

H-1503-B/H-1510-B differential thermostats

Hawthorne
INDUSTRIES, Inc.

SOLAR ENERGY DIVISION

CONTROL SYSTEMS • RESEARCH & DEVELOPMENT



SINCE 1928

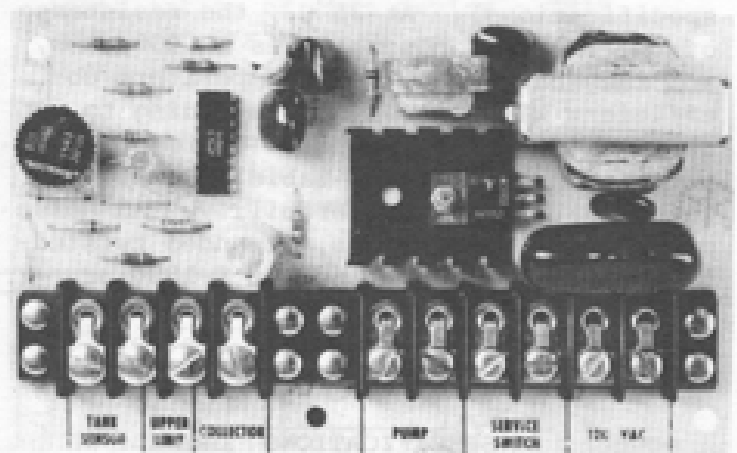
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APPLICATIONS

The Model #H-1503-B differential thermostat was designed to be used in solar hot water or air heating systems where a hard-wired control installation is desired. The basic function of the H-1503-B within a solar energy system is to continuously and simultaneously monitor the collector panel (heat source) and storage facility temperatures. When a preset temperature differential (collector-storage) is achieved, the output of the controller provides line voltage (117V AC, 6 Amp. max.) to the pump, blower, or other controlled device.

Model #H-1510-B differential thermostat is designed for applications similar to those where the H-1503-B would be used. The H-1510-B, however, provides a proportional output which speed-controls circulator pumps or blowers to produce a flow which is proportional to the collector-storage temperature differential over the range of from 3°F. to 16°F. The H-1510-B is designed to be used only with those pumps and blowers which have been tested and approved by Hawthorne Industries, Inc., for use with proportional control. Use of other equipment with proportional control may cause damage to the equipment or to the control. Please consult Hawthorne Industries, Inc. for list of approved equipment.

Both Models are capable, through the use of auxiliary thermostatic sensors, of providing frost protection via recirculation or high limit protection via stopped circulation.



FEATURES

- All solid-state components
- Accessible screw terminal connections
- Interchangeable, high value, high temperature thermistor sensors
- One basic control may be used for either differential thermostat or thermostat applications
- Immersion sensing (optional)
- Recirculating freeze protection (optional)
- Stopped circulation limit protection (optional)
- Low voltage, low current sensing
- Easy to install and wire

SENSING

The thermistor sensors used are metal-oxide thermistors, and are hermetically sealed in glass packages, thus sealing out oxygen and moisture and providing a stable and long-lived device. The thermistor is rated for use at high operating temperatures (see specifications). At 25°C., the resistance of the thermistor sensors is 10,000 ohms, and they have a negative temperature coefficient with values corresponding to those shown in the enclosed thermistor temperature/resistance table. Because of its flexibility, weatherability, and noise cancellation properties, stranded twisted-pair cable (Hawthorne number H-1550 or H-1555 or equivalent) is specified for connection of sensors to the control.

SPECIFICATIONS

H-1503-B or H-1510-B Control:

Ambient Operating Temperature: 0 to 200°F.
Electrical Load: 117V AC, 6 Amps maximum
Supply Voltage: 117V AC
Control Power Requirements: 4 watts
Shipping Weight: 1 pound
Electrical Connections: Screw terminals
Preset Temperature Differentials:
H-1510-B slow flow initiated at 3°F. differential, full flow obtained at 16°F. differential. H-1503-B turn-on differential 16°F., turn-off differential 3°F.

Thermistor Sensors:

Electrical Connections: two (2) six-or twelve-inch long 20 AWG stranded connector wire leads, teflon jacketed, non-polarized
Operating Temperatures: H-1526 to 400°F.; H-1525 and H-1525-B to 600°F. continuous, 1000°F. short-term
Reference Resistance: Ten thousand (10,000) ohms at 25°C. (77°F.)
Sensing Element: Thermistor

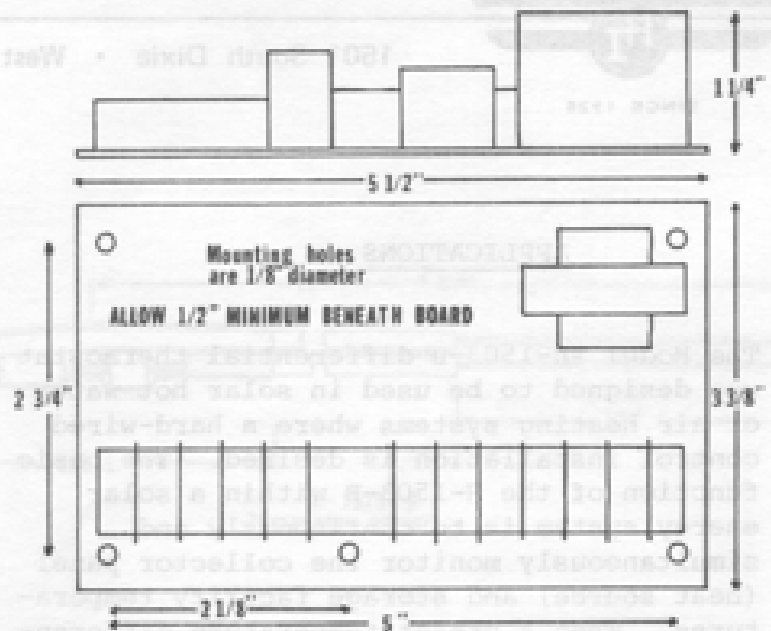


FIGURE 1

INSTALLATION

1. Mount control on standoffs spaced as per spacing and dimensions diagram Figure 1. Care must be taken to allow sufficient clearance above and below the circuit board.
2. Install storage tank and collector panel sensors at locations shown in Figure 2. Storage sensor is mounted to sense the temperature of the lower portion of the tank and may be wedged beneath the lower thermostat mounting clip. The collector sensor should be mounted to the absorber plate against the output pipe.
3. Using Hawthorne type H-1550 or H-1555 stranded twisted-pair cable (22 AWG) or equivalent, run sensor leads between sensors and control.

- If optional recirculating freeze protection is to be used, mount H-1521 frost sensor at location shown in Figure 2 (one frost sensor on each collector panel) and wire in parallel with collector plate sensor. If optional upper limit protection is to be used, mount upper limit sensor (H-1515, H-1516 or #169) at location shown in Figure 2 and run leads to control.
- Attach sensor leads to control as shown in Figure 3. Make connections to sensors using crimp-type wire nuts included with sensors (see also FSB-77-350-2).

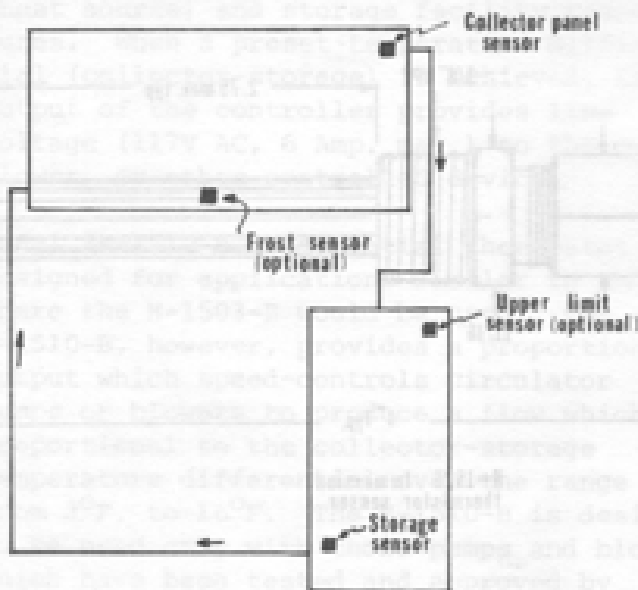


FIGURE 2

CHECKOUT PROCEDURE

- Disconnect lead at lower storage sensor terminal. Control should activate pump or other load.
- Jumper across tank terminals using a small piece of wire. Control output should deactivate.
- Replace all connections and observe system operation through one operating cycle, if possible.
- Verify proper operation of all controlled equipment.

- Attach power leads (117V AC) and controlled output leads to control as shown in Figure 3.

Note: High-voltage (line-voltage) components are exposed on this control circuit board. Applicable electrical codes should be consulted and followed concerning the wiring and installation of this device. THIS DEVICE IS DESIGNED TO BE EXTERNALLY FUSED AT 6 AMPS (fast-blo fuse).

- Check all connections and clearances before applying power.
- Apply power to control.

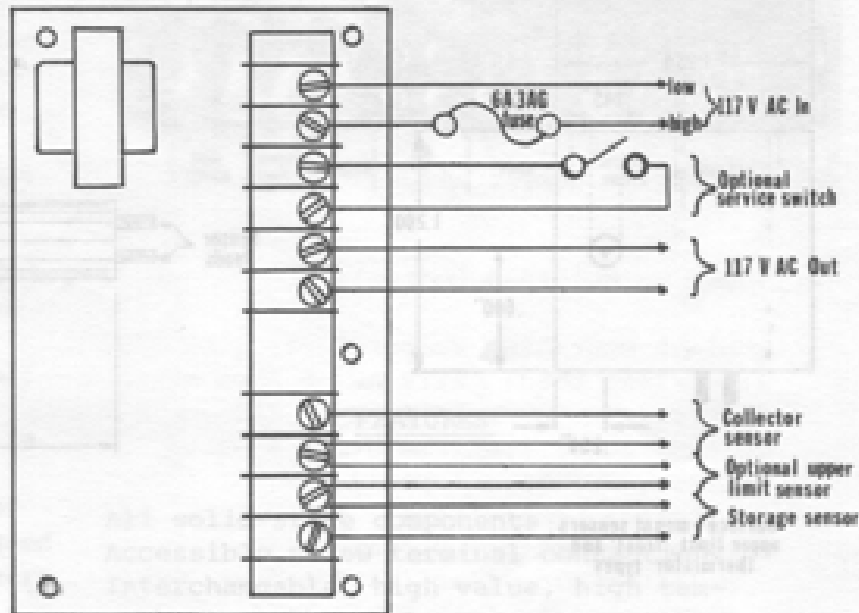
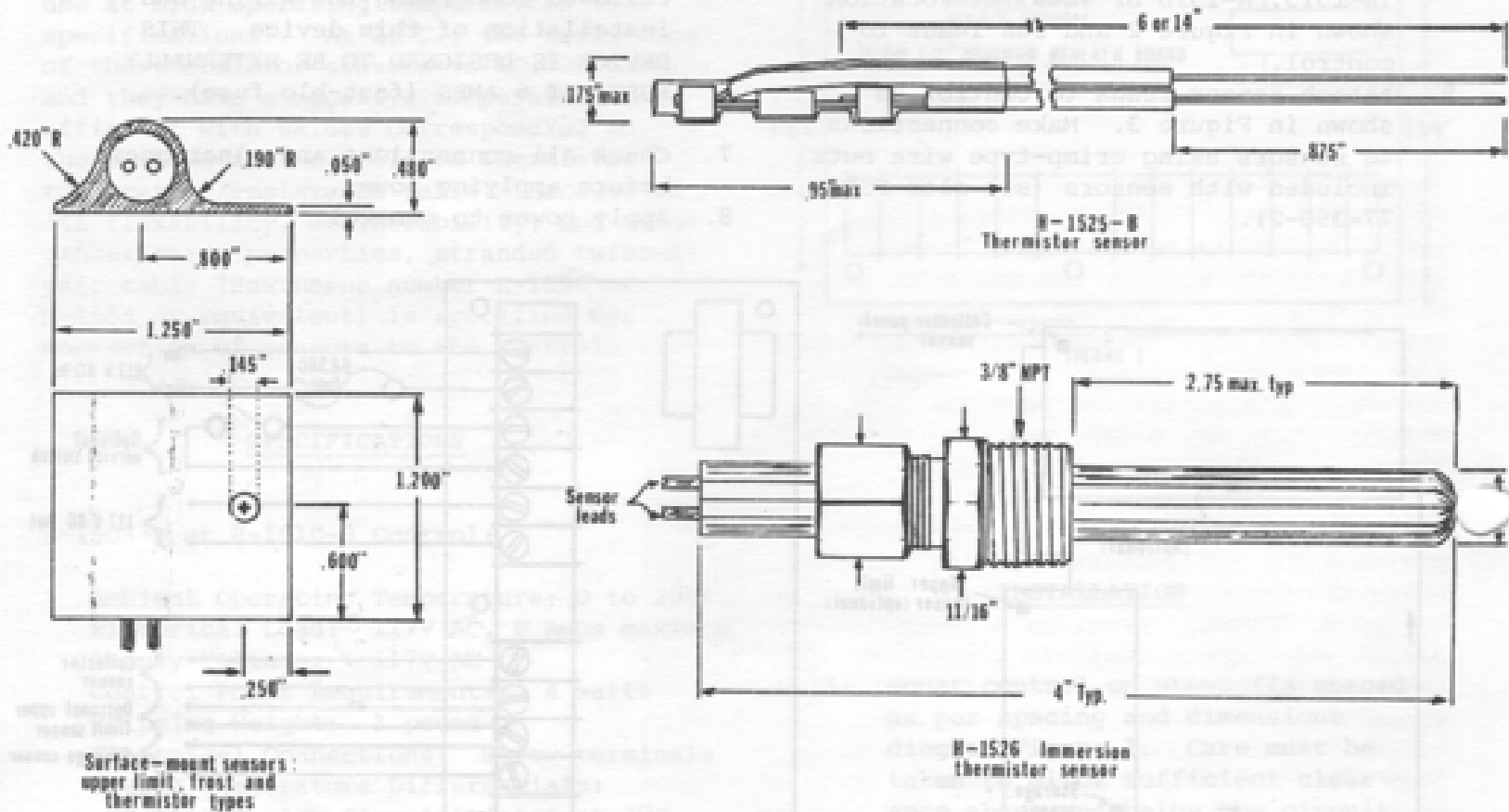


FIGURE 3

FIXED POINT SENSING

When ordering controls for this purpose, please specify turn-on differential of 2°F., turn-off differential of 0°F. From resistance-temperature conversion tables, select a fixed resistor value to correspond to the desired set-point temperature. Use a quarter-watt, one percent tolerance, metal film resistor (available at local electronics supply houses).

For power-on-rise operation, attach this resistor across storage terminals and attach sensor to collector sensor terminals. For power-on-fall operation, attach resistor to collector terminals and connect sensor to tank sensor terminals.



REPAIRS AND REPLACEMENT

Field repairs must not be made. Repairs or replacement of defective units may be obtained from your local Hawthorne dealer where your control was purchased or by returning the control to Hawthorne Industries, Inc., shipping prepaid. Please enclose an explanation of the type problem encountered, as well as a sketch of the system in which it was installed, indicating sensor locations. All repairs or replacements will be made in accordance with the provisions and conditions of the Manufacturer's limited warranty (enclosed).