



Smart Thermostat

Featuring LoRaWAN®

WT201

User Guide



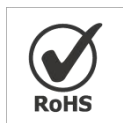
Safety Precautions

Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

- ❖ The device must not be disassembled or remodeled in any way.
- ❖ The device is not intended to be used as a reference sensor, and Milesight will not should responsibility for any damage which may result from inaccurate readings.
- ❖ Do not place the device where the temperature is below/above the operating range.
- ❖ Do not place the device close to objects with naked flames, heat source (such as oven), or exposure to sunlight, cold source, liquid, and extreme temperature changes.
- ❖ The device must never be subjected to shocks or impacts.
- ❖ Do not clean the device with detergents or solvents such as benzene or alcohol. To clean the device, wipe with a soft moistened cloth. Use another soft, dry cloth to wipe dry.

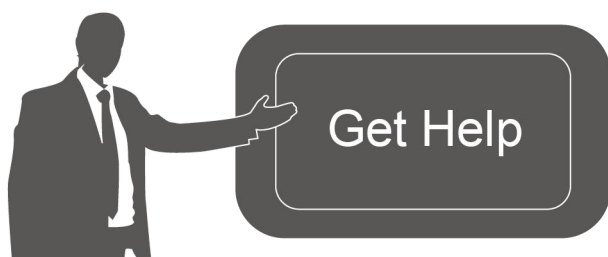
Declaration of Conformity

WT201 is in conformity with the essential requirements and other relevant provisions of the FCC and RoHS.



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Revision History

| Date | Doc Version | Description |
|---------------|-------------|--|
| Oct. 30, 2023 | V 1.0 | Initial version |
| May 14, 2024 | V 1.1 | <ol style="list-style-type: none">1. Support to select control permission;2. Support humidity collection, calibration and control features. |

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1. Product Introduction

1.1 Overview

WT201 is a LoRaWAN® thermostat used as a HVAC controller supporting a wide range of different heating and cooling systems, including heat pumps, AC, boilers, furnaces, AHU, and PTAC devices. WT201 smart thermostat provides multiple modes including heat/cool, emergent heat, auto, and fan mode, enabling precise temperature adjustments in buildings. It allows for automatic control through scheduled programming and remote management via cloud system. Real-time monitoring ensures timely alerts for sudden temperature changes, prioritizing people's safety and protecting assets. Additionally, it has the capability to store up to 1000 pieces of data, providing ample data security.

With a 4.2" LCD screen and embedded temperature and humidity sensor, the WT201 continuously displays the room status while monitoring the ambient temperature. It also accommodates to different time zones and summer/winter time, catering to users in various regions. Moreover, the thermostat seamlessly integrates with hotel room card systems, allowing for convenient remote management. Compliant with Milesight LoRaWAN® gateway and Milesight IoT Cloud solution, users can control the room temperature as well as trigger other sensors or appliances easily via a webpage or mobile App remotely and D2D protocol.

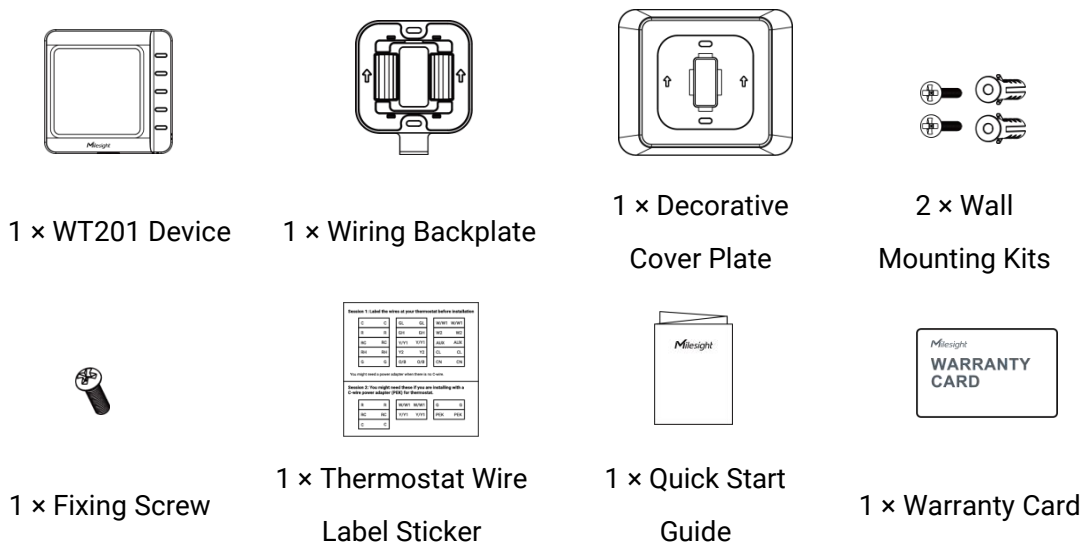
1.2 Key Features

- Support most 24VAC HVAC system, including furnaces and air conditioners (2H/2C), heat pumps (4H/2C + 1 stage AUX heat), boilers, and PTAC
- Support intuitive 4.2-inch display, allowing for showing temperature, humidity and status of the room clearly
- Support the child lock function and anti-theft installation for safety reasons
- Support 4 temperature control modes and 3 fan modes for flexible temperature control
- Adjust the room temperature manually or automatically with 4 kinds of schedule plans and allow up to 16 schedules for each plan
- Enabling real-time monitoring ensures timely alerts for sudden temperature changes
- Built-in temperature and humidity sensor, enabling environmental detection and accurate control
- Store 1000 local historical records and support retransmission to prevent data loss
- Support flexible adjustments based on time zones and summer/winter time catering to region differences

- Compatible with hotel room card systems for convenient remote management
- Equipped with NFC for one-touch configuration
- Function well with standard LoRaWAN® gateways and network servers
- Supports Milesight D2D protocol to enable ultra-low latency control without gateway
- Supports multicast for control in bulk

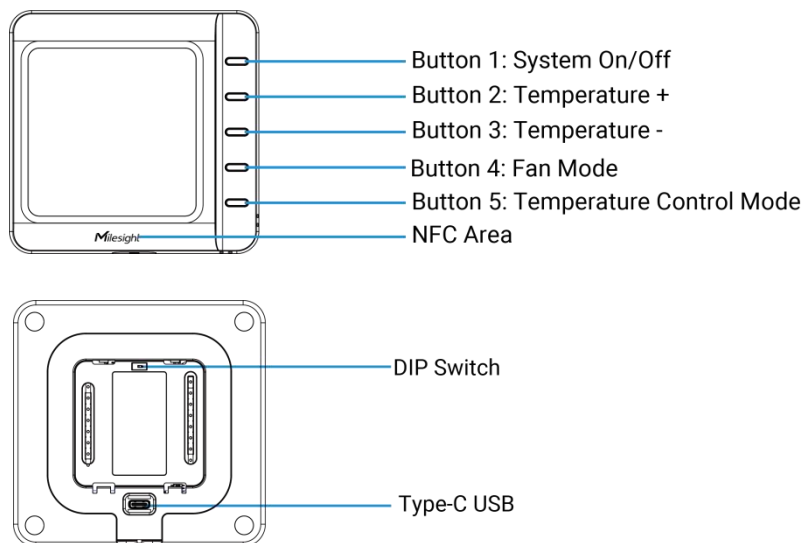
2. Hardware Introduction

2.1 Packing List

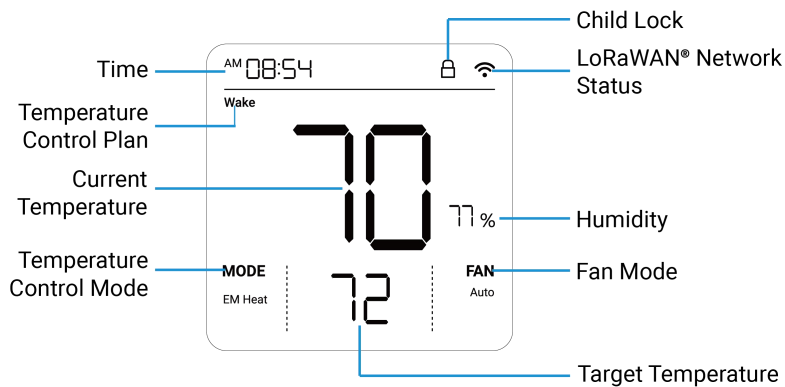


! If any of the above items are missing or damaged, please contact your sales representative.

2.2 Hardware Overview






Note: the buttons only take effect when control permission is Thermostat.



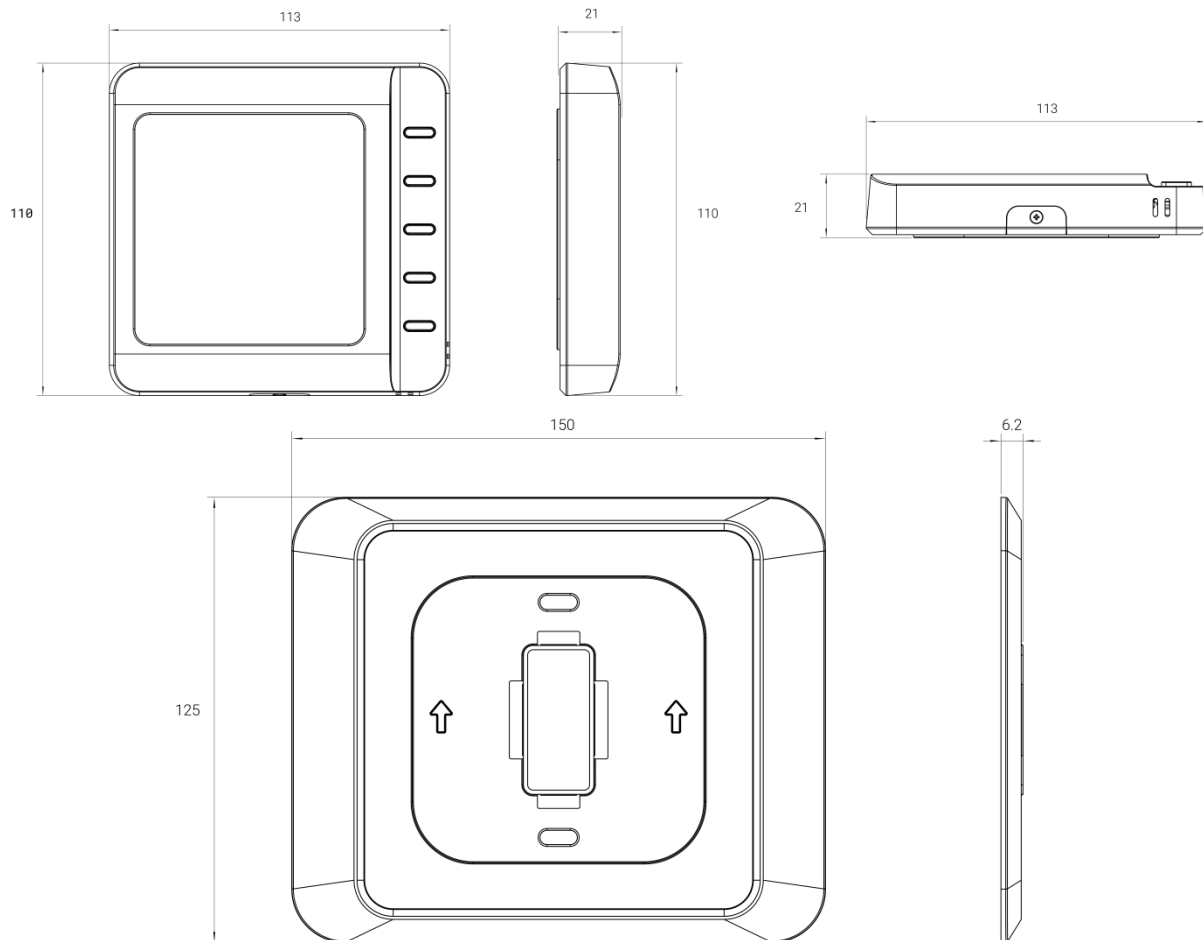
Note:

- 1) When system status is off, the screen will only show temperature and humidity.
- 2) When system status is on and control permission is Remote Control, the screen will only show temperature, humidity, time, child lock and network status.

Screen Descriptions:

| Icon | Description |
|---|---|
|  Child Lock | Display only when all buttons are locked or any locked button is pressed |
|  LoRaWAN® Network Status | Blinks: the network is de-activated |
| | Static On: the network is activated |
| | Blinks twice: send LoRaWAN® uplink packet |
|  Temperature | WT201 will display the value of internal temperature sensor by default. If the external temperature value is required to display, please enable this feature via downlink commands in WT201 Communication Protocol . |

2.4 Dimensions (mm)



3. Wiring Diagrams

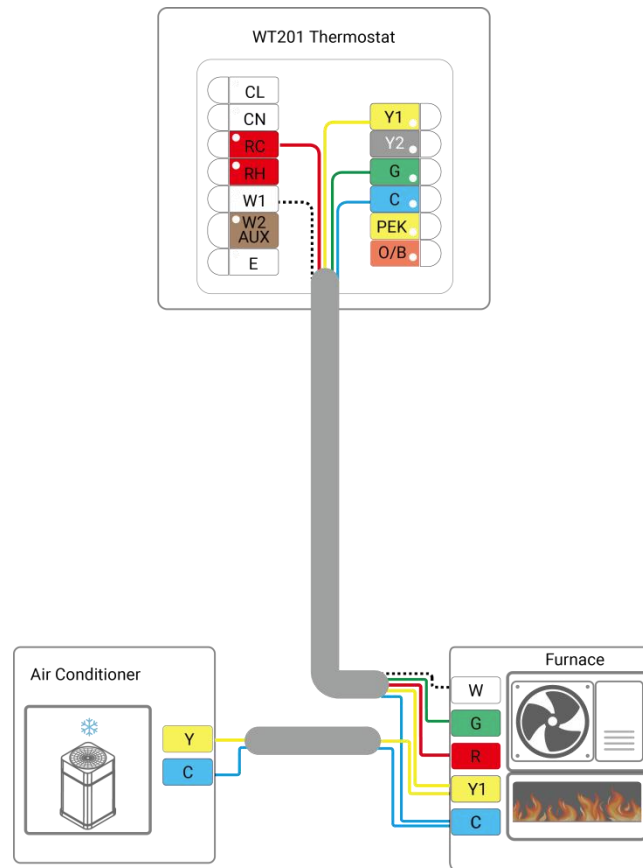
3.1 Wiring Descriptions

| Wire | Description |
|--------|--|
| CL | Live line out of room card switch |
| CN | Neutral line of room card switch |
| RC | Power of cooling system and heating system(24VAC) |
| RH | Power of heating system(24VAC) |
| W1 | Heating/The first stage of heating. |
| W2/AUX | The second stage of heating/Auxiliary heating |
| E | Emergency heating used on very cold days |
| Y1 | The first stage of cooling on cooling system or compressor on heat pump system |
| Y2/GL | Y2: The second stage of cooling on cooling system or compressor on heat pump system GL: control fan to low speed for PTAC |

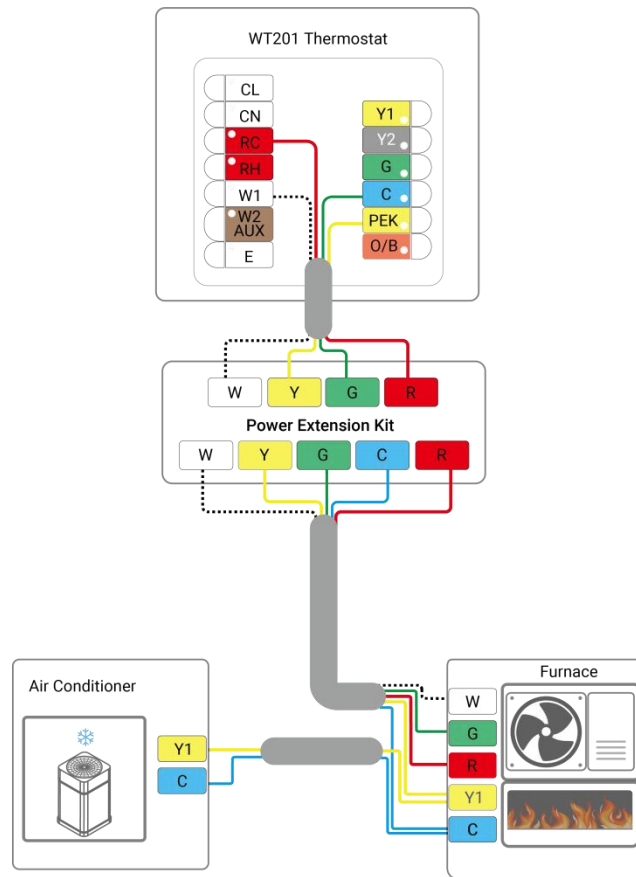
| | |
|------|---|
| G/GH | G: control fan GH: control fan to high speed for PTAC |
| C | Common of 24VAC power. It also might be labeled as X or B wire. |
| PEK | Connect Power Extender Kit when there is no C wire. |
| O/B | Switch between heating and cooling on the heat pump system. |

3.2 Wiring Examples

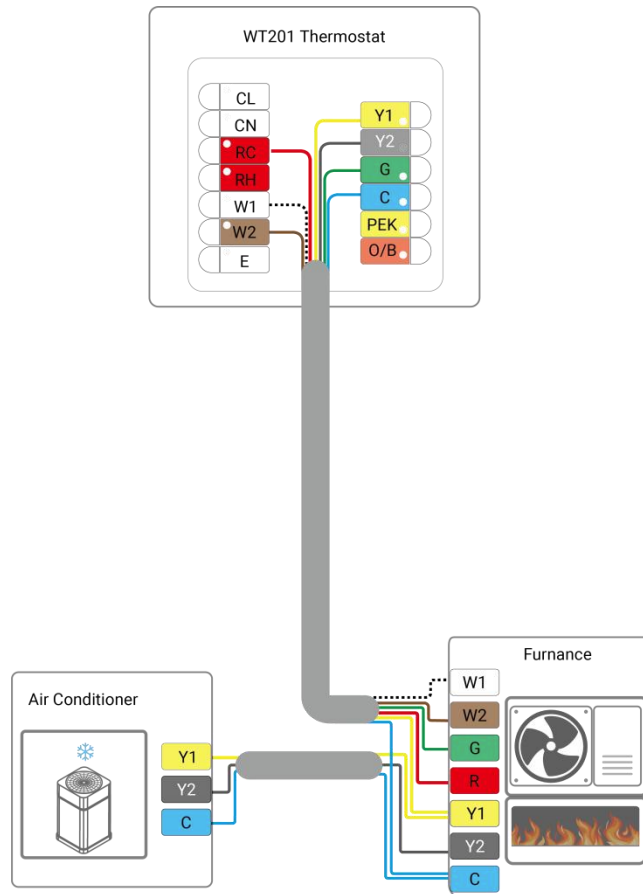
1. Furnace + Air Conditioner



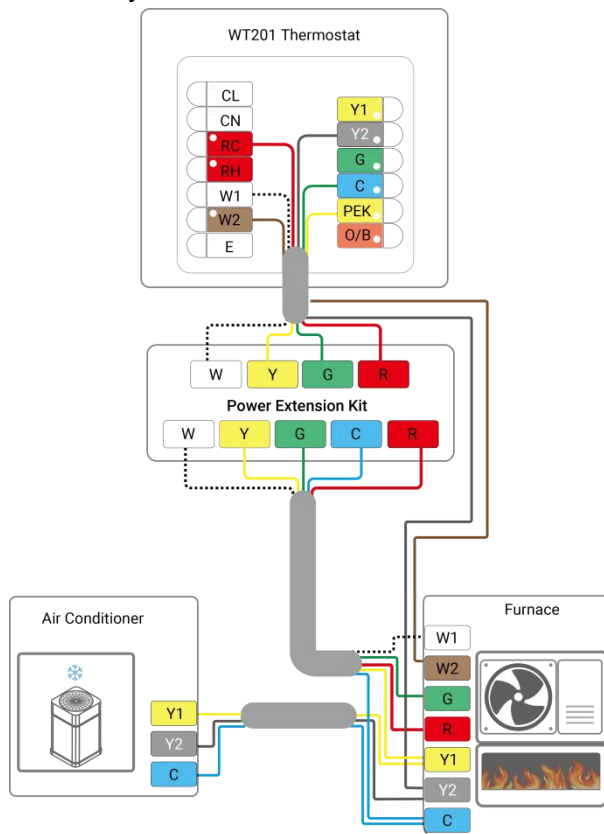
If there is no C wire, it is necessary to add a Power Extension Kit.



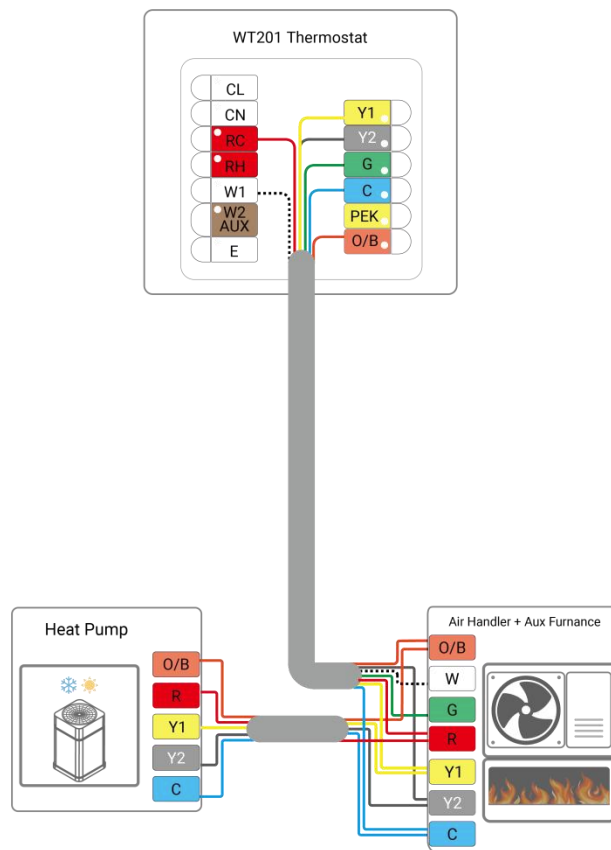
2. Furnace (2-stage) + Air Conditioner (2-stage)



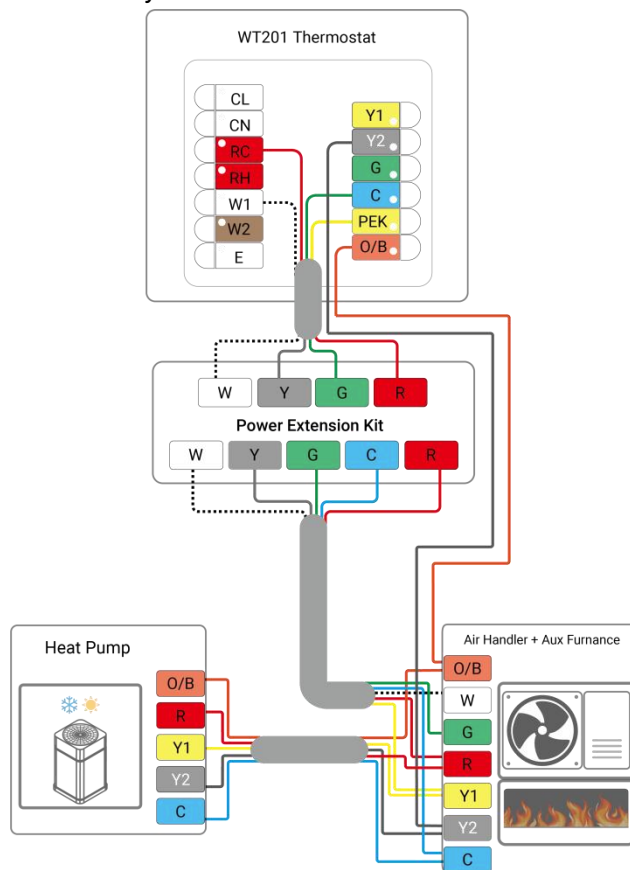
If there is no C wire, it is necessary to add a Power Extension Kit.



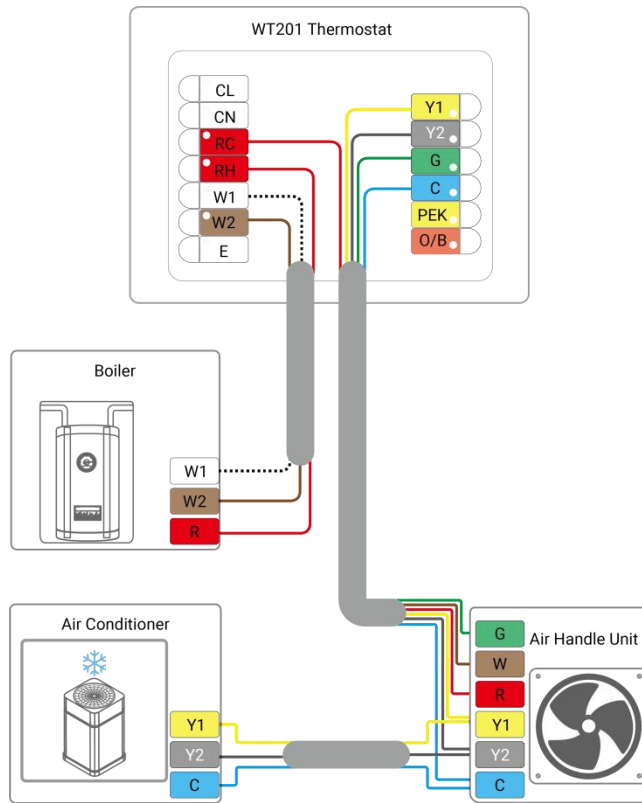
3. Heat Pump with Auxiliary Heat



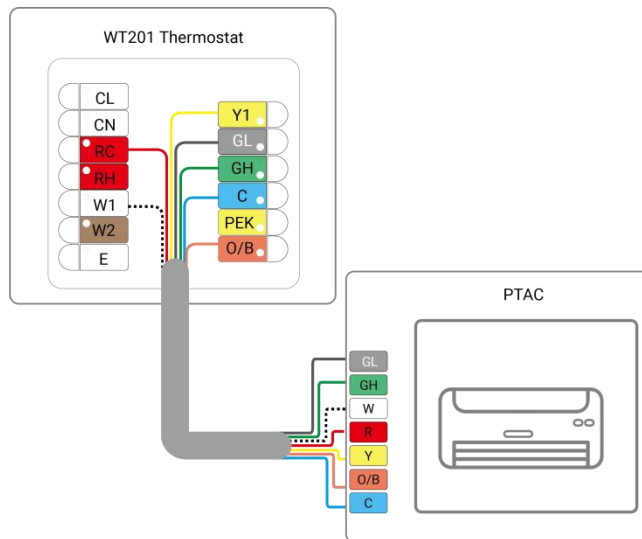
If there is no C wire, it is necessary to add a Power Extension Kit.



4. Boiler + Air Conditioner



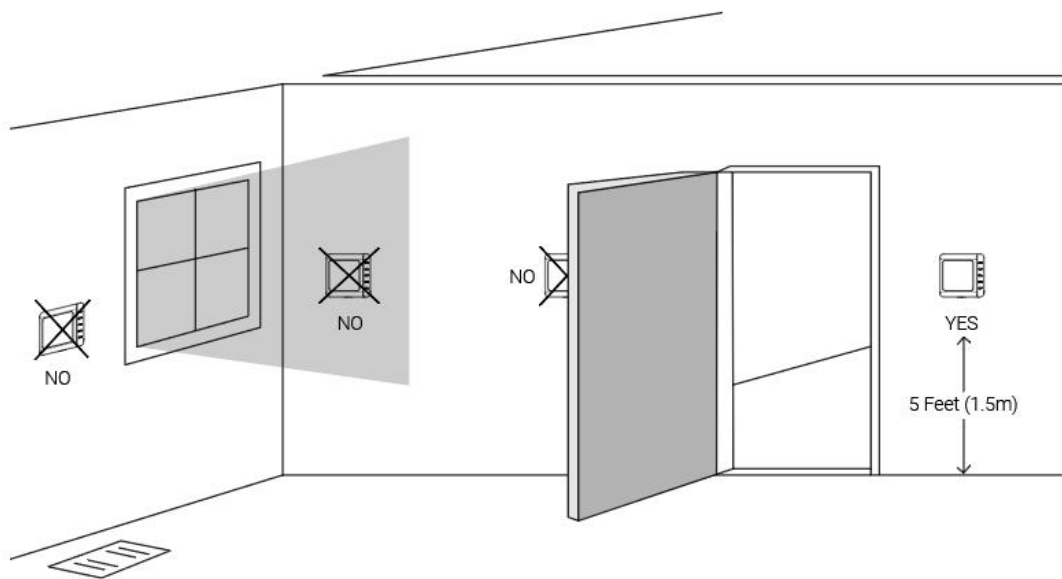
5. PTAC



4. Installation

Installation Locations

It is suggested to install the WT201 thermostat about 5 ft. (1.5m) above the floor in an area with good air circulation at average temperature.



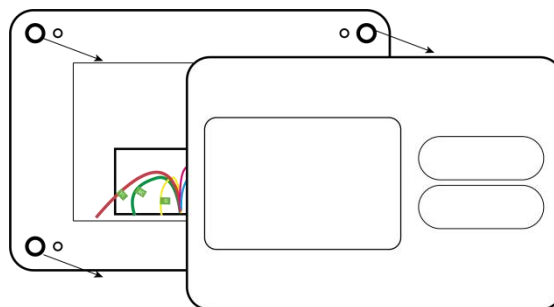
Do not install the device where:

- Close to hot or cold sources like hot or cold air ducts;
- The place in direct sunlight;
- Dead spots or drafts (behind the doors and in corners);
- In areas that do not require conditioning;
- Close to concealed chimneys or pipes;
- Close to metal objects and obstacles which affect the LoRaWAN® transmission;
- The place with lots of electromagnetic interfaces;
- The place where strong vibration may happen or easy to be subjected to physical shock.

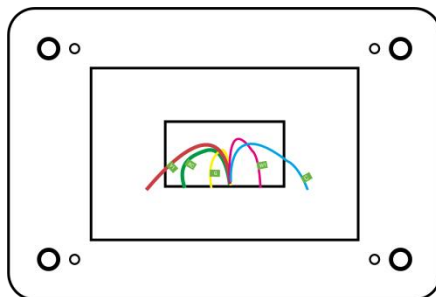
Installation Steps

1. Ensure the circuit of all related systems are shut off before installation.
2. Remove the old thermostat from the wall, check if the power supply is 24 VAC with less than 2A maximum current.

Note: do not power the WT201 device with maximum current for long time, which will damage the device.



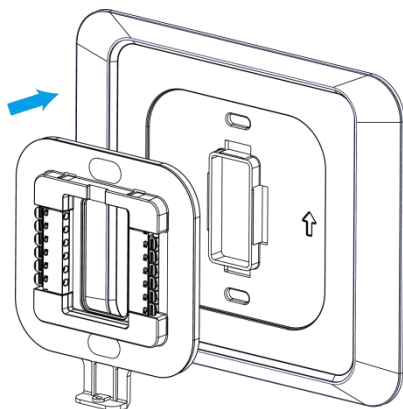
3. Disconnect the wires from old thermostat and label the wires with stickers. It is suggested to take a photo of the connected wires on the old thermostat for reference.



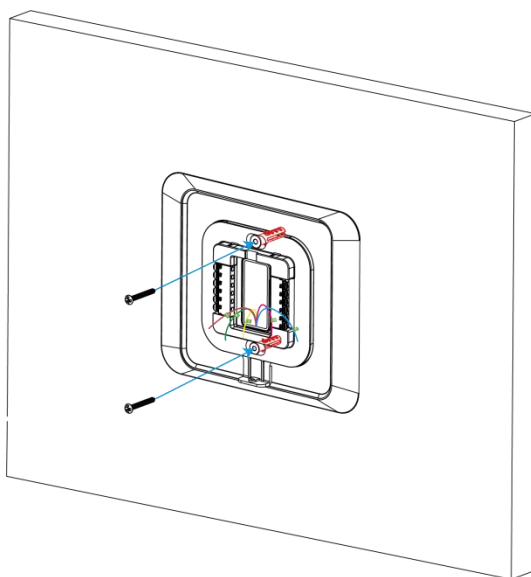
4. Remove the mounting plate of old thermostat. When removing, ensure that the wires do not fall into the holes.

5. Press the wiring backplate to decorative cover plate to fix them together. Ignore this step if you are not using a decorative cover plate.

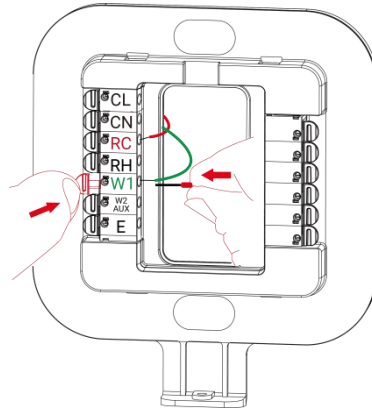
Note: it is suggested to use a decorative cover plate to cover the holes on the wall left by old thermostat, and to reduce the airflow from the hole that will affect temperature measurement.



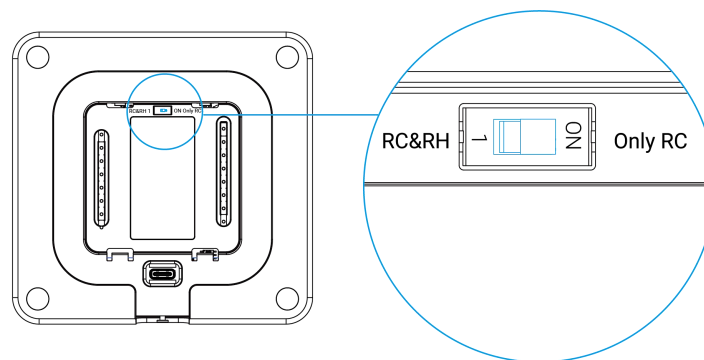
6. Pass the wires through the hole in the middle of the wiring backplate, then fix the wiring backplate (and decorative cover plate) to the wall using wall plugs and wall mounting screws.



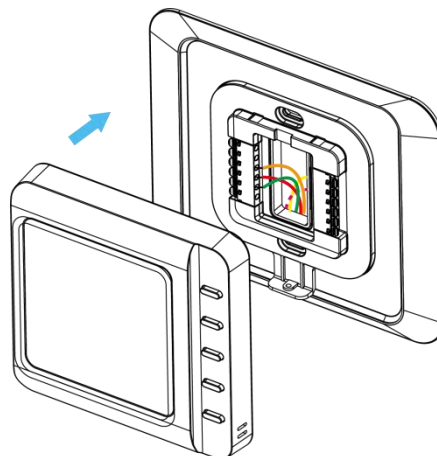
7. Hold the tabs and insert the wires into the holes of the corresponding terminals on the wiring backplate until they are firmly in place. Gently tug the wires to ensure that they are securely connected. If you need to release the wires again, take off the terminal tabs.
8. Push the remaining wires back into the hole on the wall.



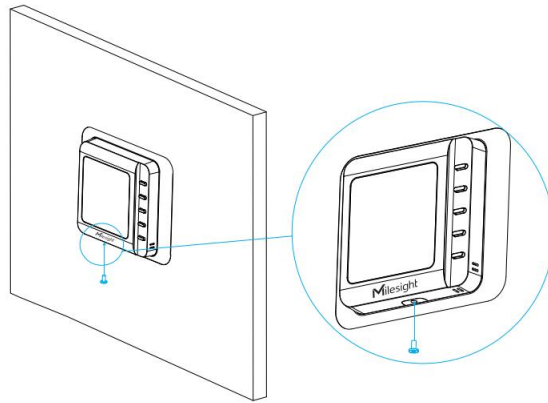
9. Adjust the DIP switch on the WT201 device. If there is only the RC wire connected, switch to Only RC; If both the RC and RH wires are connected, switch to RC & RH.



10. Push the WT201 device into the wiring backplate gently and ensure that both parts are securely fixed.



11. Turn on the systems to check if the WT201 device is on. Configure the device and ensure that it can function well.
12. Fix the bottom of WT201 device to the wiring backplate with the fixing screw.



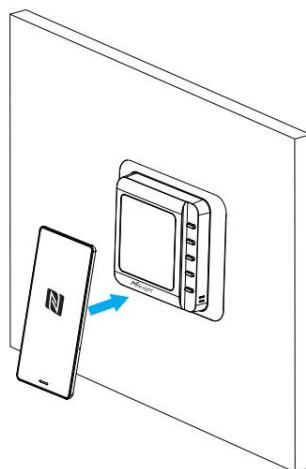
5. Operation Guide

5.1 ToolBox Login

WT201 can be configured via NFC or Type-C port. Please select one of them to complete the configuration.

5.1.1 NFC Configuration

1. Download and install the Milesight ToolBox App from Google Play or Apple App Store.
2. Enable NFC on the smartphone and launch Milesight ToolBox.
3. Attach the NFC area of a smartphone to the device, and click **NFC Read** to read device information. The basic information and settings of the device will be shown on ToolBox App if it's recognized successfully. You can read and configure the device by tapping the Read/Write device on the App. In order to protect the security of the device, please change the password when first configuring. The default password is **123456**.

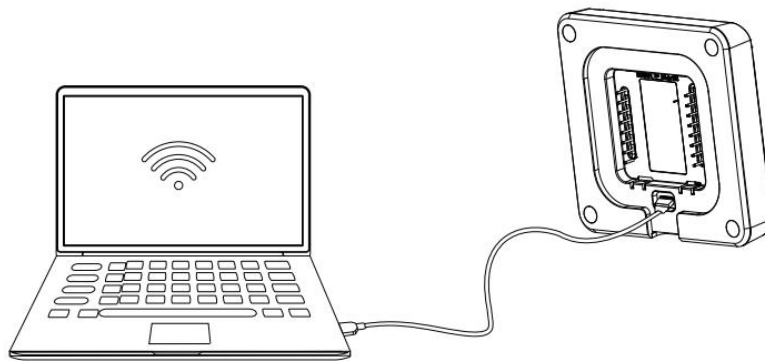


Note:

- 1) Ensure that you get the right location of NFC area of the smartphone and it's recommended to take off phone case.
- 2) If the smartphone fails to read/write configurations via NFC, remove the phone and try again.

5.1.2 USB Configuration

1. Download ToolBox software from Milesight's official website.
2. Remove the WT201 device from the backplate, connect the device to a computer via the Type-C port.



3. Open the ToolBox and select type as "General", then click password to log into the ToolBox. (Default password: **123456**)

A screenshot of a software dialog box titled "ToolBox Settings". The dialog contains several configuration fields:

- Type: General (dropdown menu)
- Serial port: COM4 (dropdown menu)
- Login password: (text input field)
- Baud rate: 115200 (dropdown menu)
- Data bits: 8 (dropdown menu)
- Parity bits: None (dropdown menu)
- Stop bits: 1 (dropdown menu)

At the bottom of the dialog are two buttons: "Save" and "Cancel".

4. After logging into the ToolBox, you can check device status and change device settings.

The screenshot displays the Milesight device management interface. On the left is a dark sidebar with four menu items: 'Status' (with a list icon), 'LoRaWAN Settings' (with a LoRa icon), 'Device Settings' (with a gear icon), and 'Maintenance' (with a house icon). The main content area shows a list of device parameters:

| | |
|-----------------------------|---|
| Model: | WT201-915M |
| Serial Number: | 6715D41008880000 |
| Device EUI: | 24e124715d410088 |
| Firmware Version: | 01.03 |
| Hardware Version: | 1.1 |
| Join Status: | De-Activate |
| Device Status: | On |
| RSSI/SNR: | 0/0 |
| Device Time: | 1970-01-01 6:25:07 AM Sync |
| Temperature Control Status: | Standby |
| Fan Status: | On |
| Temperature: | 27.6°C |
| Humidity: | 34.0% |
| Channel Mask: | ##### |
| Uplink Frame-counter: | 0 |
| Downlink Frame-counter: | 0 |

5.2 Installation Settings

Note: Below settings only take effect when control permission is Thermostat.

If it is the first time configuration, please click the boxes of wires to complete the wiring settings according to your installation. About the wiring description please refer to [Wiring Description](#).

The screenshot shows the 'Installation Settings' screen in the Milesight app. The title bar is blue with a back arrow and the text 'Installation Sett..'. Below the title bar is a section titled 'Wiring Settings' containing several buttons for selecting wire types: Y1 (highlighted in blue), G(GH), O/B, W1, E, CL&CN, PEK, W2, AUX, Y2, and GL. Below this section is a message: 'Please confirm G wiring'. Underneath is a 'Power Settings' section with an information icon and a dropdown menu currently set to 'RC Only'. At the bottom is a 'Compressor Protection' section with an information icon and a toggle switch that is currently turned off.

| Parameters | Wire | Description |
|----------------------------|-----------|--|
| Power Settings | / | Select RC Only or RC & RH. This setting should be the same as the DIP switch setting on the WT201 device. |
| Reversing Valve | O/B | Switch the O/B mode of a heat pump or PTAC. This can also be changed via the downlink command. |
| Heating System | W1/W2/E/A | Select a furnace or boiler. |
| Fan Control during Heating | UX + G | Select a thermostat or furnace/boiler. |
| Auxiliary Heating Duration | AUX | When current temperature does not reach the target temperature even heating for auxiliary heating duration, report an Auxiliary Heating Timeout Alarm packet and switch back to lower stage heating mode. |
| Emergency Heating Duration | | When the emergency heating time reaches this duration, report an Emergency Heating Timeout Alarm packet and switch back to Heat mode. |
| Freeze Protection | E | When current temperature is lower than the protection temperature, switch control mode to EM Heat to adjust to protection temperature, then change back to the original control mode. If the control system is off, this feature will turn on the system EM Heat mode temporarily and only System On/Off button can work. |
| Compressor Protection | Y1/Y2+G | Only when the minimum running duration passes, the compressor can start or stop working. |
| Room Card Settings | CL&CN | When a key card switch is connected to CL and CN of WT201, set the triggering action when a room key card is inserted or removed. Default: System On/Off: insert card - system on, remove card - system off; Insert an Event: insert card - Home plan, remove card - Away plan. The event can be changed via downlink commands. |

5.3 LoRaWAN® Settings

5.3.1 Basic Settings

WT201 supports to configure AppEUI, Join Type, Application Key, and other basic LoRaWAN® information. You can also keep all settings by default.

Device EUI

24E124791D196040

* APP EUI

24e124c0002a0001

* Application Port 85

Join Type

ABP

* Network Session Key

* Application Session Key

| Parameters | Description |
|-------------------------|---|
| Device EUI | Unique ID of the device which can also be found on the label. |
| App EUI | The default App EUI is 24E124C0002A0001. |
| Application Port | The port is used for sending and receiving data, the default port is 85. |
| Join Type | OTAA and ABP modes are available. |
| Application Key | Appkey for OTAA mode, the default is 5572404C696E6B4C6F52613230313823. |
| Network Session Key | Nwkskey for ABP mode, the default is 5572404C696E6B4C6F52613230313823. |
| Application Session Key | Appskey for ABP mode, the default is 5572404C696E6B4C6F52613230313823. |
| Device Address | DevAddr for ABP mode, the default is the 5th to 12th digits of the SN. |
| LoRaWAN® Version | V1.0.2 and V1.0.3 are available. |
| Work Mode | It's fixed as Class C. |
| RX2 Data Rate | RX2 data rate to receive downlinks or Milesight D2D commands. |
| RX2 Frequency | RX2 frequency to receive downlinks or Milesight D2D commands. Unit: Hz |
| Confirmed Mode | If the device does not receive an ACK packet from the network server, it will resend data once. |

| | |
|--------------------------------|--|
| Rejoin Mode | <p>Reporting interval \leq 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval or every double reporting interval to validate connectivity; If there is no response, the device will re-join the network.</p> <p>Reporting interval $>$ 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval to validate connectivity; If there is no response, the device will re-join the network.</p> |
| Set the number of packets sent | <p>When the rejoin mode is enabled, set the number of LinkCheckReq packets to send.</p> <p>Note: the actual sending number is Set the number of packet sent + 1.</p> |
| ADR Mode | Allow network server to adjust data rate of the device. |
| Spread Factor | If ADR is disabled, the device will send data via this spread factor. |
| Tx Power | Transmit power of the device. |

Note:

- 1) Please contact sales for device EUI list if there are many units.
- 2) Please contact sales if you need random App keys before purchase.
- 3) Select OTAA mode if you use Milesight IoT cloud to manage devices.
- 4) Only OTAA mode supports rejoin mode.

5.3.2 Frequency Settings

Select supported frequency and channels to send uplinks. Make sure the channels match the LoRaWAN[®] gateway.

* Support Frequency

AS923

* Channel Plan

AS923-1

923.2

923.4

922.2

922.4

If device frequency is AU915 or US915, you can enter the index of the channel that you want to enable in the input box, making them separated by commas.

Examples:

1, 40: Enabling Channel 1 and Channel 40

1-40: Enabling Channel 1 to Channel 40

1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60

All: Enabling all channels

Null: Indicates that all channels are disabled

* Support Frequency

US915

Enable Channel Index ⓘ

0-71

| Index | Frequency/MHz ⓘ |
|---------|-----------------|
| 0 - 15 | 902.3 - 905.3 |
| 16 - 31 | 905.5 - 908.5 |
| 32 - 47 | 908.7 - 911.7 |
| 48 - 63 | 911.9 - 914.9 |
| 64 - 71 | 903 - 914.2 |

5.3.3 Multicast Settings

WT201 supports setting up several multicast groups to receive multicast commands from the network server, then users can use this feature to control devices in bulks.

1. Enable Multicast Group, and set an unique multicast address and keys to distinguish other groups. You can also keep these settings by default.

Multicast Group1

Multicast Address (i)

McNetSKey

McAppSKey

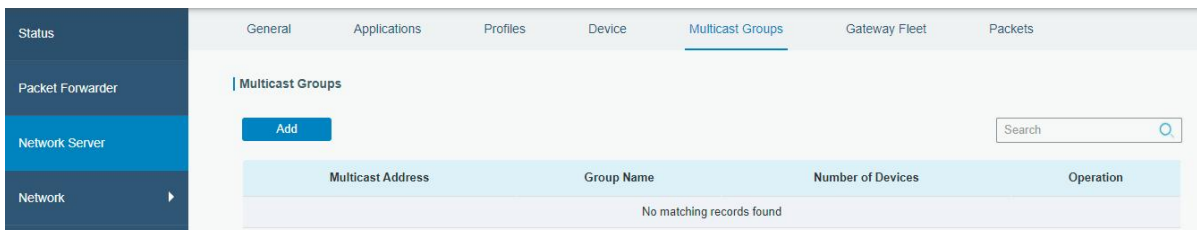
Multicast Group2

Multicast Group3

Multicast Group4

| Parameters | Description |
|---------------------|---|
| Multicast Address | Unique 8-digit address to distinguish different multicast groups. |
| Multicast McNetSkey | 32-digit key. Default values: Multicast Group 1: 5572404C696E6B4C6F52613230313823 Multicast Group 2: 5572404C696E6B4C6F52613230313824 Multicast Group 3: 5572404C696E6B4C6F52613230313825 Multicast Group 4: 5572404C696E6B4C6F52613230313826 |
| Multicast McAppSkey | 32-digit key. Default values: Multicast Group 1: 5572404C696E6B4C6F52613230313823 Multicast Group 2: 5572404C696E6B4C6F52613230313824 Multicast Group 3: 5572404C696E6B4C6F52613230313825 Multicast Group 4: 5572404C696E6B4C6F52613230313826 |

2. Add a multicast group on the network server. Take Milesight UG6x gateway as example, go to **Network Server > Multicast Groups**, click **Add** to add a multicast group.



Fill in the multicast group information the same as WT201 settings, and select the devices which you need to control, then click **Save**.

| | |
|---|--------------------------|
| Group Name | Room Control |
| Multicast Address | 11111111 |
| Multicast Network Session Key | 5572404C696E6B4C6F526132 |
| Multicast Application Session Key | 5572404C696E6B4C6F526132 |
| Class Type | Class C |
| Datarate | DR8(SF12, 500kHz) |
| Frequency | 923300000 Hz |
| Frame-counter | 0 |
| Selected Devices | |
| <div style="border: 1px solid #ccc; padding: 5px;"> WT201 x WT201_2 x </div> | |

| Multicast Address | Group Name | Number of Devices | Operation |
|-------------------|--------------|-------------------|-------------------------------------|
| 11111111 | Room Control | 2 | ↗ ✕ |

3. Go to **Network Server > Packets**, select the multicast group and fill in the downlink command, click **Send**. The network server will broadcast the command to devices that belong to this multicast group.

Note: ensure all devices' application ports are the same.

| Device EUI | Type | Payload | Port | Confirmed | Send |
|------------------|-------|---------|------|--------------------------|----------------------|
| 0000000000000000 | ASCII | | 85 | <input type="checkbox"/> | Send |

| Multicast Group | Type | Payload | Port | Send |
|-----------------|------|---------|------|----------------------|
| Room Control | hex | #f10f | 85 | Send |

5.4 General Settings

Reporting Interval(min)

Temperature Unit

Control Permissions

System On/Off

Child Locks

Time Mode

Time Zone

Daylight Saving Time

Start Time Oct. | 1st | Sun. | 02:00AM

End Time Apr. | 1st | Sun. | 02:00AM

DST Bias 60 min

Data Storage

Data Retransmission

Change Password

| Parameters | Description |
|---------------------|---|
| Reporting Interval | The interval of reporting data to network server. Default: 10 min, Range: 1 - 1440 min |
| Temperature Unit | Set the unit of temperature displayed on the screen and configuration page. |
| Control Permissions | Select the control permission as Thermostat or Remote Control . |
| System On/Off | Turn on or off the temperature control system, it can also be controlled by button. When the system is off, the screen will only show current temperature and humidity. |
| Child Locks | Enable to lock the button. After enabled, the device can only control |

| | |
|-------------------------------------|---|
| | <p>these features via ToolBox or downlink commands.</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <input type="checkbox"/> System On/Off <input type="checkbox"/> Temperature +/- <input type="checkbox"/> Fan Mode <input type="checkbox"/> Temperature Control Mode <input type="checkbox"/> Reset </div> |
| Time Mode | Set the time display mode as 24-Hour Clock or 12-Hour Clock. |
| Time Zone | Set the time zone to display on the screen. When you click Sync button of ToolBox App or ToolBox software to sync time, the device will also sync the time zone from smartphone or computer automatically. |
| Daylight Saving Time | <p>Enable or disable Daylight Saving Time (DST).</p> <p>Start Time: the start time of DST time range.</p> <p>End Time: the end time of DST time range.</p> <p>DST Bias: the DST time will be faster according to this bias setting.</p> |
| Data Storage | Disable or enable data storage locally. |
| Data Retransmission | Disable or enable data retransmission. |
| Change Password | Change the password for ToolBox App to write this device or ToolBox software to login the device. |

Thermostat: control the temperature according to the settings of thermostat.

Temperature Control Mode

Heat

Fan Mode

Circulate

Operation Time 30 min/h

Target Temperature

17 °C

Target Temperature Tolerance

1 °C

Target Temperature Regulation Range

10 °C - 28 °C

Target Humidity Range(%)

40 - 80

Temp. Control and Dehumidify



Temp. Tolerance for Dehumidification (°C) ⓘ

1

| Parameters | Description |
|------------------------------|--|
| Temperature Control Mode | <p>Select from Cool, Heat, EM Heat and Auto, this mode can also be switched by button or downlink command. These options are supported according to connected and selected wires.</p> <p>The working condition of every mode depends on the target temperature and tolerance settings of below parameters.</p> <p>Cool: start working when current temp. > (target temp. + target temp. tolerance).</p> <p>Heat: start working when current temp. < (target temp. - target temp. tolerance).</p> <p>Auto: start cooling when current temp. > (target temp. + target temp. tolerance + temp. control tolerance); start heating when current temp. < (target temp. - target temp. tolerance - temp. control tolerance).</p> |
| Fan Mode | <p>Select from Auto, On and Circulate. This mode is only supported when G wire is connected and can also be switched by button or downlink command.</p> <p>Auto: open when the system is cooling or heating. This mode supports to set the duration of the fan's deferred closing after the system stops working.</p> <p>Besides, this mode supports to enable Regulate Humidity feature working with dehumidifier or humidifier. When not reaching target humidity range, the device will turn on the fan for some minutes hourly.</p> <p>On: the fan is normally open.</p> <p>Circulate: open the fan to circulate when the system stops working. This mode supports to set the operation time hourly.</p> |
| Target Temperature | Set target environment temperature. |
| Target Temperature Tolerance | Set the tolerance value between target temperature and current temperature. |

| | |
|--------------------------------------|--|
| Temperature Control Tolerance | When temperature control mode is Auto, set the tolerance value between target temperature range and current temperature. |
| Target Temperature Regulation Range | Set the range for buttons to adjust the target temperature. Max range: 16 - 35 °C (60 - 95 °F), min range: 5 - 15 °C(41 - 59 °F). |
| Target Humidity Range | Set target environment humidity range. |
| Temp. Control and Dehumidify | When reaching the target temperature range but not reaching the target humidity range, the device will keep cooling or heating to dehumidify. |
| Temp. Tolerance for Dehumidification | When reaching this tolerance over target temperature range, the device will stop heating or cooling even it is not reaching the target humidity range. |

Configuration Example:


Target temperature(T) = 23,
 target temperature tolerance(TO)=1,
 temperature control tolerance(TC)=2,
 temp. Tolerance for dehumidification(TD)=1.


The expected start and stop cooling or heating temperature is:


| Temperature Control Mode | Start Temperature | Stop Temperature | Stop Temperature (Temp. Control and Dehumidify Enabled) |
|--------------------------|---|--|---|
| Heat | 22 (T-TO) | 24 (T+TO) | 25 (T+TO + TD) |
| Cool | 24 (T+TO) | 22 (T-TO) | 21 (T - TO - TD) |
| Auto | Start Heat: 20 (T- TO - TC) Start Cool: 26 (T+TO+TC) | Stop Heat: 24(T+TO) Stop Cool: 22(T-TO) | Stop Heat: 25(T+TO+TD) Stop Cool: 21(T - TO - TD) |



Remote Control: users can write the programs to control the relay output status directly to achieve the temperature control. Under this permission, the screen will only show temperature, humidity, time, child lock, and network status.

Control Permissions


Remote Control 

System On/Off 

Child Locks 

Room Card Settings  

Control Objects


System On/Off 

| Parameters | Description |
|--------------------|---|
| Room Card Settings | Enable or disable the CL&CN control feature. |
| Control Objects | When a room key card switch is connected to CL and CN of WT201, set the triggering action when a room key card is inserted or removed. Default: System On/Off: insert card - system on, remove card - system off |

5.5 Advanced Settings

5.5.1 Calibration Settings

Temperature Calibration: set the calibration value, the device will add calibration value to the current temperature value and report the final value.

Temperature 

Current Value(°C) Final Value(°C)

17.6 **27.6**

Calibration Value(°C)

10

Humidity Calibration: set the calibration value, the device will add calibration value to the current humidity value and report the final value.

Humidity

| | |
|------------------|----------------|
| Current Value(%) | Final Value(%) |
| 19.5 | 37.5 |

Calibration Value(%)

5.5.2 Threshold Settings

WT201 supports 2 types of temperature threshold alarms:

Temperature threshold: when current temperature is over or below the threshold value, the device will report the threshold alarm packet instantly. Only when the threshold is released and re-triggered, will the device report the alarm again.

Persistent low/high temperature threshold: when current temperature is lower or higher than the target temperature for difference value and specific duration, the device will report the threshold alarm packet instantly. When the threshold is released, it will also report the alarm release packet.

Temperature

Over / °C

Below / °C

Persistent low temperature

Difference in Temperature / °C

Duration 0 min

Persistent high temperature

Difference in Temperature / °C

Duration 0 min

5.5.3 Schedule Settings

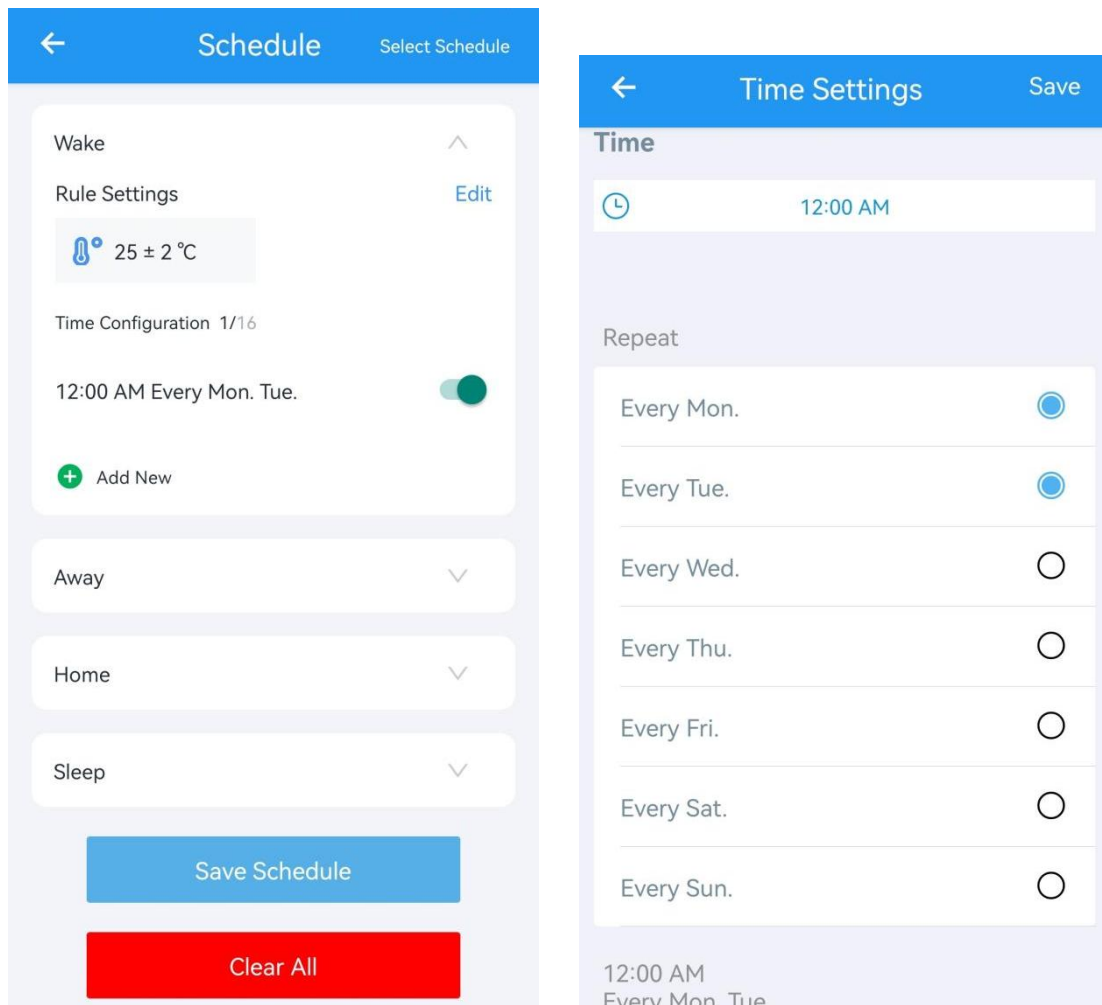
Note: Below settings only take effect when control permission is Thermostat.

WT201 supports to set 4 kinds of schedule plan: Wake, Away, Home, and Sleep.

1. Click **Edit** to set the target temperature range of every schedule, then add the time period to execute this schedule. Every schedule plan supports to add 16 time periods at most.

Note: if the repeat date is not selected, the schedule plan will only execute once.

2. Click **Write** to save the schedule settings.



3. Click **Save Schedule** to export above settings as a schedule file. And click **Select Schedule** to import the schedule file to another device.

5.5.4 Data Storage

WT201 supports storing 1000 data records locally and exporting data via ToolBox. The device will record the data according to the reporting interval even if it is disconnected from the network.

Note:

- 1) When control permission is set to Remote control, the device will stop storing data.
- 2) The device does not store humidity data.

1. Sync the device time via ToolBox.

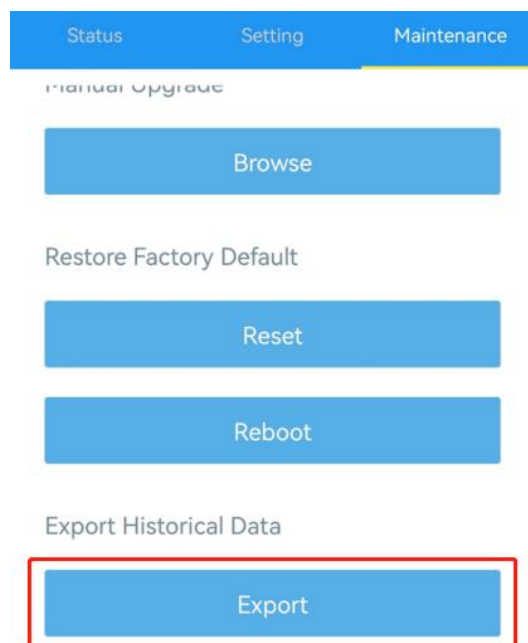
| Status | Setting | Maintenance |
|---------------------|------------------|-----------------------|
| Hardware Version | | V1.0 |
| Device Status | | ON |
| Join Status | | Activated |
| Reading Mode | | NFC |
| RSSI/SNR | | -52/10 |
| Device Time | 2023-09-07 06:01 | <button>Sync</button> |
| Current Temperature | | 25.7 °C |

Besides, when device LoRaWAN® version is set as 1.0.3, the device will send MAC commands to ask the network server everytime when it joins the network.

2. Enable the data storage feature.



3. Click **Export**, then select the data time range to export data. The maximum export data period on ToolBox App is 14 days.



Maintenance >

The screenshot shows a 'Maintenance' interface with two tabs: 'Upgrade' and 'Backup and Reset'. Under the 'Backup and Reset' tab, there are three sections: 'Config Backup' with an 'Export' button; 'Config File' with a text input field, a 'Browse' button, and an 'Import' button; and 'Export Historical Data' with an 'Export' button that is highlighted with a red rectangular box.

5.5.5 Data Retransmission

WT201 supports data retransmission to ensure that the network server can receive all data even if the network is down for some time. There are two ways to receive the lost data:

- Network server sends downlink commands to enquire the historical data for a specified time range, refer to **WT201 Communication Protocol**;
- When network is down and the device receives no response of LinkCheckReq MAC packets for a period of time, the device will record during the disconnection period and retransmit the lost data after the device is reconnected to the network.

Here are the steps of data retransmission:

1. Enable the data storage feature and data retransmission feature.

The screenshot shows two settings: 'Data Storage' and 'Data Retransmission'. Both settings have an information icon (i) and a toggle switch that is turned on (green).

2. Enable rejoin mode feature and set the number of packets sent in LoRaWAN® settings. For example, the device will send LinkCheckReq MAC packets to the network server regularly to check any network disconnection; if there is no response for 8+1 times, the join status will change to de-active and the device will record a data lost time point (the time it reconnected to the network).

The screenshot shows the 'Rejoin Mode' setting, which is turned on (green). Below it is a text input field labeled 'Set the number of detection signals sent' with an information icon (i), containing the value '8'.

3. After reconnecting to the network, the device will send the lost data from the point of time when the data was lost according to the data re-transmission reporting interval.

Note:

- 1) If the device is rebooted or re-powered during the data retransmission process, the device will re-send interrupted retransmission data again after the device is reconnected back to the network.
- 2) If the network is disconnected again during data retransmission, the device will only send the latest disconnected data.
- 3) The retransmission data format starts with "20ce", please refer to **WT201 Communication Protocol**.

5.6 Milesight D2D Settings

Milesight D2D protocol is developed by Milesight and used for connection among Milesight devices without gateway. When D2D setting is enabled, WT201 can work as the Milesight D2D agent device to receive commands from Milesight D2D controller devices or work as Milesight D2D controller device to send commands to trigger D2D agent devices.

5.6.1 Milesight D2D Controller

Note: Below settings only take effect when control permission is Thermostat.

1. Configure RX2 datarate and RX2 frequency in LoRaWAN® settings. It is suggested to change the default RX2 frequency to avoid conflicts with other D2D devices.
2. Enable D2D Controller Settings, and define a unique D2D key to be the same as D2D agent devices. (Default D2D Key: 5572404C696E6B4C6F52613230313823)
3. Select any of button to define a 2-byte hexadecimal control command (0x0000 to 0xffff). When the WT201 switches to the schedule, it will send the control command to corresponding D2D agent devices.

Note: If **LoRa Uplink** is enabled, a LoRa Uplink packet that contains the schedule switch status will be sent to the network server after sending the D2D control command packet.

D2D Key

D2D Controller Settings

Wake

Control command
ff01

LoRa Uplink ⓘ

Away

Home

Sleep

5.6.2 Milesight D2D Agent

1. Ensure the RX2 datarate and RX2 frequency in LoRaWAN settings are the same as the D2D controller device.
2. Enable D2D Agent Settings, and define a unique D2D key to be the same as the setting in D2D controller device. (Default D2D Key: 5572404C696E6B4C6F52613230313823)
3. Define a 2-byte hexadecimal control command (0x0000 to 0xffff) and command action. For example, when WT201 receives a control command ff10, it will turn the temperature control system to on; when WT201 receives a control command ff02, it will switch the schedule as Wake. WT201 supports at most 16 control commands.

Note: when [control permission](#) is set to Remote Control, the action does not support to insert a plan event.

Control command 1

Action Object



Action Status

Control command 2

Action Object



Action Status

5.7 Maintenance

5.7.1 Backup

WT201 supports backup templates for easy and quick configuring devices in bulk. The backup feature is only for devices with the same model and LoRaWAN[®] frequency band.

1. Go to **Template** page on the App and save the current settings as a template. The saved templates are also editable.

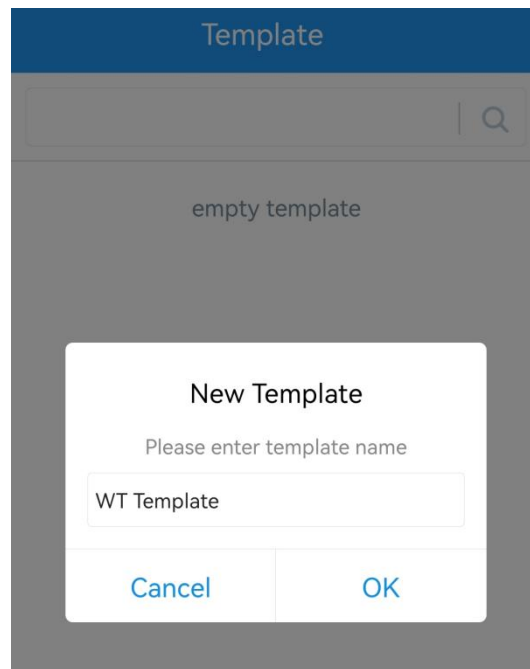


Device

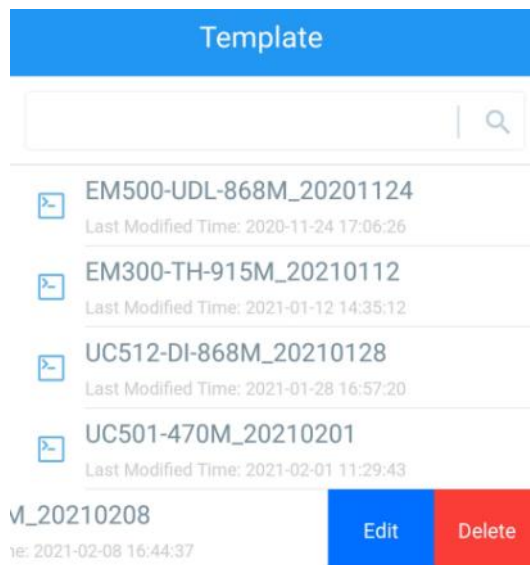


Template

2. Select one saved template and click **Write**, then attach the smartphone to another device via NFC to reuse the template.



Note: Slide the template item to the left to edit or delete the template. Click the template to edit the configurations.



5.7.2 Upgrade

1. Download firmware from the Milesight website to your smartphone or computer.
2. Click **Browse** to import firmware and upgrade the device.

Note: Operation on ToolBox is not supported during the upgrade.

Maintenance >

Reboot

Upgrade
Backup and Reset

| | | | |
|-------------------|---|--|--|
| Model: | WT201-915M | | |
| Firmware Version: | 01.01-r1 | | |
| Hardware Version: | 1.0 | | |
| Domain: | Beijing Server ▾ | | |
| FOTA: | Up to date | | |
| Local Upgrade | <input style="width: 150px; height: 20px;" type="text"/> | Browse | Upgrade |

| Status | Setting | Maintenance |
|------------------|------------------|--|
| SN | 6715D32404360003 | |
| Model | WT201-915M | |
| Firmware Version | V1.1-r1 | |
| Hardware Version | V1.0 | |
| Manual Upgrade | | Browse |

5.7.3 Reboot and Reset

WT201 supports below methods to reboot or reset the device which are as following:

Via Hardware: Press and hold the system on/off and temperature control mode button for more than 3s until the screen blinks slowly to reboot. Press and hold the system on/off and temperature control mode button for more than 10s until the screen blinks quickly to reset. This can be disabled via child lock settings.

Via ToolBox App: Go to **Device > Maintenance** to tap **Reboot** or **Reset**, then attach the smartphone to the device via NFC to complete the operation.

| Status | Setting | Maintenance |
|-------------------------|------------------|---------------------------------------|
| SN | 6715D32404360003 | |
| Model | WT201-915M | |
| Firmware Version | V1.1-r1 | |
| Hardware Version | V1.0 | |
| Manual Upgrade | | |
| | | <input type="button" value="Browse"/> |
| Restore Factory Default | | |
| | | <input type="button" value="Reset"/> |
| | | <input type="button" value="Reboot"/> |

Via ToolBox software: Go to **Maintenance > Backup and Reset** to click **Reboot** or **Reset**.

Maintenance >

Config Backup

Config File

Export Historical Data

Historical data clearing

Restore Factory Defaults

Note: Reset operation will not clean the stored data, please click **Data Cleaning** to clear data if necessary.

Export Historical Data

Export

Export Record

Data Cleaning

Maintenance >

Upgrade

Backup and Reset

Config Backup

Export

Config File

Browse

Import

Export Historical Data

Export

Historical data clearing

Clear

6. Communication Protocol

WT201 uses the standard Milesight IoT payload format based on IPSO. Please refer to the **WT201 Communication Protocol**; for decoders of Milesight IoT products please click [here](#).

-END-