

# SOLAR HEATING CONTROLS

by Radiantec Company

## THE SOLAR CONTROL LOOP



Solar Loop Control



Sensors

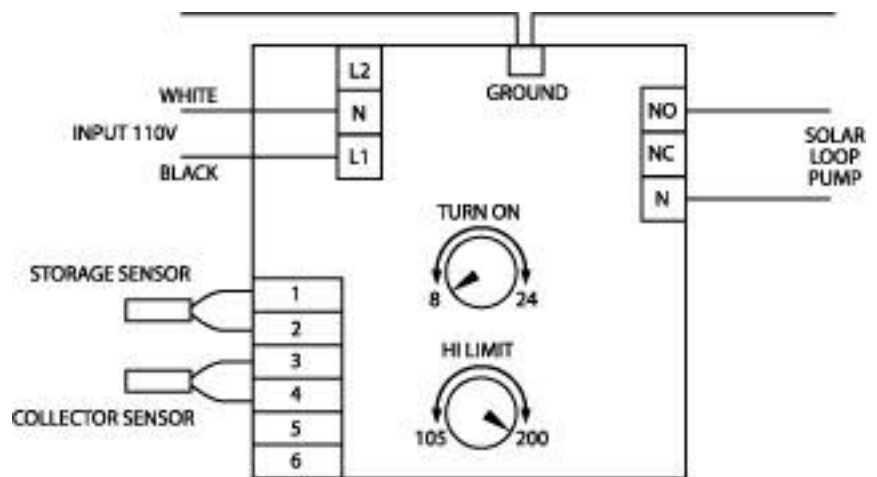


Solar Control (cover off)

**OPERATION-** The solar loop control turns on the solar loop pump whenever solar energy is available and turns the pump off when sufficient solar energy is no longer available. (See the appendix for a detailed discussion of control operation)

**CONTROLLER LOGIC-** The solar loop control is a “differential temperature control”. It senses temperature at two locations and operates according to the difference between the temperatures at these two locations. When the temperature of the “collector” sensor is 8° F warmer, or more, than the “storage/tank” sensor, the output switch is closed. (that action turns the pump on) When the temperature of the “collector” sensor is only 4° F, or less, warmer than the “storage/tank” sensor, the output switch is opened. (That action turns the pump off)

**SENSOR PLACEMENT -** Place the “collector” sensor on the outlet pipe of the solar collector array and insulate well. Place the “storage” sensor on the pipe at the point where the flow from the heat exchangers come together in one pipe for return to the solar collectors. Insulate well. See page 16 of the installation manual for sensor placement details.



**Typical Control Setting**  
Turn on = 8° Hi limit = 200°



Optional Temperature Display



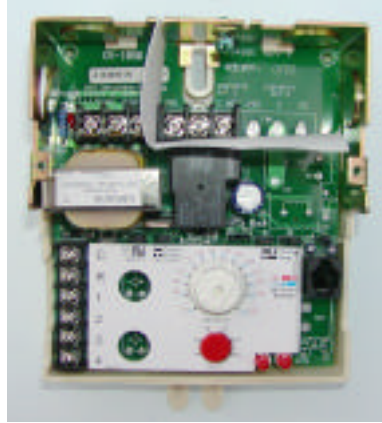
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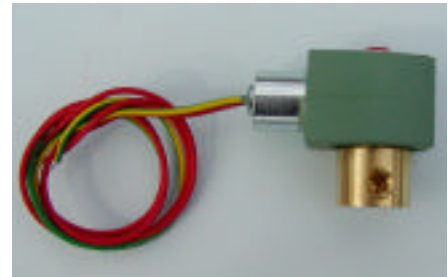
## HEAT DUMP CONTROL



Setpoint Control



Setpoint Control (cover off)

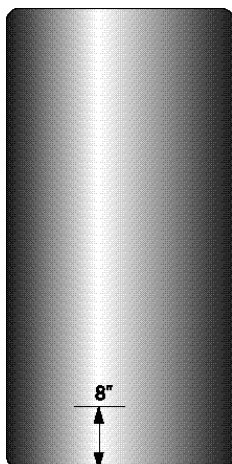


Heat Dump Valve  
Place the heat dump valve in any hot water line and plumb to a suitable drain. Laundry room placement can be convenient.

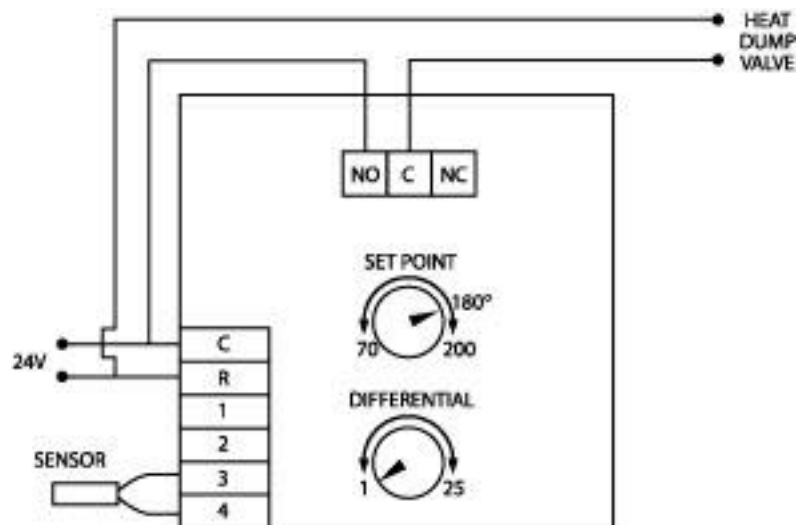
**OPERATION** - The heat dump control lowers system temperature by automatically consuming some domestic hot water whenever excessive temperatures are detected. (See the appendix for a detailed discussion of control issues)

**CONTROLLER LOGIC**- The temperature control closes the output switch whenever sensor temperature rises above a certain preset temperature. (this action opens the heat dump valve and causes domestic hot water to flow down the drain. When sensor temperature falls below the preset temperature by a certain amount, the output switch opens. (This action will close the heat dump valve)

**SENSOR PLACEMENT** - Place the sensor on the domestic hot water tank about 8" from the bottom. To achieve rapid and accurate response to a temperature change at the bottom of the tank, wrap the sensor with aluminum foil and stick the sensor and foil to the side of the tank. If a sensor lugnut is provided, don't use it, but place the sensor near it. Insulate well.



If a tank with external heat exchanger is used, put the sensor on the pipe where the heated domestic hot water leaves the heat exchanger.



**Typical Control Setting**  
Set point = 180°    Differential = 1°

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## THERMOSTAT CONTROL OF LONG-TERM PASSIVE HEAT STORAGE (Solar Option 1)



Thermostat



Setpoint Control  
(Used as a safety control)

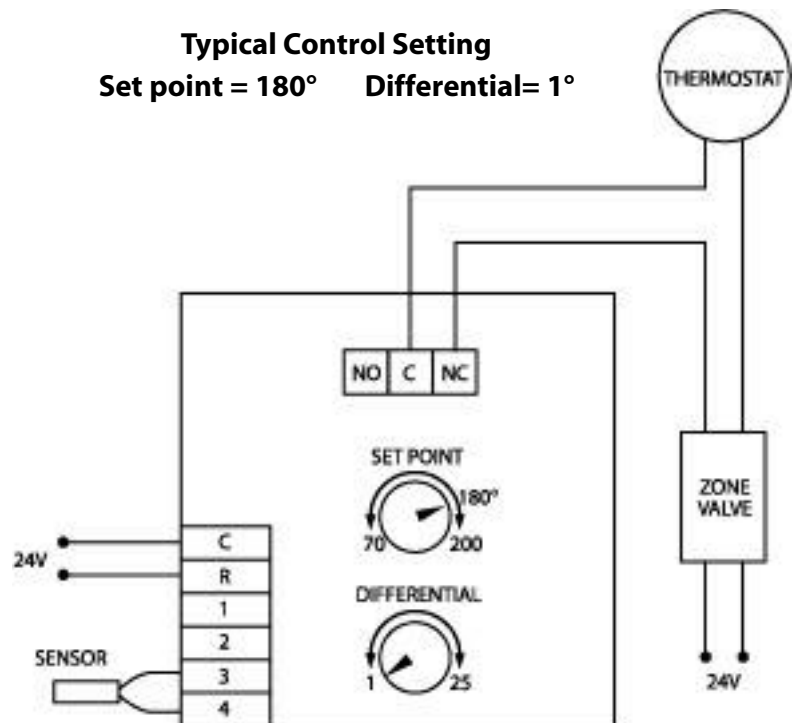


Zone Control Valve

**OPERATION** - Heat is introduced (or not) into the long term passive storage system directly from the solar loop, according to the thermostat call for heat. If system temperatures are too high, the thermostat is overridden and heat is not introduced. (See appendix for additional discussion of control issues.)

**CONTROLLER LOGIC** - The thermostat closes the circuit to the zone control valve whenever its temperature is not satisfied. (This action opens the valve and allows solar heated fluid from the solar loop to flow into the long term passive storage system.) The safety control will keep the circuit open regardless of thermostat if the sensor temperature is above setpoint. (Thus the valve remains closed.)

**SENSOR PLACEMENT** - Place the thermostat in the heated area at a height of 5 feet high and away from heat sources. The override sensor may be placed anywhere in the solar loop, but is frequently located at the solar collector outlet.



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## THERMOSTAT OVERRIDE (Solar Option 2 Systems)



Setpoint Control



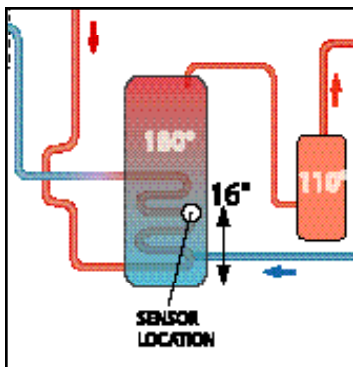
Setpoint Control (cover off)



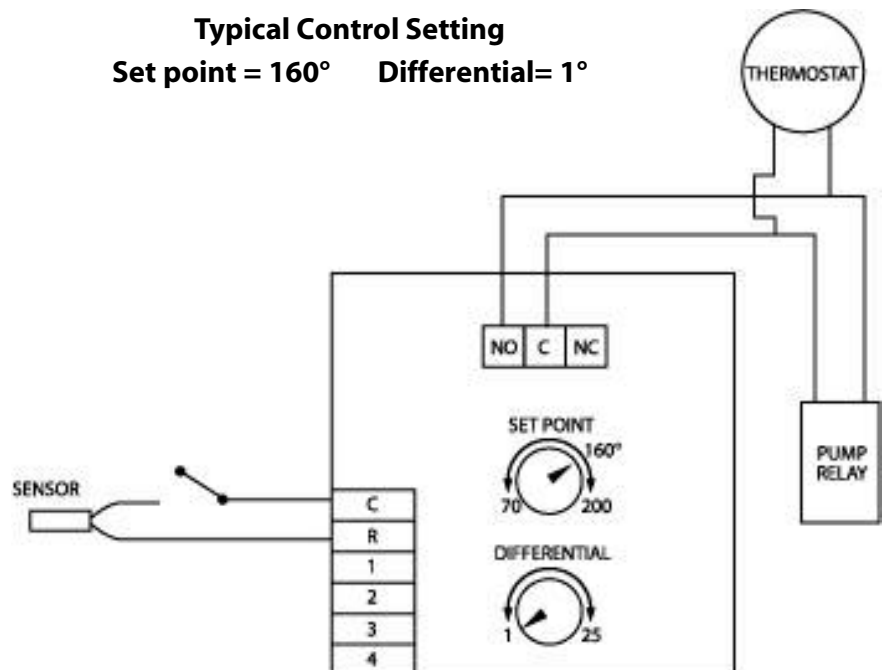
Thermostat (not supplied)

**OPERATION** - The thermostat override control will call for heat to be delivered from the solar storage tanks to the building automatically, even if the thermostat is satisfied, whenever solar storage temperatures rise above a certain set temperature. (This action causes heat to be stored within the backup tank and in the house whenever the solar storage tanks are fully charged.) The override control is shut off in the summer by interrupting the sensor.

**CONTROLLER LOGIC** - The temperature control closes switch to the pump relay no matter what the thermostat is doing. (this action causes the heat to come on)



**SENSOR PLACEMENT** - Place the sensor on the domestic hot water tank about 16" from the bottom. You want rapid and accurate response to a temperature change at the bottom of the tank, so wrap the sensor with aluminum foil and stick the sensor and foil to the side of the tank. If a sensor lugnut is provided, don't use it. Insulate well.



### Typical Control Setting

Set point = 160°    Differential = 1°