

BAYITE BTC211 Digital Temperature Controller Manual



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1. Overview

BTC201 is an easy-to-use, safe and reliable dual relay output temperature controller. It can be used as Over-temperature protection and automatic temperature control system for various electric appliances such as equipment for home-brew, aquarium, pet breeding, incubation, BBQ, seedling heat mats, oven temperature control, terrestrial heat control, constant temperature cycle of heating pump, culture fermentation, accelerating germination, electric radiator, electric oven, etc. The Plug and Play design with dual relays enables it to connect refrigeration and heating equipment easily to realize ideal temperature control. There's option for Centigrade or Fahrenheit readout. With large output power 1650W (at 110V) / 3300W (at 220V), it's suitable for most applications. BTC211 is designed with compressor delay protection for refrigeration, high / low temperature alarm, and sensor failure warning, which makes the temperature controller more safe and reliable. Functions such as temperature calibration, separate setting of differential for refrigeration and heating, enable more accurate temperature control.

2. Main functions:

- Dual relay output, for refrigeration and heating equipment at the same time
- Dual display window, display measured temp and set temp at the same time
- Turn your device on and off at desired temperatures
- Temperature calibration correction
- High and low temperature alarm
- Built in time delay feature to protect output device from excessive on/off toggling
- Auto shut off timer(disabled by default)
- Support reading with Centigrade or Fahrenheit unit
- Settings are stored even when powered off

3. Specifications:

- **Max Load: 15A (1650W @110V or 3300W @220V)**
- Temperature Accuracy: 0.1
- Probe measurement range: -58°F ~ 230°F / -50°C ~ 110°C
- Working temperature for the controller: -40°F~176°F / -40°C ~ 80°C
- Working mode: On/Off Control, Heating and Cooling
- Power supply: AC 110V ~ 240V, 50/60Hz
- Power consumption: less than 3W
- Relay Contact Capacity: Cooling (15A, 100-240VAC), Heating (15A, 100-240VAC)

4. Key Instruction

PV: Process Value. Under working status, display current probe temperature. Under setting status, display menu code.

SV: Set Value. Under working status, display set temperature (cut-off temp). Under setting status, display set value of each parameter displayed in PV screen.

Heating Indicator: Heating equipment is working when the light is on.

Cooling Indicator: Refrigeration equipment is working when the light is on. When the light is flickering, the compressor is under delay protection.

SET: Press SET for 3 seconds to enter settings menu. In the setting process, press SET once to change a parameter. When you change the parameter, the value of the former parameter has been saved.

POWER: In setting process, press POWER once to save and quit. When it's not in setting process, press POWER for 3 seconds to turn off the controller. Then press POWER once again to turn it on.

UP: In setting process, press UP button to increase value of a parameter. **Holding the button allows for rapid number adjustments.** When it's not in setting process, press and hold UP button to check HD value

DOWN: In setting process, press DOWN button to decrease value of a parameter. **Holding the button allows for rapid number adjustments.** When it's not in setting process, press and hold DOWN button to check CD value

SET+UP: Press SET and UP buttons for 3 seconds to enter advanced menu.

Restore default setting: Press SET and UP buttons for 3 seconds to enter advanced setting menu. Release the buttons once the screen shows CF. Then press POWER. You'll hear a click and all basic settings will be restored to default (CF and ST in advanced menu will not be restored).

Alarm Switch: The alarm function is disabled by default. It will be enabled if you specify a value for AL or AH. After alarm sounds, press any of the buttons to disable the alarm. **Please note that in order to enable the alarm function again, you need to cut off the power and turn on controller again.**

Heating Device Socket: this socket is for heating equipment.

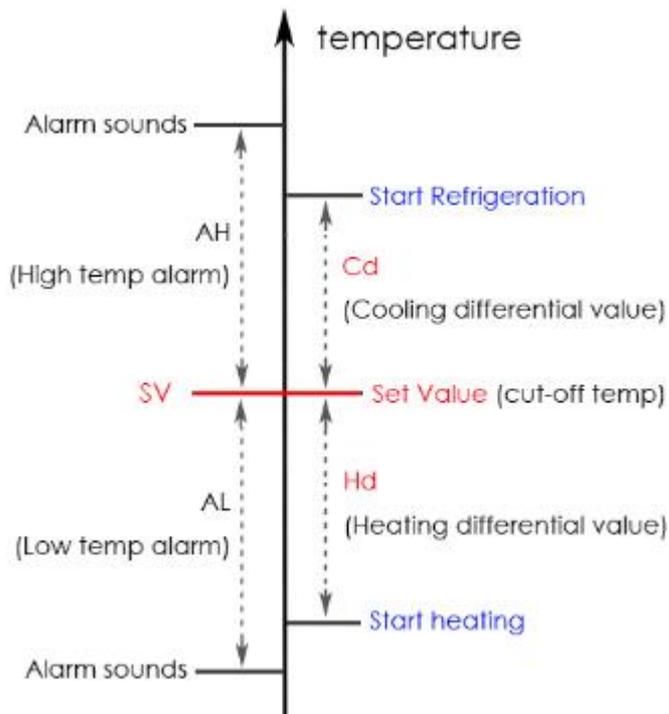
Cooling Device Socket: the socket is for refrigeration equipment.

NOTE: It's not a must to plug both heating and refrigeration equipment into the controller. You can use the controller to control only one device.

5. Quick Start

How to set parameters: When the controller is working normally, press SET for over 3 seconds to enter parameters set up mode. PV window displays the first menu code "SV". SV window displays the value of the code accordingly. Press SET to change the parameter in PV window. Press UP or DOWN to specify a value for the current parameter. After all setting completed, press POWER to save and quit. During setting, if there is no operation in 20 seconds, the system will save setting automatically and return to normal temperature display mode.

Tips: Holding the UP/DOWN button allows for rapid number adjustments



How it works: When the probe measured temp $PV > SV + Cd$, the controller turns on refrigeration equipment. The cooling indicator is on. If the indicator is flickering, it means the refrigeration equipment is under compressor delay protection status. When the probe measured temp PV drops and reaches SV , the controller turns off refrigeration equipment. The cool indicator is off.

When the probe measured temp $PV < SV - Hd$, the controller turns on heating equipment. The heating indicator is on. When the probe measured temp PV rises and reaches SV , the controller turns off heating equipment. The heating indicator is off.

When the probe measured temp $PV > SV + AH$, the beep alarm sounds.

When the probe measured temp $PV < SV - AL$, the beep alarm sounds.

For example, $SV=99.5^{\circ}\text{F}$, $Cd=0.5^{\circ}\text{F}$, and $Hd=2^{\circ}\text{F}$. Step by step instructions:

Power on the controller → Press SET for 3 seconds, release button when you see SV on screen → Press UP/DOWN to specify **99.5** for **SV** → Press SET once to select next parameter **Hd** → Press UP/DOWN to specify **2** for **Hd** → Press SET once to select next parameter **Cd** → Press UP/DOWN to specify **0.5** for **Hd** → Press POWER to save and quit

- Once the detected temperature is below 97.5°F ($SV - Hd$), the controller turns on the heating device. The heating device will be turned off when temp reaches 99.5°F .
- Once the detected temperature is over 100°F ($SV + Cd$), the controller turns on the refrigeration device. The refrigeration device will be turned off when temp reaches 99.5°F .

NOTE: The BTC211 can accurately controls turn-on and turn-off points. However, there might be overshooting due to wasted heat. It's not the BTC211's fault. You can consider changing the power of your heater to compensate for the overshooting effect.

6. Menu Instruction

Code	Default	Range	Definition	Explanation
Basic Setting				
SV	100	-58°F ~ 230°F	Set Value	Cut-off temp. When temp rises and reaches SV, heating device will be turned off. When temp drops and reaches SV, cooling device will be turned off.
Hd	1	0.1 ~ 25	Heating Differential Value	When measured temp PV < SV - Hd , the controller turns on heating equipment.
Cd	1	0.1 ~ 25	Cooling Differential Value	When measured temp PV > SV + Cd , the controller turns on cooling equipment.
CA	0	-9~9	Calibrate the reading	<i>Optional.</i> If measured temperature is 3 degree higher than the real temperature, set CA=-3.
PT***	0	0~30	Compressor Time Delay (unit: minute)	<i>Optional.</i> It defines the time interval of 2 compressor cycles(On-Off)
AH	0	0.1 ~ 25	High temperature alarm	<i>Optional.</i> It will beep once temp exceeds SV + AH . Press any key to stop alarm.
AL	0	0.1 ~ 25	Low temperature alarm	<i>Optional.</i> It will beep once temp is below SV - AL . Press any key to stop alarm.
Advanced Setting NOTE: Once you enter advanced setting, all of your former basic settings will be restored.				
CF	F or C	F or C	Temperature unit	The default unit is set according to country
ST	1	1 or 10	Number increment for each click on UP/DOWN button	<i>Optional.</i> If you choose 10, the number jumps like 2, 3, 4.... If you choose 1, it jumps like 2.1, 2.2, 2.3...

***Further explanation about Compressor Time Delay (PT):

The time delay is a way of over-riding the temperature sensor so that regardless of detected temperature the output device will not turn on unless the specified time duration has elapsed. Under refrigeration mode, after the power is on, if the measured temperature is higher than **(SV + Cd)**, the device won't start refrigeration immediately, but waiting for a delay time. **Delay time is calculated right after the moment refrigeration stops.**

When the time interval of two refrigeration cycles is larger than the preset delay time, the device will start refrigeration immediately. (For example, PT=2. It's been 3 minutes when the temperature reaches the turn-on temperature again. The fridge starts immediately.)

When the time interval between two refrigeration cycles is less than preset delay, the equipment won't start refrigeration until preset delay is satisfied. (For example, PT=5. Your fridge stopped 3 minutes ago. Although it's now turn-on-temperature, you have to wait 2 more minutes before your fridge starts again.)

7. Trouble Shooting:

A. Output device does not turn on when specified temperature is reached.

Firstly please understand that the controller turns off the load when the target temperature is reached. It turns on the load only when the specified temperature is then exceeded. The load will be turned on only when the temperature is OVER (SV - Hd) or BELOW (SV + Cd).

Then, check if a PT value is specified. If you've specified a PT value, during the delay time, the indicator on screen will flash. Your device will be turned on after the specified time delay.

B. The controller displays EEE while beeping.

Please check if the 3.5mm plug of the sensor probe is inserted completely into the jack on side of the controller. If plugged in correctly, the probe is most likely defective. Please email us at service@bayite.com for a free probe replacement.

C. The screen displays LLL.

This means the temperature is below the minimum value that this controller can measure.

D. The screen displays HHH.

This means the temperature is over the maximum value that this controller can measure.

E. It keeps beeping when the temperature reaches a certain level.

This is usually because the alarm has been set, be sure AH and AL are each set to 0. When the alarm sounds press any key to disable it.



WARNING

- ※ The sensor probe is waterproof. But the controller is not waterproof. Don't get water into the outlet.
- ※ **Rated Current of this controller is 15A** (1650W @110V, or 3300W @220V). Check amps and watts of the refrigeration and heating equipment in order to reduce the risk of fire caused by overloading. The refrigeration and heating equipment don't work at the same time. So you just need to make sure each one individually doesn't overload.