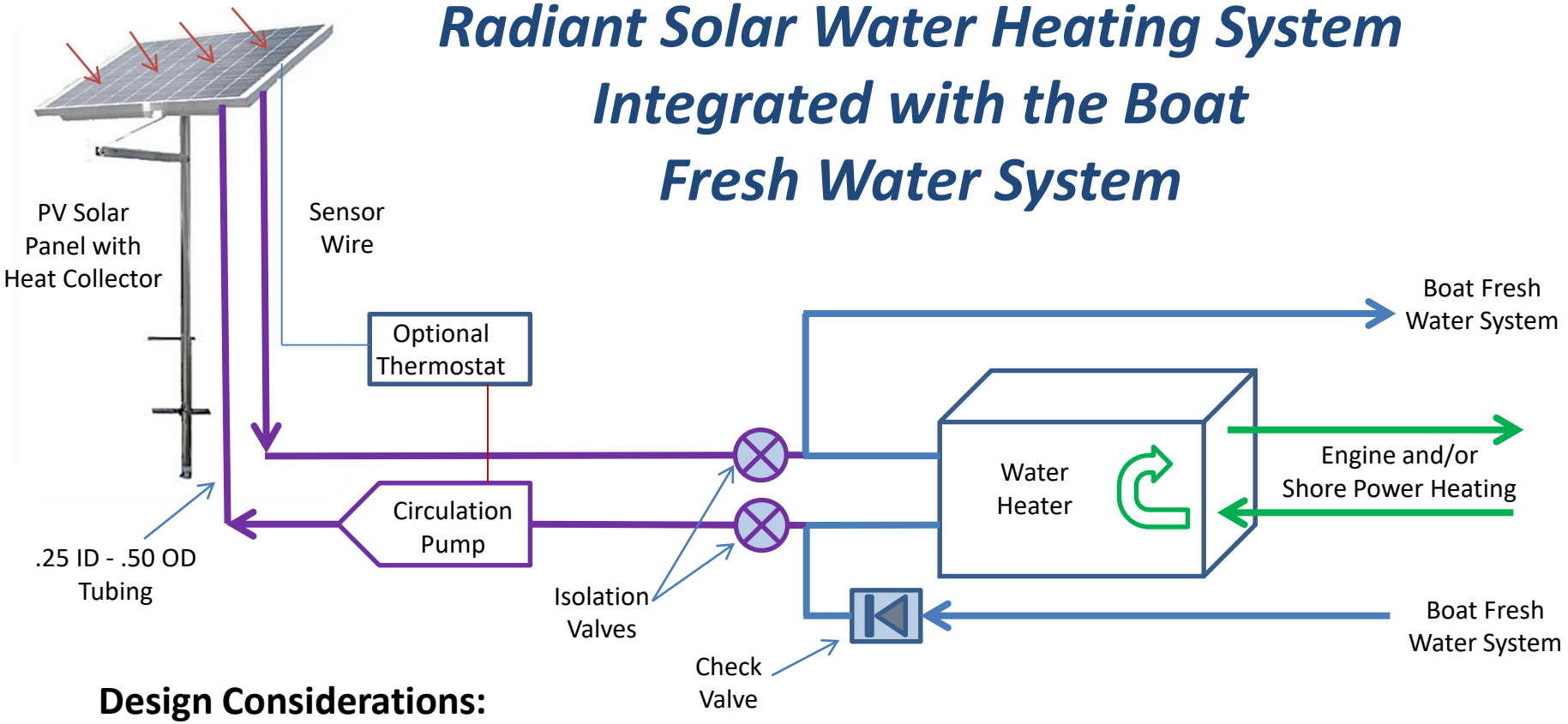
CMPower Radiant Solar Water Heating System

The CMPower Solar Water Heating System is designed to collect the radiant energy from the sun that passes through the PV solar panel. The energy is captured with a heat exchanger attached to the back of the solar panel. Water is circulated through the heat exchanger to the boat or vehicle hot water heater.

The water is heated about one tenth of a degree each time it passes through the heat exchanger. The efficiency of the system is affected by the angle of the solar panel to the sun, the intensity of the sun, the ambient temperature and the amount of wind passing over the surface of the solar panel. Under ideal conditions, the system should heat 6 gallons of water from 60 degrees to 100 degrees in less than three hours.

Insulating the tubing transporting the water will significantly improve the efficiency of the heating system. Foam insulation available at hardware stores used to insulate hot water pipes is an excellent insulation material. Insulation for a 1 inch pipe will house both tubes.

Radiant Solar Water Heating System Integrated with the Boat Fresh Water System

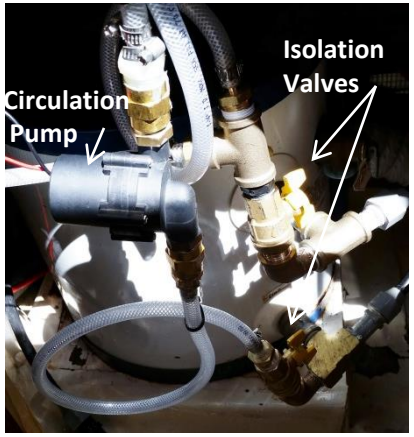


Design Considerations:

1. Heat exchanger is mounted behind the solar panel.
2. Boat water heater is used for storage of warmed water.
3. Circulation pump can be turned on and off manually or with a thermostat.
4. Solar panel is tilted and rotated for maximum heating efficiency.

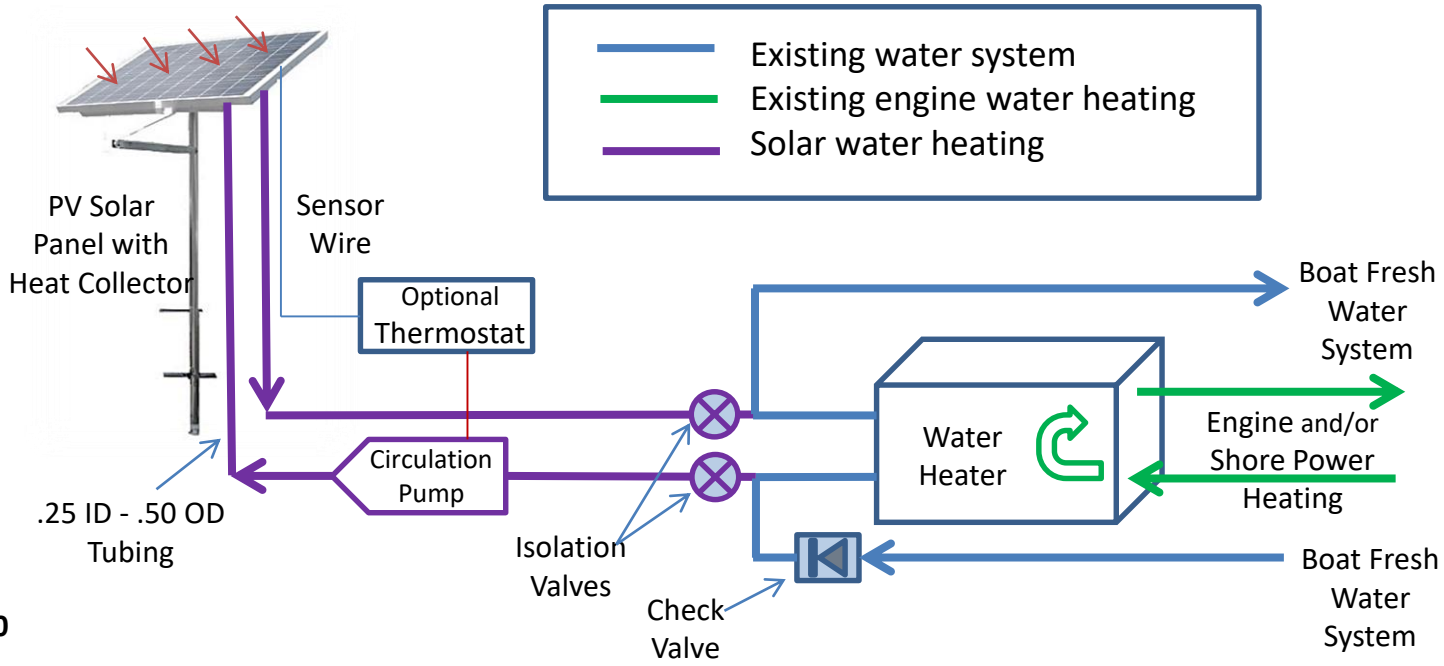
Existing water system
Existing engine water heating
Solar water heating

Radiant Solar Water Heating System Integrated with the Boat Fresh Water System
Installation Instructions



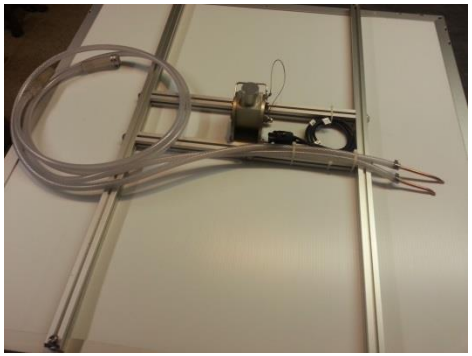
Your radiant solar water heating system is installed in the following steps:

1. **Install the heat exchanger** – If your system did not come with the heat exchanger already installed on the back of your solar panel, refer to the following pages for installation instructions.
2. **Install plumbing and circulation pump** – The standard kit includes tubing to run from the solar panel heat exchanger to the circulation pump and water storage tank and the circulation pump. All other plumbing must be sourced by the owner. Refer to the included diagram for the proper plumbing.
3. **Install and program the optional thermostat** – Refer to instruction page for proper installation of the thermostat.
4. **Remove air from the system**



Custom Marine Products 2020
custommarineproducts.com

Adhering the Heat Exchanger to the Back of the Solar Panel



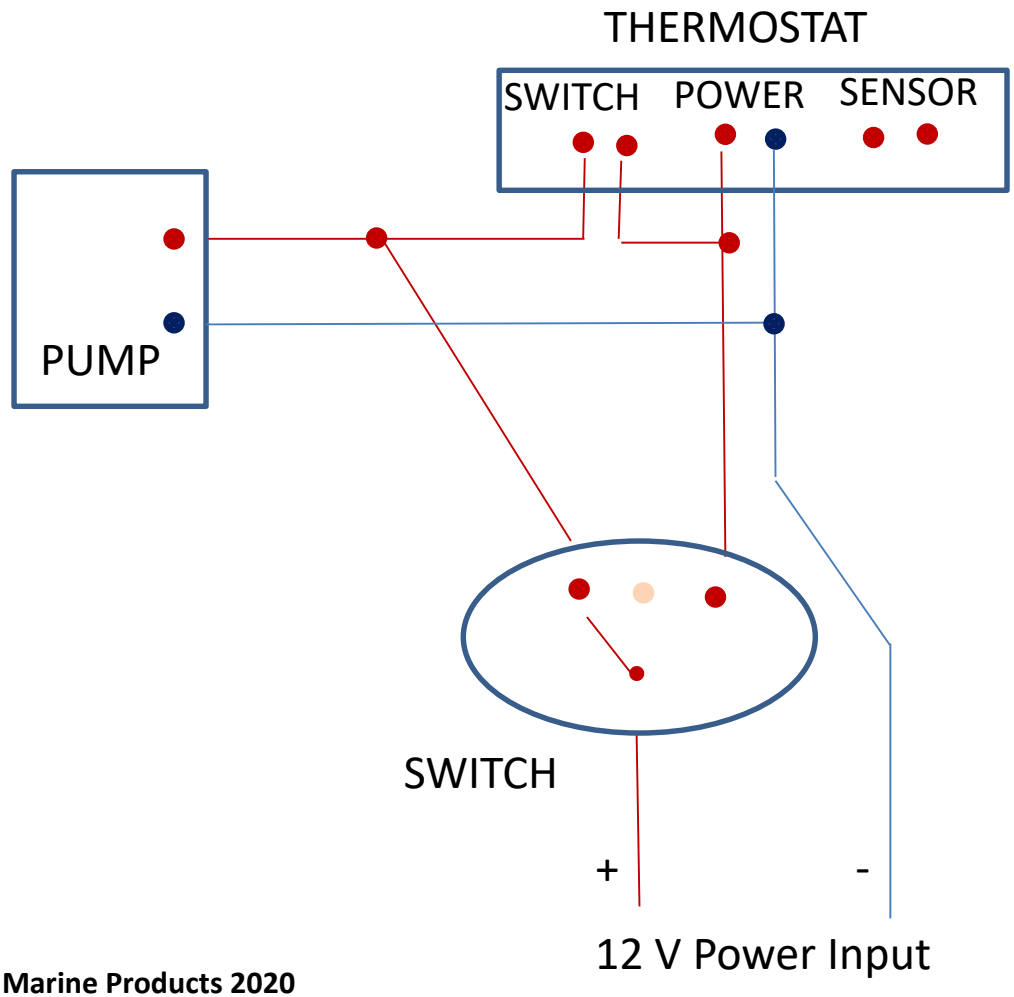
1. Attach the heat exchanger to the back of the solar panel using a silicone type adhesive. Place the solar panel face down. Place a several inch diameter bead of silicone in each corner of the heat exchanger and press it against the back of the solar panel until cured. Weight down the heat exchanger as necessary so it is flat against the back of the panel. Allow a day to cure.
2. Place the thermostat sensor between the heat exchanger and the back of the solar panel or tape to the heat exchanger. The wire from the thermostat sensor to the thermostat may be lengthened as needed.
3. Place two layers of foil type insulation over the heat exchanger. This insulation can be purchased at hardware supply stores in a roll. It is about 5/16ths thick, has foil on each side and bubble wrap type material in the middle. The idea is to capture the radiant heat from the sun in the heat exchanger and the insulation reduces heat loss.
4. Install an additional backing on the assembly. Use the white corrugated plastic sheet used in making signs. It is about a quarter inch thick and can be purchased from sign makers or plastics companies. (Laird Plastic has excellent prices and will cut it to size. They have outlets throughout the US.) Cut the sheet so that it can be tucked under the solar panel frame to hold it in place. Tuck it under on two sides and use a putty knife to force it under on the other two sides. The sheet will bend so bow it up and fit it under the panel frame. You will need to cut holes for the two water tubes and for the solar panel wires. The plastic is easy to cut with a sharp knife. This can be a bit tricky but gives the installation a nice finished look and works well.

Note: Enclose the two tubes running from the solar panel to the water heater in the foam insulation used to insulate hot water pipes. Both tubes fit into insulation designed for 1 inch OD pipe. Use wire ties to hold the insulation closed and to hold the assembly against the pole. **This will significantly increase the efficiency of the system.**

Note: Once your installation is complete, it is important to bleed the air out of the system. Tilt the panel to horizontal. Disconnect the tube from the panel to the water tank at the tank. Turn on the circulation pump to pump water from the tank through the heat exchanger. Once water comes out of the tube, reconnect it to the tank.

Wiring Diagram for Solar Heating Thermostat
Model BAYITE-TCF-3A035

This wiring approach uses a single pull double throw switch so the circulation pump can be operated manually or through the thermostat. The switch should have a center OFF position so the pump can be completely shut off.



Use the COOL mode.
Suggestion: Set the temperature to 95 and the variance to 10 degrees F. The circulation pump will turn on when the panel heat exchanger reaches 105 degrees and will turn off at 85 degrees. Once the water temperature reaches 105 degrees, the pump will stay on. Turn the switch to off as evening approaches otherwise the pump will run until the water temperature cools to 85 degrees thus cooling your warm water.

Note: The thermostat sensor wire can be extended up to 30 feet. Use a slightly heaver gauge wire.

Circulation Pump

Isolation Valves

Check Valve