

004407 – Z-Wave CO Sensor (US version)

Quick Start

This device is a Z-Wave sensor reporting Carbon Monoxide Danger. Pressing the button 'Inclusion Button' for one second adds (includes) and removes (excludes) the device from/to the Z-Wave network.

Please refer to the chapters below for detailed information about all aspects of the product.

Product description

This product combines a certified carbon monoxide detector with a plug-in Z-Wave module to form a wirelessly reporting smoke sensor plus wirelessly controllable indoor siren. The carbon monoxide detector is certified according to EN 50270:1999, EN 60335-1:1994 as well as EN 50291:2001 and satisfies all contemporary legal requirements.

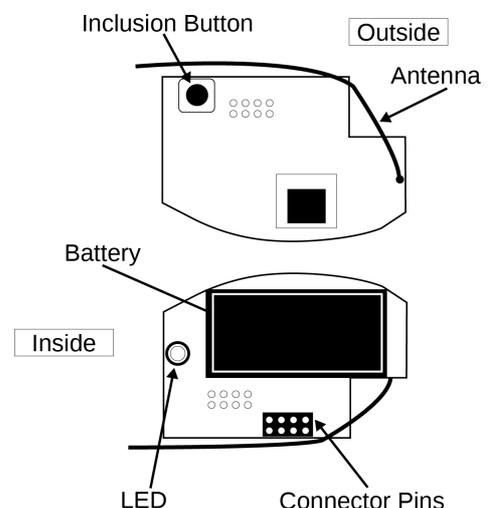
The High-End carbon monoxide detector offers a test button conveniently accessible even with a broom stick when mounted on the ceiling. Three colored LEDs on the device indicate Alarm, Error and Battery Level. The Alarm conditions as well as the actual CO level – measured in ppm – are reported wirelessly using Z-Wave. Additionally a group of actuators can be controlled using the BASIC command class in case the CO alarm triggers. Two configuration parameters define what command to be sent in this case.

The device is a secure Z-Wave Plus device and can be used in one wireless Z-Wave network with other certified devices regardless of origin and brand. It supports secure communication if the central controller supports secure communication as well. Even if included securely the device is able to communicate unsecured with devices included unsecure using the association groups 2. Beside the Carbon monoxide danger alarm the device will also report a tamper alarm if the sensor is removed from the mounting base. As a Z-Wave device it will make use of other mains-operated devices in the network as routers if the wireless situation requires so.

Installation Guidelines

Please refer to the installation guide of the carbon sensor attached for information about how and where the carbon monoxide sensor should be installed. Please note that the carbon monoxide sensor will also work stand-alone even if not Z-wave network is present

- The first step is to mount the mounting base on the desired place in the home using screws.
- Remove the battery isolation strip from the wireless module. The red LED will start blinking.
- Include the Sensor into your existing Z-Wave based Smart Home Network using the 'Inclusion button'.
- Place the Detector on the mounting base and turn clockwise. Now the detector is armed.
- Battery Change: The battery of the wireless module will be empty much earlier than the 10 years soldered in battery of the Sensor. To replace the battery, remove the detector, pull off the wireless module from the smoke sensor. Then you can replace the 1/2 AA battery and re-plug the wireless module.



Behavior within the Z-Wave network

On factory default the device does not belong to any Z-Wave network. The device needs to join an existing wireless network to communicate with the devices of this network. This process is called **Inclusion**. Devices can also leave a network. This process is called **Exclusion**. The primary controller of the Z-Wave network initiates both processes. This controller will be turned into exclusion respective inclusion mode. Please refer to your primary controllers manual on how to turn your controller into inclusion or exclusion mode. Only if the primary controller is in inclusion or exclusion mode, this device can join or leave the network. Leaving the network - i.e. being excluded - sets the device back to factory default.

If the device already belongs to a network, follow the exclusion process before including it in your network. Otherwise inclusion of this device will fail. If the controller being included was a primary controller, it has to be reset first.

Pressing the button 'Inclusion Button' for one second includes the device. If the button is pressed for at least 2 seconds the inclusion will be done without the (*Security Command Class*). A single click on the button will exclude the device.

Operating the device

There is no defined level of Carbon monoxide that will result in an alarm. The danger of CO is a result of the total level of CO in the air plus the duration of exposure. An Z-Wave alarm will be sent out when one of the following conditions where met:

- CO level above 43 ppm for a duration of 60 minutes
- CO level above 80 ppm for a duration of 10 minutes
- CO level above 150 ppm for a duration of 2 minutes

The alarm will be sent to the central controller plus any device listed in the association group 2. Additionally the alarm can be used to switch any other Z-Wave controllable actuator such as a Switch, a Dimmer or even a Door Lock that is placed in association group 3.

The wireless module will also report a low (wireless module) battery warning and a tamper alarm on and off when the mains device is place on or removed from the mounting base. Please note that the battery level of the main detector is not reported since this battery can't be replaced anyway.

Note: All communication of the wireless module is performed with application level security if the device was included securely and all communication partners support secure communication as well. In case a non-secure device is associated for switching on smoke alarm, the smoke detector will detect this and change its communication style with this very device to non-secure. This process happens one time and will take about 20 seconds. This delay will happen on first communication only.

Factory reset

To do a factory reset press the button on the bottom of the device for at least 10 seconds. This procedure should only be used when the primary controller is inoperable.

Firmware Update

Once the firmware update process has started (wakeup first by single push the button) double click the Z-Wave button to confirm firmware update process.

Support for Command Class Basic

The device supports the generic Z-Wave command class "Basic". The device will ignore any SET command but return the status of the sensor on a GET command (triggered=0xff, idle=0x00).

Alarm Messages

The device will issue the following (unsolicited) alarm messages:

- **CO Danger Detected** (this message will also be issued when the Test button is pressed)
- **Low Battery Alarm** (when the battery of the wireless modules goes low)
- **Tamper Detected** (on, when the co detector head is removed from the base; off, when the detector head is mounted to the base)
- **Malfunction** (issued, when the Detector Main Head detect a malfunction of CO detection)

Node Information Frame

The Node Information Frame is the business card of a Z-Wave device. It contains information about the device type and the technical capabilities. The inclusion and exclusion of the device is confirmed by sending out a Node Information Frame. Beside this it may be needed for certain network operations to send out a Node Information Frame.

A simple click on the 'Inclusion Button' sends a NIF.

Associations

Z-Wave devices control other Z-Wave devices. The relationship between one device controlling another device is called *association*. In order to control a different device, the controlling device needs to maintain a list of devices that will receive controlling commands. These lists are called **association groups** and they are always related to certain events (e.g. button pressed, sensor triggers, ...). In case the event happens all devices stored in the respective association group will receive a common wireless command.

Association Groups:

1	Lifeline (max. nodes in group: 10)
2	Switching Command when Alarm (max. nodes in group: 10)

Configuration Parameters

Z-Wave products are supposed to work out of the box after inclusion, however certain configuration can adapt the function better to user needs or unlock further enhanced features.

IMPORTANT: Controllers may only allow configuring signed values. In order to set values in the range 128 ... 255 the value sent in the application shall be the desired value minus 256. For example: to set a parameter to 200 it may be needed to set a value of 200 minus 256 = minus 56. In case of a two byte value the same logic applies: Values greater than 32768 may needed to be given as negative values too.

Value of On-Command (Parameter Number 1, Parameter Size 1)

Value	Description
0 — 99	(Default 99)

Value of Off-Command (Parameter Number 2, Parameter Size 1)

Value	Description
0 — 99	(Default 0)

Command Classes

Supported Command Classes

- Basic (version 1)
- Binary Sensor (version 2)
- Association Group Information (version 1)
- Device Reset Locally (version 1)
- Z-Wave Plus Information (version 2)
- Configuration (version 1)
- Alarm (version 5)
- Manufacturer Specific (version 2)
- Multilevel Sensor (version 5)
- Powerlevel (version 1)
- Firmware Update Meta Data (version 3)
- Battery (version 1)
- Association (version 2)
- Version (version 2)
- Wakeup (version2)

Controlled Command Classes

- Basic (version 1)

Z-Wave Technical Data

Battery Type	2 * AAA resp. ½ AA plus internal Lithium
Frequency	908 MHz
Wireless Range	up to 100 m outdoor, 40 m in buildings
Explorer Frame Support	Yes
SDK	6.51.6
Device Network Role	Sleeping Reporting Slave (SRS)
Device Type	Sensor
Routing	No
Firmware Version	1.0