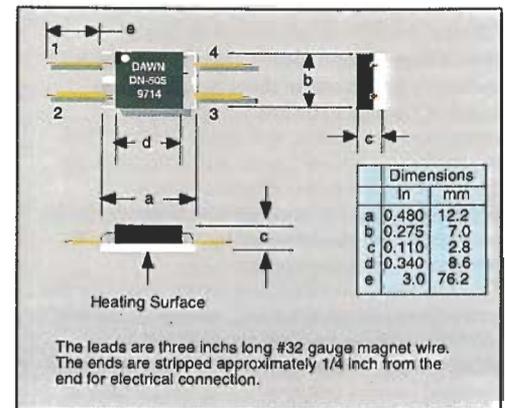


Basic Specifications for the Standard Proportionally Controlled Heaters

Catalog Number	Series	VIN (Volts)	P _{MAX} (Watts)	I _{MAX} (Amps)	V _{S(MIN)} (Volts)	V _{S(MAX)} (Volts)
DN-505-05	A	5 Vdc	5	1.0	4.5 Vdc	5.5 Vdc
DN-505	A	15 Vdc	10	0.7	5.0 Vdc	16 Vdc
DN-510	A	50 Vdc	15	0.35	24 Vdc	55 Vdc
DN-515-1528	B	15 Vdc	28	1.9	9 Vdc	18 Vdc
DN-515	B	28 Vdc	28	1.0	20 Vdc	35 Vdc
DN-515-2840	B	28 Vdc	40	1.43	20 Vdc	35 Vdc
DN-520-40	C	115 Vac	30	0.28	100 Vac	125 Vac
DN-520-50	C	115 Vac	50	0.43	100 Vac	125 Vac
DN-525	C	240 Vac	80	0.32	100 Vac	250 Vac

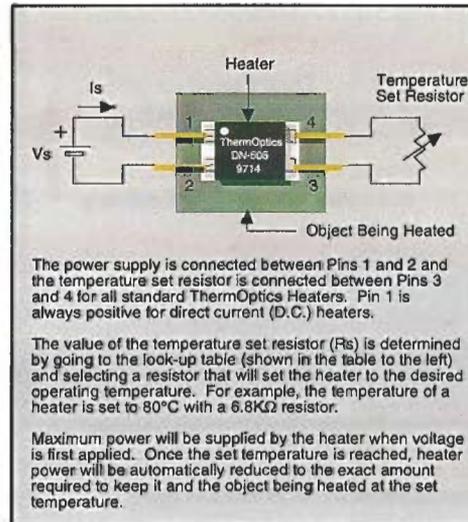
A Series



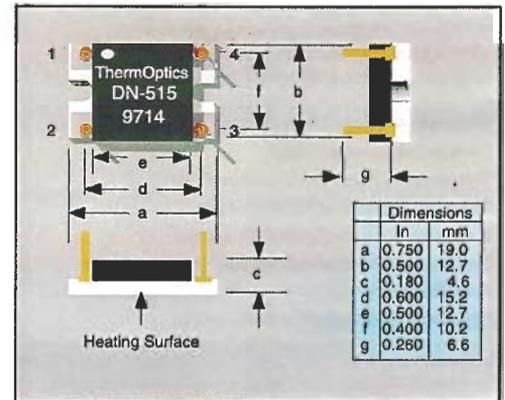
Heater Temperature vs Temperature Set Resistor

T °C	RS KΩ	T °C	RS KΩ	T °C	RS KΩ	T °C	RS KΩ
0	360.1	29	79.6	58	20.2	87	4.6
1	340.6	30	75.8	59	19.3	88	4.4
2	322.3	31	72.2	60	18.4	89	4.1
3	305.0	32	68.8	61	17.5	90	3.9
4	288.7	33	65.5	62	16.7	91	3.6
5	273.4	34	62.5	63	15.9	92	3.4
6	259.0	35	59.5	64	15.2	93	3.2
7	245.4	36	56.8	65	14.5	94	3.0
8	232.5	37	54.1	66	13.8	95	2.8
9	220.4	38	51.6	67	13.2	96	2.6
10	209.0	39	49.2	68	12.5	97	2.4
11	198.3	40	46.9	69	11.9	98	2.2
12	188.1	41	44.6	70	11.4	99	2.0
13	178.5	42	42.7	71	10.8	100	1.9
14	169.4	43	40.7	72	10.3	101	1.8
15	160.8	44	38.9	73	9.8	102	1.52
16	152.7	45	37.1	74	9.3	103	1.37
17	145.1	46	35.4	75	8.9	104	1.23
18	137.8	47	33.8	76	8.4	105	1.09
19	131.0	48	32.3	77	8.0	106	0.95
20	124.5	49	30.8	78	7.6	107	0.82
21	118.3	50	29.4	79	7.2	108	0.70
22	112.5	51	28.1	80	6.8	109	0.58
23	107.0	52	26.8	81	6.5	110	0.46
24	101.8	53	25.5	82	6.1	111	0.35
25	96.9	54	24.4	83	5.8	112	0.25
26	92.2	55	23.2	84	5.5	113	0.14
27	87.8	56	22.2	85	5.2	114	0.04
28	83.6	57	21.2	86	4.9		

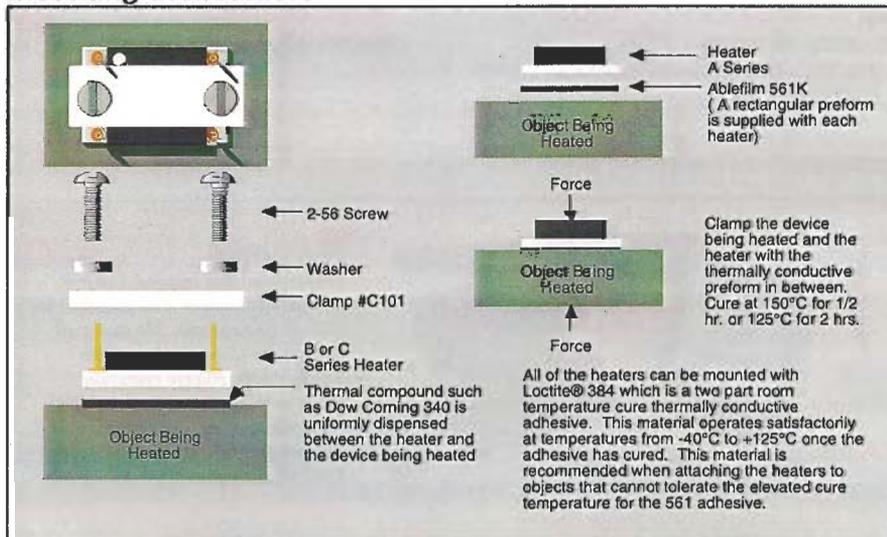
Electrical Hook-up of the Temperature Controlled Heaters



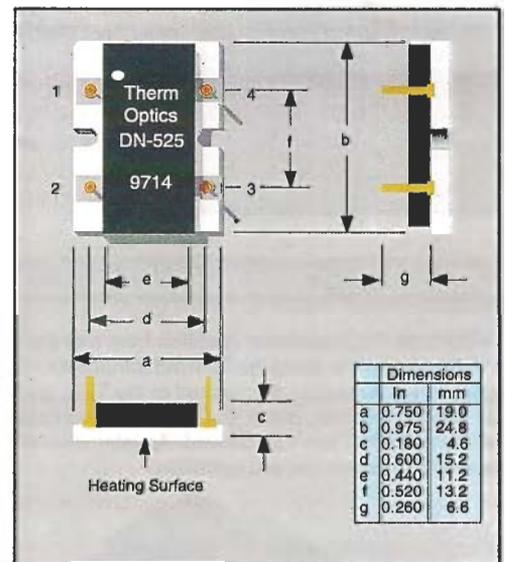
B Series



Mounting the Heaters



C Series



Definitions:

- V_{SN} Specified operating voltage for the heater
- P_{MAX} Maximum heating power that the heater can deliver at the specified operating voltage V_{SN}
- I_{MAX} Maximum power supply current drawn by the heater when the supply voltage is equal to V_{SN}

Notes:

- V_{S(MIN)} & V_{S(MAX)} are the minimum and maximum voltages at which the heaters will operate satisfactorily
- A.C. heaters operate

Proprietary Accessories for Fiber Optic Communications

Subminiature Temperature Controlled Heaters

ThermOptics™ offers a complete line of Subminiature Temperature Controlled Heaters. You simply attach one of these devices to the surface of the part to be heated, select a temperature set resistor, and apply voltage. The temperature controlled heater will automatically supply the exact amount of power needed to precisely regulate the temperature of the device to the temperature programmed by the resistor. No other components are needed.

Temperature controlled heaters are available that operate from unregulated D.C. power supplies of 5 to 50 Volts and can provide up to 40 Watts of heating power. There are also A.C. temperature controlled heaters that operate on 115 or 240Vac that can provide up to 80 Watts of heating power.

The versatility of the ThermOptics™ heaters allows them to be used in almost any application that has a thermal stability problem, such as in sensitive electronic components, electro-mechanical assemblies, and in chemical reactions, as well as in various temperature sensitive sensors.

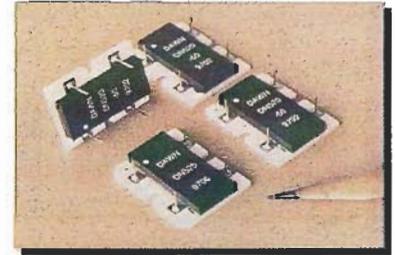
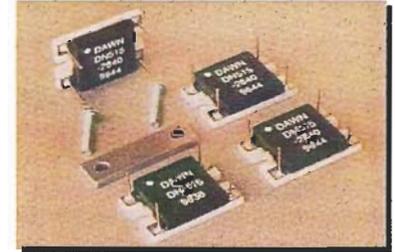
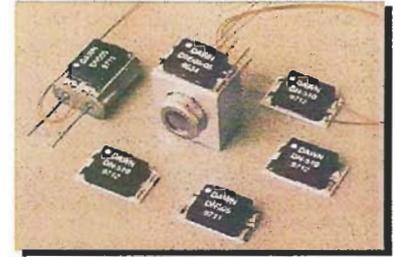
Features

- ▶ Precision Temperature Control
- ▶ Temperature Control From Ambient to 100°C
- ▶ Electrically Isolated from Heating Surface
- ▶ Beryllia Base for Good Thermal Conduction
- ▶ Temperature Set with a Single resistor
- ▶ Simple to Use
- ▶ No External Temperature Controller Needed

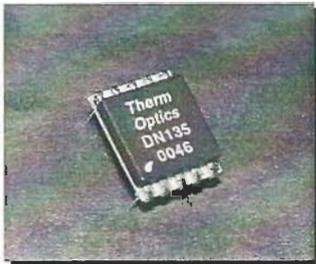
A Series: This is our smallest and lowest power configuration, ideal for controlling the temperature of oscillators, SAW filters, lasers, and for fiber optic applications.

B Series: High performance low noise, ideal for industrial, military, and fiber optic applications where precise temperature control is required.

C Series: These devices operate directly from the line voltage of 115Vac to 240Vac. They provide precise temperature control for industrial, fiber optic and military applications.



Optical Power Monitor



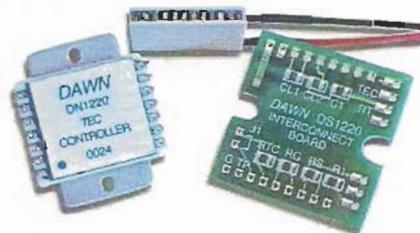
The DN135 is a current to voltage converter that is intended for use in fiber optic power monitors. The device converts current from a photodiode to voltage that is proportional to the incoming optical power in dBm. The DN135 functions equally well with InGaAs and Silicon photodiodes.

FEATURES

- ▶ 70dB DYNAMIC RANGE
- ▶ CONVERTS CURRENT LEVELS FROM 100pA to 2mA
- ▶ 0.500 VOLTS OUTPUT PER DECADE INCREASE IN OPTICAL POWER
- ▶ OPERATES FROM ± 5 VOLTS SUPPLIES

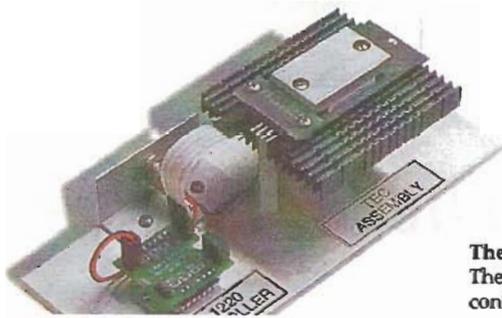
DN 1220 Thermoelectric Cooler Controller

The DN1220 TEC Controller operates from a single 5 to 15 Volt supply. It is designed for fixed temperature OEM applications. A thermistor, attached to the TEC, and a user selected resistor, determine the set temperature. Stability of 0.01°C can be achieved. An interconnect P.C. board and evaluation kit are available.



FEATURES

- ▶ Proportional and Integral Control.
- ▶ Gain and Integrator time constant set with single resistors. **No external Integrator Capacitor needed**
- ▶ Single supply voltage operation + 5 to + 15 Volts.
- ▶ ± 2 Ampere drive capability.
- ▶ Independent cool and heat current limit adjustments.



The DN1220-EVK

The DN1220 evaluation kit contains the DN1220 TEC controller, the DN1220 interconnect P.C. board, and a

Overview of the Thermoptics Product Line

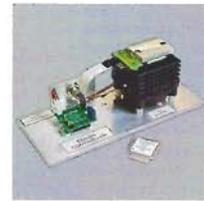
Subminiature Temperature Controlled Heaters

Thermoptics offers a complete line of Subminiature Temperature Controlled Heaters. You simply attach one of these devices to the surface of the part to be heated, select a temperature set resistor and apply Voltage. The Heater will automatically supply the exact amount of power required to precisely regulate the temperature to the programmed value. A variety of Heaters are available:

- Supply Voltage from 2.7 to 50 Volts DC
- Set Temperature from Ambient to 150°C.



Temperature Controlled Heaters



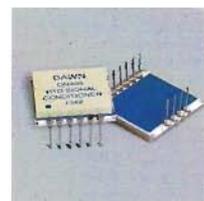
Thermoelectric Controller



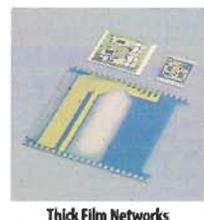
Log Amplifier



Optical Power Monitor



DN405 - RTD Signal Conditioner



Thick Film Networks

Thermoelectric Cooler (TEC) Controller

The DN1221 TEC Controller is designed to heat or cool a TEC. And has some of the following characteristics:

- PI Control with Temperature Stability to ± 0.01 °C.
- 5 to 15 VDC Operation.
- ± 2 Amperes of control current.
- Temperature is set with a single resistor.
- Evaluation kit available.

Log Amplifiers (Current to Voltage Converters)

Thermoptics manufactures two types of Log Amplifiers:

- The DN120N Which can measure input current for ± 10 fA to ± 1 ma (15 Decades).
- The DN135H low power temperature compensated Log amp. which can measure current form 100pA to 2ma. This product is ideal for optical power monitors.
- Evaluation kit available.

Optical Power Monitor

The DN1410 Optical Power Monitor measures optical power from 100pW to 1mWatt of Optical power. The input is supplied through an SC connector to a single mode fiber that is terminated in a InGaAs diode. The output of the diode is feed to a Log Amplifier. The resultant output of the DN1410 is a voltage that is the Logarithm of the input optical Power. See the data sheet for details.

Platinum RTD Signal Conditioner (Thermometer)

The DN405 is a four wire device that measures the resistance of a 100 Ω Platinum RTD. This device compensates for the non-linearities of the Platinum ROT and is calibrated to provide an output voltage of 1.0mVolt per °C. This device is capable of measuring Temperature from -100°C to +600°C.

Custom Thick Film Substrates

Thermoptics supplies Thick Film Networks that are produced on Alumina (Al₂O₃), Berilla BeO, and Aluminium Nitride (ALN) ceramic substrates. Thermoptics is interested in designing and producing custom thick film networks employing these types of ceramics. Contact the factory for assessment of your custom network designs.

Temperature Conversion Table

Celsius	Fahrenheit
-50	-58
-45	-49
-40	-40
-35	-31
-30	-22
-25	-13
-20	-4
-15	5
-10	14
-5	23
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122
55	131
60	140
65	149
70	158
75	167
80	176
85	185
90	194
95	203
100	212
105	221
110	230
115	239
120	248
125	257
130	266
135	275
140	284
145	293
150	302

Temperatures of Interest				Equations Relating the Temperature Measurement Standards	
Kelvin	Celsius	Fahrenheit		°F =	1.8°C + 32
0	-273.2	-459.8	Lowest Possible Temperature	°C =	°K -273.2
2.8	270.4	-454.7	Background Temperature of the Universe	°K =	Temperature in degrees Kelvin
4.2	-269	-452.2	Boiling Point of Helium	°C =	Temperature in degrees Celsius
77.0	-196	-321	Boiling Point of Nitrogen	°F =	Temperature in degrees Fahrenheit
273.2	0	32	Freezing Temperature of Water		
310.2	37	98.6	Human Body Temperature		
373.2	100	212	Boiling Temperature of Water		