

INSTALLATION & OPERATING INSTRUCTIONS

**RICHDEL MODEL
R409**



DIFFERENTIAL THERMOSTAT HOT WATER CONTROL

RICHDEL *Inc.*

**SOLAR
PRODUCTS**

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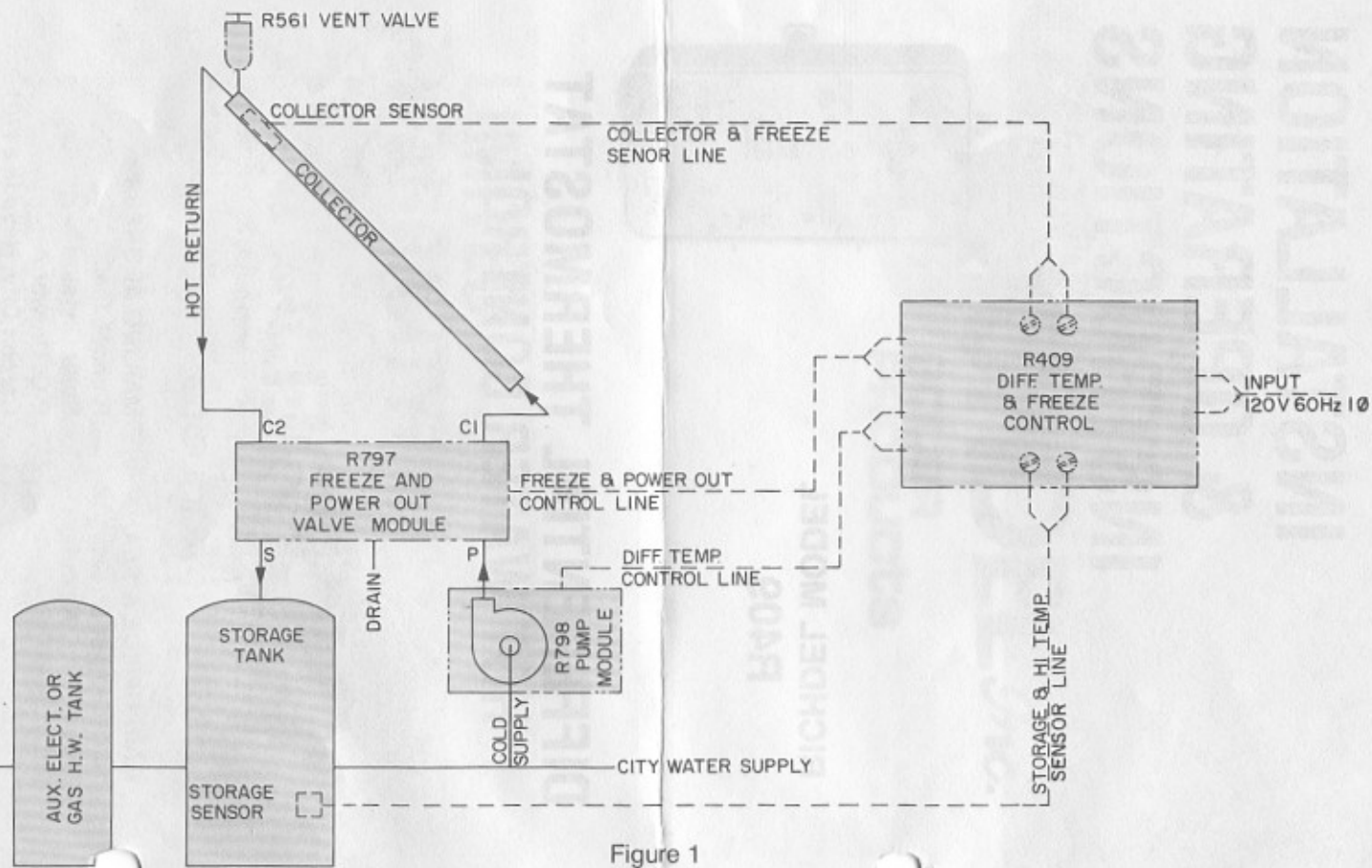


Figure 1

INSTALLATION:

DESCRIPTION:

Figure 1 shows a simplified schematic of a domestic hot water solar heating system that uses the potable water supply as the heat exchange media. Incidental valving and plumbing details of the completed solar/conventional hot water heating system are omitted here since this schematic is intended to show only the portion in which Richdel components are installed.

The R409 Solar Domestic Hot Water Differential Temperature Controller provides control of a valve used for collector drainage during freezing or power outage, and the "on-off" control of a recirculation pump dependent on availability of solar energy. On signal from a collector sensor that freezing is imminent, the control will remove electrical power from a control valve which thereby initiates collector draindown. When the difference in indicated temperatures between a storage tank sensor and a collector sensor indicates solar energy is available electrical power is supplied to a recirculation pump. When the temperature in storage reaches a predetermined high temperature limit (160°F typical) the control removes electrical power from both the recirculation pump and the drain valve, which causes recirculation to cease and collector drain to occur.

The R409 Hot Water Control features solid state sensing circuitry, with relay power switching for the valve and pump control. A "push to reset" circuit breaker protects the unit from shorts in the output wiring. A light indicates pump operation. An on-off switch removes or applies input power to the control.

MOUNTING

Select a convenient location to mount the control near the hot water system. Remove the cover plate from the wiring compartment. Wall mount the unit using appropriate screws through the key hole on the top of the control and the two holes in the wiring compartment.

ELECTRICAL HOOK UP

(1) Power In and Out

Lead wires are provided and identified in the wiring compartment as line, pump and valve. Run 18 gauge wire from 120VAC power source and to the valve and pump in conduit and connect to controller lead wires with wire nuts.

Caution: Replace compartment cover with screw.

Note: Consult local codes for conduit and wiring requirements.

Note: Maximum Electrical Loads

Pump	1.50 amps max.
Valve	.20 amps max.

(2) Low Voltage Out

(a) Sensors:

Run leads (18 gauge) to sensors from the appropriate terminals on the control. Install and connect the sensors to these leads per sensor installation instructions. The sensor lead voltage is 5.6 volts D.C. max. These leads are not required to be installed in conduit.

After wiring is complete, apply silicone adhesive around the low voltage wiring to seal the exit from the weather-tight case to prevent excessive dust from entering the control unit.

OPERATION

After proper installation of all system components the R409 controller requires no attention except to move the power switch to the "on" position and to perform periodic functional checks.

(1) Power Switch:

Moving the power switch to "off" removes power from the control and also from the "drain down" valve and the pump. This condition simulates a "power outage", and the collectors should therefore drain down.

(This test should be performed before, and several times during, the freezing season to insure proper operation.)

(2) Pilot Light:

This light comes on when the pump is running and creating flow through the collector.

(3) Circuit Breaker:

If the pump or valve or associated wiring become shorted this circuit breaker will trip and protect the control circuit. Check all wiring before resetting. Push to reset.

(4) Collector Sensor:

By removing the lead from one of these terminals the control "sees" an open circuit and makes the circuitry "think" that the collector temperature is at freezing. The pump, if running, should stop and the valve should drain down.

(This test should be performed before, and several times during, the freezing season to insure proper operation.)

(5) Tank Sensor:

By shorting across these two terminals the control "sees" a low resistance and makes the circuitry "think" that the tank temperature has exceeded the allowable maximum. The pump, if running, should stop and the valve should drain down.

(This test should be performed several times a year to insure proper operation.)



COLLECTOR
ON

RESET

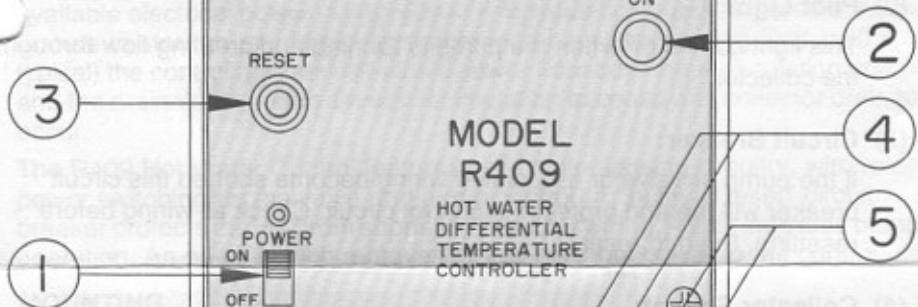
MODEL
R409

HOT WATER
DIFFERENTIAL
TEMPERATURE
CONTROLLER

POWER
ON
OFF

SENSORS
COLLY TANK

CAUTION
HIGH VOLTAGE
DO NOT REMOVE





RICHDEL *Inc.*

SOLAR PRODUCTS

LIMITED WARRANTY

Richdel Solar products are guaranteed against defective workmanship and/or faulty materials for a period of one (1) year from date of original purchase. Defective products will be repaired or replaced at Richdel's option at no charge providing the product is sent to the factory or authorized service center, transportation charges prepaid. This warranty does not apply to damages or malfunctions resulting from accidents, misuse or neglect. No allowances will be made for labor, for removal or reinstallation or any other damages resulting from so-claimed defective products.