TECHNICAL DATA

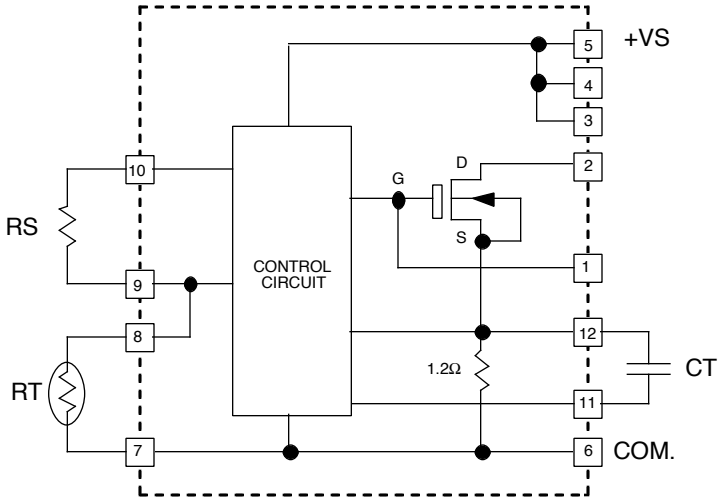
DN550-50

Designers' Data Sheet

MINIATURE PI TEMPERATURE CONTROLLER FOR FOIL AND CARTRIDGE HEATERS

The DN550-50 is a temperature controller for systems using resistive heating elements such as cartridge and foil heaters. This device operates from a 30 to 50 Volt D.C. power source and can deliver up to a maximum of 30 Watts of power or one Ampere of current to a heater. The DN550-50 operates with a negative temperature coefficient (NTC) thermistor in a Proportional Integral (PI) control loop that provides better than 0.1°C system temperature stability. The DN550-50 temperature controller supplies the exact amount of D.C. current required to keep the system at the correct temperature. As a result, it does not inject switching noise into the system like "on-off" and "pulse width modulated (PWM)" controllers often do.

BLOCK DIAGRAM

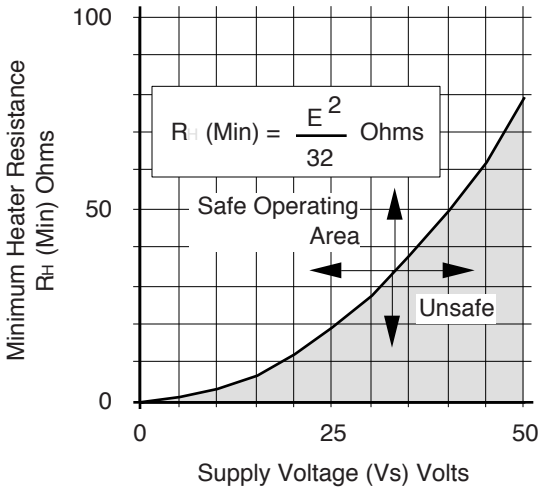


The DN550-50 controller consists of a temperature sensing bridge, an amplifier, and a power stage. The heater element is remotely located from the controller. The temperature sensing bridge is made up of two equal resistors (internal to the DN550-50), a NTC thermistor that is located in close proximity to the heating element, and an external temperature set resistor. The bridge, amplifier, and power stage form a control loop that forces the power stage to deliver enough power to the heating element until the thermistor resistance (RT) equals the temperature set resistor (RS). An external capacitor (CT) provides loop integrating capability that provides temperature stability of 0.1°C or better. A capacitor value of 1µF provides a loop intergrating time constant of 10 seconds and a 10µF capacitor provides 100 seconds. The integrating capacitor is determined through experiments and provides an integrating time constant approximating the thermal time constant of the object being heated.

To set the temperature of the object being heated, select a temperature set resistor (RS) that is equal to the value of the thermistor (RT) at the desired program temperature.

The DN550-50 can dissipate a maximum of 8 Watts when properly attached to a heat sink that has a thermal resistance of 5°C per Watt or less.

Minimum Heater Resistance
vs
Power Supply Voltage



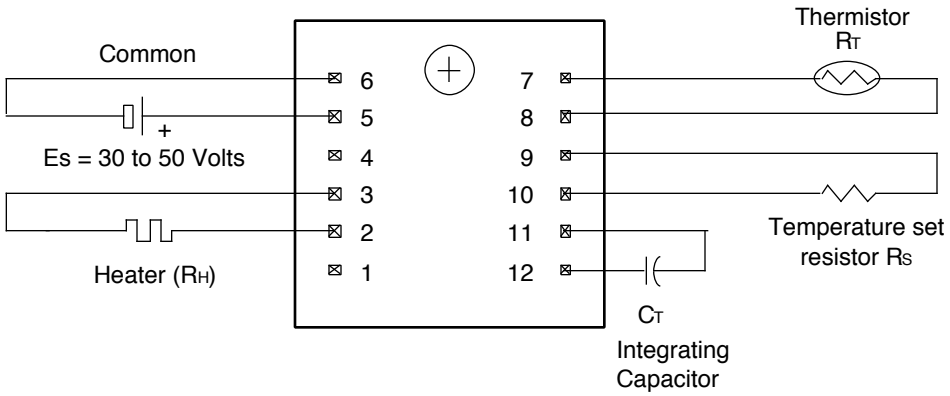
Minimum Temperature Set Resistance
vs
Power Supply Voltage

ES VOLTS	RS(MIN) OHMS
50	725
45	840
40	1,000
35	1,250
30	1,750
25	2,500
20	5,000

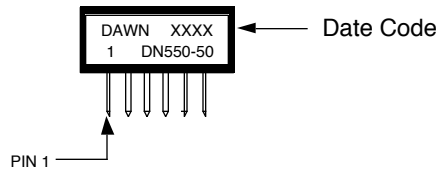
Copyright © 2000 ThermOptics™, Inc. All rights reserved.

11-4-96

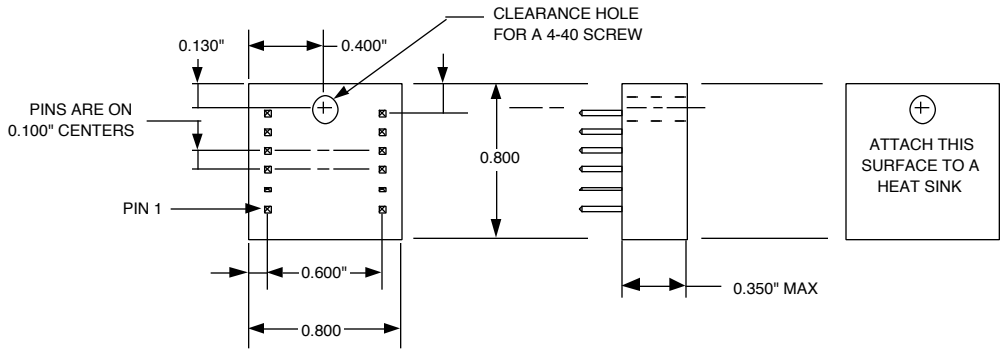
DN550-50 ELECTRICAL HOOK-UP DIAGRAM



DN550-50 Marking



MECHANICAL DIMENSIONS



ThermOptics™ 11-4-96

1004 Mallory Way • Carson City, NV 89701 • Ph (775) 882-7721 • Fax (775) 882-7675
E-mail: info@thermoptics.com • http://www.thermoptics.com