

SureStat DT10 Thermostat

User Manual



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Contents

1. Overview	3
What BHK-300 can do?	3
Key features.....	3
2. Specification	4
3. Key Instruction.....	5
4. Key Operation Instruction	6
4.1 Enquiry Set Point	6
4.2 How to Set Parameters	6
4.3 Setup Flow Chart.....	7
5. Menu Instruction	7
5.1 Temperature Control Range Setting (TS, HD, CD).....	8
5.2 Alarm High/Low Limit Setting (AH, AL).....	8
5.3 Compressor Delay (PT)	9
5.4 Temperature Calibration (CA)	9
5.5 Display in Fahrenheit or Centigrade unit (CF).....	9
6. Error Description	10
Sensor Fault Alarm	10
Over-temperature Alarm.....	10
7. Technical Assistance and Warranty	11
7.1 Technical Assistance	11
7.2 Warranty.....	11

1. Overview

What can the DT10 do?

This is a dual relay output temperature controller which can be used as over-temperature protection and automatic temperature control system for electrical appliances for home-brew, aquarium, pet breeding, incubation, seedling heat mat, oven, terrestrial heat pad/lamp, heating pump, home fermentation, electric radiator, electric oven etc.

The temperature controller is equipped with a dual relay to connect with both refrigeration and heating equipment to get the desired temperature. The dual LED displays and offers display switch between Centigrade and Fahrenheit. With its 1800 watt capacity, can handle most any 120 volt appliance.

The DT10 is designed with compressor delay protection for refrigeration, high and low temperature alarm and sensor fault alarm. Functions such as temperature calibration, separately set differential for refrigeration and heating, enable more accurate temperature control.

Main Features

- Plug and play design, easy to use;
- Dual relay output, be able to connect with refrigeration and heating equipment at the same time;
- Support reading with Centigrade or Fahrenheit;
- Maximum output: 1800W 15A.
- Dual display window to display measured temperature and set temperature at the same time;
- Temperature calibration;
- Compressor delay protection for refrigeration control;
- High and low temperature alarms are available;
- Over-temperature and sensor fault alarm;
- Heating/cooling differential function can be set separately for refrigeration and heating.

2. Specification

Temperature Control Range	-50~99 °C / -50~210 ° F
Temperature Resolution	0.1 ° C / 0.1° F
Temperature Accuracy	±1°C (-50 ~ 70°C) / ±1°F (-50 ~ 160° F)
Temperature Control Mode	On/Off Control, Heating and Cooling
Input Power	115V
Output	Max. 1800 watts, 15A, 115V
Buzzer Alarm	High and Low Temperature Alarm
Sensor Type	NTC sensor (Included)
Sensor Length	2m / 6.56ft
Relay Contact Capacity	Cooling (15A, 115V)
	Heating (15A, 115V)
Input Power Cable Length	1.5m (5ft)
Output Power Cable Length	1.5m (5ft)
Dimensions	Main Body: 145x68x30mm (5.5x2.7x1.3 inch) Socket : 83x43x25mm (3.3x1.7x1.0 inch)
Ambient Temperature	-30~ 75 ° C / -22~ 167 ° F
Storage	Temperature -20~ 60 ° C / -4~ 140 ° F
	Humidity 20~85% (No Condensate)
Warranty	1 Year

3. Keys Instruction



- 1. PV: Process Value.** under running mode, display current measured temperature; under setting mode, display menu code.
- 2. SV: Setting Value.** under running mode, display setting temperature; under setting mode, display setting value.
- 3. Cooling indicator:** when the light is on, start refrigeration; when the light is flickering, the compressor is under delay protection.
- 4. Heating Indicator:** when the light is on, start heating.
- 5. SET key:** press SET key for 3 seconds to enter menu for function setting. During the setting process, press SET key for 3 seconds to quit and save setting changes.
- 6. DECREASE key:** under running mode, press DECREASE key to inquiry CD value; under setting mode, press DECREASE key to decrease value.
- 7. INCREASE key:** under running mode, press INCREASE key to inquiry HD value; under setting mode, press INCREASE key to increase value.
- 8. Heating Device Socket:** this socket is for heating output.
- 9. Cooling Device Socket:** the socket is for refrigeration output.

4. Key Operation Instructions

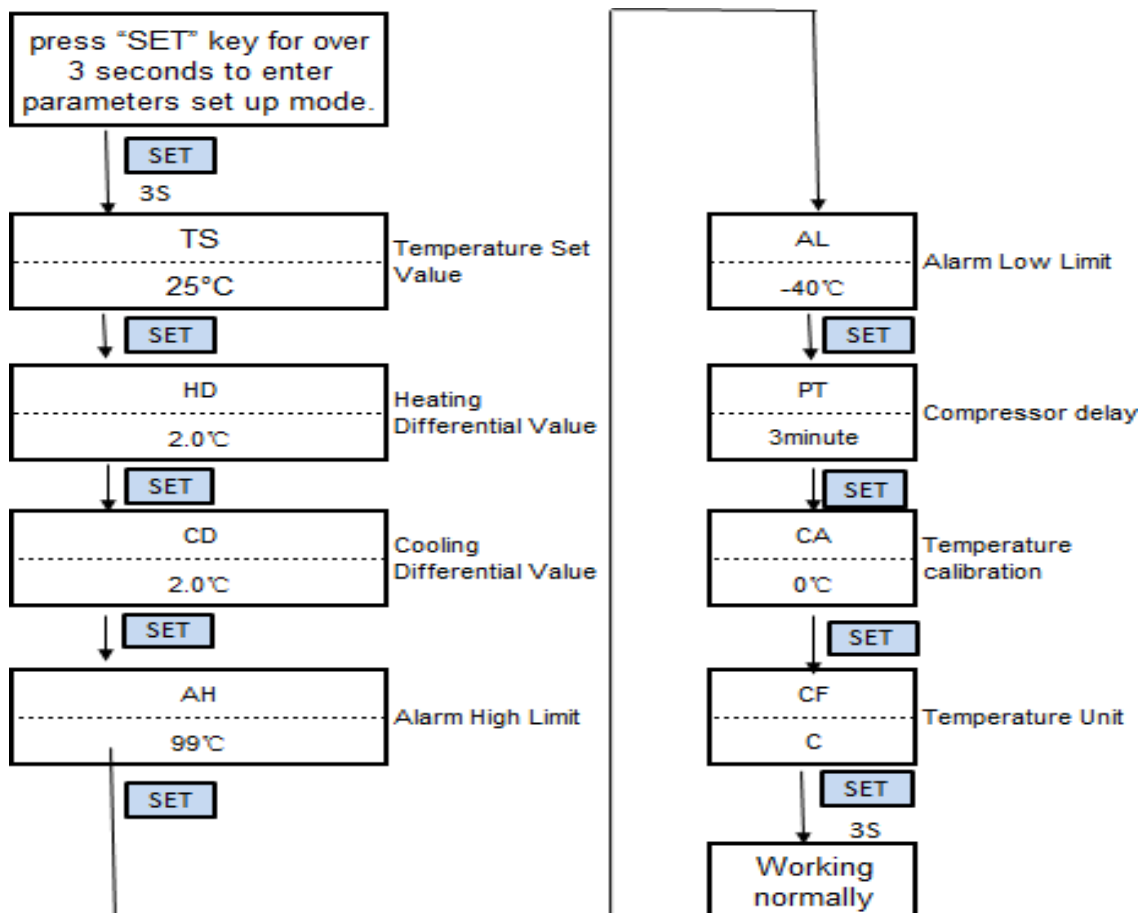
4.1 Enquiry Set Point

When the controller is working, short press the "UP" key for one time, the heating differential (HD) will be displayed; short press the "DOWN" key for one time, then the cooling differential (CD) will be displayed. The screen will return to normal display mode after 2 seconds without any operate.

4.2 How to Set Parameters

When the controller is working normally, press "SET" key for over 3 seconds to enter into parameters set up mode. "SET" indicator will be on. PV window displays the first menu code "TS", while SV window displays according setting value. Press "SET" key to go to next menu and display according menu code, press "UP" key or "DOWN" key to set current parameter value. After setting done, press "SET" key for 3 seconds at any time to save the parameters change and return to normal temperature display mode. During setting, if there is no operation for 10 seconds, the system will quit setting mode and return to normal temperature display mode without saving the parameters change.

4.3 Setup Flow Chart



5. Menu Instruction

When the temperature is displayed in Centigrade

Menu code	Function	Setting range	Default setting	Remarks
TS	Temperature Set Value	-50~99.9°C	25°C	5.1
HD	Heating Differential Value	0.3~15°C	2.0°C	
CD	Cooling Differential Value	0.3~15°C	2.0°C	
AH	Alarm High Limit	-50~99.9°C	90°C	5.2
AL	Alarm Low Limit	-50~99.9°C	-40°C	
PT	Compressor Delay	0~10 minutes	3 minutes	5.3
CA	Temperature Calibration	-15°C~15°C	0°C	5.4
CF	Display in Fahrenheit or Centigrade		C	5.5

When the temperature is displayed in Fahrenheit

Menu code	Function	Setting range	Default setting	Remarks
TS	Temperature Set Value	-50~210°F	77°F	5.1
HD	Heating Differential Value	1~30°F	3°F	
CD	Cooling Differential Value	1~30°F	3°F	
AH	Alarm High Limit	-50~210°F	200°F	5.2
AL	Alarm Low Limit	-50~210°F	-40°F	
PT	Compressor Delay	0~10 minutes	3 minutes	5.3
CA	Temperature Calibration	-15°C~15°F	0°F	5.4
CF	Display in Fahrenheit or Centigrade		F	5.5

5.1 Temperature Control Range Setting (TS, HD, CD)

When the controller is working normally, the LED displays current measured temperature (PV), and will automatically identify and switch between refrigeration and heating working modes.

When the measured temperature $PV \geq TS$ (temperature you set) + CD (cooling differential value), system enters refrigeration status, the cool indicator will be on, and refrigeration relay starts to work; when the cool indicator is flickering, it means the refrigeration equipment is under compressor delay protection status. When the measured temperature $PV \leq TS$ (temperature set value), the cool indicator will be off, and the refrigeration relay stops working.

When the measured temperature $PV \leq TS$ (temperature set value) - HD (heating differential value), system enter heating status, the heat indicator will be on and heating relay starts to work; when the measured temperature $PV \geq TS$ (temperature setting), the heat indicator will be off, then heating relay stops working.

For example, if set $TS=75^{\circ}\text{F}$, $CD=2^{\circ}\text{F}$ and $HD=3^{\circ}\text{F}$, then when measured temperature is higher than or equal to 77°F ($TS+CD$), system enters refrigeration status; when temperature decline to 75°F (TS), stop refrigeration; when measured temperature is lower or equal to 72°F ($TS-HD$), system enters heating status; when the temperature raised to 75°F (TS), stop heating. Repeat that so as to get the desired temperature range we want.

In case the time interval between two refrigeration is less than PT, please refer to 5.3.

5.2 Alarm High/Low Limit Setting (AH, AL)

When measured temperature is higher or equal to AH, high temperature alarm will be triggered, buzzer will alarm with tone "bi-bi-Biii" until the temperature is lower than AH or any key is pressed.

When measured temperature is lower or equal to AL, low temperature alarm will be triggered, buzzer will alarm with tone "bi-bi-Biii" until the temperature $>AL$ or any key is pressed.

5.3 Compressor Delay (PT)

Under refrigeration mode, after power on, if the measured temperature is higher than set temperature (TS) plus cooling differential (CD), the equipment won't start refrigeration immediately but waiting for a delay time.

When the time interval between two refrigeration operation is larger than preset delay, the equipment will start refrigeration immediately; when the time interval between two refrigeration is less than preset delay, the equipment won't start refrigeration until preset delay is satisfied.

Delay time will be calculated right after the moment the refrigeration stops.

5.4 Temperature Calibration (CA)

If there is deviation between measured temperature and actual temperature, use temperature calibration function to align the measured temperature and actual temperature.

5.5 Display in Fahrenheit or Centigrade unit (CF)

Customers can set the temperature display in Fahrenheit or Centigrade according to their own habit. Default display is in Centigrade temperature. To display in Fahrenheit, set CF value as F.

Attention: when CF value changed, all the setting value will be recovered to factory settings.

6. Error Description

Sensor Fault Alarm: when temperature sensor is in short circuit or open loop, the controller will initiate sensor fault mode, and cancel all the actions. The buzzer will alarm, LED displays ER. Buzzer alarm could be dismissed by pressing any key. After faults solved, the system will return to normal working mode.

Over-temperature Alarm: when measured temperature exceeds the measuring range (less than -50°C / -58°F or higher than 99°C / 210°F), the controller will initiate over-temperature alarm mode, and cancel all the actions. The buzzer will alarm, LED displays HL. Buzzer alarm could be dismissed by pressing any key. When temperature returns to measuring range, the system will return to normal working status.