

High-Power Temperature Controller

MODEL 3700 – 336W BIPOLAR OUTPUT



The 3700 Advantage

- 14 A/24 V, low noise, bipolar output
- Extremely stable, long term drift <math><0.002^{\circ}\text{C}</math>
- 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 3700 Temperature Controller provides a 336 W bipolar output for operation with thermoelectric (TE) coolers. At the unit's heart, DSP based controls allow for PID settings with fast settling times. This feature combined with sound electronics design and quality components results in great temperature stability and higher reliability. Computer interface is possible via a USB terminal. LabVIEW drivers are included with the computer interface as a standard feature.

All pertinent TE cooler parameters I_{TE} , V_{TE} , temperature sensor ($^{\circ}\text{C}$, 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 $^{\circ}\text{C}$.

PID control is implemented in the Model 3700 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, Voltage 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.

High-Power Temperature Controller, 3700

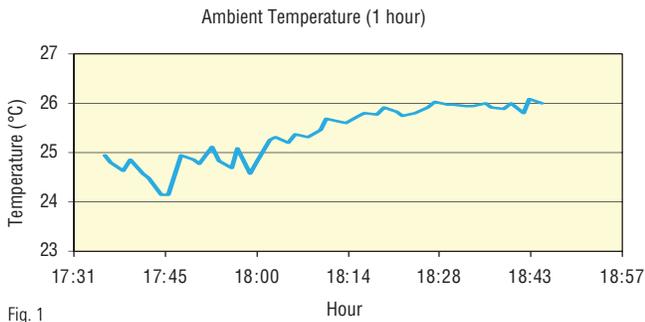


Fig. 1

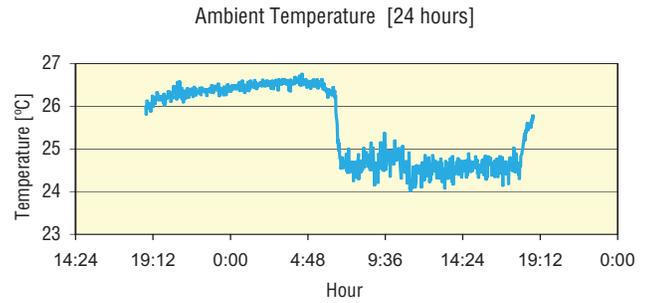


Fig. 3

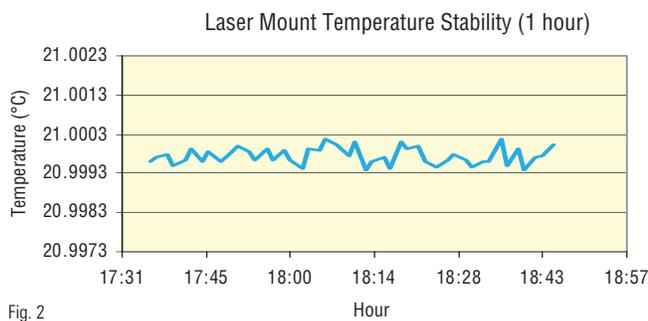


Fig. 2

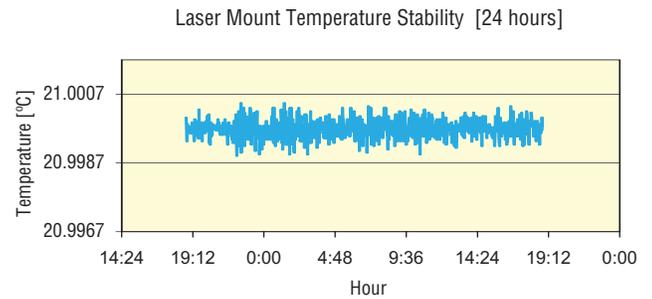


Fig. 4

One hour temperature stability measurements performed in a typical lab environment, on a Newport Laser Mount 764H-110 with an Oclaro BW-series laser running at 10W optical output power. Fig. 1 graph displays ambient temperature variations during the test period of the order of 2°C. The Laser mount temperature was set at 21°C for the entire test over a 1 hour period. Fig. 2 graph shows the laser mount temperature to be stable at 21°C with a variation of $\pm 0.0004^{\circ}\text{C}$ over the 1 hour period.

Fig. 3 shows 24 hour temperature stability measurements performed in a typical lab environment, on a Newport Laser Mount 764H-110 with an Oclaro BW-series laser running at 10W optical output power. Graph displays ambient temperature variations during the test period of the order of 3°C. The Laser mount temperature was set to 21°C for the entire test over a 24 hour period. Fig. 4 shows the laser mount temperature to be stable at 21°C with a variation of $\pm 0.00077^{\circ}\text{C}$ over the 24 hour period.

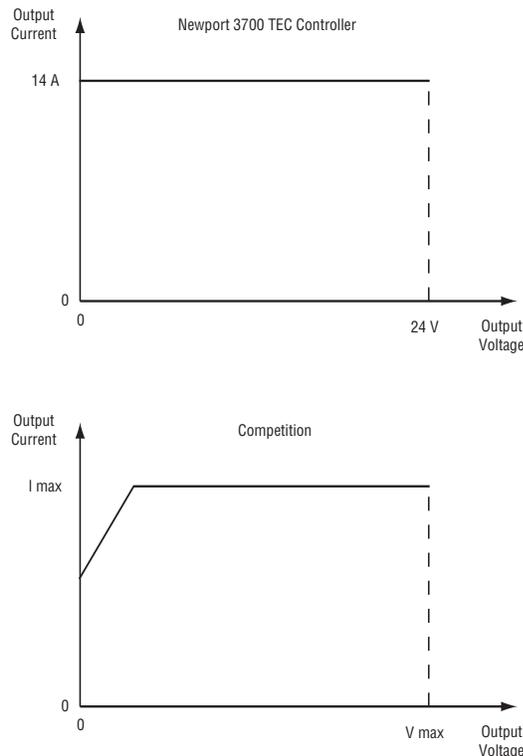


Fig. 5 Innovative hardware and firmware design allows 3700 to output 14A over the full compliance range (0-24V). Compare this with our competitors' controllers output capability shown in bottom graph of figure 5.

High-Power Temperature Controller, 3700

Specifications

TEC Output

Type	Bipolar, Low Noise
Maximum Current	14 A
Output Power (W)	336
I_{TE} Current Resolution (mA) (manual/remote) ⁽¹⁾	1/0.1
I_{TE} Current Accuracy	± 0.3%
Ripple/Noise (rms) (mA) ⁽²⁾	<1
Current Limit	
Range (A)	0–14
I_{TE} Current Resolution (mA)	1/0.1
Accuracy (%)	± 0.3
Stability	
Short-Term Stability (1 h) (°C)	< 0.0009
Long-Term Stability (24 h) (°C)	< 0.0019
Temperature Coefficient (°C/°C)	< 0.0005
TEC Measurement Display	
Temperature Range (°C)	-100.00 to + 250.00
Display Range Resistance (1 μ A) (k Ω)	0.1 to 2500.0

Auxiliary Temperature Sensor⁽⁴⁾

Temperature Range [°C]	0 to +80.00
Temperature Resolution [°C]	0.0001
Resistance Range [k Ω] at 100 μ A	0.1 to 25.0
Temperature Accuracy [°C] ⁽³⁾	± 0.001
Resistance Accuracy at 100 μ A [%]	± 0.01

Temperature Sensors	Thermistor (NTC 2-wire)	AD590	LM335	RTD (100 Ω) ⁽¹⁾
Temp. Sensor Control Resolution (°C)	0.0001			
Temp. Sensor Control Accuracy (°C) ⁽³⁾	± 0.0001	± 0.03	± 0.03	± 0.001
Sensor Bias Current (mA)	0.001, 0.01, 0.1, 1, 10	-	1	1
Sensor Bias Voltage (V)	-	+4	-	-

⁽¹⁾ In remote mode the output current is rounded at 0.5 mA steps.

⁽²⁾ Noise and ripple measured on a 1.6 ohm resistor on the full range between -14A to +14A

⁽³⁾ Temperature accuracy reflects the accuracy of temperature change measurement. This is the uncertainty that the instrument brings into the measurements and it is not a reflection of the absolute temperature measurement, which depends on the thermistor accuracy.

⁽⁴⁾ Remote mode only

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Specifications

LCD Display	
Display Type	4-line by 20 character alphanumeric, and seven segment display
Display Backlighting	Green LED
Display Controls	Brightness, contrast (optimizes viewing angle)
Chassis Ground	4 mm banana jack
Power Requirements	110/220 VAC, 50/60 Hz
Maximum Power Consumption (W)	500
Size (H x W x D) [in. (mm)]	3.47 (88.14) x 19.00 (482.60) x 12.24 (310.89)
Mainframe Weight [lb (kg)]	10.8 (4.9)
Operating Temperature (°C)	0 to 40 (<90% relative humidity non-condensing)
Storage Temperature Range (°C)	-30 to +60 (<90% relative humidity non-condensing)
I/O Signals	15-pin female D-sub
Output Connector	7-pin, female D-Sub 7W2
USB Interface Connection	USB 2.0 Connector



Model 764H Series High-Power Laser Diode Mounts

Related Products

Our Model 5700 Series Advanced High-Power Laser Diode Drivers and our Model 764H Series High-Power Temperature Controlled Mounts complement Newport's 3700 Temperature Controller in performance and value.



Model 5700 Advanced High-Power Laser Diode Driver

Ordering Information

Model	Description
3700	High-Power Temperature Controller, ± 14 A, 24 VDC, 336 W

Accessories

Model	Description
3150-02	Temperature Controller Cable, Model 3150, D-Sub 7W2 Male to Bare Wire
3150-04	Temperature Controller Cable, Model 3150, D-Sub 7W2 Male to Female
300-16	Thermistor, 10.0 k Ω , $\pm 0.2^\circ\text{C}$
300-22	Temperature Sensor, AD592CN, -45°C to $+125^\circ\text{C}$ Range



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