

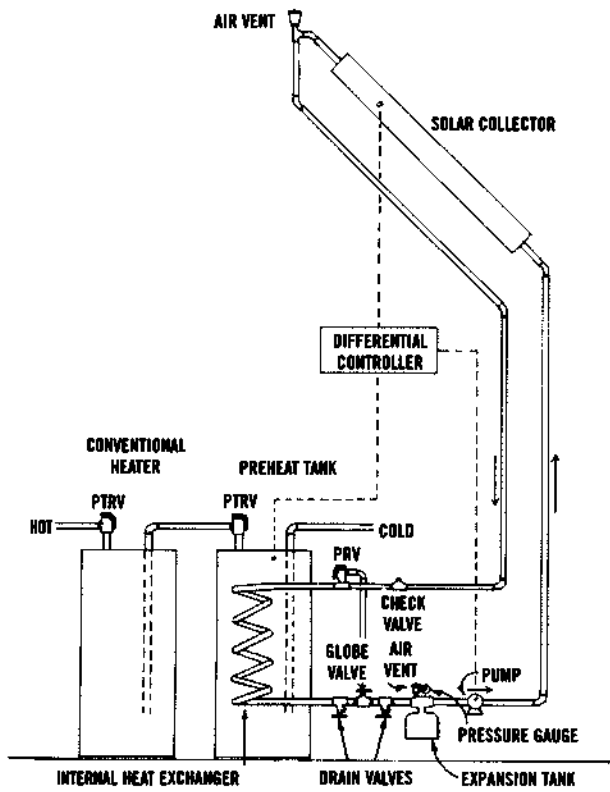
Three Basic Systems

Opposite you will find diagrams for the three basic systems. For areas where freezing occurs, a **Closed Loop Hot Water System** is recommended. Heat from the collector is transferred to storage water through a water-to-water heat exchanger in the storage tank. Antifreeze circulates through the closed loop, eliminating the need to drain the solar panels when a freeze occurs. It works during the winter months and requires little electricity to run the small pump that circulates pressurized heat transfer fluid through the collectors. The collectors can be mounted anywhere. The main disadvantages are high cost, possible overheating, and the required professional installation and servicing.

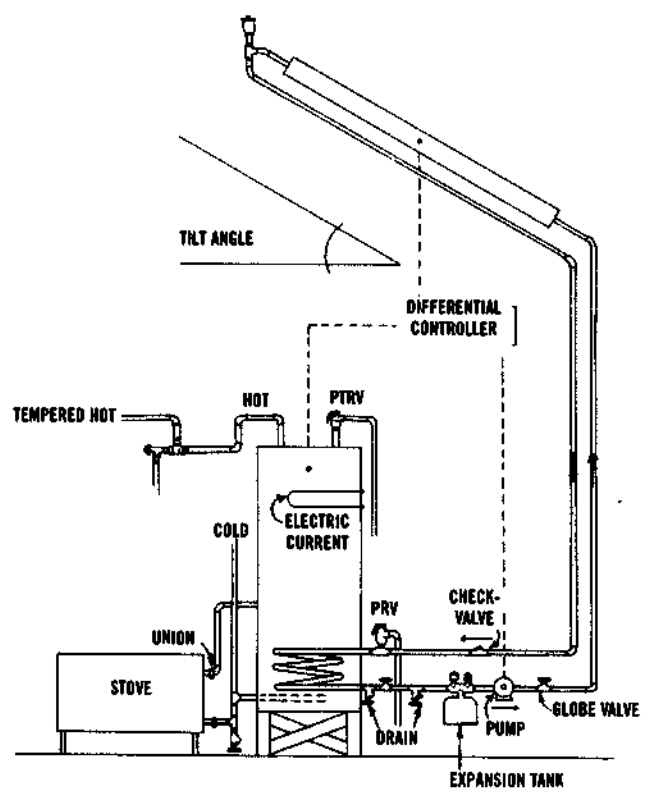
For backup heating you can drill two holes in a woodstove and run a water line from the solar hot water storage tank through it, then back into the tank as shown in the drawing. This arrangement works well in cold weather when the solar collectors aren't working, but the woodstove is being used the most.

In the **Forced Drain-Down Hot Water System**, a pump circulates water from the storage tank through the collector back to storage. During a freeze, an automatic sensing device activates a solenoid valve, draining the water from the collector. You'll need a nonfreezing automatic vent on top of the collector.

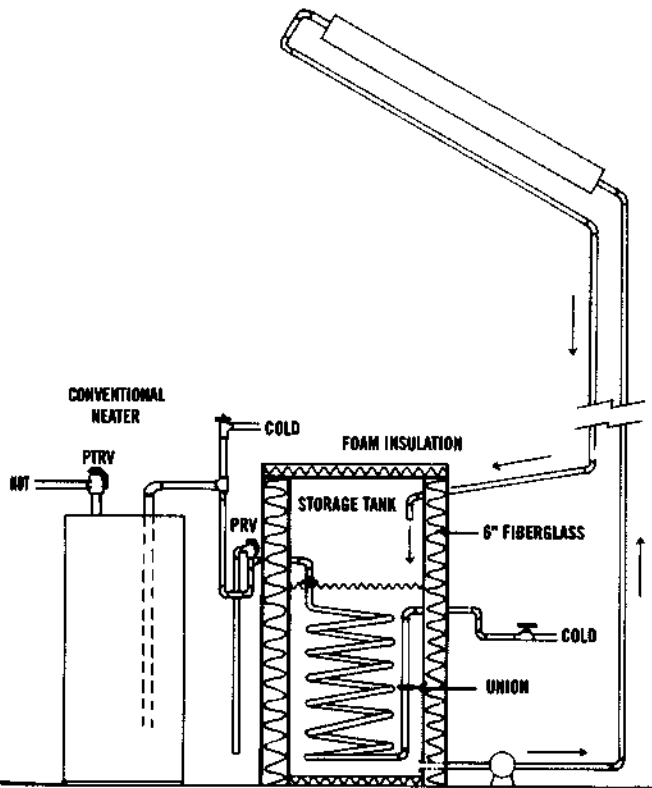
The simplest system to operate is the **Gravity or Thermosiphon Hot Water System**. Where freezing rarely occurs, this system is recommended. No pump is needed to circulate the water through the solar panels; ordinary head pressure and gravity do the work. The main drawback is that the tank for storing the hot water must be located higher than the collectors. Also, you must manually shut off the flow of water to the collectors and drain them thoroughly whenever a freeze threatens. A plumbing and heating contractor, rather than a professional solar technician, should be able to install this system.



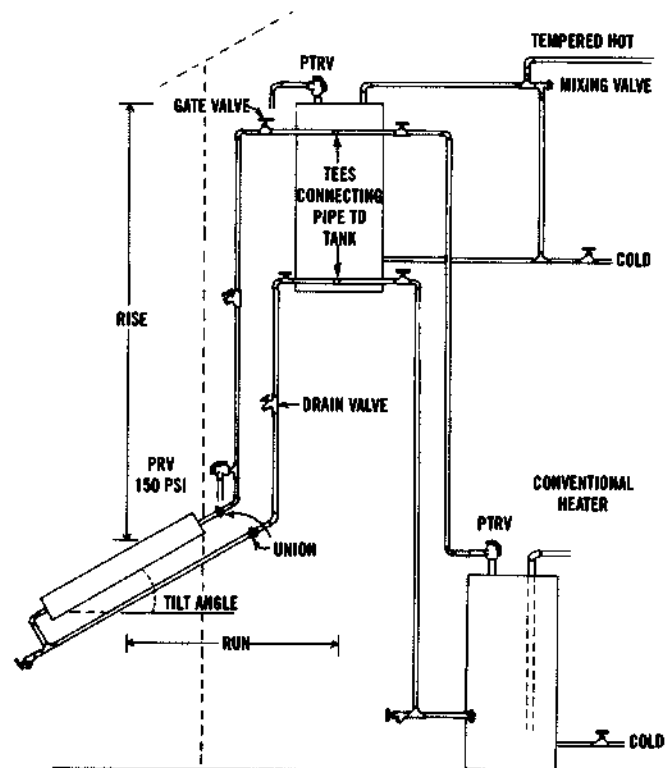
In the **Closed Loop Hot Water System**, heat from the collector is transferred to storage water through a heat exchanger.



Above, both the stove and the collector can feed hot water into this single-tank **Closed Loop Hot Water System**.



In the **Forced Drain-Down Hot Water System**, a pump circulates water from the tank through the collector and back to storage.



In the **Gravity Hot Water System**, water heated in the collector becomes lighter and rises; colder (heavier) water will flow from the bottom of the storage tank to the bottom of the collector.