heliodyne
SOLAR HOT WATER

INSTALLATION GUIDE

DELTA T 84 & 94 CONTROL UNIT

EXCELLENCE BY DESIGN

1. DELTA T

1.0. Description

This Delta-T solar controller has been specifically designed to control the basic solar thermal collector system, including open loop, closed loop with a heat exchanger, and drain back, for residential domestic water heating

There are two versions of the Delta-T, the 84 is a hardwire model and can be supplied with 120 VAC or 240 VAC. The 94 model comes with a pre-wired plug and grounded outlet for installation ease.

For operation, the control requires two SAS-10 (10,000 Ohm @ 77°F) thermistor sensors. The differential and other settings have limited adjustability using the DIP switch on the control PCB.

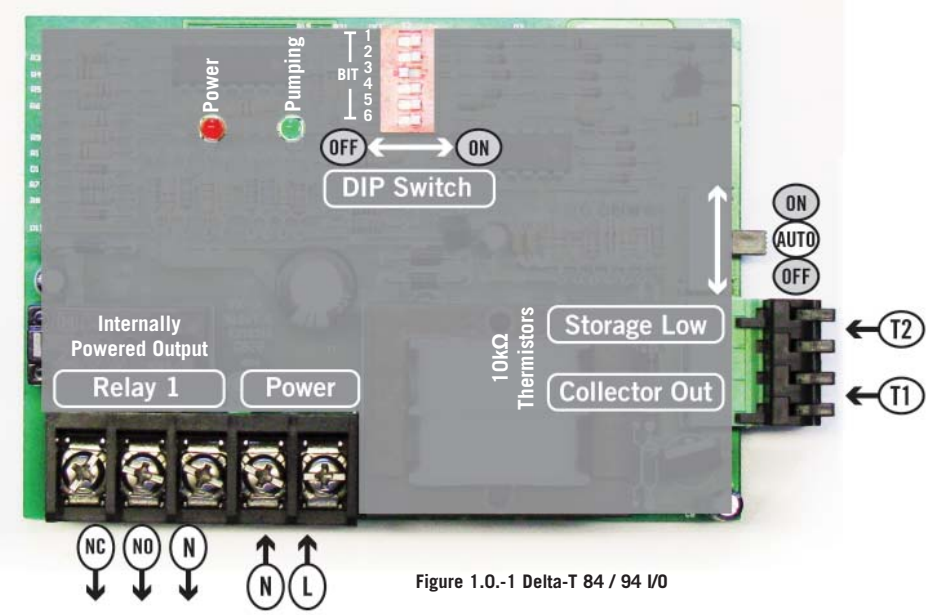


Figure 1.0.-1 Delta-T 84 / 94 I/O

1.1. General Notes

This control conforms to the National Electric Code and is certified by ETL. Installation should adhere to all national and local electric codes, and be installed by a qualified electrician or contractor. Any electrical wiring or modifications to the control I/O should be performed with the power disconnected.

1.2. Mounting

The Delta-T should be mounted on a wall indoors, away from weather and interference. Using the mounting holes on the back of the box, securely install 3 screws into mounting plane leaving 1/4" between the wall and the back of the bolt head; place control back upon screws and slide down to secure box tightly into screw pattern. The back page of this manual has a screw template.

1.3. Power and Wiring

Wire solar loop pumps into Relay 1, using the Normally Open (NO) terminal on the relay. The Normally Closed (NC) terminal can be used to supply power to a unit for use when the collectors are not heating the storage, like a swimming pool or hot tub. The voltage of the controller will determine the relay output voltage.

1.4. Thermistor Sensors

The SAS-10s sense temperature by conduction, and are not for liquid immersion, or inside collectors. For a proper reading, ensure the copper lug on the sensor is firmly against the desired surface using an SS pipe clamp across the flat surface or bolted via the through hole. Use surrounding insulation to avoid ambient temperature and other sources of reading interference.

The sensor leads are 24 GA Class II wiring and carry 4 VDC. Use a conductor 18-24 GA zip or bell wire to run from the sensor location to the control. Use caution when installing to avoid wire damage. Shielded wire is not necessary.

Install the collector sensor on the outlet header connection; install the tank sensor on the bottom of the storage tank, so it is in contact with the metal part of the tank. Insulate the sensors from ambient conditions.

1.6. Operation

The function switch on the right side of the controller should be set in the center, 'AUTO', position for automatic pump control. When the switch is in the 'ON' position, Relay 1 will be on continuously, regardless of temperature difference. With the switch in the 'OFF' position, Relay 1 will remain off.

Figure 1.4.-1 SAS-10 Sensor

1.5. DIP Switch Settings

BIT SWITCH #	FUNCTION DESCRIPTION	SETTING WHEN LEFT (OFF)	SETTING WHEN RIGHT (ON)
1	Tank high limit shutoff - automatically turns off Relay 1 when the storage sensor reads switch 4 setting of 160 or 180°F	No high limit function	High limit ON
2	Freeze recirculation - automatically turns on the Relay 1 when the collector sensor reads 42°F or below	No freeze recirculation	Freeze recirc. ON
3	Useful collector temperature - automatically turns off Relay 1 when the collector sensor reads 80°F or below, even with a satisfactory differential (Freeze recirc. can override this function)	No useful collector temperature monitor	Useful collector temperature monitor ON
4	Tank high limit shutoff temperature - choose which temperature to turn the tank off at 160 or 180°F	180°F	160°F
5 & 6	Differential setting - sets which temperature differential will turn on and off Relay 1 (Heliodyne recommends both switches OFF for glycol systems, and both switches ON for open loop or direct systems)	18°F ON 5°F OFF	9°F ON 4°F OFF

1.7. Troubleshooting

If a controller stops working, most often it is due to a sensor or wire failure. Detach the sensor plug and measure the sensor resistance with a multi-meter and compare with the chart below for appropriate reading values. Because they are inversely related to temperature, a short reads as a very hot temperature, and an open reads as a very cold temperature.

1.7.0. On/Off Test

This test verifies the controller will turn on and off. Switch the controller 'ON,' power is applied to the Normally Open relay point, terminal 2. This may be verified with an DC voltmeter across terminals 2 and 3. If a pump is connected, it should turn on.

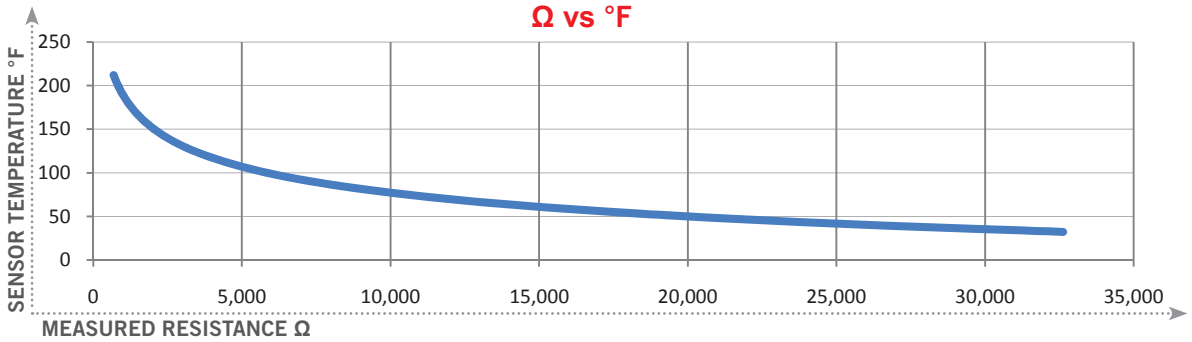
With the switch in the 'OFF' position, power is applied to the normally closed relay point, terminal 1. This may be verified with a voltmeter across terminals 1 and 3.

When the switch is 'ON', the pump LED indicator should be on. If not, consult the manufacturer.

1.7.1. Basic Function Test

This test verifies the BIT settings are working correctly. The BIT switches (figure 2) for a particular function must be on to test for that function.

Place BIT switches 1 on and 2 off (remaining switches can be either on or off.) Switch controller to 'AUTO.' Allow the sensors to come to thermal equilibrium (about one half hour.) Short the screws in positions (see figure 4) 1 and 2 and the controller should turn on. Next, place the collector sensor in a cup of hot water; this should turn the controller on. With the storage sensor screws shorted (positions 3 and 4), the controller should turn off. If the controller does not respond to these tests, consult the manufacturer.



2.0. Warranty

HELIODYNE shall provide a one-year warranty for defects in compliance with the purchased goods delivered after 3/1/2008 as follows: Objects are warranted at HELIODYNE's discretion by repair of the object of purchase or replacement of defective parts, exchange or reduction of price. The right of the contractor to convert objects is ceded by common consent. Replaced parts become the property of HELIODYNE. Wages and costs spent on installation and disassembly must be covered by the client. This provision similarly applies to all warranty agreements. It is at HELIODYNE's discretion to replace defective goods with similar, faultless goods. In this case, any rights to cancel the agreement cease. The client expressly waives the right for it and its legal successors to assert claims for damages or loss of profit (including without limitation special, indirect, loss of use, contingent, or consequential damages) due to defects or nonconformity in the purchased good. The warranty set forth above constitutes the sole and exclusive remedy against HELIODYNE for the furnishing of any nonconforming or defective goods. THE ABOVE WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. Damage resulting from improper or negligent treatment is excluded from the warranty. Claims on warranty will only be admitted and considered if they are announced in writing immediately after the defect was first noticed. Oral communication or communication by telephone are not sufficient.

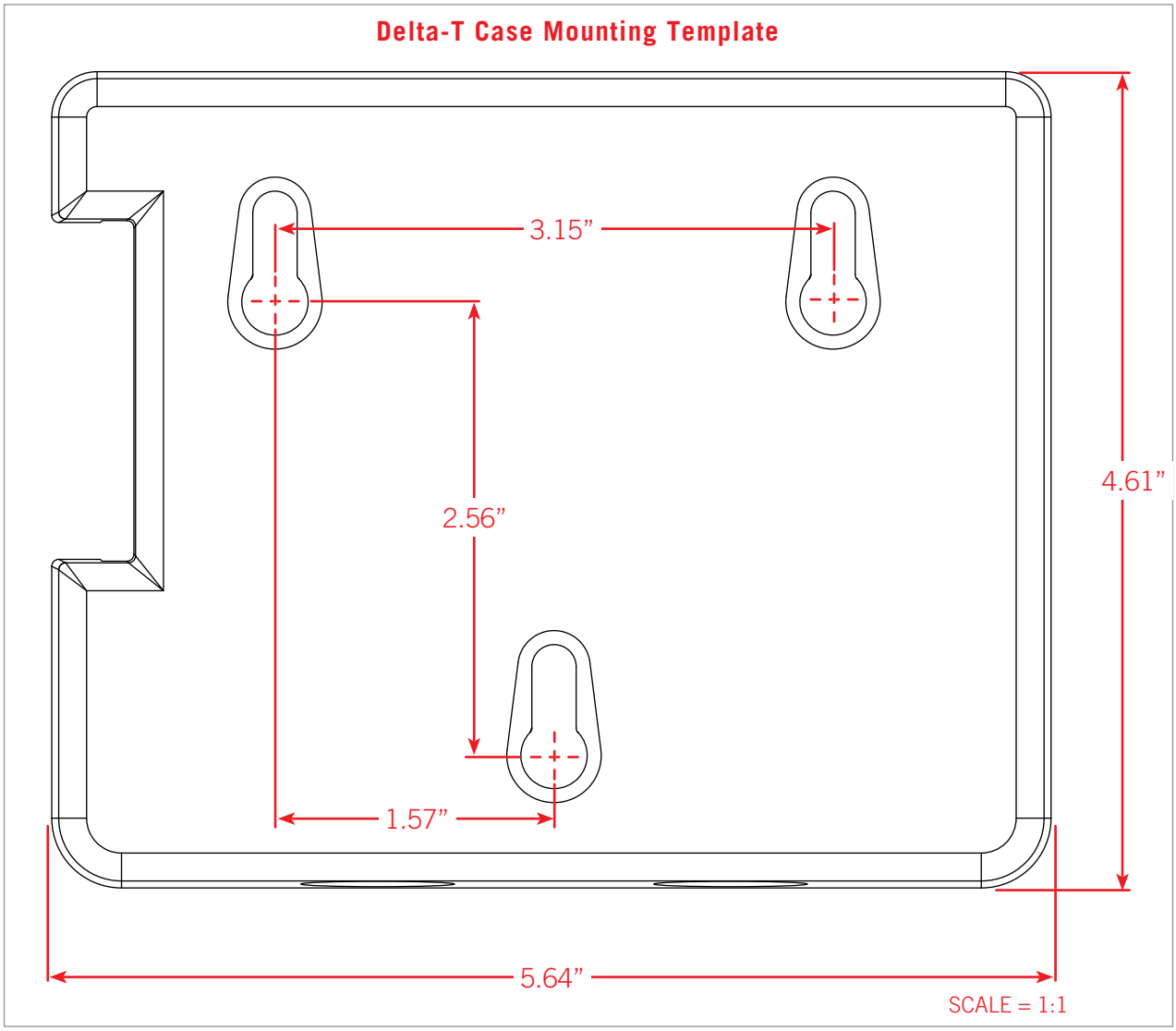
For collectors (except broken glass and collector accessories e.g. sheet metal edgings) and storage tanks (except attached components), HELIODYNE replaces materials that demonstrably fail to meet one of the requirements of the ASHRAE standard 93-77 at no charge, works within five years for storage tanks and ten years for collectors, of the date of the invoice issued by the company HELIODYNE. HELIODYNE is not liable, however, for damage caused by mechanical stress and/or changes caused by weather-related influences. Minor variations in color and/or damage to the surface that have no effect on the function of the collector are also not covered in the warranty. The warranty excludes damage caused by force majeure and malfunction that are due to improper assembly, and/or product installation. HELIODYNE is not liable for possible costs resulting from defects. In order for HELIODYNE to accept liability:

– Installation must have been carried out by a licensed specialized company (heating contractor or plumber) following the version of installation instructions in force;

– HELIODYNE or its representative was given the opportunity to check complaints on site immediately after any defect occurred;

– Confirmation exists that the system was commissioned properly and that the system was checked and maintenance was performed annually by a specialized company licensed for this purpose. The warranty agreed by HELIODYNE is only valid for their clients.

Delta-T Case Mounting Template



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