

# DIFFERENTIAL TEMPERATURE THERMOSTAT



## Delta-T®

... for solar heating and solar hot water system control

Every model has an LED indicator light to indicate when pump is on. Also a switch with AUTO, Manual ON, Manual OFF positions.

### DESCRIPTION

The Delta-T® Differential Temperature Thermostat is an automatic motor control which turns "ON" and "OFF" the circulation pump/blower in a solar heating or solar hot water system where the collector temperature exceeds the storage temperature by preset differentials. Standard models control 10 Amps, 1/3 HP at 120 VAC.

The Temp-Trak™ models feature a digital display thermometer. By depressing either of two bat-handle switches, the temperature of storage or collection is displayed in .3" high numbers.

### CIRCUIT DESIGN

The Delta-T® has a patented circuit design which incorporates four operational amplifiers (OP-AMP). The "classic" design for a differential temperature comparison is one with only one OP-AMP and this is triggered by the ramp-like increase of the temperature differences. With the classic design, there is not a sharp difference between "ON" and "OFF", and consequently relay chatter can occur at this time. This condition is partially remedied by spreading out the differential temperature settings which goes contrary to the design optimum of having lower settings for more BTU pick-up. Relay chatter, which shortens relay life, can be eliminated in the "classic" design by the cure-the-symptoms-not-the-cause

method of solid state switching. With solid state switching (triac, etc.) other problems occur such as vulnerability to lightning and unexplained stray voltage spikes which cause component failures, shortened life in warm ambient temperature (125°) and early motor failures.

Delta-T® with its unique circuit utilizes three OP-AMPs to measure the comparison of temperatures and thus can offer lower differential "ONs" and "OFFs" without any relay chatter. By curing the "cause" of relay chatter, the design allows the use of a highly reliable, enclosed relay which has been proven over many years in other applications. At full-rated power of 10 Amps, the relay should last over 150 years in a typical installation and even longer when it is considered that the motor to be controlled is typically 1/20 HP, not at the 1/3 HP rating. Typically, solid state switching utilizes a 3 to 6 Amp device which doesn't allow a sufficient derating margin for long life reliability. This unique three OP-AMP design carries US Patent Number 4, 129, 118.

### SAFETY AND RELIABILITY

All Delta-T® models, except Temp-Trak™ models, are UL listed and CSA approved. All carry a five year limited warranty. During the first year, replacement of defective merchandise with a tested replacement will be made at no charge. After one year and up to five years, replacement will be made for a service fee of \$10. Ask for a copy of warranty for full details. The warranty meets California state tax credit requirements.

HELIOTROPE GENERAL, 3733 kenora drive, spring valley, ca 92077 • (714) 460-3930

1-800-854-2674

