



DTT-80



DTT-3410



DTT-600-ST



DML-106

# HARDWIRED

MODEL NUMBER	MODEL FEATURES	SENSORS INCLUDED	SENSORS to be ordered separately for optional functions.			
			OFF below 80°F	Freeze Recirc	Drain OFF above 160°F	Hi Limit OFF
DTT-80	Standard Controller	Two SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-80-ST	Same as above with Terminal Strip	Two SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-600	One 120V output for Pump and One 120V output for Drain Down Valve	Two SAS-3 Two FS-5	One OPB-80	—	One OPA-160	One SAS-3
DTT-600-ST	Same as above with Terminal Strip	Two SAS-3 Two FS-5	One OPB-80	—	One OPA-160	One SAS-3
DTT-3410	External knob for Adjustable "HIGH LIMIT"	Three SAS-3	One OPB-80	Two FS-4	—	Included with Controller
DML-106	Two or three Differential Controls plus Drain Down Valve Control	NONE	Request separate data sheet on the Delta-T Multi-Logic™ for more specific information			



DTT-90



DTT-790 DTT-690

# PLUG-IN

MODEL NUMBER	MODEL FEATURES	SENSORS INCLUDED	SENSORS to be ordered separately for optional functions.			
			OFF below 80°F	Freeze Recirc	Drain OFF above 160°F	Hi Limit OFF
DTT-90	Standard Controller with receptacle and line cord	Two SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-790	Same as above but with two receptacles wired together	Two SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-690	One receptacle for Pump and One receptacle for Drain Down Valve and line cord	Two SAS-3 Two FS-5	One OPB-80	—	One OPA-160	One SAS-3



DTT-80T-ST



DTT-600T-ST

# HARDWIRED TEMP-TRAK®

MODEL NUMBER	MODEL FEATURES	SENSORS INCLUDED	SENSORS to be ordered separately for optional functions.			
			OFF below 80°F	Freeze Recirc	Drain OFF above 160°F	Hi Limit OFF
DTT-80T-ST	Standard Controller with three location digital temperature display and Terminal Strip	Three SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-600T-ST	Same as above but with 120V outputs for Pump and Drain Down Valve	Three SAS-3 Two FS-5	One OPB-80	—	One OPA-160	One SAS-3



DTT-90T



DTT-790T DTT-690T

# PLUG-IN TEMP-TRAK®

MODEL NUMBER	MODEL FEATURES	SENSORS INCLUDED	SENSORS to be ordered separately for optional functions.			
			OFF below 80°F	Freeze Recirc	Drain OFF above 160°F	Hi Limit OFF
DTT-90T	Standard Controller with three location digital temperature display with receptacle and line cord	Three SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-790T	Same as above but with two receptacles wired together	Three SAS-3	One OPB-80	Two FS-4	—	One SAS-3
DTT-690T	Same as above but one receptacle each for Pump and Drain Down Valve	Three SAS-3 Two FS-5	One OPB-80	—	One OPA-160	One SAS-3

Please contact factory representative for: (1) Primary voltages other than 120V (2) Relay contacts other than "NO" (3) Output control up to 3 HP.

## FIELD ADJUSTABLE DIFFERENTIAL



All models have a field adjustable choice of "ON" differential settings ranging from 5°F to 20°F. The "OFF" is fixed at 2.5°F. This adjustment is easily made by using a 1/8" blade screwdriver external to the controller box. When shipped from the factory, adjustment is set at 10°F.

## TEMP-TRAK®



Actual Size

The Temp-Trak® models feature a digital display thermometer. By depressing either of two switches, the temperature of storage bottom or collectors is displayed. One additional temperature, such as storage top, is constantly displayed.

## MODEL APPLICATIONS AND SELECTION

Models can be selected within four general categories:

- HARDWIRE, without digital thermometer.
- PLUG-IN, without digital thermometer.
- HARDWIRE TEMP-TRAK® with digital thermometer.
- PLUG-IN TEMP-TRAK® with digital thermometer.

## MODEL FEATURES COLUMN

Specific features of each model are described in the "MODEL FEATURES COLUMN" on the previous page. These features include Adjustable Hi Limit, two receptacles wired together, digital temperature readout, terminal strip for sensor hook-up, second output for control of a drain down valve, and line cord and receptacle plug-in types.

## FREEZE PROTECTION

### DRAIN DOWN

A second output for control of a Drain Down Valve is available either hardwired DTT-600 series or plug-in type DTT-690 series. The valve output remains energized until 42°F is reached when it turns off. It remains off until a rising temperature of 52°F is achieved. The pump output will not energize when the valve output is off. If an unusually long pipe run is employed, it is recommended to use additional FS-5 Sensors to afford full freeze protection as determined by a qualified installer.

The DTT-600 and DTT-690 series controls have a field selectable Drain Override feature. This feature allows the system to fill and collect heat if a temperature differential is present even if the FS-5 freeze sensors are below the drain temperature. To activate this feature requires connection of a pair of yellow leads with the quick connectors provided.

### RECIRCULATION

The pump turns on at 42°F and off at 52°F. This method circulates a small amount of storage water through the collector to warm the collector to prevent freeze damage. Recirculation requires two FS-4 Sensors which are wired in parallel with the Collector Sensor lead and requires no additional wires to the collector. One FS-4 Sensor is connected to the entrance of the collector array and the other connected to the exit of the collector array. The "recirculation" method is not recommended on systems which have more than three collectors, or in climatic regions where more than 20 freezes occur per year or temperatures below 20°F occur. If an unusually long pipe run is employed it is recommended to use additional FS-4 Sensors to afford full freeze protection as determined by a qualified installer.

## OTHER OPTIONAL FUNCTIONS

### OFF BELOW 80°F

Keeps the pump off when the collector is below 80°F. This feature prevents the pump from turning on at night when a large amount of hot water has been consumed, or when a reverse thermosyphon effect causes the Collector Sensor to turn the pump on. This function requires one OPB-80 Sensor which is wired in series with the Collector Sensor lead and requires no additional wires to the collector.

### DRAIN HIGH LIMIT

Dumps the collector and stops the pump when a high temperature of 160°F has been reached in Drain Down Valve Systems. The OPA-160 is attached to the hot water outlet of the solar tank. When this function is employed the following "Storage High Limit" SAS-3

is not needed. The OPA-160 Sensor is wired in series with the FS-5 Freeze Sensors.

## STORAGE HIGH LIMIT

Turns the pump off when the storage tank has reached 160°F (other settings are available upon specification). This feature prevents excessive temperatures in the storage tank. This function requires an extra SAS-3 Sensor and a separate pair of sensor wires from the controller to the storage tank. All models are provided with leads/terminals for connection to the extra SAS-3 Sensor. When this function is not desired the leads/terminals are left unconnected and insulated with tape or wire nuts.

## SENSORS

Storage and Collector Sensors (SAS-3) for the basic differential temperature functions are packaged with each model. The DTT-3410, DTT-600 and the DTT-690 have additional sensors as required for their specific functions. These sensors are detailed in the "SENSORS INCLUDED COLUMN" on the previous page.

Optional functions may be added to the models by ordering sensors separately. These sensors are listed in the "SENSORS TO BE ORDERED SEPARATELY COLUMN" on the previous page. Sensor hook-up is with any 18 to 24 gauge wire.

## THERMISTOR TYPE SENSORS

3,000 ohm @ 25°C



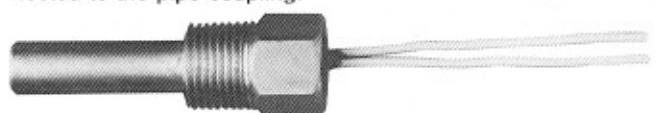
### SAS-3, STANDARD SENSOR

Screw-attached sensor in copper housing providing minimum thermal mass. May also be clamp attached to pipe.



### RBP-50, REVERSE BRASS PLUG, 1/2" MPT

The RBP series is utilized for direct top immersion into a non-pressurized tank. Utilize a pipe coupling and the necessary length of pipe to fabricate a drop tube with the open end above the tank top. The wire connections should be made before the RBP is connected to the pipe coupling.



### IS-2.5, BRASS IMMERSION SENSOR

1/2" MPT, 2 inches deep immersion.



### BP-50, BRASS PLUG, 1/2" MPT

## SWITCHING TYPE SENSORS



### FS-4

Open with lowering temperatures until 42°F when sensor closes and re-opens at 52°F. Adds recirculation freeze protection function when used with models DTT-80, 90 and 790 Series and DTT-3410. Wire in parallel with Collector Sensor.

### FS-5

Closed with lowering temperatures until 42°F when sensor opens and re-closes at 52°F. Included with DTT-600 and 690 Series.

### OPA-160

Open above 160°F and closed below 160°F. Adds Drain High Limit function when used with models DTT-600 and 690 Series. Wire in series with the FS-5 Sensors. Also available is an OPA-180.

### OPB-80

Open below 80°F and closed above 80°F. Adds off below 80°F function when used with any model. Wire in series with Collector Sensor Lead.