Robertshaw®

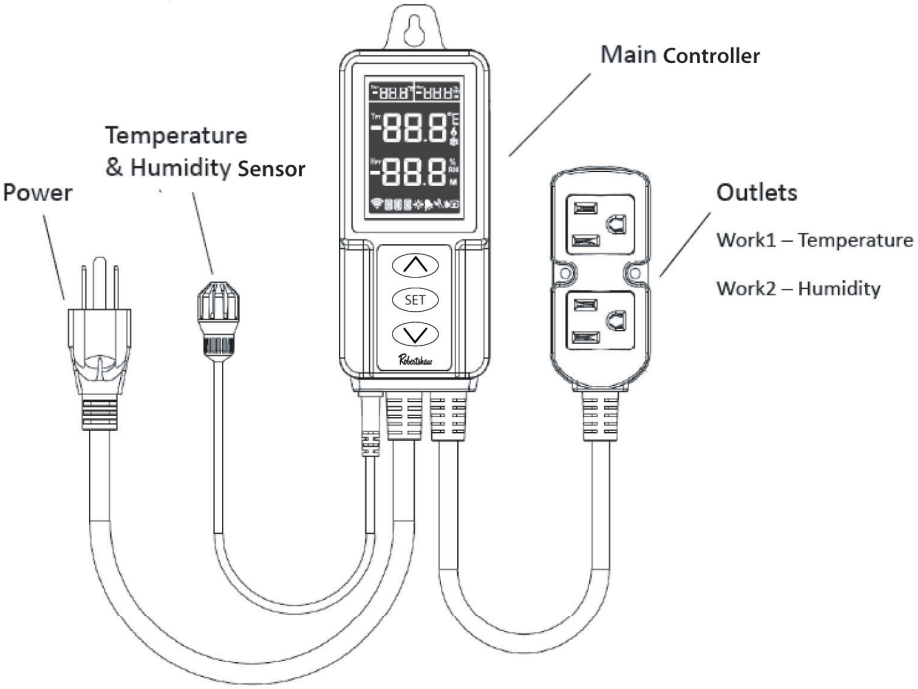
# RTC-500/RTC-500-WIFI

## Temperature and Humidity Controller

## 1. Introduction

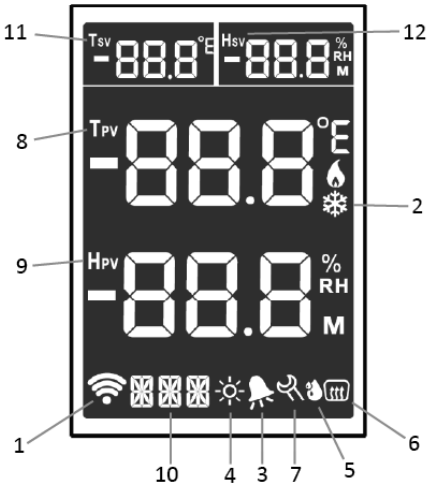
The Robertshaw RTC-500 / RTC-500-WIFI is a digital controller that has two output sockets to control temperature (work1) and humidity (work2). This controller comes with two probes, a dual temperature and humidity sensor and a fully submersible temperature sensor. The large LCD screen intuitively displays temperature, humidity and other parameters. The three-key design enables quick parameter settings, such as alarm limit calibration, protection time, unit switching, etc., for many different application scenarios.

## 2. Overview



## 2.1 Display Information

Please check the instructions below before parameter configuration.




## 2.2 Icon Table

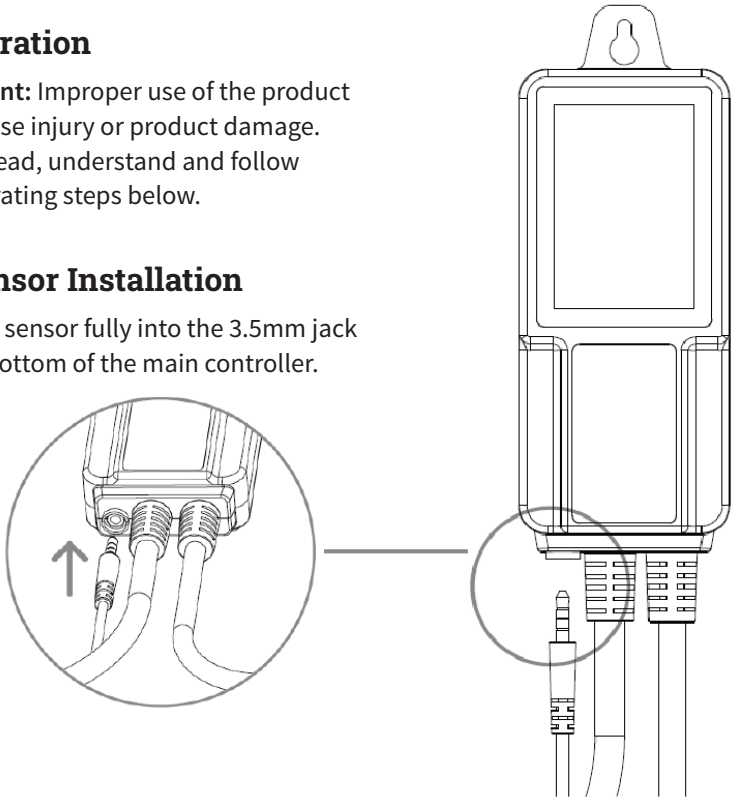
| S/N | Icon | Function | Status | | |
|---|---|---|---|---|---|
| | | | OFF | Flashing | ON |
| 1 | | Wi-Fi connection status | Not connected | Resetting | ON |
| 2 | | Cooling status | OFF | Protection delay | ON |
| 3 | | Alarm status | No alarm | —— | Alarm |
| 4 | | Heating Status | OFF | Protection delay | ON |
| 5 | | Humidification status | OFF | Protection delay | ON |
| 6 | | Dehumidification Status | OFF | Protection delay | ON |
| 7 | | Setting Status | Non-setting | —— | Setting |
| 8 | TPV | Temperature-present value | —— | —— | —— |
| 9 | HPV | Humidity-present value | —— | —— | —— |
| 10 | —— | Parameter code | —— | —— | —— |
| 11 | TSV | Temperature-set value | —— | —— | —— |
| 12 | HSV | Humidity-set value | —— | —— | —— |

## 3. Operation

**Important:** Improper use of the product may cause injury or product damage. Please read, understand and follow the operating steps below.

## 3.1 Sensor Installation

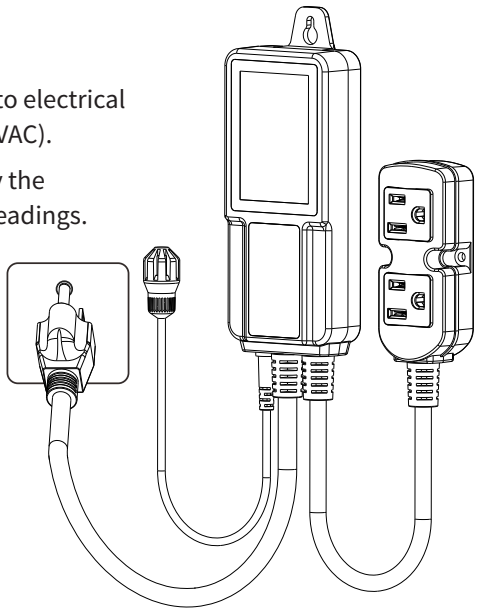
Plug the sensor fully into the 3.5mm jack on the bottom of the main controller.



## 3.2 Power On

Power on controller by plugging into electrical outlet (within the range of 100-240VAC).

The screen will light up and display the temperature, humidity and other readings.



## 3.3 Parameter Setting

Parameters can be set on the Robertshaw app for RTC-500-WIFI (Section 8 of manual).

Plug the RTC-500 in to power on the controller.

On the home screen, press and hold the SET button until you hear a beep and the TCH parameter displays. To adjust parameters:

1. Press the SET button. The parameter value will flash meaning it is now adjustable.
2. To adjust the parameter press  or  .
3. Confirm your selection by pressing the SET button. The parameter value will stop flashing meaning it has been set.
4. Go to the next parameter by pressing  . You should now be on the BL parameter.
5. Continue steps 1-4 for each parameter.
6. When you have set all the parameters needed, simply press and hold the SET button until the controller returns to the home screen.

## Table 2

| Parameter | Function | Description | Ranges |
|---|---|---|---|
| TCH | Temperature Control Mode | C = Cooling Mode, H = Heating Mode | H or C |
| BL | Screen Display Time | Determines how long the screen will stay on. BL = 0 means the screen will not turn off. (Minutes) | 0 to 999 |
| COT | Continuous Operating Time | Determines length of on and off cycles during humidity control. (Minutes) | 0 to 999 |
| HCA | Humidity Calibration Value | Calibrated if the Hpv deviates from the actual humidity. | -10 to 10%RH |
| HAL | Humidity Alarm Low Limit | Sets a low limit that will alert you if Hpv drops below your set value. (EHL code) | 5 to 99%RH |

| Parameter | Function | Description | Ranges |
|---|---|---|---|
| HAH | Humidity Alarm High Limit | Sets a high limit that will alert you if Hpv rises above your set value. (EHH code) | 5 to 99%RH |
| HPT | Humidity Protection Delay | The time interval for its power off to power on again should meet the time requirement for HPT | 0 to 10 |
| HD | Humidity Differential | Acceptable humidity range depending on HS (Percentage) | 1 to 30%RH |
| HS | Humidity Set Value | Desired humidity (Percentage) | 5 to 99%RH |
| HDH | Humidity Control Mode | D = Dehumidifying, H = Humidifying | H or D |
| CF | Temperature Unit | Choose between Celsius and Fahrenheit | C or F |
| TCA | Temperature Calibrated Value | Calibrated if the Tpv deviates from the actual temperature. | -15° to 15°F -10° to 10°C |
| TAL | Temperature Alarm Low Limit | Sets a low limit that will alert you if Tpv drops below your set value. (ETL code) | 23° to 158°F -5° to 70°C |
| TAH | Temperature Alarm High Limit | Sets a high limit that will alert you if Tpv rises above your set value. (ETH code) | 23° to 158°F -5° to 70°C |
| TPT | Temperature Protection Time | The time interval for its power off to power on again should meet the time requirement for TPT. | 0 to 10 |
| TD | Temperature Differential | Acceptable temperature range depending on TS (Degrees) | 1° to 30°F .2° to 15°C |
| TS | Temperature Set Value | Desired temperature (Degrees) | 23° to 158°F -5° to 70°C |
| Work1 | Temperature Socket | Will turn on and off depending on the Tpv in comparison to the TS and TD values | |
| Work2 | Humidity Socket | Will turn on and off depending on the Hpv in comparison to the HS and HD values | |

# 4. Function Descriptions

## 4.1 Temperature Setting – TCH, TS, TD

Cooling mode (TCH=C)

When **Tpv** is higher than **TS + TD**, ❄ will appear, **Work1** will be turned on, and cooling will begin.

When **Tpv** is lower than **TS**, ❄ will disappear, **Work1** will be turned off, and cooling will stop.

For example: TS=15°C, TD=5°C, as shown in Figure A.

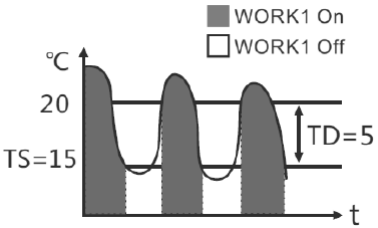


Figure A

***Heating mode (TCH=H)***

When **Tpv** is lower than **TS – TD**, ☼ will appear, **Work1** will be turned on, and heating will begin.

When **Tpv** is higher than **TS**, ☼ will disappear, **Work1** will be turned off, and heating will stop.

For example: TS=15°C, TD=5°C, as shown in Figure B.

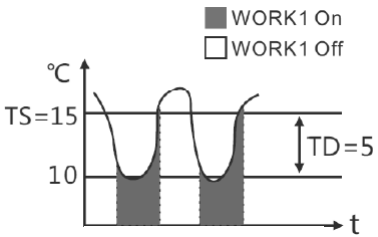


Figure B

## 4.2 Temperature Protection Time – TPT

**Work1** is a temperature socket and the time interval for its power off to power on again should meet the time requirement for **TPT**. If not, ❄ or ☼ will flash.

This protection time requirement should also be satisfied when the controller is just powered on.

## 4.3 Temperature Alarm Limits – TAH, TAL

When **Tpv** is higher than **TAH**, the temperature alarm high limit will be triggered, and EtH code will be displayed.

When **Tpv** is lower than **TAL**, the temperature alarm low limit will be triggered, and EtL code will be displayed.

During the alarm, the buzzer makes a sound of “bi-bi-Biii” until the temperature is back to the normal temperature range; press any button to mute the alarm. During the temperature alarm limit, the output of **Work1** socket is not affected.

## 4.4 Temperature Calibration - TCA

The temperature can be calibrated if the **Tpv** deviates from the actual temperature.

**Tpv** after calibration = **Tpv** before calibration **+ TCA**

## 4.5 Temperature Unit – CF

The temperature unit can be switched between Celsius and Fahrenheit. The temperature-related parameter values will be restored to factory default values after the temperature unit is changed.

## 4.6 Humidity Settings – HDH, HS, HD

***Dehumidifying mode (HDH=D)***

When **Hpv** is higher than **HS + HD**, will appear, **Work2** will be turned on, and dehumidifying will begin.

When **Hpv** is lower than **HS**, will disappear, **Work2** will be turned off, and dehumidifying will stop.

For example: HS=50%RH, HD=10%RH, as shown in Figure C.

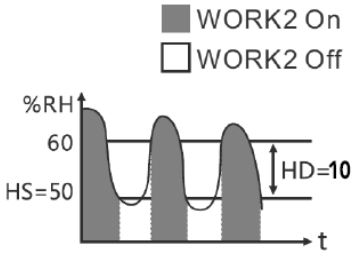


Figure C

***Humidifying Mode (TCH=H)***

When **Hpv** is lower than **HS – HD**, will appear, **Work2** will be turned on, and humidifying will begin.

When **Hpv** is higher than **HS**, will disappear, **Work2** will be turned off, and humidifying will stop.

For example: HS=50%RH, HD=10%RH, as shown in Figure D.

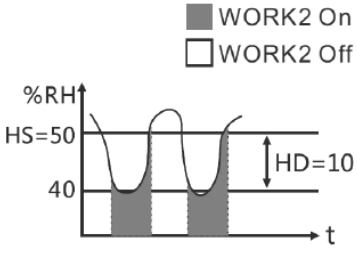


Figure D

## 4.7 Humidity Protection Delay – HPT

**Work2** is a humidity socket and the time interval for its power off to power on again should meet the time requirement for **HPT**. If not, or will flash.

This protection time requirement should also be satisfied when the controller is just powered on.

## 4.8 Humidity Alarm Limits – HAH, HAL

When **Hpv** is higher than **HAH**, the humidity alarm high limit will be triggered, and EHH code will be displayed.

When **Hpv** is lower than **HAL**, the humidity alarm low limit will be triggered, and EHL code will be displayed.

During the alarm, the buzzer makes a sound of “bi-bi-Biii” until the humidity is back to the normal humidity range; press any button to mute the alarm. During the humidity alarm limit, the output of **Work2** socket is not affected.

## 4.9 Humidity Calibration – HCA

The humidity can be calibrated if the **Hpv** deviates from the actual humidity.

**Hpv** after calibration = **Hpv** before calibration **+ HCA**

## 4.10 Continuous Operating Time – COT

During humidity control, when **COT** ≠ 0 and output conditions are met, **Work2** socket will work in on-off, on-off mode. COT is time on as well as time off.

Example: if **COT** = 10, the **Work2** output socket will turn on for 10 minutes and off for 10 minutes, then repeat. When **COT** = 0 and output conditions are met, **Work2** output socket will not be affected by **COT**.

## 4.11 Screen Display – BL

**BL** is the screen display time. When **BL** = 0 indicates display is always on.

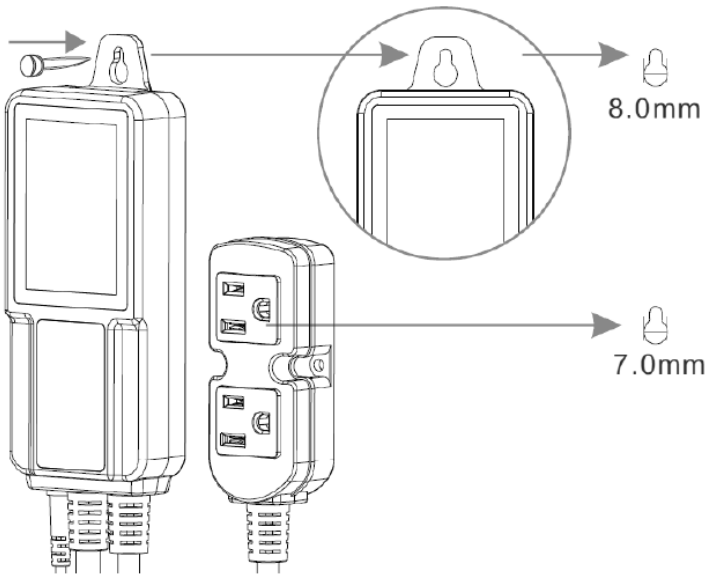
## 5. Alarm

In the following circumstances during operation, the buzzer will give a “bi-bi-Biii” alarm, and at the same time, the alarm symbol will appear on the screen. Press any button to mute the alarm.

| S/N | Code | Function | Socket output status |
|---|---|---|---|
| 1 | Err | Sensor failure | Outputs terminated |
| 2 | EtH | Temperature alarm high limit | Outputs unchanged |
| 3 | EtL | Temperature alarm low limit | Outputs unchanged |
| 4 | EHH | Humidity alarm high limit | Outputs unchanged |
| 5 | EHL | Humidity alarm low limit | Outputs unchanged |

## 6. Equipment Installation

⚠ As a safety precaution, it is recommended to power on the equipment after the installation is completed. The only installation method is by hanging the equipment. Please check the installation distance and screw size according to its application scenario before installation. The schematic diagram of equipment installation is shown below.



## WARNING

**Electrical Shock Hazard - Turn off power at the main power source before installing the RTC control. DO NOT restore electrical power to the unit until the RTC control is properly installed and cover assembled.**

**Fire Hazard - DO NOT locate the RTC control in an explosive atmosphere as a fire could result due to possible spark generation in the control.**

**All RTC Controls are designed as temperature controls and are not used as temperature limit controls.**

**Where failure or malfunction of the RTC control could cause personal injury or property damage, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn or protect against failure or malfunction of the RTC control must be installed.**

## CAUTION

**Read all of the information in these instructions before installing or operating the RTC control.**

**The schematic drawings and other information included in these installation instructions are for the purpose of illustration and general reference only.**

**RTC controls are not to be located in areas of significant moisture, dirt or dust as use of the control in such environment may cause personal injury or property damage and is likely to shorten the control life.**

**It is the responsibility of the installer and the user to assure that the application and use of the RTC control is in compliance with all applicable federal, state, and local laws, regulations and ordinances, including, without any limitation, all requirements imposed under the National Electric Code and any applicable building codes.**

## 7. Restore Operation Functions

### 7.1 Restore Factory Settings

When the controller is powered on and in non-setting parameter status, press ∧ + **SET** + ∨ buttons simultaneously on the main controller and don't release until the screen turns off. Wait for the equipment to restart automatically and restore to factory settings.

### 7.2 Restore WiFi Network Settings (for RTC-500-WIFI)

If you would like to reconfigure to a new WiFi network, please keep the equipment in power-on status, press **SET** + ∨ buttons and release when the symbol on the screen flashes. The icon will disappear after the network restoration is completed. Please do not power off the equipment during the restoration process.

## 8. Access to Network (for RTC-500-WIFI)

RTC-500-WIFI features a built-in WiFi module that allows you to remotely view and configure it on the app.

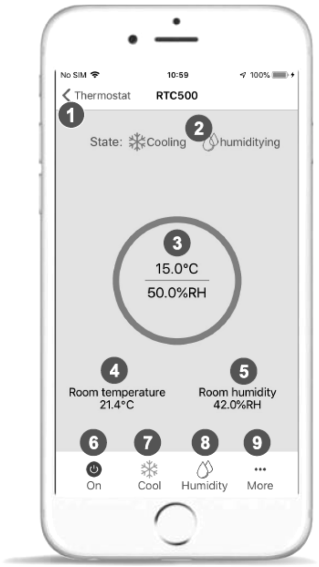
### 8.1 Before You Begin, Please Make Sure:

The device supports 2.4G WiFi, (5G WiFi is not compatible). The device is in a good and stable WiFi network environment. Search Robertshaw in the App Store, download and install the app.

### 8.2 Connect the Device to the Robertshaw App (for RTC-500-WIFI)

1. Log in or create an account. (Note: Multiple people can use the same account by sharing the login information after setup is complete.)
2. Once logged in select Heating and Cooling to proceed to the device list page.
3. Select the "Add New Device" button to add a controller to your account.
4. Select the correct corresponding controller (RTC-500-WIFI) that you are trying to connect.
5. "Has the device been installed and powered on?" Select the YES button.

6. Ensure the RTC-500-WIFI is plugged in and powered on. Then press and hold the and **SET** button at the same time until the AP character is displayed. Once it is displayed, select the YES button in the app.
7. Now enter your WiFi and the correct password. Make sure Ap Config is selected before clicking next.
8. You will then be asked to Connect the device to “therm_xxxxxxxxxxx” WiFi. Select YES and it will direct you to your WiFi connections in your settings. Select “therm_xxxxxxxxxxx” then navigate back to the Robertshaw app to continue the setup process.
9. Once you are back in the app it should say Connect the device to “therm_xxxxxxxxxxx” WiFi. Select YES to proceed. Binding will begin and should take 15-30 seconds. A message “Configuration completed successfully” should be displayed on the screen.


1. **Back Button**
   Return back to Device List screen.
2. **Relay**
   System Relays and Humidity Relays
3. Set temperature and humidity
4. **Room temperature**
   current room temperature
5. **Room humidity**
   current room humidity
6. **Power**
   on or off
7. **System Mode**
   Heat or Cool
8. **Humidity Mode**
   Humidity Or Dehumidity
9. More Setting

## 9. Technical Parameters

**Working voltage:** 100-240VAC, 50/60Hz

**Temperature measurement range:** 23°F to 158°F / -5°C to 70°C

**Temperature control range:** 23°F to 158°F / -5°C to 70°C

**Temperature measurement accuracy:** ±1°F / ±.5°C

**Temperature resolution:** 0.1°F / 0.1°C

**Humidity measurement range:** 5 to 99%RH

**Humidity control range:** 5 to 99%RH

**Humidity measurement accuracy:** ±5%RH

**Output power:** 2200W (resistive) in total /
200W (inductive) per channel @220VAC,

1100W (resistive) in total /
100W (inductive) per channel @110VAC

**Total power consumption:** <5W

**Working environment temperature:** 32°F to 140°F / 0°C to 60°C

**Storage temperature:** 14°F to 140°F / -10°C to 90°C

**Length of power cable:** 5ft

**Length of output power cable:** 1ft

**Length of sensor cable:** 6.5ft (including probe length)

**Enclosure size:** 153mm x 60mm x 29m

**WiFi type available on RTC-500-WIFI:** 2.4G (does not support 5G)

**Complies with FCC Standards**

**Warranty:** 3 Year Limited Warranty

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352-00318-001 Rev B


**3 Year Limited Warranty**