

TMST-2B-ZBS Thermostat

Introduction

TMST-2B-ZBS is a battery powered ZigBee Thermostat. It is designed to be incorporated into household heating and cooling system for home environment control. The Thermostat can be operated manually using the LCD screen and buttons, or accessed remotely via ZigBee network. It feature Cooling, Heating, Auto modes with temperature set point and automatic schedule for you to control your home environment easily.

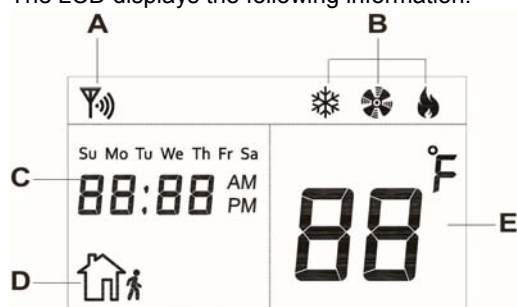
The Thermostat utilizes ZigBee technology for wireless signal transmission. ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on the IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission

The Thermostat serves as an end device in the ZigBee network. It can be included in the ZigBee network to transmit signal upon activation, but cannot permit any other ZigBee device to join the network through the Thermostat.

Parts Identification

1. LCD Display

The LCD displays the following information:



- A. ZigBee network connectivity icon  will be displayed when the Thermostat has joined ZigBee network and is within signal range.
- B. The current mode will be displayed when the Up, Down or Mode button is pressed.
 - Cool: 
 - Heat: 
 - Auto: Interval flash between  and 
 - Fan: 
- C. Current time and weekday
- D. Away mode icon  will be displayed when Thermostat is under Away mode.
- E. The temperature can displayed in Celsius or Fahrenheit format.

2. Low Battery LED Indicator

The LED flashes when low battery voltage is detected

3. Test / ZigBee Network Button

- Press the button once to:
 - Send a supervision signal with temperature and set point info.
- Press and hold for 10 seconds then release to reset the Thermostat.

4. Down Button

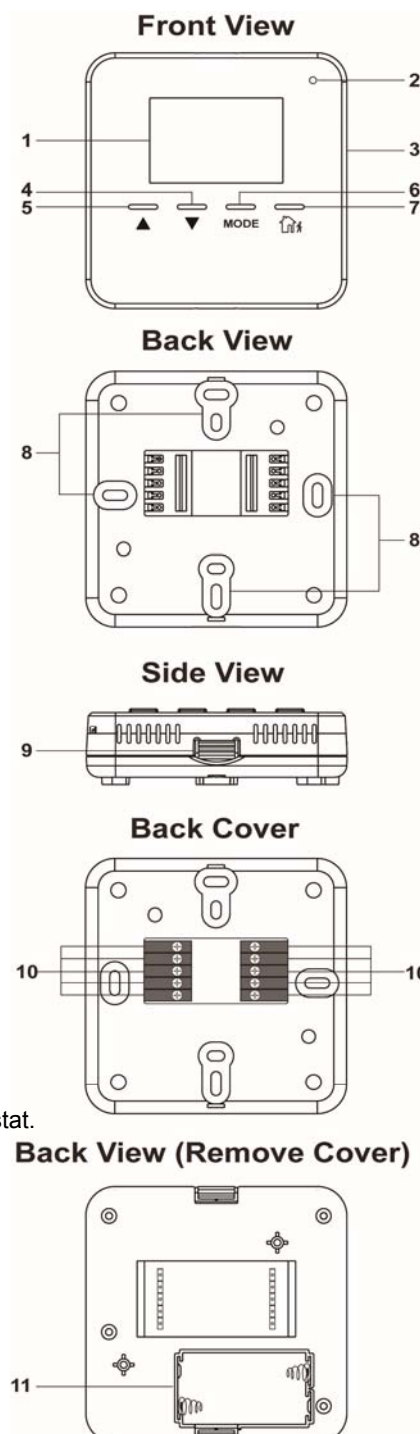
Press the button to change set point.

5. Up Button

Press the button to change set point.

6. Mode Button

Press the button to change Thermostat mode.



7. Away Button

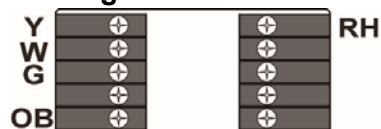
Press the button to change Thermostat to Away Mode.

8. Wall Mounting Holes

9. Back Cover Latch

Press both latches on the back cover to remove cover if needed.

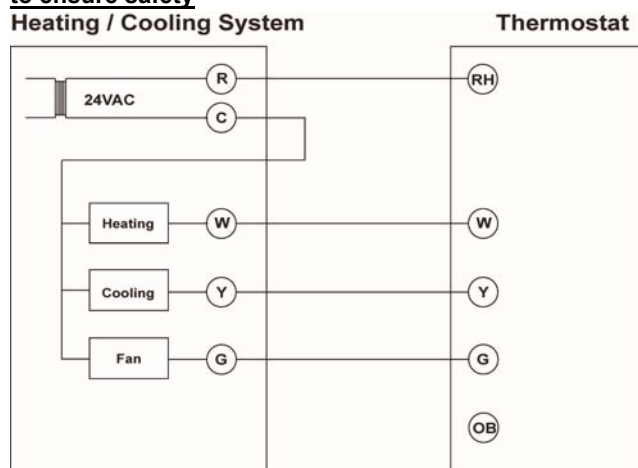
10. Wiring Connection Terminals



Name	Description	Name	Description
Y	Cooling	RH	24VAC Power Input
W	Heating		
G	Fan		
OB	Reversing Valve		

Refer to Wiring Diagram below for detail.

Wiring of the Thermostat should be performed by a certified technician with proper equipment to ensure safety



11. Battery Compartment

Insert 2 AA Alkaline batteries to power on the Thermostat.

Features

● **Battery and Low Battery Detection**

The Thermostat uses 2 AA Alkaline batteries as its power source. The Thermostat features Low Battery Detection function. When the battery voltage is low, the Thermostat will transmit Low Battery signal to the coordinator in ZigBee network. The Low Battery LED will also begin to flash to indicate the condition.

● **Manual Operation**

● **Mode and Temperature Setting:**

Cool, Heat and Auto Mode

- Press any of the UP, Down or Mode button, the Thermostat will display current mode, temperature set point and light up LCD backlight for 4 seconds.
- Press the Mode button again during this period to set Thermostat mode between Cool, Heat and Auto.

Press the Up or Down button to select temperature set point.

Heat setpoint range: 9°C ~ 30°C.

Cool setpoint range: 11°C ~ 32°C.

When under Auto mode, you will first select Auto Cool set point and pressing UP or Down button, press Mode button again to select to Auto Heat set point. The Cool set point must be at least 2°C higher than Heat set point.

- Press the Mode button The Thermostat will exit setting screen and apply the new setting after 4 seconds of inactivity.

- **Away Mode**

The Thermostat can be put into Away mode when the user leaves the house by pressing the Away button.

- To program Away Mode setting, press and hold Mode button for 3 seconds. You will first program Away Cool set point, press Mode button after finish setting to program Away Heat set point, the Cool set point must be at least 2°C higher than Heat set point. Press Mode button again to program Fan setting when done.

- **Fan Setting**

- When in Fan setting, press UP or Down button to select fan option between Always on or Auto mode.

Always On ( icon steady on) – The fan is always turned on except under Off Mode

Auto mode ( icon flash) – The fan will be turned on according to Away, Cool and Heat mode setting.

- **Off Mode**

The Thermostat can be put into Off mode by pressing and holding the Away button for 3 seconds. When under Off mode, the Thermostat stop all function and only display current time.

- **Time / Temperature Display / HVAC Type Setting:**

Press and hold the Mode button for 10 seconds to enter setting mode. The time on LCD display will begin to flash:

- Use the Up and Down buttons to select time and Mode button to proceed to next option. Available options include:

1. Weekday
2. Hour
3. Minute,
4. AM/PM or 24-hour format display. (You can only change the time display format when the time is set to between 1:01~12:59)
5. Celsius or Fahrenheit display
6. HVAC type: Type 1 = Gas/Electric, Type 2 = Heat Pump(O), Type 3 = Heat Pump(B).
Factory Default HVAC Type = 1 Gas/Electric

- **HVAC Type**

According to the HVAC system in the home environment, select the HVAC type in Thermostat setting.

Type 1: General Gas/Electric HVAC system

Type 2: HVAC system with Reversing Valve which operates during Cooling (Heat Pump “O”)

Type 3: HVAC system with Reversing Valve which operates during Heating (Heat Pump “B”)

- **Remote Control**

After the Thermostat joins a ZigBee network, you can control the Thermostat via ZigBee network coordinator or gateway. Please refer to your ZigBee coordinator/gateway manual for more information.

The following functions are only available for setting via ZigBee coordinator and gateway:

- **Schedule:**

You can only program Schedule configuration via ZigBee network coordinator/gateway.

Schedule Setting: Up to 5 schedules can be programmed for every weekday with Mode, Setpoint and Start time.

Schedule Control:

Normal - The Thermostat will execute programmed schedule setting accordingly.

Hold – The Thermostat will bypass currently timed schedule and perform the next schedule when it begins

No Schedule – The Thermostat will not execute any set schedule until it is set to Normal again.

- **Temperature Detection**

- The Thermostat has built-in temperature sensors and will display the temperature reading on the LCD display
- The Thermostat will transmit temperature signals regularly according to setting. The factory default interval is 10 minutes.
- When the temperature changes by +/- 2°C, the Thermostat will also transmit a signal.
- You can also press the ZigBee Network Button once to transmit a temperature signal manually.

- **Supervision**

The Thermostat will transmit a supervision signal every 10 minutes along with the temperature, current mode and set point information to report its condition regularly.

ZigBee Network Setup

- **ZigBee Device Guideline**

ZigBee is a wireless communication protocol that is reliable and has low power consumption and high transmission efficiency. Based on IEEE802.15.4 standard, ZigBee allows a large amount of devices to be included in a network and coordinated for data exchange and signal transmission.

Due to the fundamental structure of ZigBee network, ZigBee device will actively seek and join network after powering on. Since performing a task in connecting network may consume some power, it is required to follow the instructions to avoid draining battery of a ZigBee device

- Ensure your ZigBee network router or coordinator is powered on before inserting battery into the ZigBee device.
- Ensure the ZigBee network router or coordinator is powered on and within range while a ZigBee device is in use.
- Do not remove a ZigBee device from the ZigBee network router or coordinator without removing the battery from a ZigBee device.

- **Joining the ZigBee Network**

As a ZigBee device, the Thermostat needs to join a ZigBee network to for user to control it remotely. Please follow the steps bellow to join the Thermostat into the ZigBee network.

1. Remove the Thermostat back cover and insert 2 AA Alkaline batteries to power up the Thermostat.
2. Press and hold the ZigBee network button for 10 seconds then release to join ZigBee network. Please make sure the permit-join feature on the router or coordinator of your ZigBee network is enabled.
3. Wait for several seconds for the Thermostat to join ZigBee network, if the Thermostat successfully joins a network, the ZigBee connection icon will appear on LCD display.
4. After joining the ZigBee network, the Thermostat will be registered in the security system in the network automatically. Please check the security system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
5. After joining the ZigBee network, if the Thermostat loses connection to current ZigBee network, the ZigBee connection icon will disappear after 10 minutes. Please check the ZigBee network condition and Thermostat signal range to correct the situation.

- **Removing Device from ZigBee Network (Factory Reset)**

To remove the Thermostat from current ZigBee network, the Thermostat must be put to Factory Reset to complete device removal. Factory Reset function will clear the Thermostat of its stored setting information and prompt the device to search for new ZigBee network.

Before removing device, make sure the Thermostat is within current ZigBee network signal range

1. Press and hold the function button for 10 seconds, then release the button to reset Thermostat.
2. Upon reset, the Thermostat will clear current ZigBee network setting and transmit signal to ZigBee coordinator to remove itself from current ZigBee network. It will then actively search for available ZigBee network again and join the network automatically.

Thermostat Mode Setting Reset

The Thermostat mode setting can be reset to factory default by following instruction below:.

1. Remove batteries to power down the Thermostat.
2. Press and hold both Up and Down buttons and insert batteries when holding down the button.
3. Release the buttons after the Thermostat is powered up. The Thermostat setting has been restored to factory default:
 - Mode: Heat
 - Heat set point: 20°C
 - Cool set point: 26°C
 - Away mode heat set point: 10°C
 - Away mode cool set point: 30°C
 - Time: 00:00
 - Time display: 24-hour format

Appendix(For developers only.)

• **Thermostat Cluster ID**

Device ID: ZCL_HA_DEVICEID_THERMOSTAT 0x0301 Endpoint: 0x01	
Server Side	Client Side
Mandatory	
Basic (0x0000)	Identify(0x0003)
Identify(0x0003)	
HVAC THERMOSTAT (0x0201)	
Optional	
None	None

• **Attribute of Basic Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZCLVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x01	M
0x0001	<i>ApplicationVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0x00	O
0x0003	<i>HWVersion</i>	Unsigned 8-bit integer	0x00 –0xff	Read only	0	O
0x0004	<i>ManufacturerName</i>	Character String	0 – 32 bytes	Read only	Climax Technology	O
0x0005	<i>ModelIdentifier</i>	Character String	0 – 32 bytes	Read only	(Model Version)	O
0x0006	<i>DateCode</i>	Character String	0 – 16 bytes	Read only		O
0x0007	<i>PowerSource</i>	8-bit	0x00 –0xff	Read only		M
0x0010	<i>LocationDescription</i>	Character String	0 – 32 bytes	Read / Write		O
0x0011	<i>PhysicalEnvironment</i>	8-bit	0x00 –0xff	Read / Write	0x00	O
0x0012	<i>DeviceEnabled</i>	Boolean	0x00 –0x01	Read / Write	0x01	M

• **Attribute of Identify Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>IdentifyTime</i>	Unsigned 16-bit integer	0x00 –0xffff	Read / Write	0x0000	M

• **Attribute of Thermostat Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>LOCAL_TEMPERATURE</i>	16-bit	0x954d – 0x7fff	Read only	0x0000	M
0x0003	<i>MIN_HEAT_SETPOINT_LIMIT</i>	16-bit	0x954d – 0x7fff	Read only	0x01F4	O
0x0004	<i>MAX_HEAT_SETPOINT_LIMIT</i>	16-bit	0x954d – 0x7fff	Read only	0x0DAC	O
0x0005	<i>MIN_COOL_SETPOINT_LIMIT</i>	16-bit	0x954d – 0x7fff	Read only	0x01F4	O
0x0006	<i>MAX_COOL_SETPOINT_LIMIT</i>	16-bit	0x954d – 0x7fff	Read only	0x0DAC	O
0x0011	<i>OCCUPIED_COOLING_SETPOINT</i>	16-bit	<i>Min Cool Setpoint Limit – Max Cool</i>	Read / Write	0x0A28	M

			<i>Setpoint Limit</i>			
0x0012	<i>OCCUPIED_HEATING_SETPOINT</i>	16-bit	<i>Min Heat Setpoint Limit – Max Heat Setpoint Limit</i>	Read / Write	0x07D0	M
0x001B	<i>CTRL_SEQ_OF_OPER</i>	8-bit Enumeration	0x00 – 0x05	Read / Write	0x04	M
0x001C	<i>SYSTEM MODE</i>	8-bit Enumeration	0x00 – 0x09	Read / Write	0x04	M

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example – use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

