

*FOR SERVICE CALL:*



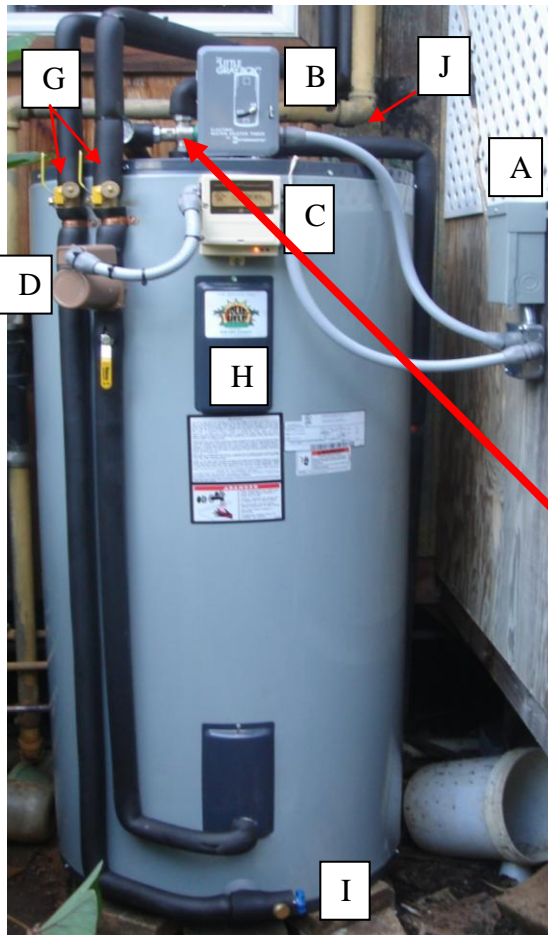
*548-HELP(4357)*

## **SOLAR HOT WATER SYSTEM MANUAL**

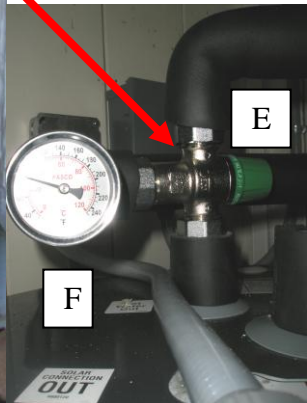
- 1) SYSTEM DESCRIPTION & COMPONENTS
- 2) TEMPERATURE GAUGE
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- 4) PERIODIC SYSTEM MAINTENANCE
- 5) EMERGENCY PROCEDURES
- 6) VACATION PROCEDURES
- 7) CONTORLLER OPERATION
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## 1) System Description & Components

Various types of systems are used, depending on customer preference, existing conditions, geographic location, hot water usage, and compliance with Hawaiian Electric Company, Inc. requirements. All systems have a storage tank, solar collector(s), interconnecting piping, anti-scald valve, a time clock, circulating pump, and a differential thermostat control or photovoltaic panel to power pump.



- A) ELECTRIC SERVICE DISCONNECT BOX
- B) HEATER TIMER BOX
- C) PUMP CONTROLLER
- D) SOLAR CIRCULATING PUMP
- E) ANTI-SCALD MIXING VALVE
- F) GAUGE MEASURING WATER TEMP GOING INTO HOUSE
- G) ISOLATION/DRAIN VALVES FOR SOLAR (LEFT-HOT RETURN FROM ROOF RIGHT-COLD FEED TO ROOF)
- H) TOP SERVICE PANEL WHERE HEATER RESET BUTTON/THERMOSTAT IS LOCATED (UNDER COVER)
- I) TANK DRAIN VALVE
- J) LOCATION OF MAIN WATER SHUT OFF VALVE FOR HEATER ( FOLLOW BACK RIGHT LINE AND VALVE SHOULD BE INLINE)



## 2) TEMPERATURE GAUGE



**Dial Type Temp**



**Digital Temp**

The temperature gauge is not an indication of the current heater temperature

The gauge only measures the temperature that is coming out of the mixing valve going into the house. The gauge will only be accurate when a hot water faucet is turned on and hot water has passed through the line.

### **3) System Operation**

In general, the system operation requires little action by the owner. This is a brief description of various components, adjustments, and things that should be monitored from time to time.

A disconnect switch is supplied for houses that do not come equipped with the breaker switch in the same room where the heater is located. This switch should be turned off before servicing any of the electrical components of the system.

According to the Hawaii plumbing codes, all solar systems must come equipped with a hot water tempering valve or anti-scald valve to regulate the high temperatures of a solar system. The tempering valve mixes hot and cold water to achieve a set temperature. Plumbing codes require that the hot water into the house not exceed a temperature of one hundred and twenty degrees Fahrenheit.

Each system comes equipped with an in-line temperature gauge that is located on the top of the heater. The temperature displayed on the gauge will not always be accurate due to its location outside the heater. If no hot water has been used for awhile, the reading may be lower than the actual temperature at the top of the heater because it measures what's going into the house after the mixing valve. To get an accurate reading, hot water must be turned on briefly.

It is standard to supply a heater timer with the system. This timer prevents the electrical backup from running during times when there will be no usage. Usually, the timer will be set to allow the electrical backup to operate an hour or two per day, sometimes during two separate periods of the day, depending on household usage. It is important NOT to remove the "off" switches as this will hide any problems with the solar system by allowing the electrical backup to be active 24 hours a day even during peak sunlight. The timer has a manual override that can be used during periods of low sunlight or high usage (such as frequent cloudy days or family visiting on vacation). If a power outage should occur, the clock in the timer will not be accurate and will have to be adjusted. To adjust time, simply pull yellow dial inside timer door towards you and set to appropriate time to the silver pointer. (See troubleshooting for illustration)

Systems that come with a differential thermostat to circulate pump should be monitored from time to time.

A "controller" measures the difference of temperatures to decide when the pump should circulate water to the roof. When the collector temperature rises above the storage tank, the pump should turn on. When storage tank temperature rises above collectors, the pump should turn off. The pump will normally give off a slight humming sound or vibration when operating. The pump should only run during times of sunlight unless the temperature of the tank is greater than the

collectors. A pump circulating at night is NOT normal and should be serviced as soon as possible. It is normal for a pump to be extremely hot to the touch when in operation.

Photovoltaic pump systems should operate when direct sunlight is upon the panel. If panel has direct sunlight and pump does not operate it must be serviced as soon as possible.

#### **4) Periodic System Maintenance**

The systems tank and collectors should be flushed annually. To flush out tank, a garden hose should be attached to bottom drain valve and flushed for 1 minute (illustrated on page 1 location i). To flush out collectors, attach hose to solar return line drain valve and flush for 1 minute (opposite line with circulating pump location G left side).

A visual inspection should also be done annually to catch potential defects early. This is important to prevent costly future repairs.

Replacing of the storage tanks sacrificial anode rod should be done at least every four to five years. (Electronic Anode Rods do not have to be replaced)

Piping insulation should be replaced or repainted as needed.

#### **5)Emergency Procedures**

If the water in the collectors becomes very hot or pressurized, there is a pressure relief valve to minimize the chance of system damage. If this safety valve operates, scalding hot water can be expelled. People and objects should be kept away from the potential source of hot water.

If there is any water leakage, notify us immediately. The system is provided with isolation valves. Depending on where the leakage occurs, the owner may need to shut off the main water valve for the building, and owner should become familiar with where all valves are located.

If there is any type of electrical problem, owner should emphasize safety. Possibility of water nearby can make electrical issues more dangerous. If area is safe owner may make preliminary action of turning off breaker or shut off switch to water heater (where occurs).

#### **6)Vacation Procedures**

For short vacations no action is required(2-3 days). For longer vacations turn the controller to the "on" position. This will allow the system to run at night and cool

down by sending hot water from the tank to the cold collectors. During extended vacations it is advisable to either cover the solar collectors with an opaque material or to manually drain the collector loop. The manufacturer recommends that you cover the collectors. For long vacations, you may also wish to consider shutting down the electrical backup. Location of controller switch may vary depending on model of controller.

## 7) Controller Operation

Controller operation and operation will vary depending on the brand and model of the controller unit that is installed. The three types of controllers that we have found to work the best are Heliodyne, Taco, Sunearth, and Steca.

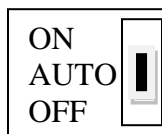


### **Heliodyne controller**

Switch located on right side of unit  
3 position switch as illustrated

Normal operation: Switch to AUTO  
Red light-controller is powered on  
Green light-Roof is 12-15degrees hotter than tank and pump is circulating

**Note: Green light should never be on at night**



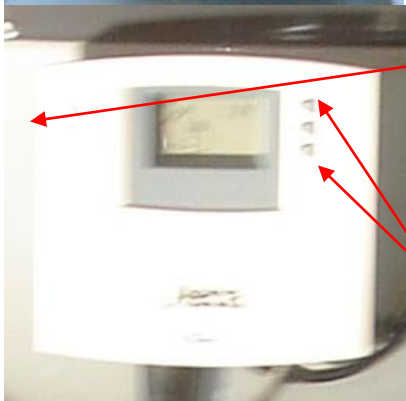
### **Sunearth/ Goldline controller**

Switch located under panel cover. Pop off with small screwdriver or thin objec.

3 position switch as illustrated  
Normal operation: Switch to AUTO

1 light- controller is powered on  
2 lights-Roof is 12-15 degrees hotter than tank and pump is circulating

**Note: 2<sup>nd</sup> light should never be on at night**



### **Sunearth/Steca digital controller**

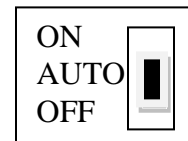
Switch located on left side of unit  
3 position switch as illustrated  
Normal operation: Switch to AUTO  
Illustration on digital screen will show motion on diagram when pumping

**Note: Motion on screen should not appear at night**

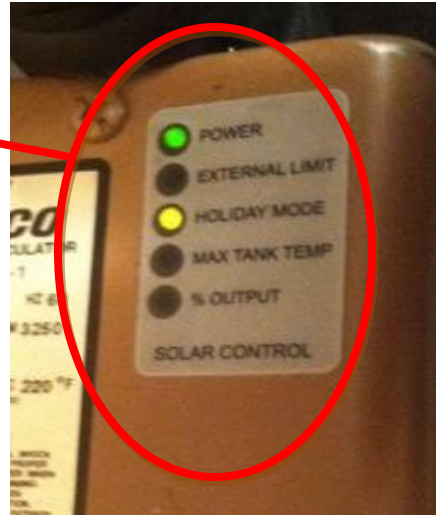
Scroll buttons to view various temperatures

T1 sensor is for collector temperature

T2 sensor is for bottom of tank temperature



## Taco Variable Speed Pump/ Controller



Taco Variable Speed Pump/Control unit has no switches or settings to adjust. To turn off unit simply unplug unit from AC outlet. Operation of unit is automatic and prevents overheating during daily operation, or when household is unoccupied during a vacation.

Power light should always be illuminated when unit is plugged in

External Limit feature is not used

Holiday Mode feature will always be illuminated

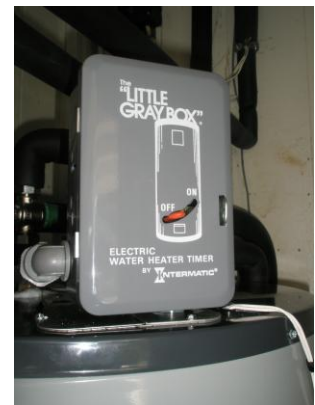
Max Tank Temp will be illuminated when pump is circulating to prevent overheating

% Output light may flash or be steady during sunlight hours periodically when collector temperature is higher than storage temperature

### **8) Troubleshooting**

#### **No hot water from electrical back-up when no sun:**

- 1) Check to make sure timer switch is "ON" position
- 2) Open timer cover and check that time is accurate on dial and time pins have not fallen off dial.
- 2) Check to make sure main breaker switch on house electric panel has not tripped and is fully engaged (turn off and on to make sure)



3) Open top service panel on front of water heater and push red thermostat reset button (should take about 15-20 minutes for the water to get hot)

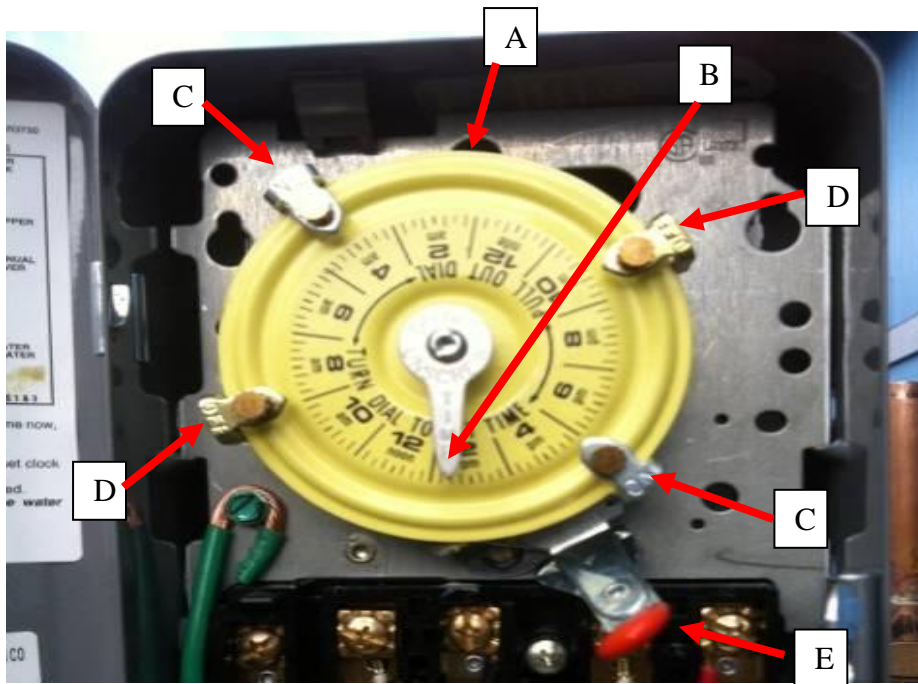


**Water not hot enough when running on electrical back-up (days of overcast) Or water too hot when sunny**

1) Adjust mixing valve by popping off green cap on valve body (small screwdriver or thin object will work). The green cap is the key to adjust the valve, turn cap around and match up triangular female shape to the male shape at the end of valve. On the lip of the brass end is the arrows for "H" for hot and "C" for cold, adjust accordingly. When a hot faucet is turned on gauge will read temperature going into house.



**Timer Clock not correct or ON/OFF pins need to be readjusted**



**Illustration A)** Grab yellow dial and pull out towards you. Spin dial either clockwise or counter clockwise to adjust clock to correct time.

**Illustration B)** Be sure that silver arrow is pointing to the correct time on the dial AM or PM.

**Illustration C)** To adjust silver ON pins, simply loosen thumb screw and retighten to desired time .

**Illustration D)** To Adjust brass OFF pins, simply loosen thumb screw and retighten to desired time.

**Illustration E)** Manual switch to turn ON/OFF power. If switch is turned on manually, it will automatically turn off when it reaches the next OFF pin on the dial.

## **No solar hot water from the sun after a full day**

- 1) Check to make sure that the controller is switched to the “AUTO” position (see controller operation)
- 2) Make sure valves on solar lines are in the open position



Open

Closed

**Note: Solar valves should always be in the open position during normal operation**

## **9) System Warranty**

Solar Help Hawaii offers a five year warranty that covers all labor an installation of the system. All components of the system come with individual manufacturer's warranty. If problem should arise call us for all warranty claims. The warranty does not cover abuse, damage, improper maintenance, or any problems with existing piping system and other existing components.

**Any further questions please feel free to call us!**



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