SD-8ZBS-EL Smoke Detector

Introduction

SD-8ZBS-EL is a ZigBee Smoke Detector. It is capable of sending wireless signals to the coordinator in the ZigBee network upon detection of smoke particles. The Smoke Detector is designed to be mounted on ceiling or top of stairwells when smoke would concentrate to raise alarm timely and protect your home from fire hazards.

The Smoke Detector 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 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 Smoke Detector 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 Smoke Detector.
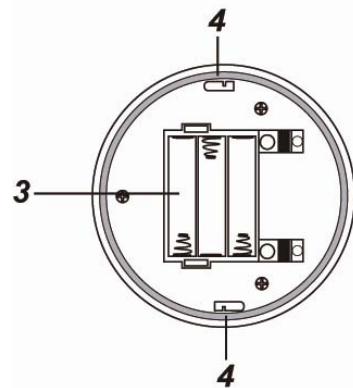
Parts Identification

1. Function Button

- Press the button once to send a supervision signal.
- Press the button once during alarm to silence the alarm.
- Press and hold the button for 10 seconds then release to reset the Smoke Detector.
- Press and hold the button for 20 seconds then release to recalibrate the Smoke Detector.

2. LED indicator

The LED indicator lights up in the following conditions:

- Continuous quick flashes

  The Smoke Detector is alarming.
- Two quick flashes

  The Smoke Detector has successfully joined a ZigBee network after factory reset.
- Flashes once every 20 minutes:

  The Smoke Detector has lost connection to its current ZigBee network.
- Flashes every 2 seconds:

  Battery Exhausted
- Flashes every second:

  The Smoke Detector is performing self-calibration

  or

  The Smoke Detector is in Alarm Silence mode.

Function Button Usage:

- Press the button once to send a supervision signal.
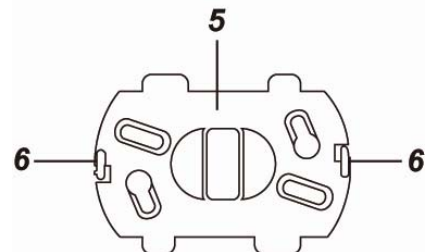- Press and hold the button for 10 seconds then release to reset the Smoke Detector.

3. Battery Compartment

The Smoke Detector is powered by three AA Alkaline 1.5V batteries.

4. Mounting Hole

5. Mounting Bracket

6. Hooks

Features

- ## *Smoke Detection*
  - The Smoke Detector will be activated whenever the smoke concentration exceeds the detection threshold. After activation, the Smoke Detector will transmit signal to the ZigBee network coordinator and raise alarm with its built in buzzer for 10 seconds. The LED Indicator will flash quickly.
  - The Smoke Detector will check smoke concentration every 10 seconds, if the smoke concentration still exceeds detection threshold after 10 seconds, the buzzer will continue to sound alarm and the LED will continue to flash.
  - If the smoke concentration drops below detection threshold, the Smoke Detector will stop alarming and transmit a restore signal

- ## *Alarm Silence*
  - When the Smoke Detector is alarming, you can press the Function button once on Smoke Detector to enter Alarm Silence mode for 10 minutes
  - Under Alarm Silence mode, the Smoke Detector will not sound alarm; the LED Indicator will flash every second to indicate it is under Alarm Silence mode.
  - After 10 minutes, if the smoke concentration still exceeds detection threshold, the Smoke Detector will raise alarm and send alarm signal again.

- ## *Recalibration*
  The Smoke Detector will calibrate its sensor every time when power is applied to ensure optimal smoke sensitivity. After installation, the operation condition of the Smoke Detector may vary after some time, which may affect its smoke detection function. As a result, the user may need to recalibrate the sensor occasionally maintain its effective working condition.

  To recalibrate the Smoke Detector:
  1. Press and hold the function button for 23 seconds.
  2. The Smoke Detector will emit 2 short beeps at after 10 seconds and 3 short beeps after 23 seconds. Keep holding the function button and release until you hear the 3 short beeps after 23 seconds.
  3. The Smoke Detector will enter calibration process. The LED Indicator will flash every second.
  4. After the Smoke Detector finishes recalibration, it will emit two quick beeps to indicate. The LED will turn off.
  5. If calibration process fails, Smoke Detector will emit alarm sound. Please remove and reinsert battery to restart process again.

- ## *Auto-Calibration*
  - After first installation, the Smoke Detector will perform auto-calibration after 4 hours.
  - After the first auto-calibration, the Smoke Detector will perform auto-calibration once every month. During the auto-calibration process, the Smoke Detector will not emit any sound. Each calibration sampling process takes 2 minutes, if the process fails, it will be retried. The Smoke Detector will sample for a maximum of 5 times. If the 5th sampling fails, the LED will flash rapidly and the Smoke Detector will send a calibration fail signal to the ZigBee Network coordinator. To stop the LED from flashing, remove and reload the batteries or start a new calibration process manually. If the manual calibration fails again, Smoke Detector will emit continuous beeps. To stop the beeping sound and the flashing LED, remove and reload the batteries (please wait for 30 seconds after removing batteries before reloading them).
  - When Smoke Detector auto calibration fails, the smoke alarm function will still work normally using the threshold value taken from the last successful calibration.

- ## *Battery and Low Battery Detection*
  - The Smoke Detector uses three 1.5 V Alkaline battery as its power source. The batteries are included in the package.
  - The Smoke Detector feature Low Battery Detection function. When the battery voltage is low, the Smoke Detector will transmit Low Battery signal to the coordinator in ZigBee network.
  - If batteries are not changed after low battery, the Smoke Detector will stop all function when batteries are exhausted and flash LED every 2 seconds to indicate failure.
  - When changing batteries, after removing the old batteries, press the Function Button twice to fully discharge before inserting new batteries.

- *Supervision*

   The Smoke Detector will transmit a supervision signal to report its condition regularly according to user setting. The factory default interval is 30 minutes. The user can also press the Function Button once to transmit a supervision signal manually.

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 Smoke Detector needs to join a ZigBee network to transmit signal when smoke concentration is detected. Please follow the steps bellow to join the Smoke Detector into ZigBee network.
   1. Insert the batteries into the battery compartment to power on the Smoke Detector.
   2. The Smoke Detector will begin warm up for 6 minute, the LED will flash every second.
   3. Joining ZigBee network is allowed during the 6-minute warm up period. Press and hold the function button for 10 seconds and release to search for existing ZigBee network. Please make sure the permit-to-join feature on the router or coordinator of your ZigBee network is enabled.
   4. After joining the ZigBee network, the Smoke Detector will be registered in the network automatically. Please check the ZigBee coordinator, security system control panel or CIE (Control and Indicating Equipment) to confirm if joining and registration is successful.
   5. After the 6-minute warm up period expires, the Smoke Detector will enters calibration process. The calibration process takes about 2-16 minutes; the LED will continue to flash during calibration. Joining ZigBee network is **prohibited** during calibration process.
   6. When calibration is complete, the Smoke Detector will emit 2 beeps and LED will stop flashing to indicate it is now under normal operation.
   7. Under normal operation, if the Smoke Detector loses connection to its current ZigBee network, the LED indicator will flash every 20 minutes to indicate the situation. Please check your ZigBee network condition and Smoke Detector signal range to correct the situation.

- **Factory Reset**

   If you want to remove the Smoke Detector from current network and join a new network, you need to use the Factory Reset function to clear the Smoke Detector of its stored setting and information first before it can join another network. To perform Factory Reset:
   1. Press and hold the function button for 10 seconds, release the button upon hearing two short beeps.
   2. The Smoke Detector 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 Smoke Detector successfully joins a ZigBee network, the LED Indicator will flash twice to indicate.

Installation

- ## *Installation Guideline*
    - It is recommended to install the Smoke Detector at the center of the ceiling, or top of stairwell with at least 60 cm of space between the Smoke Detector and the wall
    - Do not install the Smoke Detector in the following locations:
        - The Kitchen – Smoke from cooking might cause an unwanted alarm.
        - Near a ventilating fan, florescent lamp or air-conditioning equipment – air drafts from them may affect the sensitivity of the detector.
        - Near ceiling beams or over a cabinet – stagnant air in these areas may affect the sensitivity of the detector.
        - In the peak of an "**A**" frame type of ceiling.
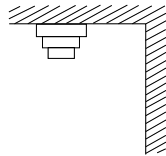

At least 60 cm from the wall
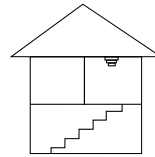
At the top of a stairway

- ## *Mounting the Smoke Detector*

    The Smoke Detector has a mounting bracket for mounting on ceiling.
    1. Use the mounting bracket as template to mark the two holes on ceiling for installing screws
    2. Screw the mounting bracket onto the ceiling according to marked location. Install wall plugs if necessary
    3. Locate the hooks of the mounting bracket and line up the hooks with the mounting holes on the Smoke Detector. Fit the hooks into the mounting holes, then rotate the Smoke Detector counter-clockwise to lock it into the mounting bracket. Mounting the Smoke Detector is now complete.
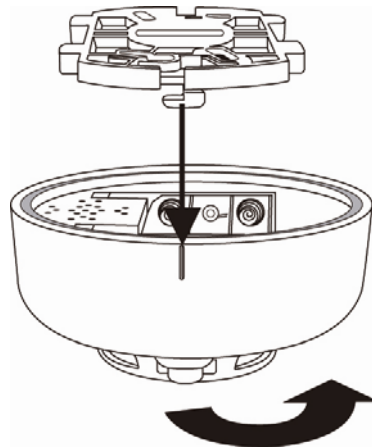
- ## *Using Smoke Detector with ZigBee Router*

    <u>IMPORTANT NOTE</u>

    If the Smoke Detector 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 Smoke Detector connected to the router will lose connection with ZigBee network. You should plan your Smoke Detector installation location using only ZigBee router with backup battery.

Appendix (For developers only)

● *Smoke Detector Cluster ID*

Server Side	Client Side
Device ID: IAS Zone 0x402	
Endpoint: 0x01	
Server Side	Client Side
Mandatory	
Basic (0x0000)	*None*
Identify(0x0003)	
IAS Zone(0x0500)	
Optional	
None	*None*

● *Attribute of Basic Cluster Information*

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

● *Attribute of Identify Cluster Information*

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

● *Attribute of IAS Zone Cluster Information*

Identifier	Name	Type	Range	Access	Default	Mandatory / Optional
0x0001	*ZoneState*	8-bit Enumeration	All	Read only	0x00	M
0x0002	*ZoneType*	8-bit Enumeration	All	Read only		M
0x0003	*ZoneStatus*	16-bit bitmap	All	Read only	0x00	M
0x0010	*IAS_CIE_ADDRESS*	IEEE ADDRESS	Valid 64bit IEEE address	Read / Write		M
0x0011	*ZONE_ID*	Unsigned 8-bit integer	All	Read only	0xFF	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.