WAVELENGTH
ELECTRONICS

PID-1500

Thermoelectric & Resistive Heater
Plug-n-Play Temperature Controller

GENERAL DESCRIPTION:

The PID-1500 Linear Bipolar, Thermoelectric Temperature Controller provides ultra-stable, low noise temperature control from a single output DC supply. The on-board, 12-turn Temperature Set trimpot sets the desired temperature. Single-turn trimpots control the proportional gain and current limit. A four-position Sensor Select jumper applies the proper bias current for thermistors, IC sensors, or RTDs. All inputs and outputs are accessed via a single 14-pin header on the base. These pins provide easy access for DC supply input, sensor, thermoelectrics or resistive heaters, external control, and measurements with an external voltmeter.
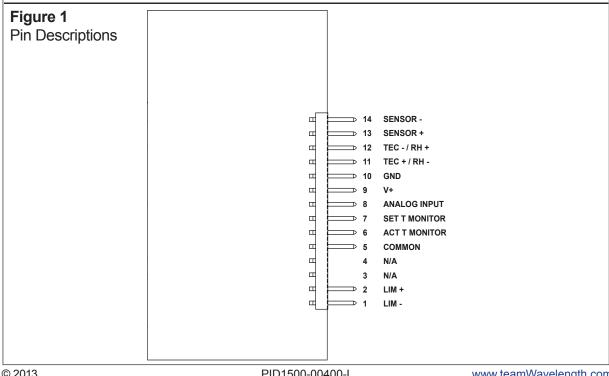
The rugged, compact design can be used in many environments and has a -20°C to +85°C operating range. The integral heatsink can be removed to mount the module to a system chassis.

FEATURES:
- Single supply operation: +5 V to +12 V
- Up to 1.5 A output current available
- < 0.005°C stability (24-hour)
- Adjustable current limit
- Remote Analog Input to adjust Temperature Setpoint
- Supports Thermistors, IC Sensors, or RTDs
- Temperature Setpoint, Proportional Gain, and Current Limit are user adjustable
- Remotely Enable/Disable output
- Can be wired for Resistive Heater control

RoHS Compliant

Figure 1
Pin Descriptions

Pin	Description
14	SENSOR -
13	SENSOR +
12	TEC - / RH +
11	TEC + / RH -
10	GND
9	V+
8	ANALOG INPUT
7	SET T MONITOR
6	ACT T MONITOR
5	COMMON
4	N/A
3	N/A
2	LIM +
1	LIM -

ELECTRICAL AND OPERATING SPECIFICATIONS

GENERAL SPECIFICATIONS DESCRIPTION	SYMBOL	VALUE	UNIT
Power Requirements [1], [2]	V_{DD}	+5 to +12	Volts DC
Supply Current		PID Limit Current plus 100	mA
Operating Temperature	T_{OPR}	-20 to +85	°C
Storage Temperature	T_{STG}	-40 to +125	°C
Size		1.52 x 1.10 x 2.65	inches
		39 x 28 x 67	mm
Weight		4	ounces
Warm-up Time to rated accuracy		1	hour
TEMPERATURE CONTROL			
Temperature Control Range [3]		Range is sensor dependent	°C
Short Term Stability, 1 hour [4]		< 0.003	°C
Long Term Stability, 24 hours [4]		< 0.005	°C
OUTPUT			
Bipolar Output Current [2]		± 1.5	Amps
Compliance Voltage		See note [5]	
Maximum Output Power		12	Watts
Maximum Internal Power Dissipation		9	Watts
Current Limit Range		0 - 1500	mA
Control Loop		PI	
Proportional Gain, adjustable		1 - 50	A / V
Integrator Time Constant, fixed		1	second
TEMPERATURE SENSOR TYPES			
Thermistor Types, 2-wire		NTC or PTC	
Sensor Bias Currents		0.01, 0.10, 1.0 and 10.0	mA
Thermistor Range		1 - 500	kΩ
IC Sensor Types [6]		AD590, LM335	
IC Sensor Bias (LM335)		1	mA
RTD Types, 2-wire		100 - 1000	Ω
TRANSFER FUNCTION (Analog IN to Monitor)		1.3 / 1	V / V
SET T versus ACT T Accuracy		< 1	%

[1] +12.5 V MAXIMUM

[2] At V_{DD} = 5 VDC, maximum bipolar output current is ±1.25 A.

[3] Temperature range depends on the physical load, sensor type, and TE module used. 5 V operation will limit the Setpoint Voltage to 2.5-3.5 V, thus limiting the temperature range of the PID-1500.

[4] Stability quoted for a typical 10 kΩ thermistor at 100 µA sensing current.

[5] Compliance Voltage varies with power supply voltage. A maximum compliance voltage of ± 10.5 V will be obtained with a +12 V input. A compliance voltage of ± 4 V will be obtained with +5 V input.

[6] AD590 requires an external bias voltage and 10 kΩ sense resistor.