

Temperature Sensor (TSO-9-EL-ZBS)

Introduction

TSO-9-EL-ZBS is wireless temperature sensor with attached temperature probe. It can automatically or manually transmits temperature condition to the coordinator in the ZigBee Network.

The Temperature Sensor 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 Temperature Sensor 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 Temperature Sensor.

Parts Identification

Remove the cover by loosening the bottom fixing screw, the inside of the Temperature Sensor will be revealed as shown.

1. External Temperature Probe Terminal

Connect the External Temperature Probe to this Terminal

2. Tamper Switch

The Tamper switch will be activated when the Temperature Sensor is removed from mounted surface.

3. Internal LED

Flashes – when the Learn Button is pressed.

Flashes twice – when successfully joined a ZigBee network.

Flashes once every 20 minutes – lost connection to its current ZigBee network.

4. Learn Button

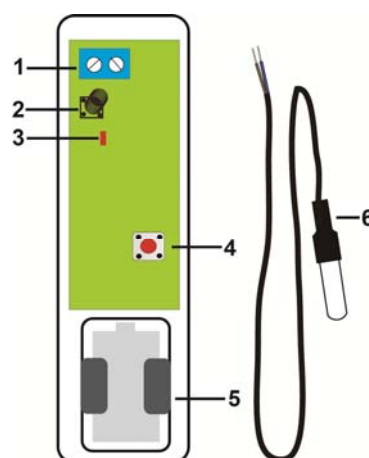
Press the button once to transmit a test / temperature signal to the ZigBee coordinator.

Press and hold the button for 10 seconds then release to reset the Temperature Sensor.

5. Battery Compartment

6. External Temperature Probe

Connect the Probe to External Temperature Probe Terminal



Features

● Temperature Detection

- The Temperature Sensor will transmit temperature signals to the ZigBee coordinator in every 10 minutes regularly.
- If Temperature Sensor fails to receive acknowledgment from the Control Panel, it means that Temperature Sensor has lost connection to the ZigBee coordinator, please check you ZigBee coordinator condition.
- When the temperature changes by +/- 2°C, the Temperature Sensor will also transmit a signal.
- You can also press the Function Button once to transmit a temperature signal manually.
- The temperature detection range is about -30°C ~ 100°C (-22°F ~ 212°F).

● Battery and Low Battery Detection

The Temperature Sensor uses one **CR123 - 3V Lithium battery**. Please always replace battery with the correct size and voltage. When the Temperature Sensor is in low battery status, a low battery signal will be sent to notify the user.

- **Battery Change**
 1. Remove the Cover by loosening the bottom fixing screw.
 2. Remove the Old Battery.
 3. Press the Tamper Switch or the Learn Button a few times.
 4. Fit a new battery into the battery compartment. Please orient the battery according to the correct polarity.
 5. Replace the Cover.

- **Tamper Protection**

- The Tamper Protection is only active after power on the Temperature Sensor for 5 minutes.
- The Temperature Sensor is protected by a tamper switch which is compressed against the mounting surface when mounted. Whenever the Temperature Sensor is removed from mounted location, the tamper switch will be activated and the Temperature Sensor will send a tamper open signal to remind the user of the condition.

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 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.

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 Temperature Sensor needs to join a ZigBee network to transmit temperature signal. Please follow the steps below to join the Temperature Sensor into the ZigBee network.

1. Insert the battery into the battery compartment to power on the Temperature Sensor
2. After powering up, press and hold the learn button for 10 seconds as the Siren resets and starts searching for existing ZigBee network. Please make sure the permit-to-join feature on the router or coordinator of your ZigBee network is enabled.
3. If the Temperature Sensor successfully joins a ZigBee network, the LED Indicator will flash twice to confirm.
4. After joining the ZigBee network, the Temperature Sensor will be registered in the network automatically. Please check your ZigBee coordinator, 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 Temperature Sensor loses connection with current ZigBee network, the LED will flash every 20 minutes to indicate. Please check your ZigBee network condition and Temperature Sensor signal range to correct the situation.

- **Factory Reset**

If you want to remove the Temperature Sensor from current network and join a new network, you need to use the Factory Reset function to clear the Temperature Sensor for its stored setting and information first before it can join another network. To perform Factory Reset:

1. Press and hold the learn button for 10 seconds, release the button when the LED flashes once.
2. The Temperature Sensor has been reset to factory default setting with all its previous network information removed. It will now actively search for available ZigBee network again and join the network automatically.
3. If the Temperature Sensor successfully joins a ZigBee network, the LED Indicator will flash twice.

● **Mounting Methods**

There are two ways to mount the Temperature Sensor, by either Self-adhesive installation or Screw mounting.

● **Self adhesive mounting**

1. Clean the surface with a suitable degreaser.
2. Remove the protective covering from one side of the double-sided adhesive pad and firmly apply to the back of the device.
3. Next remove the other cover and firmly press the item onto the desired location.

<NOTE>

- ☞ Do not use the adhesive pad method of installation on a surface with peeling or cracked paint, or on a rough surface.

● **Screw mounting**

The Base has two knockouts, where the plastic is thinner, for mounting purpose.

To mount the Temperature Sensor

1. Remove the cover
2. Break through the knockouts on the base
3. Using the holes as a template, drill holes in the surface
4. Insert the wall plugs if fixing into plaster or brick
5. Screw the base into the wall plugs
6. Screw the cover back on to its base

● **Using Temperature Sensor with ZigBee Router**

IMPORTANT NOTE

If the Temperature Sensor installation location is away from your system control panel and requires ZigBee routers to improve signal strength. **DO NOT** use a ZigBee Router without backup battery. A ZigBee router without battery will be powered down during AC power failure and the Temperature Sensor connected to the router will lose connection with ZigBee network. You should plan your Temperature Sensor installation location using only ZigBee router with backup battery.

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.

Appendix

(The Appendix information is for developers only.)

- ***Temperature Sensor Cluster ID***

Device ID: Temperature Sensor 0x0302	
Endpoint: 0x01	
Server Side	Client Side
Mandatory	
Basic (0x0000)	None
Identify(0x0003)	
Temperature Measurement(0x0402)	
Optional	
IAS Zone(0x0500)	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 /	0x00	O

				Write		
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 Temperature Measurement Cluster Information**

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>MeasuredValue</i>	Signed 16-bit Integer	MinMeasuredValue to MaxMeasuredValue	Read only	0x00	M
0x0001	<i>MinMeasuredValue</i>	Signed 16-bit Integer	0x954d – 0x7ffe	Read only	-10	M
0x0002	<i>MaxMeasuredValue</i>	Signed 16-bit Integer	0x954e – 0x7fff	Read only	50	M
0x0003	<i>Tolerance</i>	Unsigned 16-bit Integer	0x0000 – 0x0800	Read only	100(1%)	O

Attribute of IAS Zone Cluster Information

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0000	<i>ZoneState</i>	8-bit Enumeration	All	Read only	0x00	M
0x0001	<i>ZoneType</i>	16-bit Enumeration	All	Read only		M
0x0002	<i>ZoneStatus</i>	16-bit bitmap	All	Read only	0x00	M
0x0010	<i>IAS_CIE_ADDRESS</i>	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	<i>ZONE_ID</i>	Unsigned 8-bit integer	All	Read only	0xFF	M