HVAC Controller

UC711

User Guide

Contents

Chapter 1. Preface

Copyright Statement

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Safety Instruction

These instructions are intended to ensure that users can use the product correctly to avoid danger or property loss. Milesight will not take responsibility for any loss or damage resulting from failure to follow the instructions in this operating guide.

Warning:

Serious injury or death may be caused if any of these warnings is neglected.

- The installation must be conducted by a qualified person and should strictly comply with the electrical regulations of the local region.
- Before installation or maintenance, make sure to keep the power off. Failure to follow these steps may result in personal injury and/or death from electric shock.
- Make sure all wires are connected, and unused cables must be insulated and secured.
- Please contact the after-sales service for equipment failure, do not try to repair it yourself.

CAUTION:

Injury or equipment damage may be caused if any of these cautions are neglected.

- The device is intended only for indoor use.
- The device must not be disassembled or remodeled in any way.
- Do not place the device close to objects with naked flames.
- Do not place the device where the temperature is below/above the operating range.

- The device must never be subjected to shocks or impacts.
- To protect the security of the device, please change the device password when first configuring.

Revision History

Release Date	Version	Revision Content
July 31, 2026	V1.0	Initial version.

Chapter 2. Product Introduction

This chapter describes basic product information.

Overview

UC711 is a LoRaWAN® HVAC controller that supports heating and cooling systems, including heat pumps, furnaces, and PTAC devices, via BMS systems or paired Milesight WT401 thermostat. UC711 offers multiple temperature control modes and fan modes, 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.

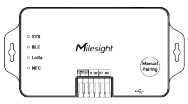
Compliant with Milesight LoRaWAN® gateway and Milesight Development Platform solution, users can control the room temperature via webpage remotely

The device has the following features:

- Support 24VAC HVAC systems including PTAC, AC & furnaces, and heat pumps
- Work with Milesight WT401 wireless thermostat via Bluetooth (wireless)
- Equipped with RTC to keep time correct for 72 hours even without power supply
- Built-in NFC and Bluetooth for easy configuration
- Function well with standard LoRaWAN® gateways and network servers
- Compatible with BACnet system via Milesight LoRaWAN® gateways
- Compatible with Milesight Development Platform
- Supports multicast for control in bulk
- Support Firmware Update Over the Air (FUOTA) feature

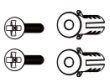
Packing List

This section describes the packing list. After unboxing, please check that the following items are included in the package. If any of the below items are missing or damaged, please contact your sales representative.



1 × HVAC Controller

1 × Wire Harness



2 × Wall Mounting Screw Sets

1 × 3M Tape

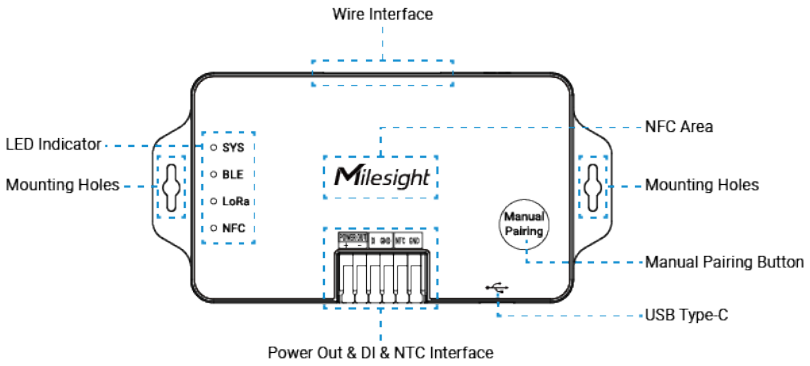
1 × Warranty Card

1 × Quick Guide Card

Hardware Introduction

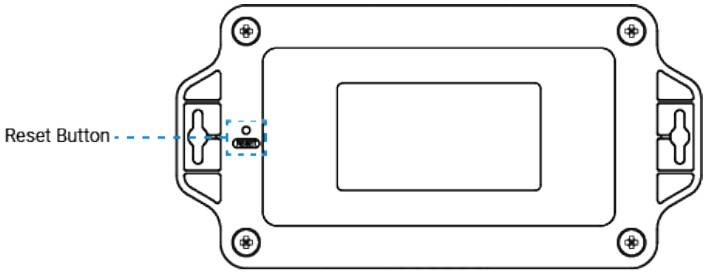
Hardware Overview

Front View



Part	Description
LED Indicator	Refer to LED descriptions.
Wire Interface	Connect to the HVAC system.
NFC Area	Enables wireless configuration via Milesight ToolBox App.
Manual Pai ring Button	Refer to Button Descriptions.
Power Out & DI & NTC Interface (Un der Development)	There are three interfaces for external device connection: **Power Out**: Supply power to WT401 thermostat. **DI**: Connect to magnet switches, keycard switches, etc. **NTC**: Connect to an external NTC sensor.
USB Type-C	Used for power supply during configuration or device console.
Mounting Holes	Used to secure the device.

Back View



Part	Description
Reset Button	Reboot or reset the device. Refer to Button Descriptions.

LED Descriptions

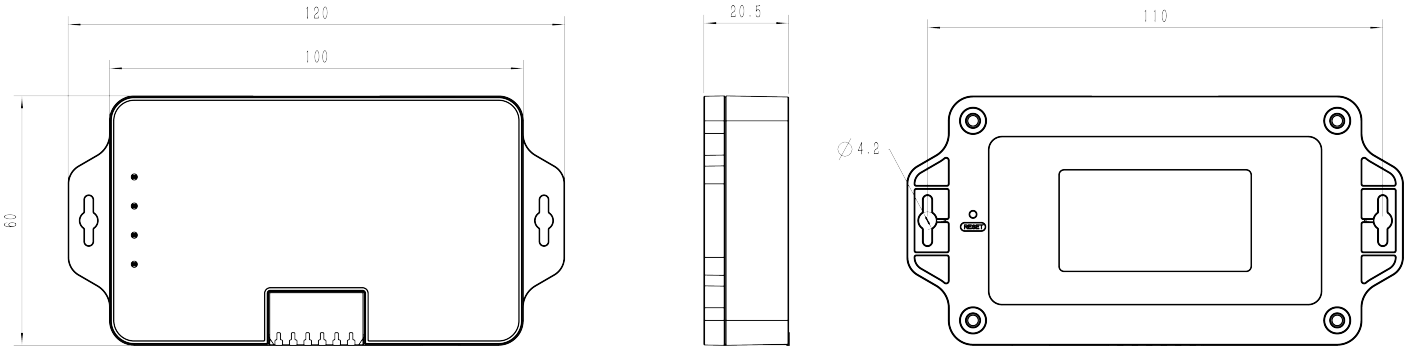
LED	Status	Description
SYS	Off	The power is switched off.
	Static On	The power is switched on.
BLE	Off	The communication mode does not include BLE.
	Slowly Blinks	The Bluetooth is not paired or pairing failed.
	Quickly Blinks	The Bluetooth pairing is successful and communication failed.
	Static On	The Bluetooth pairing is successful and communication success.
LoRa	Slowly Blinks	The network is not activated.
	Quickly Blinks Twice	The network changes to activated.
	Static On	The network is activated.

Button Descriptions

Function	Operation	LED Status
Cancel BLE Pairing	Press and hold Manual Pairing button for more than 3s.	BLE: Static On → Slowly Blinks
Reboot	Press and hold the reset button for more than 3s.	BLE, LoRa, NFC: Slowly Blinks
Reset to Factory Default	Press and hold the reset button for more than 10s.	BLE, LoRa, NFC: Quickly Blinks

Dimensions

The following figures show the device dimensions (unit: mm).



Chapter 3. Compatibility

This chapter introduces the device compatibility and describes the steps to check the compatible systems.

Compatible HVAC Systems

The controller is compatible with the following systems:

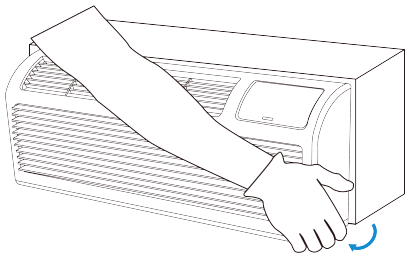
- **PTAC** (Up to 1-cool/2-heat)
- **Heat Pump System** (Up to 1-cool/1-heat)
- **Heat Pump System with AUX Heat**
- **Conventional HVAC System** (Furnace + Air Conditioner, up to 1-cool/1-heat)

How to Check HVAC System Compatibility

1. Power off the HVAC system by using the master switch or circuit breaker.
2. To confirm power is off, adjust the temperature on the current thermostat and wait for a few minutes. If the system does not respond accordingly, the power is shut off successfully.

   > ⚠ **Warning:**
   > Failure to follow these steps may result in personal injury and/or death from electric shock.

3. Remove the cover of the HVAC system.



4. **Check whether HVAC system can supply the controller with 24 VAC and that the current supplied to the controller does not exceed 1A.** If the system is labeled with L1 and L2, or with **high-voltage indicators** such as 110V, 120V, or 240V, the controller is not compatible with the system. Otherwise, continue to the next step.
5. Identify the wires in use by checking the labels on the previous thermostat or the HVAC control terminals.
6. Compare the existing wire labels with the following table, wiring diagrams or use Compatibility Checker to determine the system compatibility.

HVAC Wire Label (s)	Description
C	Common wire of 24 VAC power. If there is no C wire, check if this wire is labelled as other names (like B).
R/RH/RC	Power wire. If there is only one R/RC/RH wire, it may provide both heating and cooling system power. If both RH and RC are present, contact a local professional installer or Milesight to confirm compatibility.
Y/Y1	In conventional systems, Y/Y1 controls the 1-stage cooling. In heat-pump systems, Y1/Y1 controls the 1-stage compressor for cooling/heating.
W/W1	In conventional systems, W/W1 controls the 1-stage heating. In heat-pump systems with auxiliary heat, W/W1 controls the 1-stage auxiliary heat.
G/G1	Controls the fan. For a single G wire, connect this wire to GL of the controller.
GL/G1	Low-speed fan control.
GM/G2	Medium-speed fan control.
GH/G3	High-speed fan control.
O/B	In heat pumps, O/B controls the reversing valve to switch between heating and cooling. If there is only one O wire or B wire, connect this wire to O/B of the controller.

7. If a wire label is not listed above, or if compatibility is difficult to determine, take a clear photo of the terminals and send it to local professional installer or Milesight.

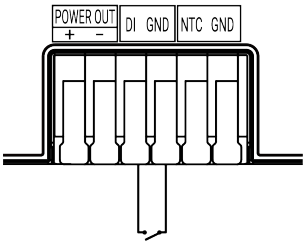
NTC/DI Input Compatibility (Under Development)

The controller is equipped with NTC and DI interfaces for connecting external sensors. Before installation, check the requirements below to determine whether the external sensor can be connected to the controller.

Interface	External Device Type	Requirement
Digital Input	Key card, magnetic switch, or other physical switch	The device must provide a pass ive, voltage-free dry contact.

Interface	External Device Type	Requirement
NTC	NTC temperature sensor	It is recommended to use the NTC sensor provided by Milesight to ensure compatibility and reliable performance.

CAUTION:
The DI input is a dry contact input. Do not connect powered (active) signals to the dry contact input. Doing so may damage the device.



Chapter 4. Wiring and Installation

This chapter describes the controller terminals, HVAC wiring diagrams and the device installation steps.

Before Installation

CAUTION:
The controller is designed for 24VAC systems only. Do not install it on high-voltage, high-current, or millivolt systems!

Prerequisites

- Confirm that the controller is compatible with the target HVAC system.
- If an NTC sensor or DI device will be connected, complete the compatibility check before installation.
- If the controller and the WT401 thermostat communicate through Bluetooth, keep the two devices within 10 meters of each other.
- Make sure the controller is located within the LoRaWAN® gateway's communication range. Do not install it inside a fully enclosed metal object cabinet or behind large metal obstructions.
- Check the default accessories in the box.

Wire Terminal Descriptions

The terminal names below are the actual controller terminals. The listed colors apply only to the supplied wire harness. Identify existing HVAC wires by terminal label, not by wire color.

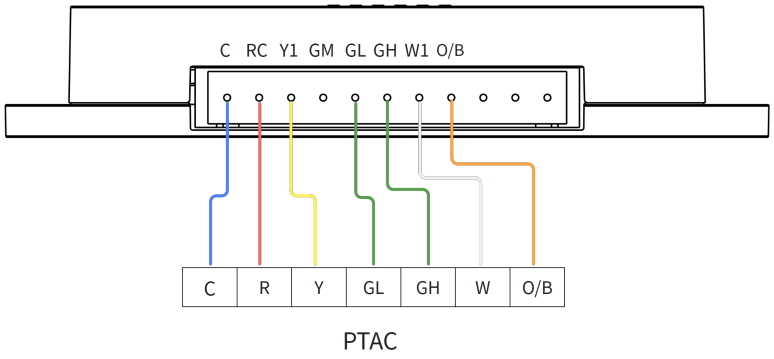
Terminal	Harness Wire Color	Description
C	Blue	Common wire of 24 VAC power. If no C wire, check if this wire is labelled as other names (like B).
RC	Red	Heating or cooling power wire.
Y1	Yellow	In conventional systems, Y/Y1 controls the 1-stage cooling. In heat-pump systems, Y1/Y1 controls the 1-stage compressor for cooling/heating.
GM	Green	Medium-speed fan. In multiple-fan system, connect G2 or GM to this wire.
GL	Green	Low-speed fan. In multiple-fan system, connect G1 or GL to this wire. If there is only G wire, connect to this wire as well.

Terminal	Harness Wire Color	Description
GH	Green	High-speed fan. In multiple-fan system, connect G3 or GH to this wire.
W1	White	In conventional systems, W/W1 controls the 1-stage heating. In heat-pump systems with auxiliary heat, W/W1 controls the 1-stage auxiliary heat.
O/B	Orange	In heat pumps, O/B controls the reversing valve to switch between heating and cooling. If there is only one O wire or B wire, connect this wire to O/B of the controller.

Wiring Diagrams

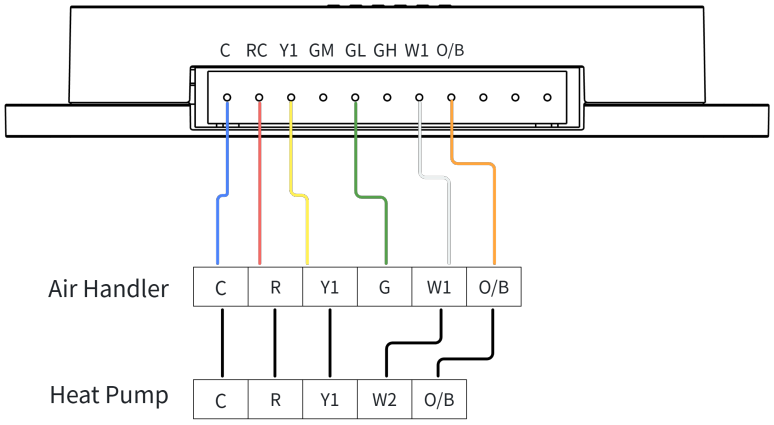
Select the wiring diagram that matches the target HVAC system.

Wiring for PTAC

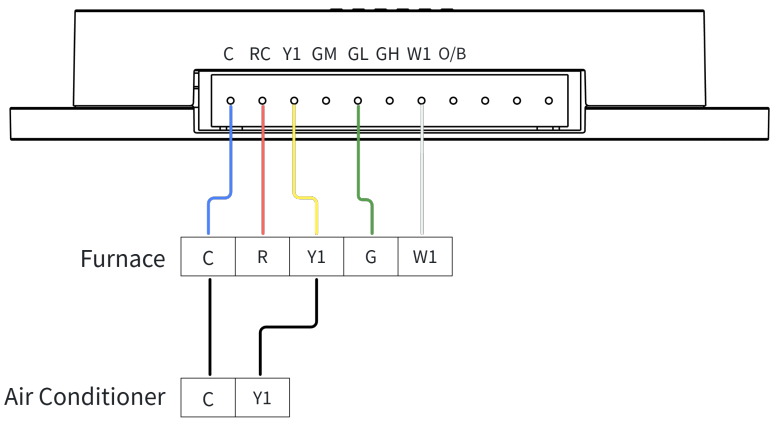


PTAC

Wiring for Heat Pumps



Wiring for Conventional Systems



Installation Procedure

- Step 1. Connect the Controller to the HVAC System
- Step 2. Connect Controller to External Sensors (Optional)
- Step 3. Install the Controller
- Step 4. Test the Controller

Step 1. Connect the Controller to the HVAC System

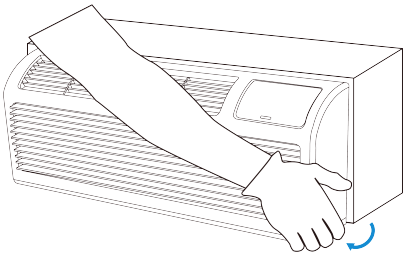
Prerequisites: Wire Harness, Screwdriver, Electrical Tapes

Steps:

1. Power off the HVAC system by using the master switch or circuit breaker.
2. To confirm power is off, adjust the temperature on the current thermostat and wait for a few minutes. If the system does not respond accordingly, the power is shut off successfully.

> **Warning:**
> Failure to follow these steps may result in personal injury and/or death from electric shock.

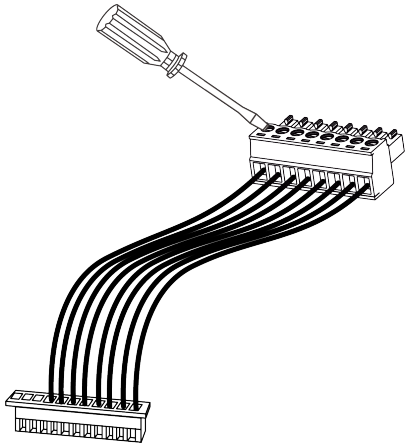
3. Remove the cover of the HVAC system.



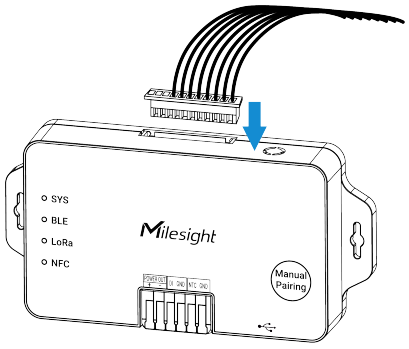
4. Locate the HVAC control terminal block. If it is connected to a thermostat or controller, disconnect the wires from the old device.

> **CAUTION:**
> If the system is labeled with L1 and L2, or with high-voltage indicators like 110V, 120V, or 240V, it means the controller is not compatible with this system. DO NOT CONTINUE INSTALLTION.

5. Strip a suitable length of insulation from the wire harness, then fasten it to the HVAC control terminal block according to the applicable wiring diagram.



6. Secure and insulate any excess wire with electrical tape.
7. Install the wire harness to the controller.



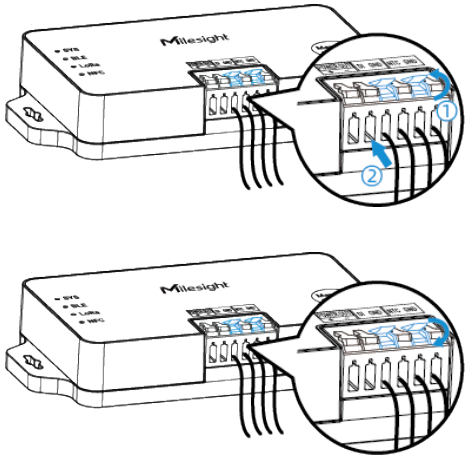
Step 2. Connect Controller to External Sensors (Optional)

Prerequisites:

- Confirm that the external sensor or dry-contact device is compatible with the controller.
- Ensure the wire diameter of the sensors complies with AWG 24-16.
- Strip 8-9 mm of insulation from the ends of the sensor's wires.

Steps:

1. Lift the small levers of the corresponding interface.
2. Push the stripped wires fully into the terminal openings.
3. Close the levers to activate the internal spring clamps.
4. Gently pull the wires to ensure they are securely fixed to the controller.



Step 3. Install the Controller

The controller supports multiple mounting options. Select the appropriate method for the installation location.

3M Tape Mounting

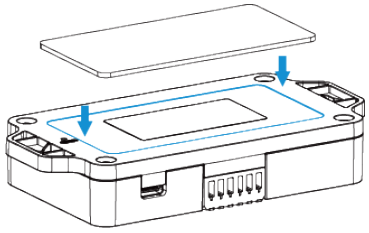
Requirements: To ensure the devices are securely installed and prevent falling due to adhesive failure, please strictly adhere to the following requirements.

- The mounting surface must be dry, smooth, solid, and free of oil, dust, and debris.
- Do not mount on rough, damp, dusty, greasy surfaces, nor those covered with soft materials such as wallpaper or fabric.
- Clean the surface with alcohol before installation; avoid touching the adhesive side.
- Recommended application temperature: 20-40°C. In low temperatures, pre-warm the tape to approximately 30°C.
- Allow 24 hours of curing time before use.
- If the surface is unsuitable or long-term use in low temperatures is required, use screw mounting instead.

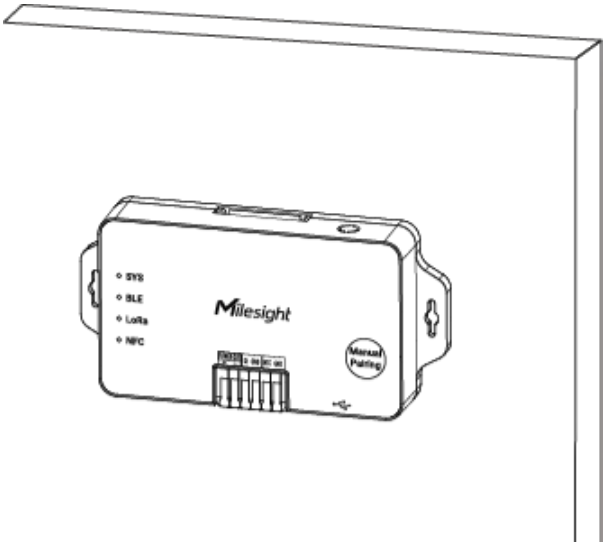
Prerequisites: 3M Tape

Steps:

1. Apply 3M tape to the back of the device, avoiding touching the adhesive side with your fingers.



2. Remove the liner and position the device to the target surface.
3. Press firmly for at least 30 seconds to ensure full adhesion.



Wall Screw Mounting

Requirements:

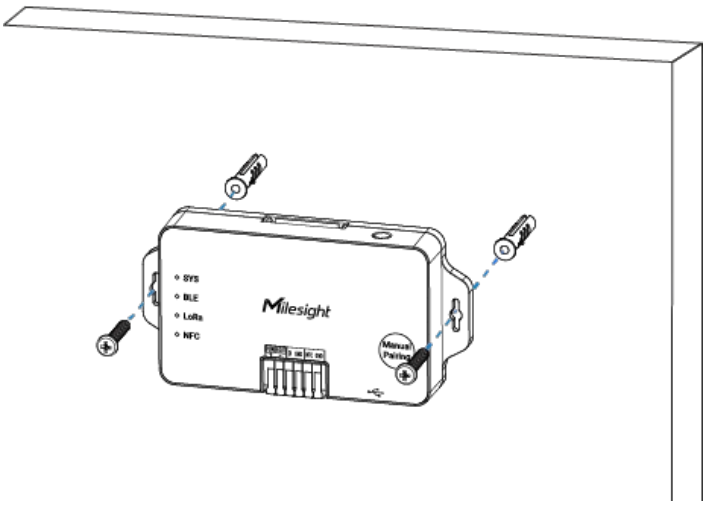
- The wall structure shall be sufficiently solid and stable to ensure firm screw fixation and overall mounting stability.
- Screw mounting positions must avoid internal wall electrical wiring, water pipes and other concealed utilities to prevent structural damage and potential safety hazards.

Prerequisites: Wall Screw Mount Sets, Screwdriver, Pencil, Electric Drill (15/64" or 1/4" drill bits)

Steps:

1. Drill two holes in the wall aligned with the wall-mount holes of the controller.
2. Insert the wall plugs into the drilled holes.

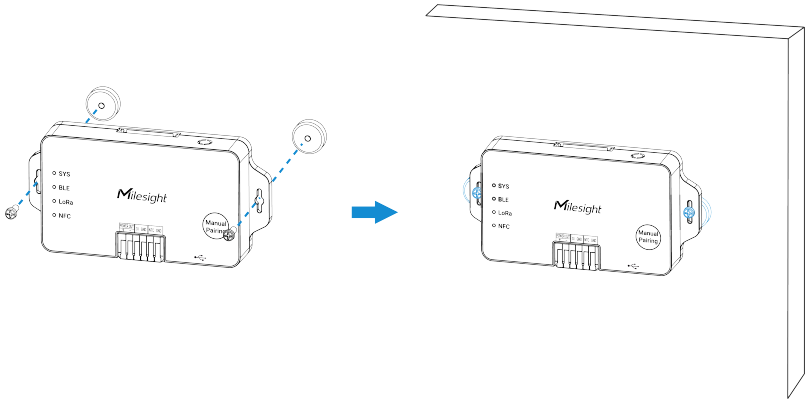
3. Fasten the device to the wall plugs with the supplied wall mounting screws.



Magnetic Mounting (Optional)

The device can be mounted to a magnetic surface after screwing the magnetic nuts.

Contact Milesight for more details about this accessory.



Step 4. Test the Controller

1. Test the controller with the following steps.
    a. Power on the HVAC system.
    b. Switch HVAC system control permission to external control. Refer to the corresponding HVAC system guide for the required steps.
    c. Check whether the SYS indicator is steadily on to confirm that the controller is powered on.
    d. Check whether the LoRa indicator is steadily on to confirm if the controller has joined the network.
    e. Connect to a WT401 thermostat and check if WT401 can control the controller.
2. Restore the HVAC system cover.

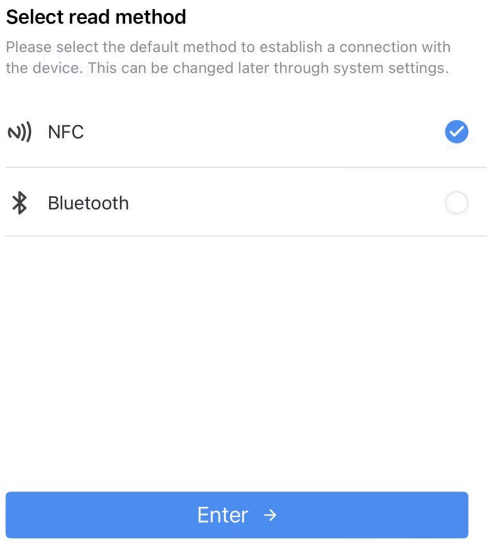
Chapter 5. Operation Guide

Access the Device

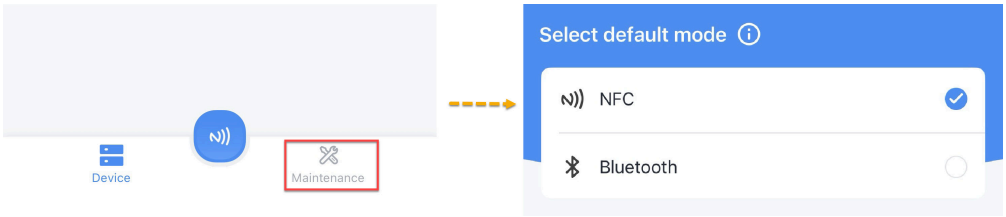
This section describes how to access the device using NFC or Bluetooth. Please select one to configure the device. NFC and Bluetooth are enabled by default on this device.

Access the Device Using NFC

1. Download Milesight ToolBox app from Google Play or Apple Store.
2. Enable the NFC function on the smart phone.
3. Launch ToolBox.
    a. Upon initial launch, the following page will appear. Select **NFC** and click **Enter**.

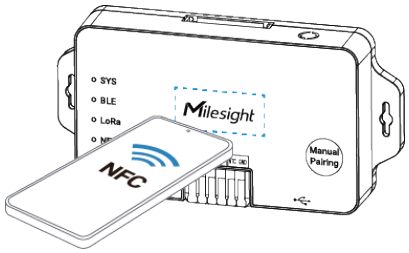


    b. Upon subsequent launches, Click **Maintenance** on the home page, and then select **NFC**.



4. (Optional) To locate the NFC detection areas of the phone and the device, click **Can't find the NFC location**.
5. Put the NFC detection area of the phone close to the NFC antenna of the device.

Tip:
It is recommended to remove the phone case.

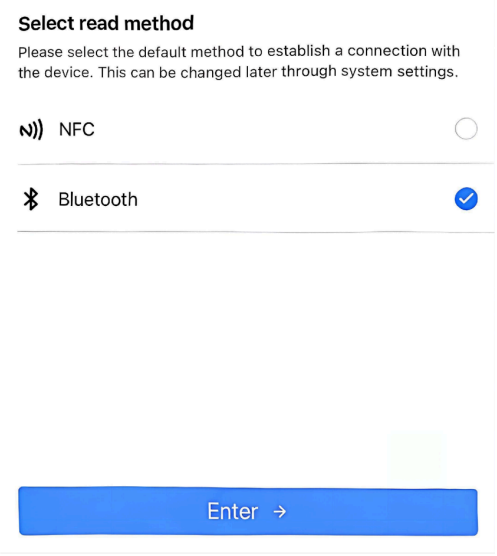


6. Tap in ToolBox. If the device is recognized successfully, the ToolBox homepage is displayed.

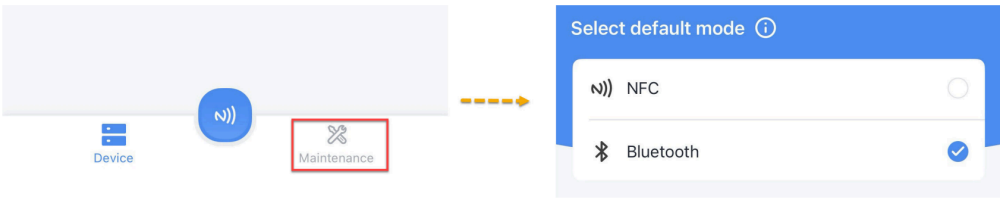
Troubleshooting:
If the NFC read fails, move the smartphone away from the device, reposition it near the device's NFC antenna, and try again.

Access the Device Using Bluetooth

1. Download Milesight ToolBox app from Google Play or Apple Store.
2. Enable the Bluetooth and location functions on the smart phone.
3. Launch ToolBox.
    a. Upon initial launch, the following page will appear. Select **Bluetooth** and click **Enter**.

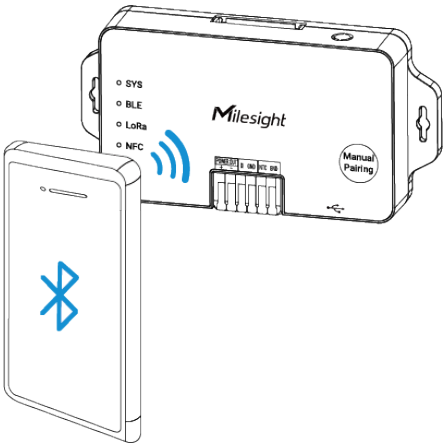


b. Upon subsequent launches, Click **Maintenance** on the home page, and then select **Bluetooth**.

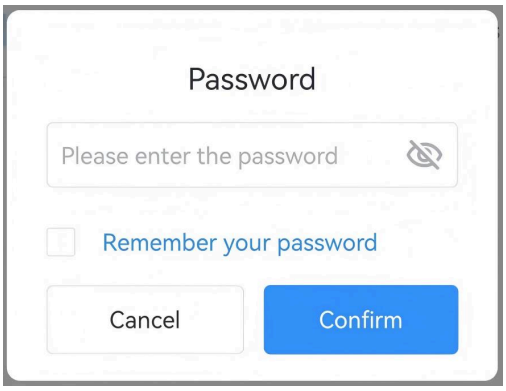


4. Click  to scan for nearby devices, and then select the target device. The default Bluetooth name is `uc711-xxxxxxx`, where `xxxxxxx` represents digits 5 through 11 of the device serial number.

> **Note:**
> One device can only connect to one smartphone via Bluetooth. If you select a device already connected to another phone, it will disconnect the current connection and connect to your phone.



5. Enter the device password, then click **Confirm**. The default password is 123456.



6. After the connection is established, the ToolBox homepage is displayed.

> **Tip:**
> The Bluetooth connection is terminated if no data is exchanged for three minutes.

ToolBox Homepage

The same ToolBox homepage is displayed after a successful NFC read or Bluetooth connection. The following table describes the common homepage options.

Item	Description
Basic Information	Shows basic device information and synchronizes the device time.
Setting	Configures device and network parameters.
Send to Gateway	Add the device to Milesight gateway. For details, refer to Milesight Toolbox App User Guide.
	Imports, adds, exports, or deletes configuration templates.
	Selects the app language, displays NFC positions, and shows the ToolBox version and other app information.

Configure the Devices in ToolBox

After accessing the device through NFC or Bluetooth, use the following common procedure to view and configure the device parameters.

> **Note:**
> Unless otherwise specified, the configuration procedures in the following sections assume that the device has already been accessed through ToolBox.

1. On the ToolBox home page, tap **Setting**.
2. Follow the ToolBox path shown in the relevant feature section.
3. Configure the required parameters.
4. Tap **Write** in the lower-right corner to apply the configuration. Complete the write operation according to the access method.

Access Method	Write Operation
NFC	After tapping **Write**, place the NFC detection area of the smartphone near the device's NFC antenna and keep it in position until the write operation is completed.
Bluetooth	After tapping **Write**, keep the Bluetooth connection active until the write operation is completed.

5. Confirm that the write-success page is displayed.

Write successfully!

6. Read the device again to check if the parameters are written well.

Important:
For security, change the default device password after accessing the device for the first time. see Change the Device Password.

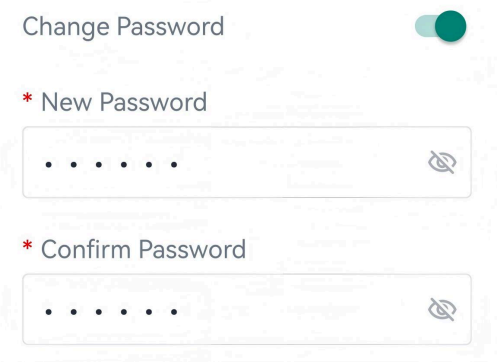
Change the Device Password

It is recommended to change the device password upon initial configuration for security purposes. This section describes how to change the device password.

Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Configure by ToolBox

1. Navigate to **Device > General**.
2. In the **General** page, enable **Change Password** and enter the new password.



Parameter	Description
New Password	Enter a new password of 6 characters. Only letters, digits, and underscores are allowed.
Confirm Password	Enter the password again.

3. Tap **Write** to apply the configuration.
4. Use the new password for subsequent authenticated access or configuration through ToolBox.

Configure Communication Parameters

This section describes how to configure the communication mode and change the Bluetooth name.

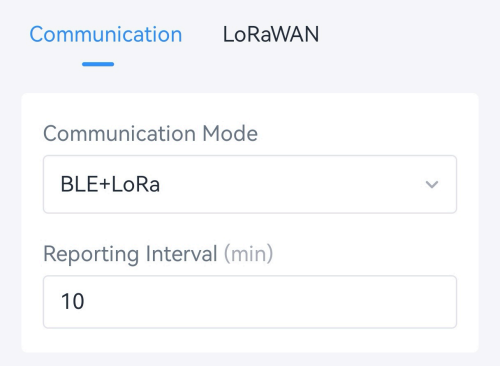
Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Configure Communication Mode

Select how the controller communicates with other devices.

Configure by ToolBox

1. Navigate to **Network > Communication**.
2. On the **Communication** page, select the communication mode and configure the related parameters.



Communication Mode	Description
BLE + LoRa	Communicates with a Milesight thermostat via Bluetooth while also communicating with LoRaWAN® gateways and network servers. **Reporting Interval**: The interval to report data to the LoRaWAN® gateway. Range: 1-1440 min, Default: 10 min.

3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Reporting Interval.
- LoRaWAN Hex Command: `6600`. See *UC711 Payload Protocol (HEX)*, Reporting Interval.

Change or Reset Bluetooth Name

Change by ToolBox

1. Navigate to **Network > Communication**.
2. In the **Bluetooth Name** field, enter the new name.
3. Tap **Write** to apply the configuration.

Reset by Downlink

- LoRaWAN Hex Command: `B400`. See *UC711 LoRaWAN Payload Protocol (HEX)*, Reset Bluetooth Name.

Configure LoRaWAN® Parameters

This section describes how to configure the device transmission parameters for the LoRaWAN® network. LoRaWAN® is enabled by default on this device.

Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Configure the required network settings first, and then configure the optional parameters as needed:

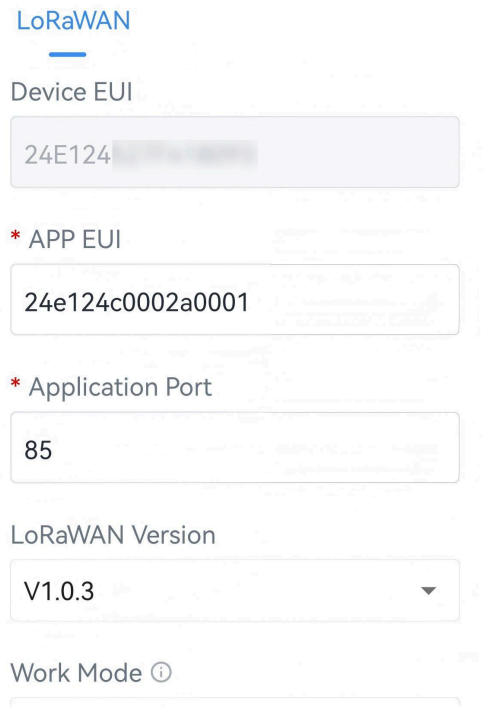
1. Configure Join Type and Supported Frequency (required)
2. Configure Other LoRaWAN® Parameters (optional)
3. Configure Multicast Group (optional)

Configure Join Type and Frequency

It is necessary to configure the join type and the frequency to establish communication with LoRaWAN® gateways.

Configure by ToolBox

1. Navigate to **Network > LoRaWAN**.



2. From the **Join Type** selection box, select **OTAA** or **ABP** as needed.

> **Note:**
> OTAA is required if you connect the device to the Milesight Development Platform.

3. Configure **Join Type** related parameters as needed. You can use default values unless otherwise specified.
   - If **OTAA** is selected, configure **Application Key** and **Rejoin Mode** as needed. For details, refer to the following table.

Parameter	Description
Application Key	Appkey for OTAA mode. Default: **Device EUI + Device EUI**. Example: 24e124123456789024e1241234567890. **Tip:** For device security, it is recommended to modify the default value or contact sales before purchase to use random keys.

Parameter	Description
Rejoin Mode	Rejoin mode for OTAA mode. Reporting interval≤35 minutes: The device sends a specific number of LinkCheckReq MAC packets at each reporting interval or every other reporting interval to verify connectivity. Reporting interval > 35 minutes: The device sends a specific number of LinkCheckReq MAC packets at each reporting interval to validate connectivity. If there is no response, the device will re-join the network. When **Rejoin Mode** is enabled, enter a number in the **Set the number of detection signals sent** text box. The actual sending number is the configured number +1.

- If **ABP** is selected, configure **Network Session Key**, **Application Session Key** and **Device Address** as needed. For details, refer to the following table.

> **Tip:**
> For device security, it is recommended to modify the default values.

Parameter	Description
Network Session Key	Nwkskey for ABP mode. Default: **5572404C696E6B4C6F52613230313823**.
Application Session Key	Appskey for ABP mode. Default: **5572404C696E6B4C6F52613230313823**.
Device Address	DevAddr for ABP mode. Default: 5^{th} to 12^{th} digits of SN.

4. Select a frequency from the **Support Frequency** selection box as needed. This must be the same as the frequency configured on the gateway's web GUI.

   - If the **Supported Frequency** is **US915** or **AU915**, enter the channel index(es) 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: All channels are disabled

> **Tip:**
> Set the **Channel Index** to **8-15** when connecting to a Milesight LoRaWAN® gateway with default settings.

- If the **Supported Frequency** is **AS923**, select a channel plan and enable the frequencies as needed.
- If the **Supported Frequency** is any option other than those listed above, enable the frequencies as needed.

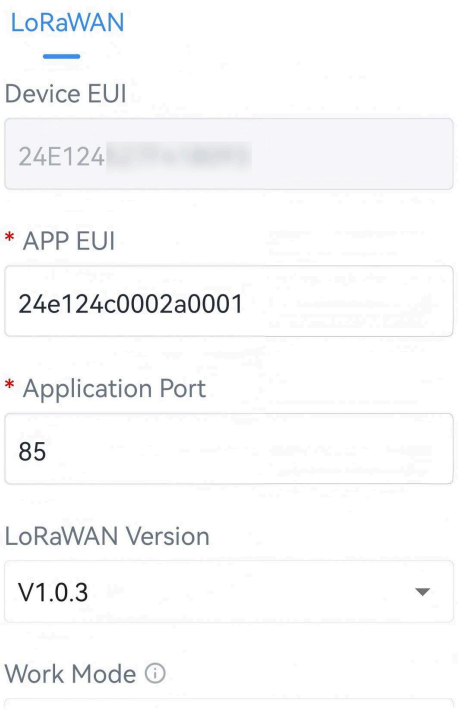
5. Tap **Write** to apply the configuration.

Configure Other LoRaWAN® Parameters

Configure the remaining LoRaWAN® parameters as required.

Configure by ToolBox

1. Navigate to **Network > LoRaWAN**.



2. Configure the following parameter as needed. You can use default values unless otherwise specified. For a description of the parameters, refer to the following table.

Parameter	Description
Device EUI	Unique ID of the device labelled on the device housing. **Tip:** For bulk deployments, contact sales to request the device EUI list.
App EUI	The default App EUI (join EUI) is 24E124C0002A0001.
Application Port	Port used for sending and receiving data. Default: **85**.
LoRaWAN® Version	Options: **V1.0.2**, **V1.0.3**.
Work Mode	Fixed as Class C mode.
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend data once.
Join Type	Refer to Configure Join Type and Supported Frequency.
Supported Frequency	Refer to Configure Join Type and Supported Frequency.
ADR Mode	Enables the network server to adjust the spreading factor, the bandwidth and the transmission power to optimize data rates, airtime and energy consumption in the network.
Spreading Factor	If ADR mode is disabled, the device sends uplink data using this spreading factor. A higher spreading factor increases transmission range but reduces data rate and increases power consumption. This parameter varies with **Supported Frequency**.
Tx Power	Defined by the LoRa Alliance. Specifies the strength of the radio signal transmitted by the device.
RX2 Data Rate	RX2 data rate to receive downlinks.
RX2 Frequency	RX2 frequency to receive downlinks. Unit: Hz

Parameter	Description
Multicast Group	Enable or disable multicast groups. For more details, see Configure Multicast Group.

3. Tap **Write** to apply the configuration.

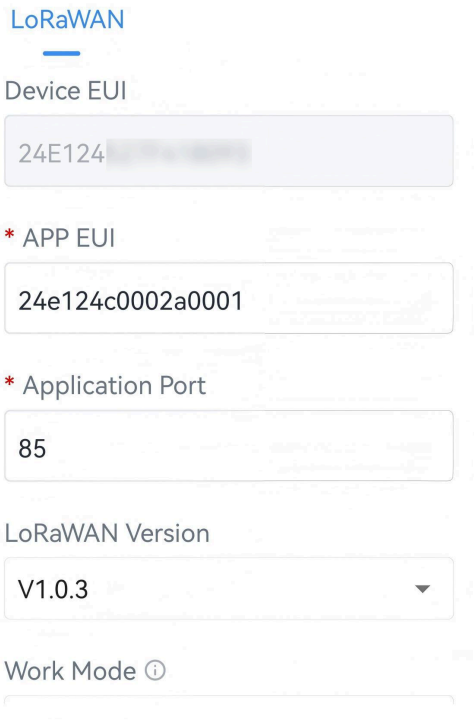
Configure Multicast Group

The device supports setting up multiple multicast groups to receive multicast commands from the network server, allowing users to control devices in bulk.

Step 1. Enable Multicast Group on the Device

Configure by ToolBox

1. Navigate to **Network > LoRaWAN**.



2. On the **LoRaWAN** page, ensure the **Application Port** of each device is the same.
3. Enable a **Multicast Group**, and configure the following parameter as needed. You can use default values unless otherwise specified. For a description of the parameters, refer to the following table.

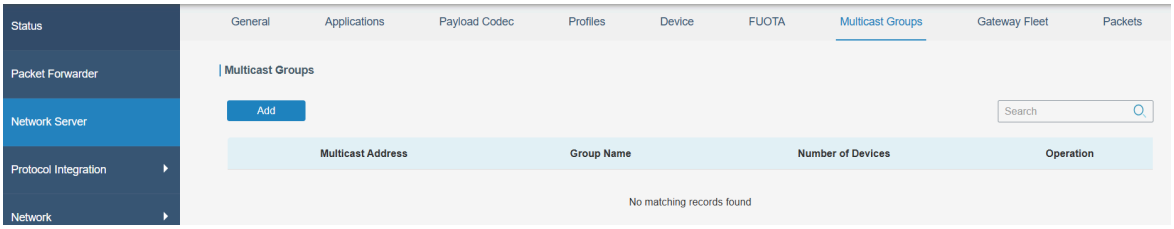
Parameter	Description
Multicast Address	Unique 8-digit address to distinguish multicast groups.
McNetSKey	32-digit key. Default values: - Multicast Group 1: 5572404C696E6B4C6F52613230313823 - Multicast Group 2: 5572404C696E6B4C6F52613230313824 - Multicast Group 3: 5572404C696E6B4C6F52613230313825 - Multicast Group 4: 5572404C696E6B4C6F52613230313826
McAppSKey	32-digit key. Default values: - Multicast Group 1: 5572404C696E6B4C6F52613230313823 - Multicast Group 2: 5572404C696E6B4C6F52613230313824 - Multicast Group 3: 5572404C696E6B4C6F52613230313825 - Multicast Group 4: 5572404C696E6B4C6F52613230313826

4. (Optional) To enable another multicast group, follow the above step to configure the corresponding group.
5. Tap **Write** to apply the configuration.

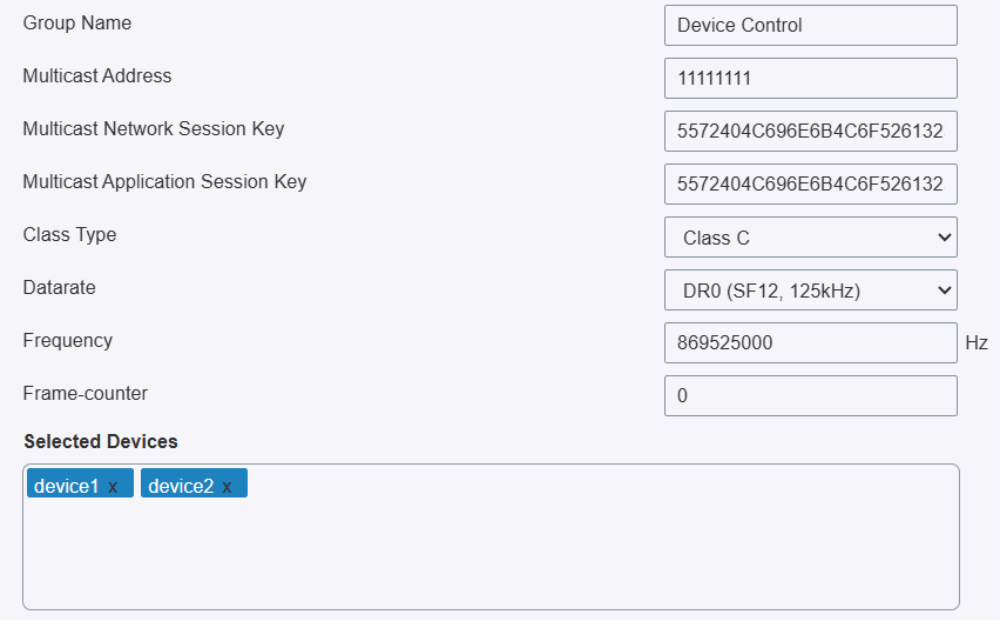
Step 2. Add a Multicast Group on the Network Server

The following steps use a Milesight gateway as an example. For other network servers, please refer to corresponding guides.

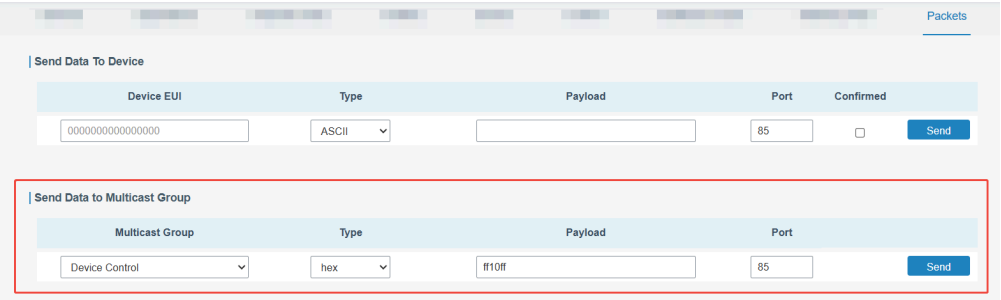
1. Ensure the target devices are added to this gateway and have joined to the network.
2. On the gateway web GUI, navigate to **Network Server**> **Multicast Groups** page.



3. Click **Add** to add a multicast group.
4. Configure the multicast group parameters to match those configured on ToolBox and select the devices that you need to control.



5. Click **Save** to save this multicast group.
6. Click **Packets** tab in the upper right corner.
7. In the **Send Data to Multicast Group** section, select the multicast group from the **Multicast Groups** drop-down list and configure the downlink command parameters.
8. Click **Send**. The network server broadcasts the command to all devices in this multicast group.



Temperature Control Settings

This chapter describes the critical features about temperature control.

Configure Installation Parameters

This section describes the settings related to the wirings.

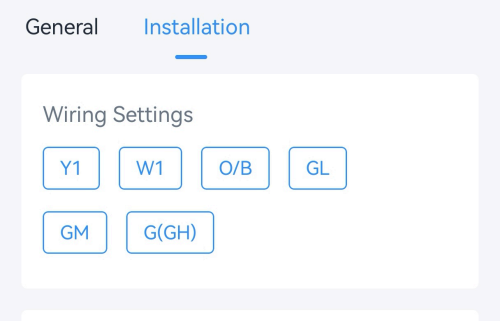
Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Wiring Settings

The wiring settings are used to control the software state of the relays and define the supported functions.

Configure by ToolBox

1. Navigate to **Device > Installation**.
2. Enable the wire terminals that match the wirings during the installation.



3. Select the options according to the HVAC system.

Parameter	Wire	Description
Reversing Valve	O/B	Switch the O/B mode of a heat pump or PTAC. **Energize on Cool:** O/B relay closed=cool (default) **Energize on Heat:** O/B relay closed=heat
Fan Control during Heating	W1+O/B+ GH/GM/GL	Select **Thermostat** or **HVAC System**. If **HVAC System** is selected, the fan will stop running when fan mode is **Auto** or **Circulate**.

4. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object list*, Installation Parameters.
- LoRaWAN Hex Command: `8E00`, `8E01`, `8E03`. See *UC711 Payload Protocol (HEX)*, Configure Installation Parameters.

Result

By default, the thermostat will use the following control stages according to the enabled wires:

Control Stage	Used Relay in Conventional System	Used Relay in Heat Pumps/PTAC
Stage-1 Cool	Y1	Y1
Stage-1 Heat	W1	Y1 (+O/B)
Stage-2 Heat	/	W1

Compressor and Auxiliary Heat Linkage

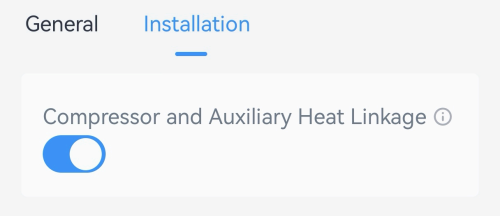
This feature is only for PTAC or heat pump systems. After enabled, when the highest heating stage of compressor (Y1) is not able to reach the target temperature, the device will use W1 as auxiliary heat. Example:

Heating Stage	1-stage	2-stage
Disable linkage	Y1+O/B	W1
Enable linkage	Y1+O/B	Y1+O/B + W1

Prerequisites: **Y1 + W1 + O/B** are selected in Wiring settings.

Configure by ToolBox

1. Navigate to **Device > Installation**.
2. Enable **Compressor and Auxiliary Heat Linkage**.



3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- LoRaWAN Hex Command: `8E02`. See *UC711 Payload Protocol (HEX)*, Compressor and Auxiliary Heat Linkage.

System Protection

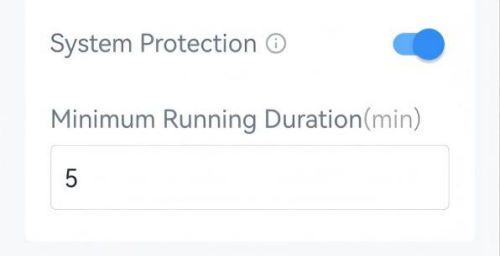
The device supports enabling system protection to avoid frequent switches. After enabled, the relay can only be switched after a specific time.

> **Note:**
> This does not take effect when switching among GH, GM, and GL.

Prerequisites: Either **Y1/W1/ GL/GM/GH** is selected in Wiring Settings.

Configure by ToolBox

1. Navigate to **Device > Installation**.
2. Enable **System Protection** and configure the minimum running duration.



3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- LoRaWAN Hex Command: `7400`, `7401`. See *UC711 Payload Protocol (HEX)*, System Protection.

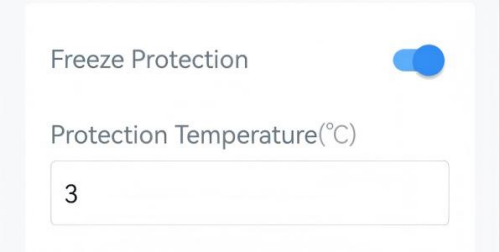
Freeze Protection

The device supports switching to Heat system to avoid freezing when detecting that the ambient temperature is too low. This feature takes effect even when the system is off.

Prerequisites: Heat mode is supported. If Heat mode is not supported, the device will only send freeze protection trigger packet.

Configure by ToolBox

1. Navigate to **Device > Installation**.
2. Enable **Freeze Protection** and configure the protection temperature.



3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object list*, Installation Parameters.
- LoRaWAN Hex Command: `7100`, `7101`. See *UC711 Payload Protocol (HEX)*, Freeze Protection.

Result

- When the device detects that the ambient temperature is lower than protection temperature, it sends a freeze protection trigger packet and starts heating.
- When the device detects that the ambient temperature is higher than freeze protection temperature, it sends a freeze protection release packet and switch to the previous status.

Configure Temperature Control and Fan Parameters

This section describes the settings related to the temperature and fan control.

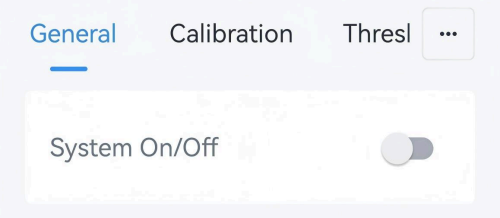
Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Configure System On/Off

System On/Off allows users to remotely enable or disable the HVAC system.

Configure by ToolBox

1. Navigate to **Device > General**.
2. Set **System On/Off** as required.



3. Tap **Write** to apply the configuration.

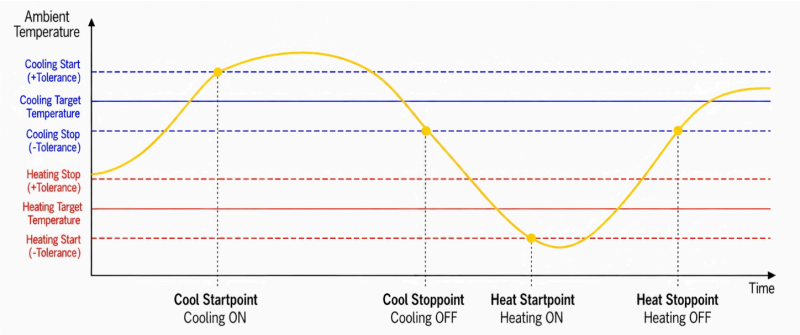
Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, System Status.
- LoRaWAN Hex Command: `6F`. See *UC711 Payload Protocol (HEX)*, System On/Off.

Configure Temperature Control Basic Parameters

The controller supports the basic temperature control.

When the ambient temperature is outside the setpoint (target temperature) for a specific range, the controller will start heating or cooling until the ambient temperature returns to the setpoint. After reaching the setpoint, the system will continue working to a higher/lower temperature to prevent frequent control.



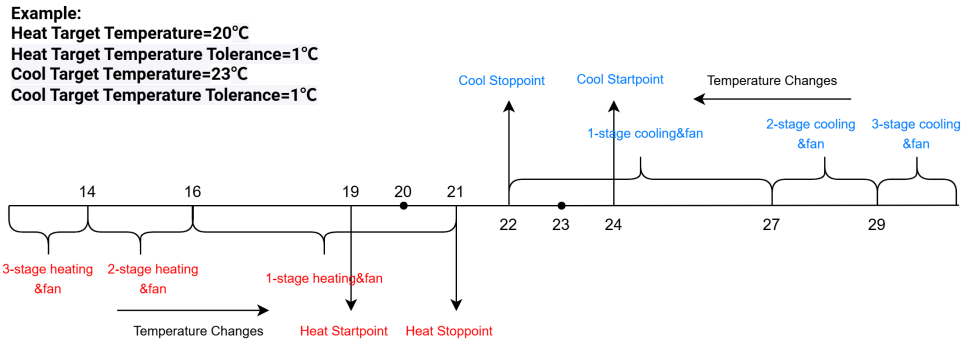
Prerequisites: Wiring settings are configured.

Configure by ToolBox

1. Navigate to **Device > General**.
2. Select the **Temperature Control Mode** and configure the related parameters.

> **Note:**
> The values must follow the rule: Heat Target - Heat Tolerance < Cool Target - Cool Tolerance, Heat Target + Heat Tolerance < Cool Target + Cool Tolerance.

Parameter	Description
Temperature Control Mode	Select from: Cool, Heat, Auto. **Heat**: Raises the temperature when it is below the heating target. **Cool**: Lowers the temperature when it is above the cooling target. **Auto**: Automatically switches between heating and cooling according to the ambient temperature.
Target Temperature Resolution	Select the adjustment step of target temperature. **0.5:** Increase or decrease target temperature by 0.5 each time. **1:** Increase or decrease target temperature by 1 each time.
Heating Target Temperature	Set the target temperature for heating. Range: 5~35 °C/41~95 °F.
Cooling Target Temperature	Set the target temperature for cooling. Range: 5~35 °C/41~95 °F.
Heating Target Temperature Tolerance	Defines the temperature difference allowed before heating starts or stops to prevents frequent HVAC cycling. Range: 0.1-5°C.
Cooling Target Temperature Tolerance	Defines the temperature difference allowed before cooling starts or stops to prevents frequent HVAC cycling. Range: 0.1-5°C.
Heating Target Temperature Regulation Range	Set the adjustable range of heating target temperature. Range: 5~35 °C/41~95 °F.
Cooling Target Temperature Regulation Range	Set the adjustable range of cooling target temperature. Range: 5~35 °C/41~95 °F.



3. Tap **Write** to apply the configuration.

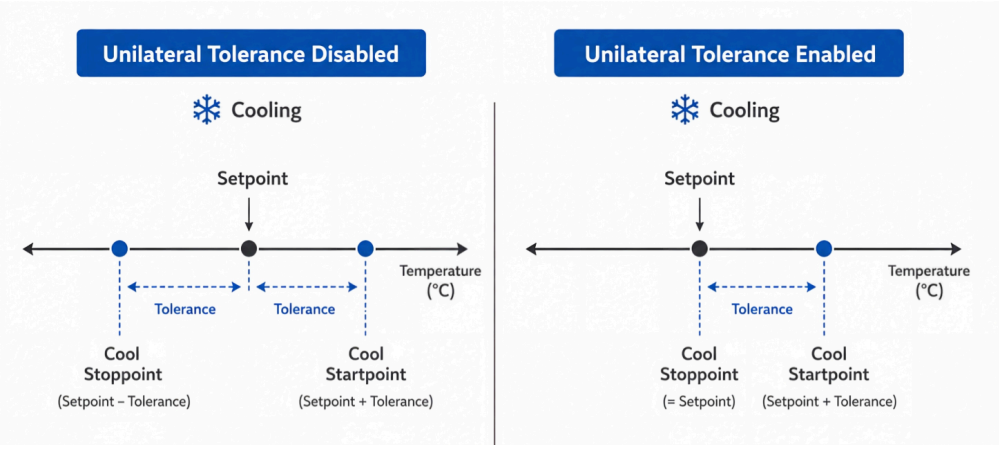
Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Temperature and Fan Control.
- LoRaWAN Hex Command: `59`, `6000`, `65`, `61`, `62`, `63`, `7202`, `7203`. See *UC711 Payload Protocol (HEX)*, Configure Temperature Control Basic Parameters.

Unilateral Tolerance

> **Important:**
> This feature is configured by downlink and is not available in ToolBox.

The controller supports enabling **Unilateral Tolerance** to apply the tolerance only to the heating or cooling start point while keeping the stop point at the target temperature. This allows more precise control behavior for specific HVAC applications. It's disabled by default.



Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Control Unilateral Tolerance.
- LoRaWAN Hex Command: `77`. See *UC711 Payload Protocol (HEX)*, Configure Unilateral Tolerance.

Configure Fan Parameters

The controller supports controlling the fan.

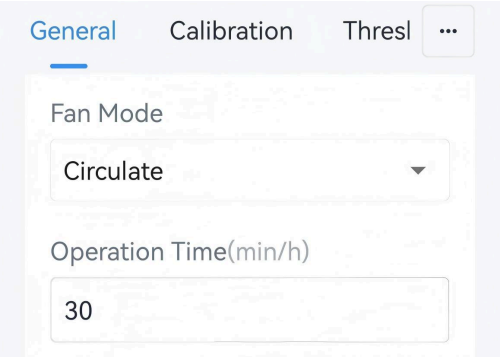
Prerequisites: Any G wire is selected in Wiring settings.

Configure by ToolBox

1. Navigate to **Device > General**.
2. Select the **Fan Mode** to decide how the controller operate the fan in the system.

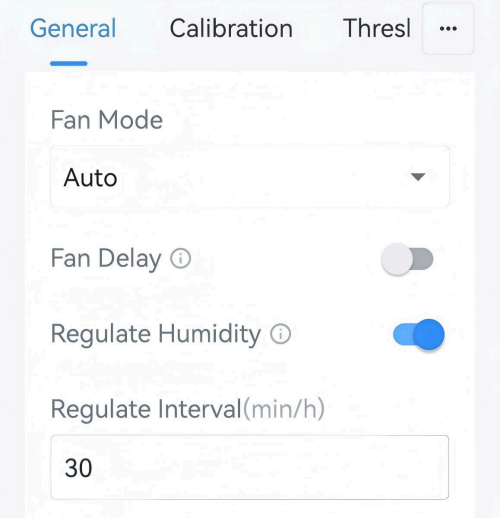
Fan Mode	Description
Auto	The fan runs when heating or cooling is active and stops when temperature control stops.
On	The fan runs continuously. This can be selected when only one G wire is selected.
Circulate	The fan runs for the configured duration during each hour when heating or cooling is inactive.
Low/Medium/High Speed	The fan runs in different speeds. These options can be selected when more than one G wire is selected.

If the Fan Mode is Circulate, configure the fan **Operation Time** per hour.



Optional: If the Fan Mode is Auto, configure **Regulate Humidity** as the following steps:

a. Set the **Target Humidity Range**.
b. Enable **Regulate Humidity** and configure the interval as required. When the ambient humidity is outside the target humidity range, the controller will open the fan for an interval per hour to dehumidify or humidify.



3. (Optional) Enable **Fan Delay** and configure the time to delay the fan to close after the system stops cooling or heating.
4. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Fan Mode and Related Objects.
- LoRaWAN Hex Command: `7000`, `7001`, `7002`, `7003`, `8200`, `8201`. See *UC711 Payload Protocol (HEX)*, Fan Mode and Related Commands.

Control Stage Switching

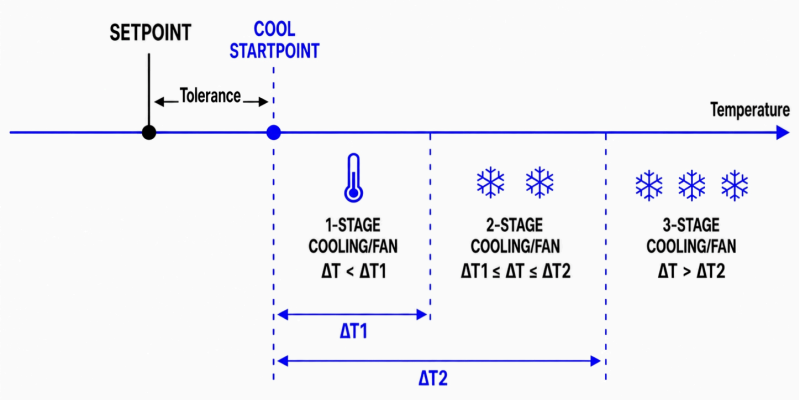
Important:
This feature is configured by downlink and is not available in ToolBox.

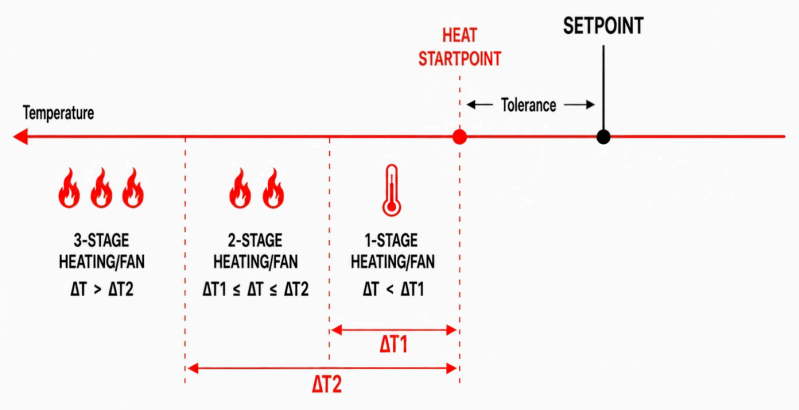
When connected to a HVAC system with multiple control stages, the controller can automatically switches stages according to temperature difference. This helps balance comfort and energy consumption.

Temperature Delta (ΔT): Defines the difference between the ambient temperature and the startpoint to determine the control stage:

- ΔT < ΔT1 → 1-stage heating, cooling or fan
- ΔT1 ≤ ΔT ≤ ΔT2 → 2-stage heating, cooling or fan
- ΔT > ΔT2 → 3-stage heating, cooling or fan

The default values are 3°C for ΔT1 and 5°C for ΔT2. ΔT2 must be greater than ΔT1. If a higher stage is not supported, the controller will use the current highest stage.





Setforward: When enabled, the controller automatically switches to the higher stage based on temperature delta values; when disabled, the controller uses only the initial stage determined by the temperature delta until the setpoint is reached. It's enabled by default.

Setback: When enabled, the controller automatically switches to the lower stage based on temperature delta values; when disabled, the controller uses only the initial stage determined by the temperature delta until the setpoint is reached. It's enabled by default.

Stage-up Switch: If the ambient temperature does not change by 1 °C within 5 minutes in the current stage & fan, the controller will switch to a higher stage & fan. The change value and the time can be adjusted as required.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Control Stage Switching.
- LoRaWAN Hex Command: `8300-8307`. See *UC711 Payload Protocol (HEX)*, Control Stage Switch.

Configure Energy Saving Parameters

After communicating with the WT401 thermostat, the UC711 controller can receive the occupancy status detected by the WT401. The UC711 supports two levels of energy-saving settings. When the room is detected as vacant for a configurable duration, the controller applies a wider target temperature tolerance, which delays the activation of HVAC cooling and heating, thereby enhancing energy efficiency.

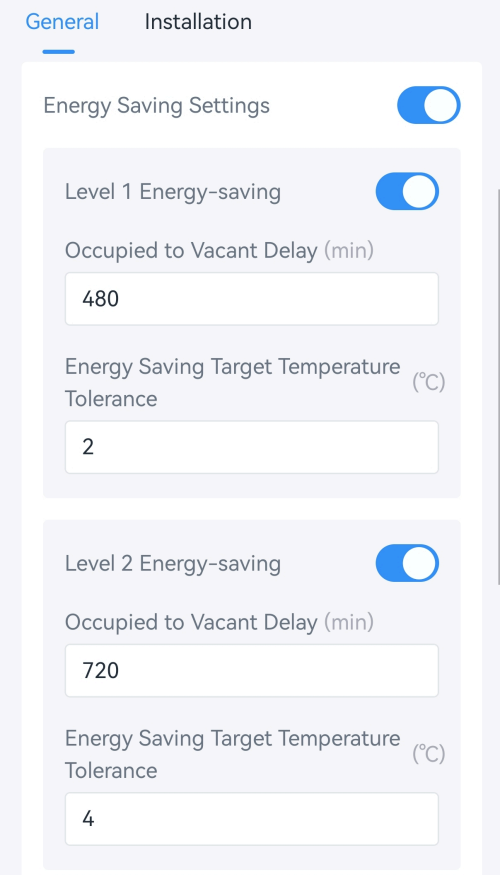
Prerequisites

- The controller is connected to a WT401 thermostat.
- The connected WT401 thermostat has enabled Occupancy Detection.

Configure by ToolBox

Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

1. Navigate to **Device > General**.
2. Enable **Energy Saving Settings** and configure the related parameters.



Parameter	Description
Level 1/Level 2 Energy-saving	Enable or disable the energy-saving setting.
Vacant Duration	The duration after the occupancy status changes to vacant. Range: 1-1440, Unit: min, Default: 480 (Level 1), 720 (Level 2)
Energy Saving Target Temperature Tolerance	The target temperature tolerance after triggering the energy-saving conditions. Usually this value is larger than the tolerance value in basic parameters.

3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Energy-saving Parameters.
- LoRaWAN Hex Command: `84`, `850000`, `850100`, `850001`, `850101`, `850002`, `850102`. See *UC711 Payload Protocol (HEX)*, Configure Energy Saving Parameters.

Result

- When the occupancy status is vacant and the vacant time lasts for the preset duration, the controller uses the energy saving target temperature tolerance.
- When the occupancy status changes to occupied or the vacant time does not reach the preset duration, the controller uses the target temperature tolerance in General Settings.

Auxiliary Features

This chapter describes the auxiliary features of this device.

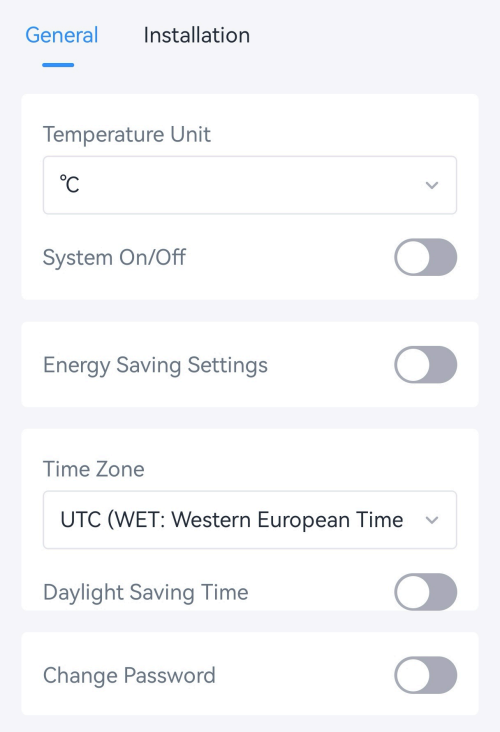
Configure General Parameters

This section describes the general device parameters and provides links to the detailed configuration procedures for related features.

Configure by ToolBox

Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

1. Navigate to **Device > General**.
2. Configure the related parameters.



Parameter	Description
Temperature Unit	Select the temperature unit displayed in ToolBox. Default: °C. **Note:** After changing the unit, it is necessary modify the temperature-related settings.
System On/Off	Turn on or off the HVAC system. For more details, see Configure Temperature Control and Fan Parameters.
Energy-saving Setting	Disable or enable energy-saving setting. For more details, see Configure Energy Saving Parameters.
Time Zone	For details, see Configure Time Parameters.
Daylight Saving Time	
Change Password	Change the password used for authenticated access and configuration through ToolBox. For details, see Change the Device Password.

3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Temperature Unit.
- Raw Hex Command: `64`. See *UC711 Payload Protocol (HEX)*, Temperature Unit.

Configure Time Parameters

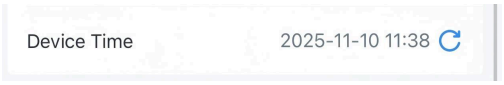
This section describes how to configure the time parameters to ensure the correct time.

Note:
Before configuring the device through ToolBox, access it through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

Synchronize the Device Time

Synchronize by ToolBox

1. Tap to synchronize the time and the time zone with the smartphone.



If the time is synchronized successfully, the following page is displayed.

Synchronize through a LoRaWAN® Network Server

Prerequisites:

- The device has joined a LoRaWAN® network.
- The LoRaWAN® network server supports device time synchronization.

Limitation: Network-server synchronization retrieves UTC time only. It does not configure the device time zone.

1. Set the LoRaWAN® version of the device to **V1.0.3**.
2. Connect the device to the network server. Once the device successfully joins the network, it sends a MAC command to query the time from the network server.

Note:
The device sends a DeviceTimeReq command every five days after the last successful synchronization. To request synchronization immediately, you can also send the downlink command.

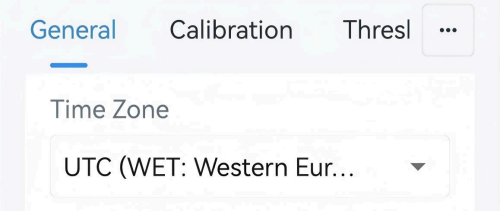
Remote Configuration Reference

- BACnet: See *UC711 BACnet Object List*, Synchronize Time.
- LoRaWAN Hex Command: `B8`. See *UC711 Payload Protocol (HEX)*, Sync Time from LNS.

Configure the Time Zone

Configure by ToolBox

1. Navigate to **Device > General**.
2. Select **Time Zone** as required.



3. Tap **Write** to apply the configuration.

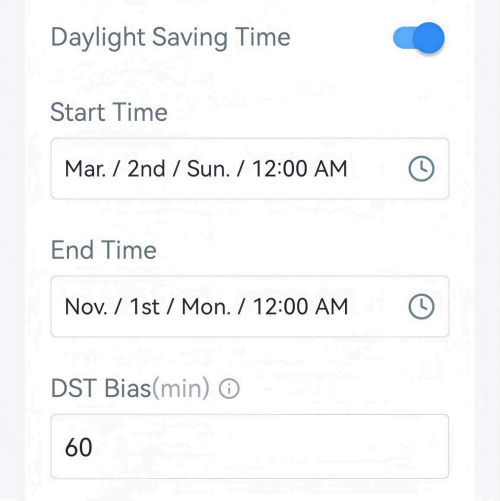
Remote Configuration Reference

- LoRaWAN Hex Command: `C7`. See *UC711 Payload Protocol (HEX)*, UTC Time Zone.

Configure Daylight Saving Time

Configure by ToolBox

1. Navigate to **Device > General**.
2. Enable **Daylight Saving Time** and configure the related parameters.



Parameter	Description
Start Time	The start time of DST time range.
End Time	The end time of DST time range.
DST Bias	The DST time will be faster according to this bias.

3. Tap **Write** to apply the configuration.

Remote Configuration Reference

- LoRaWAN Hex Command: `C6`. See *UC711 Payload Protocol (HEX)*, Daylight Saving Time.

Maintain the Device

This section describes how to maintain the device.

Upgrade the Device

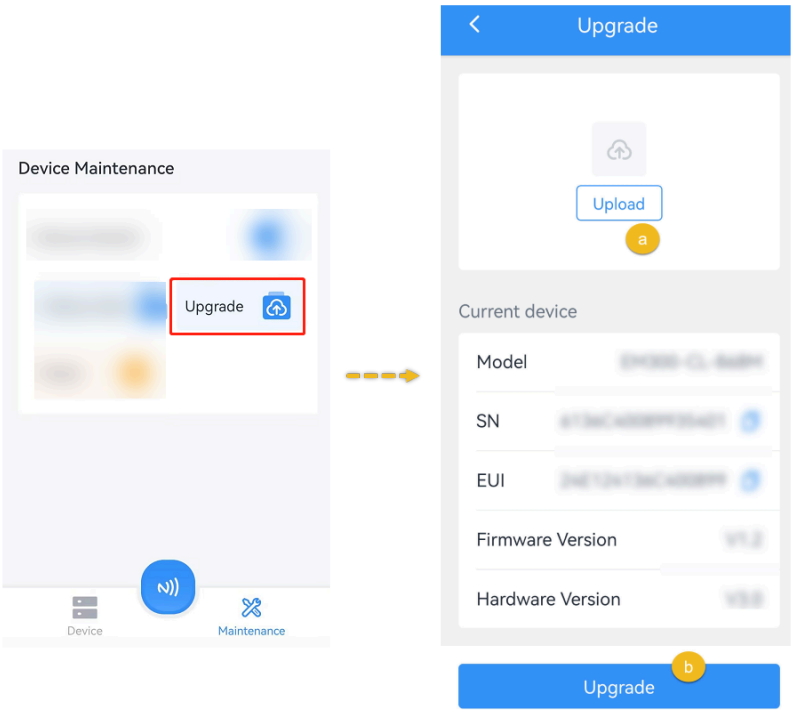
This section describes how to upgrade this device.

Upgrade through ToolBox

Tip:
Before upgrading the device through ToolBox, access it through NFC or Bluetooth. For ToolBox access instructions, see Access the Device. It is recommended to use Bluetooth to upgrade the device.

Prerequisites: Download firmware from Milesight official website and save it to the smart phone. It is recommended to consult technical support before upgrading to ensure a safe and successful upgrade.

1. Navigate to **Maintenance > Upgrade**.
2. Click **Upload** to select the firmware from the local path of the smartphone.
3. Click **Upgrade** to upgrade the device.



4. Wait until a success message is displayed.

> **CAUTION:**
> Do not perform any operations in ToolBox during upgrade, otherwise, the upgrade will be interrupted or the device may malfunction.

Upgrade through FUOTA

The device also supports Firmware Update Over the Air (FUOTA) through a compatible LoRaWAN® network server.

Prerequisites:

- The device has joined a LoRaWAN® network.
- The network server supports FUOTA.

For the upgrade procedure, refer to the FUOTA documentation for the corresponding LoRaWAN® network server.

Configure a Template for Configuration Backup

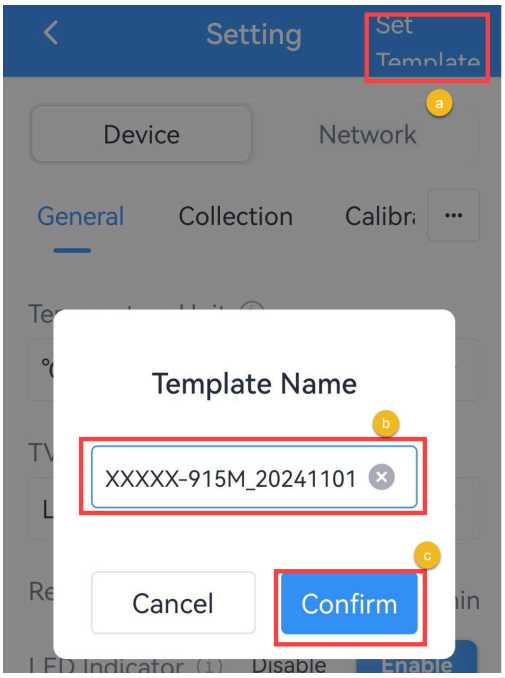
This device supports configuration backup, which enables quick and easy batch configuration. This section describes how to back up the device configuration and write it to other devices.

Note:
This feature is available only through ToolBox. Before configuring a template, access the device through NFC or Bluetooth. For the navigation path and write operation conventions used in this guide, see Configure the Device in ToolBox.

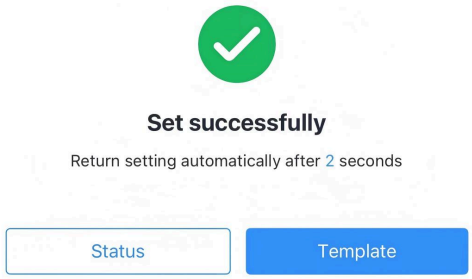
Prerequisites: The backup device and the device importing the backup are exactly the same model.

Step 1. Set a Template

1. Access the device via ToolBox App.
2. On the homepage of ToolBox, click **Setting** to enter the **Setting** page.
3. Edit the device parameters as required, click **Set Template** in the top right corner.
4. Customize a template name, click **Confirm** to save the current configuration as a template.

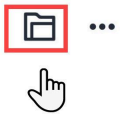


5. If the template is saved successfully, the following page is displayed. The template will be saved to the ToolBox App.

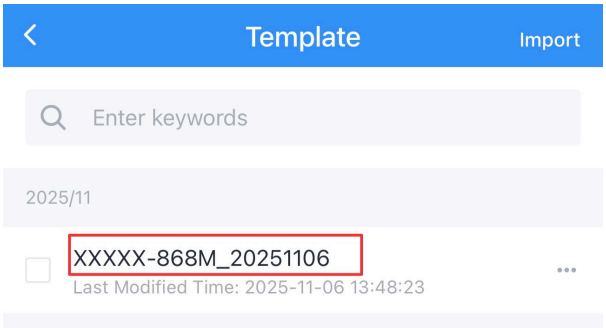


Step 2. Write Template Configuration to the Target Device

1. Click Template icon in the top right corner to go to **Template** page.



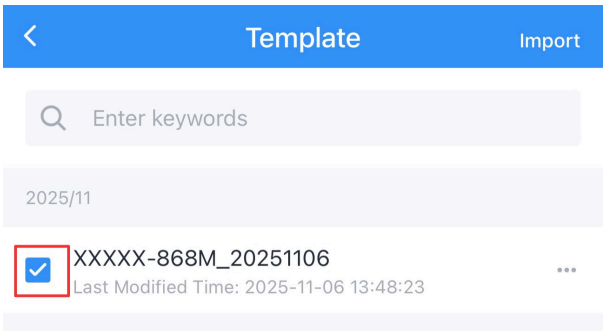
2. Click the saved template. Do not select the template.



3. Tap **Write** to apply the template configuration to the target device.

Step 3. Export or Delete a Template (Optional)

1. Select the checkbox of the target template as shown in the following figure.



2. Click **Export** in the lower left corner to export this template as a JSON format file and save it to the smart phone.
3. Click **Delete** in the lower right corner, then click **Confirm** to delete this template from ToolBox.

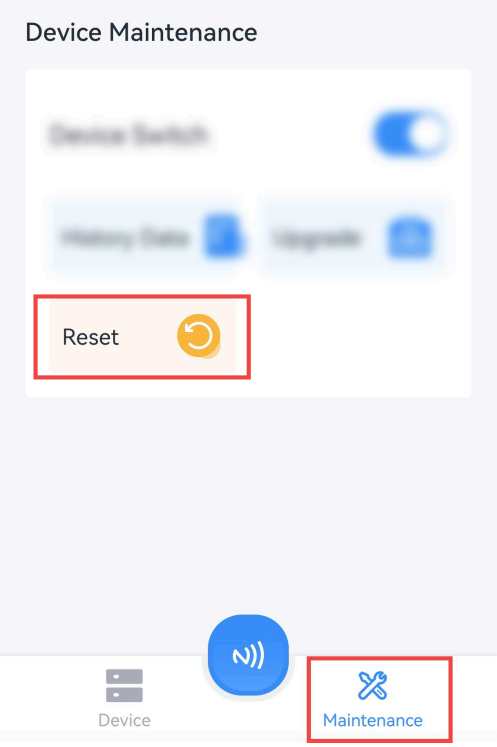
Reset the Device

This section describes how to reset the device.

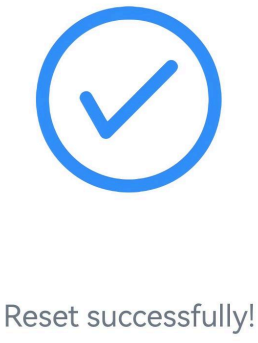
Reset through ToolBox

Note:
Before resetting the device through ToolBox, access it through NFC or Bluetooth. For ToolBox access instructions, see Access the Device.

1. On the homepage of ToolBox, click **Maintenance** in the lower right corner. The **Maintenance** page is displayed, see the following figure.



2. Click **Reset**.
3. In the displayed dialog box, click **Confirm**.
4. If the device is successfully reset, the following page is displayed.



Perform a Hardware Reset

If the device cannot be read from or written to normally through ToolBox, perform a hardware reset.

Chapter 6. Services

Milesight provides customers with timely and comprehensive technical support services. End-users can contact their local dealer to obtain technical support. Distributors and resellers can contact Milesight directly for technical support.

Technical Support Mailbox: iot.support@milesight.com

Online Support Portal: https://support.milesight-iot.com

Resource Download Center: https://www.milesight.com/iot/resources/download-center/

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