

Programmable Outlet Thermostat

ITC-310T User Manual

Version 1.5s



INKBIRD

Inkbird Tech. Co., Ltd.

Copyright

Copyright© 2016 Inkbird Tech. Co., Ltd. All rights reserved. No part of this document may be reproduced without prior written permission.

Disclaimer

Inkbird has made every effort to ensure that the information contained in this document is accurate and complete; however, the contents of this document are subject to revision without notice. Please contact Inkbird to ensure you have the latest version of this document.

Contents

1. Overview	3
What is ITC-310T?.....	3
Main features	3
Safety Precautions.....	3
2. Specification	4
3. Keys 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	8
5.1: Temperature setting (TS, HD, CD).....	9
5.2 Alarm High/Low Limit Setting (AH, AL).....	10
5.3 Compressor Delay (PT).....	10
5.4 Temperature Calibration (CA).....	10
5.5 Display in Fahrenheit or Centigrade unit (CF)	11
5.6 Time -Temperature Parameter Setting (TR, UT, STA, ST1~ST6, HT1~HT6)	11
5.7 Cycle and Automatic Mode (MD, AT).....	11
6. Error Description	12
Sensor fault alarm	12
Over-temperature alarm.....	12
7. Technical Assistance and Warranty	13
7.1 Technical Assistance	13
7.2 Warranty.....	13

1. Overview

What is ITC-310T?

ITC-310T is dual-relay, programmable outlet thermostat, which can auto-execute to control 6 periods times with different temperatures based on its timer function.

The ITC-310T is mainly used to control temperature during fermentation process of beer and wine brewing, also widely used in home brewing, aquarium, pet breeding, hatching, barbecue, boiler temperature control, geothermal temperature control, heating pump constant temperature cycle, strain culture fermentation, seed sprouting, electric heating, electric oven, over-temperature protection and automatic temperature control system of all kinds of electrical equipment, etc.

This product has Plug and Play design with dual relay, be able to connect with refrigeration and heating equipment easily to realize ideal temperature control. It's equipped with dual LED display, and offers display options of Centigrade and Fahrenheit, enabling more humanized temperature control. With large output power 1,200W (110V) /2,200W (220V), it's suitable for most applications.

ITC-310T is designed with compressor delay protection for refrigeration, high and low temperature alarm, and sensor fault alarm, which makes the temperature controller more safe and reliable. Functions such as temperature calibration, separately set differential for refrigeration and heating, enable more accurate temperature control.

Main features

- Programmable, 6 temperatures in 6 periods of time;
- Plug and play design, easy to use;
- Dual relays, heating and cooling outputs;
- F / C temperature display;
- Easy to set, PV and SV dual display windows;
- User calibration;
- Delay protection of refrigeration control;
- Can set high and low temperature alarms;
- Alarm when over-temperature and sensor error.

Safety Precautions

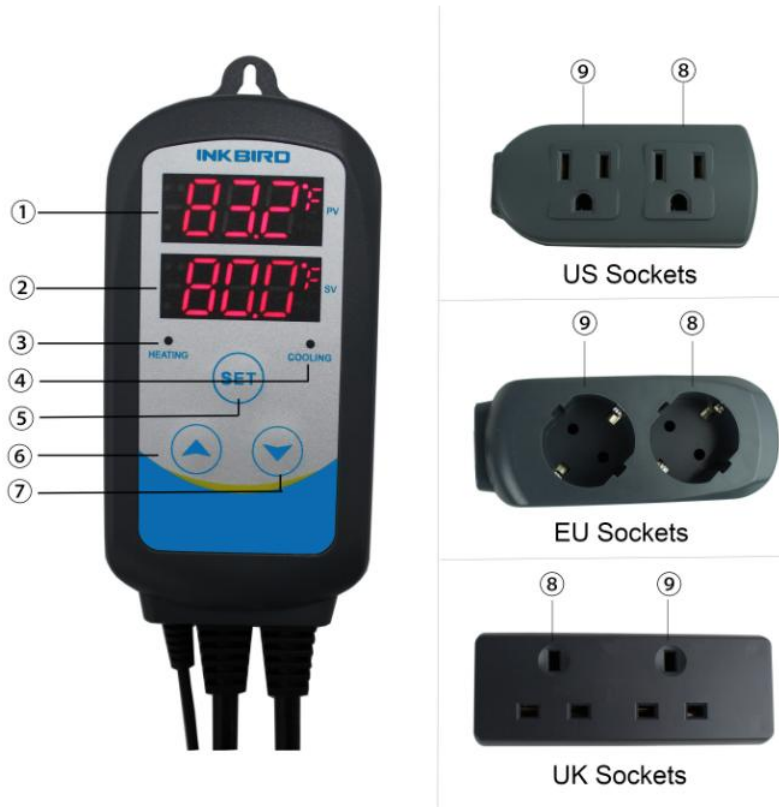
- Ensure the product using within the specification.
- Do not touch the terminals at least while power is being supplied. Doing so may occasionally result in injury due to electric shock.
- Do not allow pieces of metal, wire clippings, or fine metallic shaving or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.

- Do not use the product where subject to flammable or explosive gas. Otherwise, injury from explosion may occasionally occur.
- Never disassemble, modify or repair the product or touch any of the internal parts. Electric Shock, fire, or malfunction may occasionally occur.
- If the output relays are used over their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy.

2. Specification

Temperature Control Range	-50~120℃ / -58~248 ℉
Temperature Resolution	0.1 ℃ / 0.1℉
Measuring Accuracy	±1℃ (-50 ~ 70℃) / ±1℉ (-58 ~ 158℉)
Temperature Control Mode	On/Off Control, Heating and Cooling
Timing Range	1~999 (min/hour/day)
Periods of Time	Max: 6 periods
Cycle Setting	1-999 times cycle, or 00 infinite cycle
Input Voltage	100 ~240VAC, 50Hz/60Hz
Control Output	Current: Max.10A
	Voltage: 100~240V AC
	Power: Max.1200W(110V)/2200W(220V)
Alarm	High and Low Temperature Alarm
Sensor Type	NTC Sensor(including)
Sensor Length	2m / 6.56ft
Relay Output	Cooling(10A,100-240VAC)
	Heating(10A,100-240VAC)
Input Power Cable Length	1.5m (5ft)
Dimension	Main Body: 140x68x33mm (5.5x2.7x1.3 inch) Socket (US Version): 85x42x24mm (3.3x1.7x1.0 inch) Socket (EU Version): 135x54x40mm (5.3x2.1x1.6 inch) Socket (UK Version): 140x51x27mm (5.5x2.0x1.0 inch)
Operating Ambient Temperature	-30~ 75 ℃ / -22~ 167℉
Storage Condition	Temperature: -20~ 60℃ / -4~ 140℉
	Humidity: 20~85% (No freeze or moisture condensation)
Warranty	1 Year

3. Keys Instruction



① PV: Process Value.

- Under running mode, display current temperature;
- Under setting mode, display menu code.

② SV: Setting Value.

- Under running mode, display setting temperature;
- Under setting mode, display setting value.

③ Heating Indicator Lamp: light on, heating start working.

④ Cooling Indicator Lamp:

- Light on, cooling start working;
- Light flicker, status of compressor delay.

⑤ SET key: press and hold SET key for 3 seconds to enter menu for function setting, press and hold SET key for more than 3 seconds, then quit and save the settings during the setting process.

⑥ INCREASE key: under running mode, press INCREASE key to inquiry remaining time value; under setting mode, press INCREASE key to increase value.

⑦ **DECREASE key:** under setting mode, press DECREASE key to decrease value;

⑧ **Heating Device Socket:** for heating output.

⑨ **Cooling Device Socket:** for cooling output.

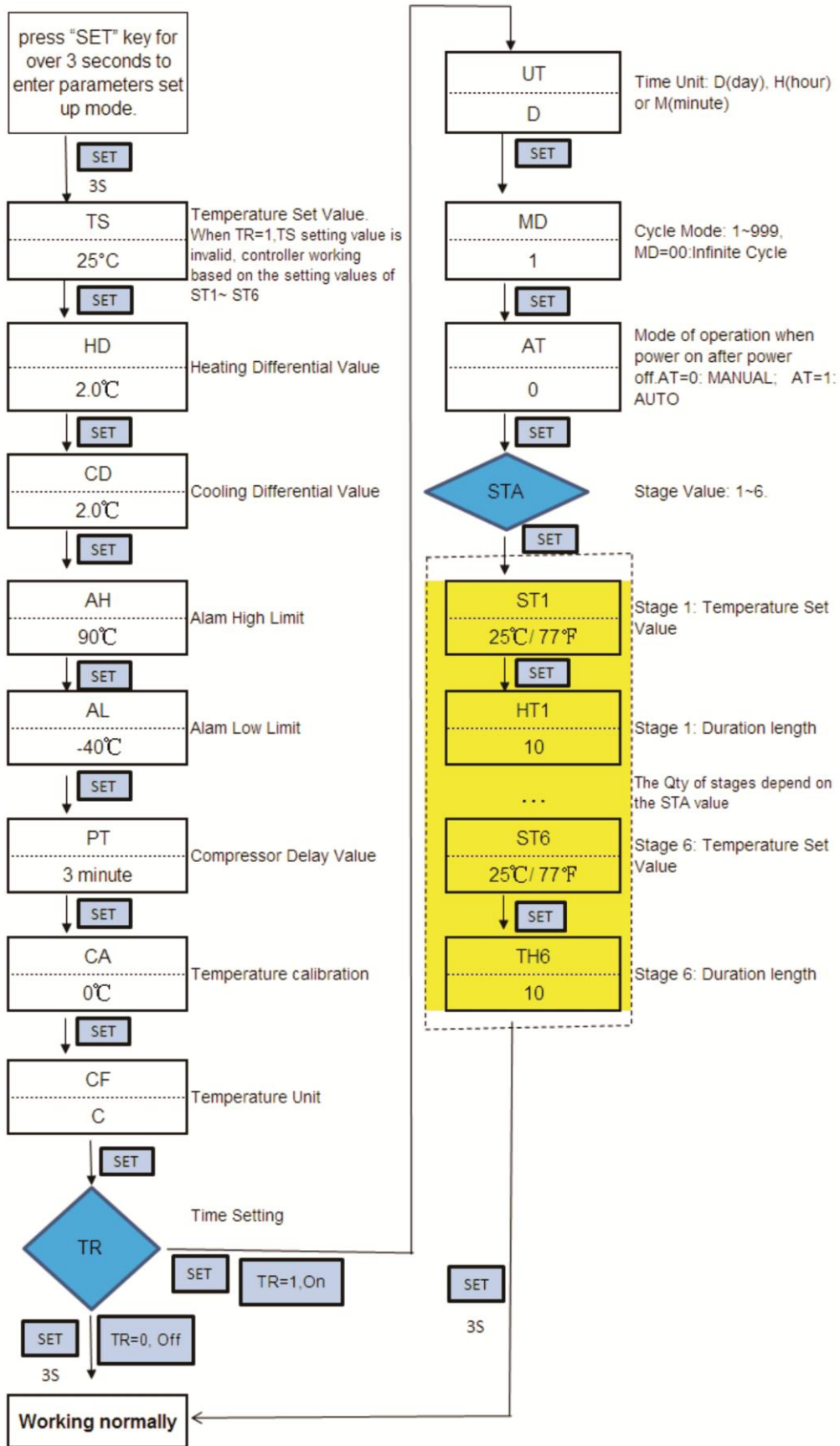
4. Key Operation Instruction

4.1 Enquiry Set Point: When controller works normally, short press “▲” key once, then displaying remaining time value;

4.2 How to Set Parameters

When controller works normally, press and hold “SET” key to enter into the parameter setting mode, indicator lamp of “SET” will on, PV window displaying the first code “TS” of menu, while SV window displaying the related setting values. Press “SET” key to page down the menu then displaying the codes of menu, press “▲” or “▼” key to change the current parameter values. After setting, press and hold “SET” key for 3 seconds at any status to save the parameter correction and return to the normal displaying mode of temperature. During setting, if there is no operation for 10 seconds, system will quit the menu automatically and return to the mode of normal temperature displaying without saving the parameters modification.

4.3 Setup Flow Chart



5. Menu Instruction

When TR=0

Symbol	Code	Function	Setting Range(C/F)	Default Setting(C/F)	Remarks
	TS	Temperature Set Value	-50~120°C/-50~248°F	25°C/77°F	Note1
	HD	Heating Differential Value	0.3~15°C/1~30°F	2.0°C/3°F	
	CD	Cooling Differential Value	0.3~15°C/1~30°F	2.0°C/3°F	
	AH	Alarm High Limit	-50~120°C/-50~248°F	90°C/200°F	Note2
	AL	Alarm Low Limit	-50~120°C/-50~248°F	-40°C/40°F	
	PT	Compressor Delay	0~10 minutes	3 minutes	Note3
	CA	Temperature Calibration	-15°C~15°C/-15~15°F	0°C/0°F	Note4
	CF	Centigrade or Fahrenheit Displaying		C	Note5
	TR	Time Setting	0: on; 1: off	0	Note6

When TR=1, user needs to set *chart 5* as below.

Symbol	Code	Function	Setting Range	Default Setting	Remarks
	UT	Time Unit Setting	D: day; H: hour M: minute	D	Note6
	MD	Cycle Mode Setting	0-999 cycle times, 00=infinite cycle	1	Note7
	AT	Manual or Auto Setting	0: MANUL 1: AUTO	0	
	STA	numbers of controlling stages	1-6 stages	1	Note6

When setting STA=6, menus as followings:

Symbol	Code	Function	Setting Range	Remarks
888	ST1	Setting Temperature Value(-50~248°F)	25°C or 77°F	<i>Note6</i>
888	HT1	Temperature Controlling Duration (0~999)	10	
888	ST2	Setting Temperature Value(-50~248°F)	25°C or 77°F	
888	HT2	Temperature Controlling Duration (0~999)	10	
888	ST3	Setting Temperature Value(-50~248°F)	25°C or 77°F	
888	HT3	Temperature Controlling Duration (0~999)	10	
888	ST4	Setting Temperature Value(-50~248°F)	25°C or 77°F	
888	HT4	Temperature Controlling Duration (0~999)	10	
888	ST5	Setting Temperature Value(-50~248°F)	25°C or 77°F	
888	HT5	Temperature Controlling Duration (0~999)	10	
888	ST6	Setting Temperature Value(-50~248°F)	25°C or 77°F	
888	HT6	Temperature Controlling Duration (0~999)	10	

5.1: Temperature setting (TS, HD, CD)

When controller works normally, window displays current measuring temperature, switch working modes of cooling and heating automatically.

When TR=0

When measured temperature $PV \geq TS$ (Temperature Set Value) + CD (Cooling Differential Value), entering into the status of cooling, cooling indicator lamp will on, cooling relay start working; when the Cooling Indicator Lamp flickering, cooling device is being in the status of compressor delay protection. When measured temperature $PV \leq TS$ (Temperature Set Value), cooling indicator lamp off, cooling relay stop working.

When measured temperature $PV \leq TS$ (Temperature Set Value)-HD (Heating Differential Value), entering into the status of heating, heating indicator lamp will on, heating relay start working; when measured temperature $PV \geq TS$ (Temperature Set Value), heating indicator lamp off, heating relay stop working.

For example, set $TS=25^{\circ}C$, $CD=2^{\circ}C$, and $HD=3^{\circ}C$, then when measured temperature $\geq 27^{\circ}C$ ($TS+CD$), cooling start working, when temperature decline to $25^{\circ}C$ (TS), stop cooling; when measured temperature $\leq 22^{\circ}C$ ($TS-HD$), heating start working, when measured temperature reach to $25^{\circ}C$ (TS), stop heating.

When TR=1

TS setting value is invalid, temperature controller working based on the setting values of ST1~ ST6 and HT1~HT6.

For example, when the period of time is within HT1 and while measured temperature $PV \geq ST1$ (Temperature Set Value) + CD (Cooling Differential Value), cooling output working, indicator lamp of cooling will on, cooling relay start working...

Remark:

In case the time interval between two cooling switches on is less than PT, please refer to note 3.

To set periods of time operation HT1~HT6, please refer to note 6.

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

When measured temperature $PV \geq AH$, alarm with "BI-BI-BIII" sound until the temperature $< AH$ or press any keys, then will close the buzzer.

When measured temperature $PV \leq AL$, alarm with "BI-BI-BIII" sound until the temperature $>AL$ or press any keys, then will close the buzzer.

When the buzzer alarm, output of heating or cooling will still working follow the setting.

5.3 Compressor Delay (PT)

Under cooling mode, first time to power on, when measured temperature $PV \geq TS$ (Temperature Set Value) + CD (Cooling Differential Value), device won't start cooling immediately, but waiting for a delay time (PT).

When the interval time between two refrigeration operations is longer than the delay time, device will start cooling immediately. When the interval time between two refrigeration operations is shorter than the delay time, device will start working until there is no delay time left.

Delay time will be calculated right after the moment when device stop working.

5.4 Temperature Calibration (CA)

When there is deviation between measured temperature and standard temperature, use temperature calibration to align the measured value and the actual value of temperature.

The corrected temperature = the temperature before calibration + calibration value (positive value, 0 or negative value)

5.5 Display in Fahrenheit or Centigrade unit (CF)

Users can select display with Fahrenheit or Centigrade temperature value according to their own habit. Default setting is display with Centigrade. For displaying with Fahrenheit, set CF to F.

Attentions: when CF value changed, all the setting will be recovered to factory default setting.

5.6 Time -Temperature Parameter Setting (TR, UT, STA, ST1~ST6, HT1~HT6)

TR: a parameter to check whether the function of timer works or not, TR=0, timer off; TR=1, timer on. When TR=0, there is no working of timer function and all the setting parameters after TR will not display in menu, no need to set. When TR=1, timer working, periods of time and related temperature parameters can be set according to the demand. At this time, TS (Temperature Setting Value) is invalid, temperature control according to the setting of periods of time.

UT: a parameter of time unit. can be set to day, hour or minute as need.

STA: a parameter of numbers of controlling stages, which can be set to max. 6 stages, each stage including a set of temperature correspond to a continuous periods of time.

ST1~ST6: a parameter of temperature setting, when TR=1, the setting values of ST1~ST6 will replace TS value, as the condition parameter of temperature controlling.

HT1~HT6: a parameter of continuously time, e.g. the unit of UT is hour, HT1=12, then temperature controller will control the setting value ST1 as 12 hours.

For example:

Control an incubator, keep the temperature 24~26°C for 5 hours and 30~32°C for 10 hours.

Setting as followings:

HD=1, CD=1,

TR=1,

Set UT=H,

STA=2,

ST1=25, HT1=5,

ST2=31, HT2 =10.

5.7 Cycle and Automatic Mode (MD, AT)

MD: execute times of Time-Temperature setting. 00: infinite cycle; 1~999: specific times of execution. 1 is the default setting, which means it will stop running after execute the setting values once.

AT: mode of operation when power on after power off.

AT=0: MANUAL, which means when power on again after power outage, temperature controller will stop working; it need to reset the parameters by entering into menu, then restart the controller and get working again.

AT=1: AUTO, means when power on again after power outage, the temperature controller will continue to work; at this time, the performance time of temperature controller is in accordance with natural time, and it has no concern with the power outage.

For example, If set keeping 25°C for four hours, keeping 30°C for six hours; If there is power outage for three hours after temperature controller keep working at 25°C for two hours. At this time, the temperature controller will default the time 2+3=5 hours to the execution time, when it is power on again, temperature controller will execute the temperature setting at 30°C.

6. Error Description

Sensor fault alarm: when temperature sensor being in short circuit or open loop, the controller will initiate the mode of sensor fault, and cancel all the actions. Buzzer alarm, LED displays ER. Pressing any keys can stop the alarm, and return to the normal working mode after remove the sensor fault.

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. Buzzer alarm, LED displays HL. Pressing any keys can stop the alarm, and return to the normal working mode when temperature returns to measuring range.

7. Technical Assistance and Warranty

7.1 Technical Assistance

If you have any problems installing or using this thermostat, please carefully and thoroughly review the instruction manual. If you require assistance, please write us to cs@ink-bird.com. We will reply your emails in 24 hours from Monday through Saturday. You can also visit our web site www.ink-bird.com to find the answers of the common technical questions.

7.2 Warranty

INKBIRD TECH. C.L. warrants this thermostat for one years from the date of purchase when operated under normal condition by the original purchaser (not transferable), against defects caused by INKBIRD's workmanship or materials. This warranty is limited to the repair or replacement, at INKBIRD's discretion, of all or part of the thermostat. The original receipt is required for warranty purposes.

INKBIRD is not responsible for injury property damage or other consequential damages or damages of third parties arising directly from an actual or alleged in mater of workmanship of the product.

There are no representations, warranties, or conditions, express or implied, statutory or otherwise, other than herein contained in the sale of goods act or any other statue.

Contact Us

Business Contact: sales@ink-bird.com

Technical Support: cs@ink-bird.com

Business Hours: 09:00-18:00(GMT+8) from Monday to Friday

URL: www.ink-bird.com