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Model 3150

Advanced High-Power Temperature Controller



- 15 A/23 V, low noise, bipolar output
- Extremely stable, long term drift <0.001°C
- Multiple sensors supported: thermistors, RTD, AD590/592, and LM335
- Complete characterization of TE cooler (I_{TE} and V_{TE}) versus temperature
- Automatic power management and failsafe shutdown

The **Model 3150 Temperature Controller** provides a 350 W bipolar output for operation with thermoelectric (TE) coolers. Active power management of the output DC power supply reduces unnecessary power dissipation resulting in increased temperature stability and higher reliability. Full 16-bit control and characterization of the TE module and temperature sensor is attainable via the IEEE-488 or RS-232 interfaces. LabVIEW drivers are included with the computer interfaces as a standard feature.

All pertinent TE cooler parameters I_{TE}, V_{TE}, temperature sensor (°C, R, Amp, or Volts) are measured and simultaneously presented on the four line alphanumeric LCD display. All standard temperature sensors including thermistors, platinum RTD, AD590/592 and LM335 IC sensors are supported without the need for additional interface units. Sensor calibration constants are easily programmed for direct readout in °C.

A proportional-integral (P-I) control circuit is implemented in the Model 3150 that meets all the temperature stabilization requirements for laser diode users.

During operation, the front panel controls can be disabled to prevent any changes in the output by accidental misadjustment of the control knob.

Protection features include: I_{TE} Limit, Hi and Lo Temperature Limits, Sensor Open and TE Open Detection. To prevent noise pickup, either by the output lines or the sensor inputs — resulting in undesirable temperature oscillations — shielded cables are also available.

Specifications

LCD Display	
Display Type	4-line by 20 character alphanumerical
Display Backlighting	Green LED
Display Controls	Brightness, contrast (optimizes viewing angle)
Chassis Ground	4 mm banana jack
Power Requirements	90–132 VAC, 198–250 VAC (6 Amp Max), 50–60 Hz
Size (H x W x D) [in. (mm)]	3.5 (86) x 14 (356) x 14 (356)
Mainframe Weight [lb (kg)]	14 (6.4)
Operating Temperature	0°C to 40°C (<80% relative humidity non-condensing)
Storage Temperature Range	-20°C to + 60°C (<90% relative humidity non-condensing)
Connectors	
RS-232	9-pin, male D-Sub
GPIB	24-pin, IEEE-488
Output Connectors TE Module and Sensor	7-pin, female D-Sub 7W2

Accessories

Model	Description
3150-02[1]	Temperature Controller Cable
3150-04[1]	Temperature Controller/Mount Cable
300-16	10.0 kΩ Thermistor (±0.2°C)
300-22	AD592CN IC Sensor (-45°C to +125°C Range)
LD1-RACK	Rack Mount Kit, Single

1) Please see page 347 for Cable Diagrams

Ordering Information

Model	Description
3150	Advanced High-Power Temperature Controller

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Specifications

TEC Output	
Type	Bipolar, Low Noise
Maximum Current	15A at 23V or 12.5A at 28 V
Maximum Power (W)	350
I_{TE} Current Resolution (mA)	0.458
I_{TE} Current Accuracy(3)	±(3% setting + 50 mA)
Current Limit	
Range (A)	0–15
Accuracy (mA)	±150
Ripple/Noise (rms) (mA)	<10
Short-Term Stability (1 h) (°C)	0.0005
Long-Term Stability (24 h) (°C)	0.001
Temperature Coefficient (°C/°C)	<0.05
TEC Measurement Display	
Temperature (°C)	-100.00 to +240.00
Resistance (10 µA) (kΩ)	0.01–495
Resistance (100 µA) (kΩ)	0.001–49.5
Range Resistance (RTD) (Ω)	20-192
Range TE Voltage (V)	0.0 to + 30.0
TE Current (A)	-15.00 to +15.00
Range AD590 Current (µA)	248–378
Range LM335 Voltage (mV)	2331-3731
Temperature (°C)	0.01
Resistance (10 µA) (Ω)	10
Resistance (100 µA) (Ω)	1
Resolution Resistance (RTD) (Ω)	0.01
Resolution TE Voltage (V)	0.1
TE Current (mA)	10
Resolution AD590 Current (µA)	0.01
Resolution LM335 Voltage (mV)	0.1
Temperature (°C)(4)	Typical ±0.1
Resistance (10 µA)(3)	±(0.04% + 16Ω)
Resistance (100 µA)(3)	±(0.05% + 8Ω)
Accuracy Resistance (RTD)(3)	±(0.03% + 50 mΩ)
Accuracy TE Voltage(3)	±(0.005% + 100 mV)
TE Current(3)	±(0.50% + 30 mA)
Accuracy AD590 Current(3)	±(0.005% +0.5 µA)
Accuracy LM335 Voltage(3)	±(0.09% + 1 mV)

Temperature Sensors	Thermistor (NTC 2-wire)	AD590	LM335	RTD (100Ω)(1)
Temp. Sensor Control Resolution (°C)		0.01		
Temp. Sensor Control Accuracy	±0.05 °C(2)	±0.05	±0.05	±0.05
Sensor Bias	10/100 µA	+5 V	1 mA	1 mA
Temperature Computation and Calibration				
Thermistor	$1/T = (C1 \times 10^{-3}) + (C2 \times 10^{-4})(\ln R) + (C3 \times 10^{-7})(\ln R)^3$			
AD590	$T = C1 + C2 \times (I_{AD590}/1\ \mu A/K - 273.15)$			
LM335	$T = C1 + C2 \times (V_{LM335}/10\ mV/K - 273.15)$			
RTD (100Ω)	$R_T = Ro\ [1 + C1T + C2T^2]$; T ≥0°C, Ro = resistance at 0°C where Ro = 100Ω for a 100Ω Pt RTD. $R_T = Ro\ [1 + C1T + C2T^2 + C3T^3(T - 100)]$; T < 0°C			

1) Accuracy is with lead wire resistance calibrated out
2) Thermistor accuracy will degrade at temperatures above 25°C
3) ± (x% Reading + Fixed Error)
4) Temperature is a value derived from the sensor's parameter (resistance, voltage or current) using the above temperature computation equations. Accuracy can be computed by applying the sensor's parameter to the above equations at the temperature in question.



Model 3150 Rear Panel

Related Products

Our Model 5600 Advanced High-Power Laser Diode Drive and our Model 762 Series High-Power Temperature Controlled Mounts complement Newport's 3150 Temperature Controller in performance and value.



Model 762/762W High-Power Laser Diode Mounts



Model 5600 Advanced High-Power Laser Diode Driver

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