User's Manual
Rev A / February 2016

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1 Revision History

Date	Revision	ECR #	Description of Change
July 2008	1.0.1		Initial release
January 2013	1.0.2		Update to new corporate format
February 2016	A	2887	Rebranding and format changes
Document Part Number: 97-00042-000			

2 Preface

2.1 *About Trillium US Inc.*

Trillium US Inc., an Oregon based company, specializes in the manufacture and repair of cryogenic vacuum pumps, cryocoolers (refrigerators) and helium compressors for semiconductor, optical coating, linear accelerators, medical equipment, and R&D applications.

You can find just what you need from our range of products and support services:

- New Equipment - cryopumps, compressors, cryocoolers, and cryopump controllers.
- Comprehensive range of accessories for the installation of whole systems and a complete range of spare parts to repair cryopumps and compressors.

2.2 *Other Services from Trillium US Inc.*

Trillium US Inc. offers comprehensive refurbishment services for its own equipment as well as for that of most of our competitors. Our products and services are available through our global network of agents and dealers.

- Repair and refurbishment services - We offer our own quality products, as well as most other manufactures models, often with off-the-shelf availability.
- Exchanges - We offer our own quality products, as well as most makes of cryopumps and helium compressors, which are refurbished and fully warranted.
- Technical Support - Our support engineers will help determine if your cryopump system is operating correctly so that you can get your system back to optimum efficiency as soon as possible.
 - To contact Trillium US Inc. Technical Support:
 - E-mail: support@trilliumus.com
 - Telephone: 1-512-441-9258 or Toll Free: 1-800-404-1055
- Installation - On-site installation services are available to guarantee performance and save you time.
- Training - We offer on-site training to help you and your staff to know more about your cryopump and compressor systems. Our training will give you confidence and the ability to maintain a highest possible uptime for your system.

2.3 *About this Manual*

The purpose of this manual is to provide our customers using the E350 Cryogenic Temperature monitor with the information needed to safely and efficiently operate the monitor when operating as part of a cryogenic refrigeration system. Such a system is often comprised of the following equipment:

- Cryopump compressors
- Coldhead(s) or cryopump(s)
- Connecting helium lines
- Temperature monitor(s)

This manual describes the design, operation and maintenance of the E350 Cryogenic Temperature monitor.



2.4 Compatibility

The E350 Cryogenic Temperature Monitor is compatible with most cryopumps and coldheads.

3 Introduction

3.1 E350 Cryogenic Temperature Monitor Features

The E350 Cryogenic Temperature Monitor features:

- Continuous visual update using an LCD display
- Drives single diode, intended for cryogenic temperature measurement
- Diode temperature curve selection from four pre-defined curves

3.2 Description

The E350 Cryogenic Temperature Monitor drives a single diode temperature sensor, and provides a visual display of the temperature on an LCD module. The high resolution measurement sensors provide noise rejection to deliver precise, accurate temperature readings. The diode curves are user selectable from four (4) pre-defined curves providing support for common diodes. In addition, a user-programmable curve is available for non-supported diodes. Temperature conversion is provided by a 10 μ A constant current source using a spline interpolation (piecewise polynomial).

3.2.1 Specifications

The E350 specifications are listed in **Table 3-1**. The E350 rear panel is shown in **Figure 1** and described in **Table 3-2**.

Table 3-1: E350 Specifications

Item	Specification
Features	Display Temperature of 1 Diode
	Four Selectable Diode Curves
Power	110/220 VAC Input @ 50/60 Hz (Universal Input)
Connectors	IEC Power Input
	DB9F (Diode Driver)
Dimensions	6.5" (W) x 7.5" (L) x 3.05" (H)

Figure 1 – E350 Rear Panel

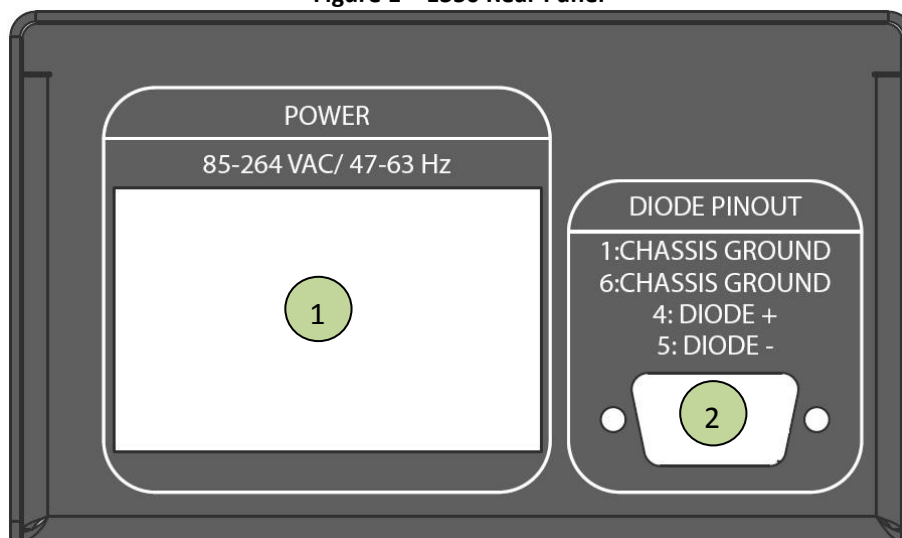


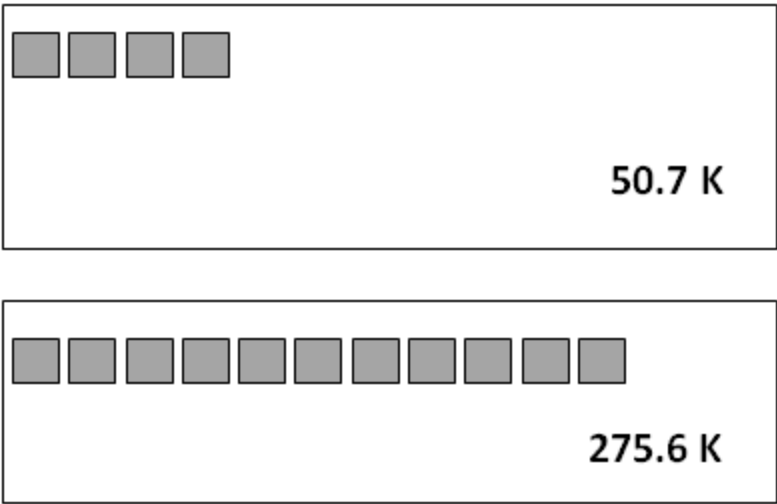
Table 3-2: E350 Rear Panel Features

Feature	Description
1: IEC Power Entry	Universal Power input accepts 110 or 220 VAC at 50 or 60 Hz
2: D-Sub 9 Female-Temp Sensors	Connect temperature sensor according to the following pin out: • Pin 1: Shield (GND) • Pin 2: No Connect (NC) • Pin 3: NC • Pin 4: Diode Sensor Positive • Pin 5: Diode Sensor Negative • Pin 6 – 9: NC

4 E350 User Interface

The E350 provides a continuous display of the temperature measurement on a 16 x 2 LCD character display. The top line of the display provides an indication of the temperature status. As temperature increases, the bar graph grows from left to right. See **Figure 2**.

Figure 2 – E350 LCD Temperature Status



Lower temperature indication (50.7 K) illustrated by fewer bars on the visual display

In addition, the front panel LED’s color gives the user a visual indication of the temperature range:

- **Red**: Temperature > 20° K
- **Yellow**: 15° K < Temperature < 20° K
- **Green**: Temperature < 15° K

The display interface also provides diode curve selection.

4.1 Diode Curve Selection

The user can select the diode curve which corresponds to the temperature diode sensor connected to the E350. To select a diode curve:

1. Press the **MENU** button.
2. Scroll through the standard diode options by pressing the **UP** and **DOWN** buttons.
3. When the appropriate diode curve has been selected, press **MENU**.



E350 supports the following standard temperature sensor diodes:

- Trillium US Inc. Temperature Diode
- CTI Temperature Diode
- DT-470 Silicon Diode
- DT-670 Silicon Diode

The user selected diode type is stored to permanent memory to ensure the unit powers up in the same state it was powered down.

5 Ordering Information

Table 5-1 contains the ordering information for the E350 Cryogenic Temperature Monitor. Customers can also order the E350 Cryogenic Temperature Monitor kits with diode cables of alternate lengths listed in

Table 5-2.

Table 5-1: E350 Cryogenic Temperature Monitor Ordering Information

Cryopump	Part Number
E350 Kit: includes power cable and one 10ft standard single diode cable. For kit with other cable length, see below	99-00076-010
Rack Mount Cradle	40-02005-000

Table 5-2: E350 Alternate Cable Length Kits

Configuration	Cables	Part Number			
		20 Ft.	25 Ft.	30 Ft.	50 Ft.
Single Cryopump or coldhead	Standard Single Diode Cable	99-00076-020	99-00076-025	99-00076-030	99-00076-050

