

## Overview

The WTL (Wireless Pneumatic Thermostat LoRa) Summer Winter Series Thermostat retrofits an existing pneumatic thermostat to provide Direct Digital Control (DDC) such as zone control functionality at a fraction of the time and cost, without disturbance to occupants. The WTL Summer Winter Thermostat is direct-acting and reverse-acting, with single setpoint control for summer and winter mode.

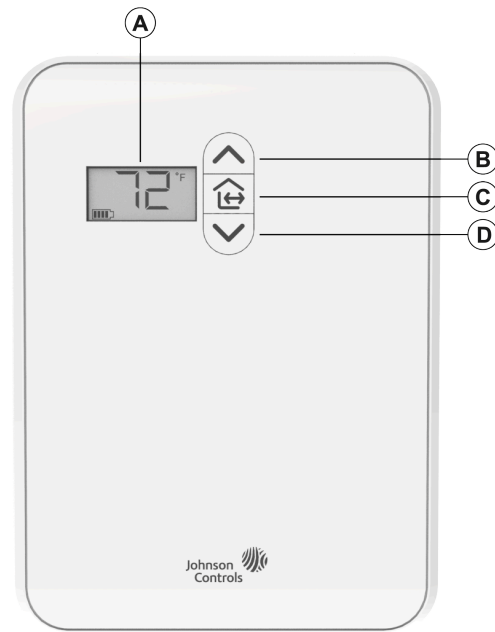
Use the WTL Summer Winter Thermostat to remotely monitor the zone temperature and branch pressure, control the setpoints, program the setback, or set up the pneumatic HVAC systems.

The WTL Summer Winter Thermostat functions in three different modes:

- As a standalone advanced thermostat replacing an existing conventional pneumatic thermostat
- As part of a network of thermostats wirelessly integrated into standalone system with the WTL Wireless Gateway and Control Server
- As integrated through BACnet®/IP with an existing building management system (BAS) such as Metasys or Facility Explorer.

As an integrated device, the WTL Summer Winter Thermostat can help save energy through the implementation of indoor temperature policies, improve comfort, and reduce the maintenance cost of the legacy pneumatic HVAC systems.

**Figure 1: WTL Summer Winter Thermostat**

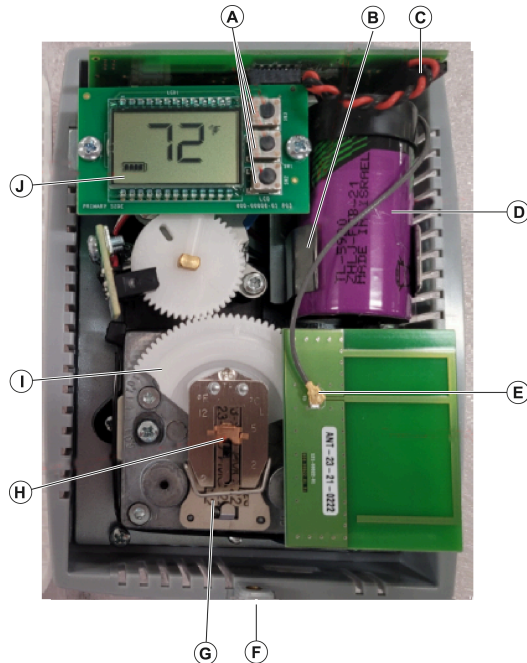


**Table 1: WTL Summer Winter Thermostat descriptions**

Callout	Description
A	LCD screen
B	Up
C	Confirm
D	Down



**Figure 2: WTL Summer Winter Thermostat without cover**



**Table 2: WTL Summer Winter Thermostat without cover descriptions**

Callout	Description
A	Buttons
B	Battery clip
C	Battery connector
D	Battery
E	LoRa antenna
F	Safety screw
G	Bimetallic spring. Sensitive, do not touch
H	Throttling range adjuster tab. Sensitive, do not touch
I	Cam gear
J	LCD screen

## Parts included

- One thermostat
- One universal wall bracket
- Two 1 in. self-tapping mounting screws
- Two wall anchors
- One Tadiran TL-5920 lithium battery

## Tools required

- Phillips head screwdriver
- 1/16 in. hex Allen wrench
- 3/16 in. drill

## Prerequisites

The WTL Thermostat communicates over a LoRaWAN® wireless network with the WTL Control Server and BAS. LoRaWAN is a networking protocol designed to wirelessly connect battery-operated devices to the internet. The gateway converts LoRa RF (Radio Frequency) packets into IP (Internet Protocol) packets and IP packets into RF packets. For more information about LoRaWAN, visit <https://lorawan-alliance.org/about-lorawan/>.

Unless you are using standalone mode, you must set up the LoRa wireless network before you install the thermostat. To set up the wireless network, you must first install the WTL Gateway and Control Server. See [Wireless Gateway and Control Server for WTL Thermostats Quick Start Guide, Part No. 24-11497-00005](#).

## Location considerations

The following objects may affect the wireless range. Avoid these objects in the line of transmission.

- Solid metal sheets
- Rebar-reinforced concrete
- Metal-reinforced concrete walls, pillars, and columns
- Hollow lightweight walls filled with insulating metal foil
- Office equipment and furniture such as book shelves, file cabinets, metal partitions, and computer racks
- Glass walls with metal coating
- Plumbing and electrical risers
- Elevator shafts and stairwells
- Mechanical and electrical equipment rooms

## Mounting

### About this task:

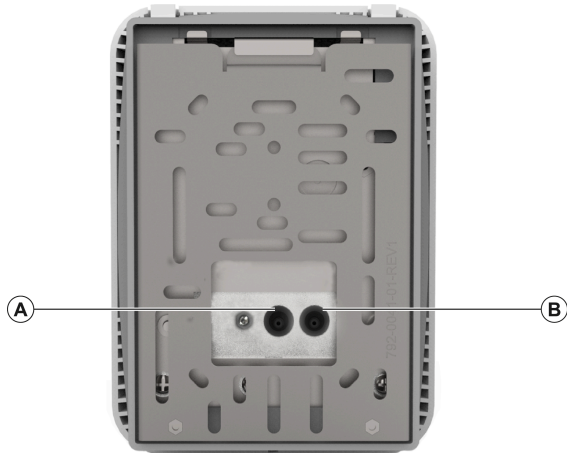
#### ► Important:

- The thermostat contains electrostatic discharge (ESD) sensitive circuit cards and components. Do not touch any of the circuit boards with your fingers or any part of your body.
- If you touch the circuit boards they may cause the unit to fail due to electrostatic discharge.
- Exercise care while you handle the thermostat when the cover is not attached.
- Keep the thermostat free of dust when you mount and install the thermostat.
- Before installing, take careful note of the main and branch air tubes, see [Removing the existing thermostat](#). Connecting an air tube to the incorrect port can damage the thermostat.

1. Align the large center opening of the wall bracket with the air tubes and mark the drill holes with a pencil. Use a level to ensure the wall bracket is correctly aligned.
2. Drill the holes and then push in the drywall anchors.
3. Carefully pull the air tubes through the large center opening of the wall bracket and attach the wall bracket to the wall.

- Remove the plastic cover from the thermostat. Use a 1/16 in. Allen wrench to loosen the safety screw. Set the cover aside.
- Connect the main tube to the air tube port on the right (marked M) at the back of the thermostat and connect the branch tube to the port on the right (marked B). See Figure 3.

**Figure 3: WTL air tube ports**



**Table 3: WTL air tube port descriptions**

Callout	Description
A	Main air tube (marked M)
B	Branch air tube (marked B)

- Attach the thermostat to the wall bracket with the two captive screws.
- Connect the battery.
- Attach the thermostat cover and secure the cover with the safety screw.

## Removing the existing thermostat

### About this task:

If you need to replace an existing thermostat, complete the following steps:

- Remove the cover of the existing thermostat.
- Remove the mounting screws and carefully remove the unit from the wall along with the attached pneumatic (air) tubes.
- Carefully detach the old thermostat unit from the two air tubes.
 

① **Note:** The air tubes may not have a lot of slack. Be careful that the tubes do not retract into the wall.
- Take note of which air tube is the main air tube and which is the branch. To distinguish them, the main air tube has air hissing from it, while the branch does not.

- ① **Note:** To distinguish between the main and branch tubes if the compressor is turned off and no air emits from the main tube, take note as you remove the air tubes from the old thermostat where the ports are marked M and B.

## Installing and replacing the battery

### About this task:



### WARNING

#### Risk of Explosion or Fire

Replace the battery with the approved Tadiran TL-5920 lithium metal battery. This battery meets UL-1642, as evidenced by UL component listing. Alternatively, use any 3.6 V Tadiran battery with connector. Use of any other battery type may present a risk of fire or explosion.

The battery icon on the LCD screen indicates how much life remains in the battery. The battery information is also relayed to the control server and sent through BACnet as an object. Replace the battery when the battery icon displays one bar or the empty battery icon.

When the battery level is too low to function normally, the thermostat enters a fail-safe mode until you replace the battery. The fail-safe mode shuts down all functions of the thermostat except for temperature control, which continues to operate at a setpoint of 72°F (22°C). The screen is blank with an empty battery icon while in this mode.

To install or replace the battery, complete the following steps:

- Remove the thermostat cover.
- To replace, unplug the connector to disconnect the battery then remove the battery from the clip.
- Place the new battery into the clip.
- When you:
  - initially install the battery, plug in the battery connector directly above the battery. See Figure .
  - replace the battery, press and hold the middle button and plug in the battery connector. Release the button when the screen turns on. The battery icon reinitializes to full.

The connector is polarized and must only be attached to the battery in the correct way.
- Re-attach the thermostat cover and secure the cover with the safety screw.

### What to do next:

1. After the initial install of the battery, configure the thermostat. See [Configuration](#). Omit this step if you replaced the battery.
2. Confirm calibration and, if needed, perform a manual calibration. See .
3. Perform a wireless communication OTAA (Over-The-Air Activation) bind. See [Activating LoRa Over-The-Air](#).

## Configuration

Use the three front buttons to access the programming mode and configure the thermostat. You require a passcode to access the programming mode. The passcode is a series of button presses, which you cannot change. To access the programming mode, press all three front panel buttons simultaneously until **pd** appears on the screen, then press the buttons in the following order: **Confirm, Confirm, Up, Down, Confirm**.

### Standalone mode

In the default standalone mode, the WTL Thermostat acts as a standard wireless programmable thermostat. The radio signal is turned off from the factory until you initiate binding to link the thermostat with a gateway or BAS. See [Gate and Control Server mode](#) and [BAS mode](#).

### Gateway and Control Server mode

The WTL Thermostat can also be integrated with the WTL Gateway and Control Server. For set up, refer to [Wireless Gateway and Control Server for WTL Thermostats Quick Start Guide \(Part No. 24-11497-00005\)](#).

To bind the thermostat with the gateway, you must enter both a unique four digit node ID (range 1001-9999) for each thermostat and the gateway's two digit frequency sub-band (default 01).

You assign the node ID in two places: the thermostat and a configuration file for the gateway. See [Binding the thermostat to the gateway](#) and [Adding WTL Thermostats to the .csv file in the Wireless Gateway and Control Server Quick Start Guide](#).

### Binding the thermostat to the gateway

#### Before you begin:

If you did not do so yet, connect the battery and press any button to power on the thermostat. While the thermostat initializes and starts a discovery process, **dy** displays on the screen. During this process, the thermostat turns on the motor and calibrates the position of the motor. Do not disturb this process by pressing the buttons or touching the motor. When the thermostat finishes the initialization, the screen displays either the current temperature or an error code. See Table 7 for a description of error codes.

#### About this task:

To bind the thermostat to the gateway, complete the following steps:

1. Ensure that the gateway is turned on and in range.
2. Press all three buttons on the thermostat at the same time and release. The screen displays **pd**.

3. Enter the passcode: **Confirm, Confirm, Up, Down, Confirm**. The screen displays the default frequency sub-band 01. 1 flashes to indicate you can now program the first digit of the two-digit frequency sub-band. °F displays while entering the frequency sub-band.

① **Note:** Digits are entered from right to left.

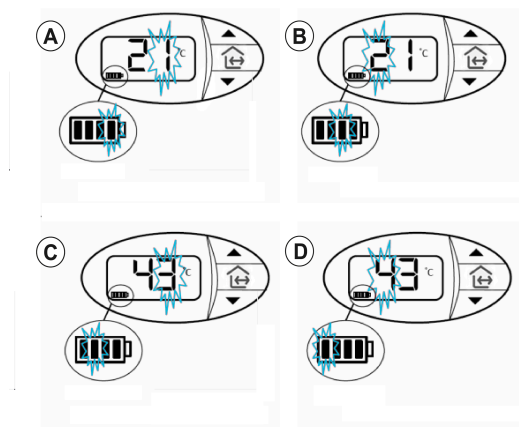
4. Press **Up** or **Down** to change the first digit of the frequency sub-band to the required value.
5. Press **Confirm**. The second digit of the frequency sub-band now flashes.
6. Press **Up** and **Down** to change to the required value.
7. Press **Confirm** to confirm the frequency sub-band. The screen displays 01 indicating that you can now program the four-digit node ID. °C displays while entering the node ID.

① **Note:** Digits are entered from right to left, beginning with the fourth digit and ending with the first.

8. Press **Up** or **Down** to change the fourth digit of the node ID to the required value. See Figure 4 for an example entry sequence. The battery symbol segments flash to indicate the digit being entered.

① **Note:** The fourth digit value cannot be 0.

Figure 4: Node ID example 4321 entry sequence



9. Press **Confirm**.
  10. Repeat Step 8 and Step 9 to change third, second, and first digits of the node ID to the required values.
- ① **Note:** The first digit value cannot be 0.
11. Press **Confirm** until **bd** displays for bind selection.
  12. Press **Up** to bind the thermostat. Six dashes appear while the bind is in progress. **PA** displays after a successful bind.
  13. Press **Confirm** to return to the home screen.
  14. **Optional:** If you are binding the thermostat to the gateway for the first time, restart the gateway by disconnecting and reconnecting the power.

## BAS mode

The WTL Thermostat can be further integrated into a BAS such as Metasys or Facility Explorer through the WTL Control Server. If you connect to a BAS, you must ensure scheduling on the Control Server is turned off. Off is the default setting. When you connect the BAS to the Control Server, you can control all setpoints and scheduling with the BAS.

When setting up the WTL Thermostat scheduling through BACnet on the BAS, consider the following points:

- BAS can send an occupied setpoint or an unoccupied setpoint to each WTL.
- BAS can command the thermostat to unoccupied or occupied mode. Each WTL saves the last commanded setpoint for each mode.
- The WTL BACnet interface does not support schedule objects or groups.
- The WTL BACnet interface does not support setpoint limits, but these can be configured on the Control Server web application.

## Setting the temperature scale

### About this task:

You can display the temperature in Fahrenheit or Celsius. The default scale is Fahrenheit. To change the temperature scale, complete the following steps:

1. To access the programming mode, press and hold all three buttons simultaneously until **pd** appears on the screen.
2. Enter the following passcode: **Confirm, Confirm, Up, Down, Confirm**.
3. Press **Confirm** to navigate to the Celsius/Fahrenheit screen.  
°F displays, this indicates that you now program the temperature scale.
4. Press **Up** or **Down** to change the temperature scale.
5. Press **Confirm** to confirm the change.
6. Press **Confirm** repeatedly to exit the programming mode.

When you exit the programming mode, the thermostat rebinds to the LoRa network.

## Calibrating the WTL Summer Winter Thermostat

### Before you begin:

Remove the cover of the thermostat and ensure that the thermostat is acclimatized to the ambient temperature. This may take 5 minutes to 10 minutes after you attach the thermostat to the wall.

### ① Note:

- The pneumatic main and branch lines must be connected to perform the calibration steps.
- The bimetallic spring is very sensitive to body heat. Keep your hands and your breath away from the thermostat to minimize calibration error.

- The copper-colored throttling range adjuster is factory set at 6°F, as marked on the lever. The factory setting provides a throttling range (TR) of 2 to 0.5 psi/°F.
- **Important:** To ensure correct operation and accuracy of the thermostat, do not move the TR adjuster.

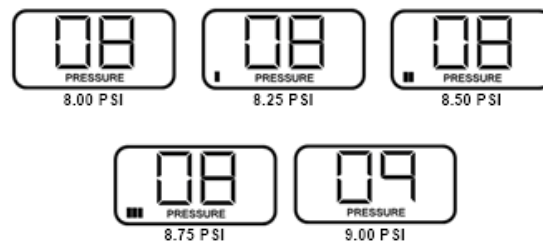
### About this task:

To access calibration mode, complete the following steps:

1. Press and hold **Down** and **Confirm** for 2 seconds. The screen shows **dt**.
2. Press **Confirm** until the screen shows **PRESSURE**. The screen shows the branch pressure in psi along with the pressure indicator. If the motor is in motion when you try to access the branch pressure the screen shows **--**.
3. Press and hold all buttons simultaneously to access calibration mode. The symbol °C flashes rapidly while in this mode.

- ① **Note:** Each battery segment symbol on the LCD screen represents 0.25 psi resolution, as shown in the following figure. Pay special attention to this extra resolution while you turn the set screw. It is critical that this value precisely matches the neutral pressure for seamless operation of the thermostat.

Figure 5: Pressure display resolution



## Setting switch-over pressure

- **Important:** The switch-over point adjustment requires changes to the main supply air pressure. This could affect other parts of the system. Make this adjustment on a test bench where an adjustable main supply pressure is available.

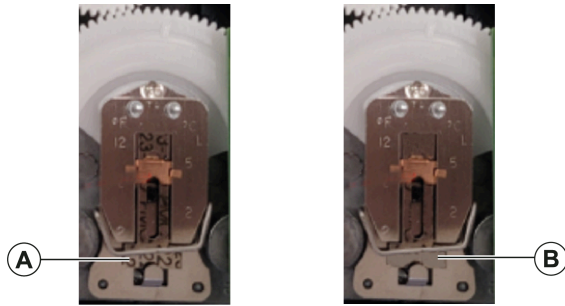
1. Adjust the main supply pressure regulator to the required switch-over pressure.
2. Set the control temperature as follows:
  - 85°F for reverse acting/direct acting thermostats (reverse acting at low main supply, direct acting at high main supply).
  - 55°F for direct acting/reverse acting thermostats (direct acting at low main supply, reverse acting at high main supply).



- ① **Note:** To tell what type of thermostat you have, check the bimetallic spring. If the bimetallic spring has text on the surface it is a reverse acting/direct acting thermostat. If there is no text, it is a direct acting/reverse acting thermostat.

When the control temperature is set, the cam gear moves to the farthest clockwise position and the branch pressure is very close to main supply pressure.

**Figure 6: Bimetallic spring**



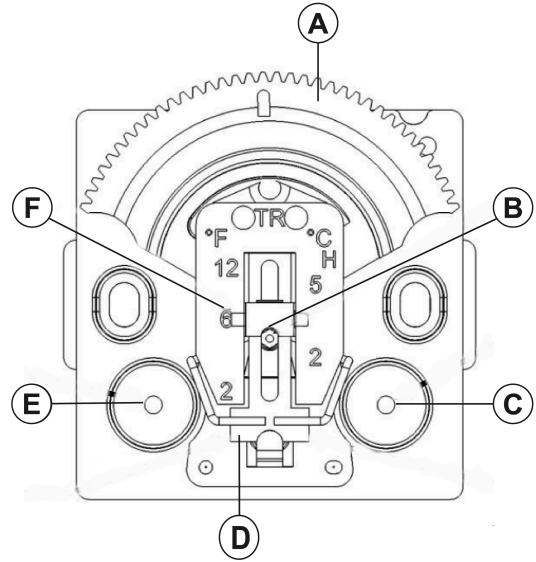
Callout	Description
A	Bimetallic spring with no text indicates this is a direct acting/reverse acting thermostat.
B	Bimetallic spring with text indicates this is a reverse acting/direct acting thermostat.

3. Locate the switch-over pressure calibration screw, see Figure 7. Use 1/16 in. Allen drive to carefully the screw until the indicated branch pressure on the test bench drops to 0 psig. This sets the switch-over pressure snap action point.

① **Note:**

- Turning screw clockwise will eventually cause branch pressure to drop.
- To verify (or fine tune) the switch-over pressure: reduce main supply pressure to 2 psig below required switch point, then increase slowly to note when branch pressure increases (branch pressure increases at the instant the main supply reaches the switch-over pressure). Repeat steps 1, 2 and 3 as needed to achieve required switch-over pressure.

**Figure 7: Switch-over pressure**



Callout	Description
A	Cam gear
B	Branch pressure calibration screw (low)
C	Switch-over pressure calibration screw
D	Bimetallic spring (sensitive, do not touch)
E	Branch pressure calibration screw (high)
F	Throttle range adjuster tab set to 6°F

Calibrating branch pressures for low and high main supply modes

**About this task:**

① **Note:**

- Refer to Figure 7 for locations of the two branch pressure calibration screws.
- The low main supply pressure calibration must be performed first to achieve proper calibration in both modes.

- Use extreme care when inserting the 1/16 in. hex drive through the opening in the bimetallic spring to the calibration screw. The bimetallic spring can be very easily damaged by a misplaced tool movement.

1. After switch-over pressure is confirmed correct, set main supply regulator pressure to ~ 2 psig below the switch-over pressure (to ensure thermostat is in low main supply pressure action mode), then use 1/16 in. hex drive to adjust the branch pressure calibration screw (low) to the required neutral pressure (typically 8 psig, but can be as high as 12 psig). Adjustment is sensitive and should require less than 1/8 turn to go from a control pressure of 8 psig to 12 psig.

① **Note:** Turning the branch pressure calibration screw (low) clockwise increases the branch pressure (counter-clockwise rotation decreases branch pressure).

2. Re-set main supply pressure to ~ 2 psig above the switch-over pressure (to ensure thermostat is in high main supply pressure action mode), then use 1/16 in. hex drive to adjust the branch pressure calibration screw (high) to desired neutral pressure (typically 8 psig, but can be as high as 12 psig). Adjustment is very sensitive and should require less than 3/4 turn to go from a control pressure of 8 psig to 12 psig.

① **Note:** Turning the branch pressure calibration screw (high) clockwise reduces the branch pressure (counter-clockwise rotation increases branch pressure).

3. When the required control pressure is achieved, press the **Confirm** button to exit calibration mode and save the value.
4. A confirmation screen appears and flashes the stored control pressure for 3 seconds. Repeat the calibration procedure if this value does not match the desired control pressure.

① **Note:** The thermostat automatically exits calibration mode if **Confirm** is not pressed after 3 minutes. The control pressure will not be saved and the thermostat will return to the home screen.

## Operation

Use the LCD screen and three buttons to adjust the setpoint temperature, turn on or off the occupancy override, and to measure the branch tube pressure.

Figure 8: WTL Thermostat screen

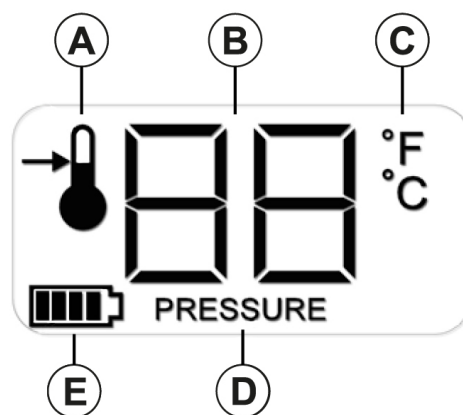


Table 4: WTL Thermostat screen

Callout	Description
A	Setpoint
B	Temperature
C	Fahrenheit or Celsius indicator
D	Pressure indicator, shows in select operating modes only
E	Battery level

## Adjusting the setpoint temperature

1. Press **Up** or **Down** once to view the current temperature setpoint.
2. Press **Up** or **Down** to change the temperature setpoint to the required setpoint.
3. Press **Confirm** to confirm the change.

## Measuring the branch tube pressure

1. Press and hold **Down** and **Confirm** for 2 seconds. The screen shows **dt.**
2. Press **Confirm** until the screen shows **PRESSURE**. The screen shows the branch pressure in psi along with the pressure indicator.  
If the motor is in motion when you try to access the branch pressure the screen shows **--**. Press **Confirm** to exit and try again.
3. Press **Confirm** repeatedly to exit.

## Checking the neutral pressure

1. Press and hold **Down** and **Confirm** for 2 seconds. The screen shows **dt.**
2. Press **Confirm** until the screen shows **PRESSURE**. The screen shows the branch pressure in PSI along with the pressure indicator.  
If the motor is in motion when you try to access the branch pressure, the screen shows **--**. Press **Confirm** to exit and try again.

3. Press **Down**. The screen flashes the stored neutral pressure for 3 seconds, then returns to the home screen. The battery segments on the screen represent 0.25 psi increment. See Figure .

## Locking and unlocking the thermostat controls

### About this task:

You can lock the thermostat to prevent occupants overriding the setpoints. To lock or unlock the thermostat, complete the following step:

- Press **Up** and **Down** simultaneously.

### Result

The screen shows **LC** if the thermostat is locked or **UL** if the thermostat is unlocked.

## Activating LoRa Over-The-Air

### About this task:

The WTL Thermostat uses OTAA to create a connection link to the network.

#### ① Note:

- You must configure the gateway with the LoRa device equipment unique identifier, this is the MAC ID, for each thermostat before you bind that thermostat.
- Use the following steps also to initiate a forced discovery when required. A forced discovery before you bind the thermostat to the LoRa network causes an error. A forced discovery transmits a test data packet and verifies that an acknowledge is received from the network to indicate the link is good.

1. Press **Confirm** and **Down** simultaneously.
2. Press **Up** to bind. The screen shows three horizontal dashes while it performs a bind.

### Result

If the bind is successful, the screen shows **PA**. If the bind is not successful the screen shows **E2**. See Table 7 for information about the E2 error code.

## BACnet objects

**Table 5: BACnet objects for WTL thermostat**

BACnet object name	Data type	Read/Write	Function	Operational details
Current_Temp	AI-1	Read-only	Current space temperature	Displays the current space temperature at the thermostat in degrees Fahrenheit.
Branch_Pressure	AI-2	Read-only	Branch line pressure	Displays the current branch line pressure at the thermostat in PSI.
Battery_Level	AI-3	Read-only	Battery level percentage	Displays the current battery level as a percentage.
Humidity	AI-4	Read-only	Relative humidity	Displays the current relative humidity reading in % RH.  ① <b>Note:</b> Available only on relative humidity-enabled models.
Setpoint	AO-1	Read/write	Occupied state setpoint	Displays and enables control of the Occupied state setpoint value in degrees Fahrenheit.
Unoccupied_Setpoint	AO-2	Read/write	Unoccupied state setpoint	Displays and enables control of the Unoccupied state setpoint in degrees Fahrenheit.
Setpoint_CoolAbove	AO-3	Read/write	Deadband Cooling Setpoint	Displays and enables control of the cooling setpoint value in degrees Fahrenheit. Available on Deadband models only.
Setpoint_HeatBelow	AO-4	Read/write	Deadband heating setpoint	Displays and enables control of the heating setpoint value in degrees Fahrenheit. Available on Deadband models only.



**Table 5: BACnet objects for WTL thermostat**

BACnet object name	Data type	Read/Write	Function	Operational details
Unoccupied_Setpoint_CoolAbove	AO-5	Read/write	Unoccupied deadband heating setpoint	Displays and enables control of the unoccupied heating setpoint value in degrees Fahrenheit. Available on Deadband models only.
Unoccupied_Setpoint_HeatBelow	AO-6	Read/write	Unoccupied deadband Cooling setpoint	Displays and enables control of the unoccupied cooling setpoint value in degrees Fahrenheit. Available on Deadband models only.
Occ_State	BO-1	Read/write	Occupancy state status	Displays and enables control of binary status indicator for the operation state of the thermostat, occupied or unoccupied.

- ❗ **Note:** The WTL Thermostats do not provide an offline alarm notification in the event of loss of communication or power. When you integrate the WTL Thermostats into a BAS Supervisory Controller, it is best practice to create a separate offline alarm that triggers on the reliability status of the thermostat's BACnet points. In the event of loss of communications or power, the thermostat's BACnet objects show a status of unreliable after being offline for 25 minutes.

## Troubleshooting

- ❗ **Note:** These diagnostic indications disappear automatically after a few seconds.

**Table 6: Diagnostic functions**

Code	Cause
dy	Discovery Status. The thermostat performs a discovery operation. Do not disturb.
dt	Select the required diagnostic function: press <b>Up</b> to perform a Forced Discovery or press <b>Confirm</b> for diagnostics.
Fd	The thermostat performs a Forced Discovery. If connection is successful, PA appears on the screen. If connection is unsuccessful, an error code appears on the screen.
PA	The selected operation is successful. Used in conjunction with OTAA bind or Forced Discovery.
UL	The keypad is unlocked.
LC	The keypad is locked.
bd	The thermostat has successfully bound to the gateway.

**Table 7: Error codes**

Code	Cause	Solution
E0	Discovery Error. Not able to connect to the gateway. Possible causes: the gateway is not turned on, the thermostat configuration is removed from the gateway, or the gateway is not within wireless range.	Verify that the gateway is turned on and the status LED is blinking. Move the thermostat closer to the gateway.
E1	The thermostat is not bound to the gateway.	Perform the OTAA bind procedure and check Forced Discovery again. See <a href="#">Activating LoRa Over-The-Air</a> for the steps.
E2	The thermostat is not successfully bound to the gateway or the gateway is out of wireless range.	Verify that the thermostat is correctly added to the gateway and try to bind again. Move the thermostat closer to the gateway.

**Table 8: Additional troubleshooting**

Symptom	Possible solution
The thermostat does not appear to build branch pressure.	<p>As a possible solution, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Remove the thermostat from the wall bracket.</li> <li>2. Verify that both the main and branch tubes are connected correctly. If they are not connected correctly, reattach the tubes and check the pressure again. See Figure 3 for locations of main and branch air ports.</li> <li>3. Remove the main tube and verify that air is coming out. If possible, measure the main pressure, this requires the connection of an additional pressure gauge, not included, to the main tube.</li> <li>4. Reconnect the main tube and remove the branch tube connection.</li> <li>5. Cover the branch port on the thermostat completely with a finger.</li> <li>6. Adjust the setpoint to at least 5°F above the ambient temperature for a direct-acting thermostat, or 5°F below the ambient temperature for a reverse-acting thermostat.</li> <li>7. Check the branch pressure, see <a href="#">Measuring the branch tube pressure</a>.</li> <li>8. <ul style="list-style-type: none"> <li>- If the branch pressure is the same as the main pressure, the thermostat is working correctly. Potentially a leak exists in the branch tube downstream of the thermostat.</li> <li>- If the branch pressure is not the same as the main pressure, the thermostat may be faulty. Swap the thermostat with another unit.</li> </ul> </li> </ol>
The thermostat does not seem to control correctly or makes a loud hissing sound.	<ol style="list-style-type: none"> <li>1. Verify that both the main and branch tubes are connected correctly. See Figure 3 for locations of main and branch air ports. <ul style="list-style-type: none"> <li>- If the tubes are not connected correctly, reattach the tubes and check the system again.</li> <li>- If the branch and main tubes are swapped, the thermostat is installed incorrectly and may be damaged.</li> <li>- If the tubes are connected correctly, try to swap the thermostat with another unit.</li> </ul> </li> </ol>
The thermostat exhibits incorrect or suspect behavior after battery replacement, for example: non-responsive buttons, erroneous setpoint limits, inaccurate ambient temperature, or excessive motor movement.	<ol style="list-style-type: none"> <li>1. Disconnect the battery from the thermostat.</li> <li>2. Press and hold <b>Confirm</b> until the screen turns black.</li> <li>3. Let the thermostat sit for 30 minutes to 45 minutes to fully discharge all components. This defaults many of the operating parameters of the thermostat to factory defaults.</li> <li>4. Reconnect the battery and follow the steps in <a href="#">Installing and replacing the battery</a>.</li> </ol>

## Technical specifications

**Table 9: WTL Summer Winter Thermostat technical specifications**

Specification	Description
Action	<ul style="list-style-type: none"> <li>• Direct acting (at high pressure) / Reverse acting (at low pressure)</li> <li>• Direct acting (at low pressure) / Reverse acting (at high pressure)</li> </ul>
Number of pipes	2-pipe
Setpoint temperature range	55°F to 85°F (13°C to 29°C)
Air connections	3/32 in. (2.5 mm) ID tube fittings
Maximum operating pipe pressure	25 psi (170 kPa)
Airflow usage	31.1 scim at 16 psig, 43.2 scim at 25 psig
Sensitivity	Factory adjusted to 2.0 PSI/F – 2.5 PSI/F
Operating frequency band	915 MHz LoRa network band
LoRa encryption	128, dual layer

**Table 9: WTL Summer Winter Thermostat technical specifications**

Specification		Description
Transmission ranges <sup>1</sup>	Recommended indoor on one floor	250 ft (76.2 m)
	Recommended indoor over multiple floors	150 ft (45.7 m)
	Line of sight, maximum	400 ft (122 m)
Transmission interval		5 minutes
Antenna gain		1.7 dBi
Output power		18.5 dBm
Battery life		Minimum of 2 years, with four setpoint changes per day
Operating conditions		32°F to 122°F (0°C to 50°C), 95% RH maximum, noncondensing
Storage conditions		-40°F to 122°F (-40°C to 50°C) 95% RH maximum, noncondensing
Dimensions H x W x D		5.6 in. (141 mm) x 4.1 in. (104 mm) x 2.1 in. (53 mm)

<sup>1</sup> Metal objects or other obstructions can reduce or completely block the wireless signal transmissions.

## Repair information

If the WTL thermostat fails to operate within its specifications, replace the unit. For a replacement thermostat, contact the nearest Johnson Controls® representative.

## Product warranty

This product is covered by a limited warranty, details of which can be found at [www.johnsoncontrols.com/buildingswarranty](http://www.johnsoncontrols.com/buildingswarranty).

## Patents

Patents: <https://jciapat.com>

## Single point of contact

APAC	EU	UK	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS TYCO PARK GRIMSHAW LANE MANCHESTER M40 2WL UNITED KINGDOM	JOHNSON CONTROLS 5757 N GREEN BAY AVE. GLENDALE, WI 53209 USA

## Contact information

Contact your local branch office:

[www.johnsoncontrols.com/locations](http://www.johnsoncontrols.com/locations)

Contact Johnson Controls: [www.johnsoncontrols.com/contact-us](http://www.johnsoncontrols.com/contact-us)

