4.2 CO Alarm Levels and Alarm Mode

CO Alarm Levels

This X-Sense carbon monoxide alarm is programmed to sound an alarm at the following CO concentrations within the periods listed:

70 ppm for 60–240 minutes,

150 ppm for 10–50 minutes,

400 ppm for 4–15 minutes.

When CO is detected and the alarm sounds, the CO concentration will be displayed on the LCD and a blue backlight will be lit. The LED indicator will flash red and the alarm will issue 4 short beeps, repeating the cycle every 5.8 seconds. An alarm push notification will be sent to your smartphone by the app.

Alarm Mode

When the device detects CO and the CO ppm reaches a certain level for a period of time, it will trigger an alarm, sounding 4 beeps every 5.8 seconds, and the LED will flash red. The LCD will light up and display the real-time CO concentration, which updates every 30 seconds.
If the device is connected to the base station, the app will display a "CO Alarm Triggered" notification, and a push notification will be sent to your smartphone. The CO concentration will be shown in both the in-app message and the push notification. You can also view the CO concentration in the history section of the app.
When the carbon monoxide concentration drops below the alarm threshold, the alarm sound will stop. Then, it will automatically enter standby mode. When the alarm ends, an app push notification will be sent to your smartphone.
If the device is operating in interconnected customizable network mode, when a smoke alarm within the network is triggered, the device's LED will alternately flash red and green 3 times. When a carbon monoxide alarm within the network is triggered, the device's LED will flash red 4 times consecutively, followed by the LED flashing green once.

4.3 Peak Concentration Memory and Reset

The peak CO concentration feature is helpful in identifying if there have been any dangerous CO readings since a peak CO concentration reset.
Press the Peak Level Button once and the device will perform a brief test. The LCD backlight will turn on and display the maximum value recorded since the last peak data reset. The "Peak" indicator will appear on the left side of the LCD. The peak data will be shown for 5 seconds. If no further action is taken within those 5 seconds, the device will automatically return to standby mode.
In the example, 300 ppm was the maximum CO concentration recorded since the unit was last reset.
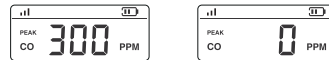
Peak CO Concentration Reset: During the 5 seconds when the LCD displays the peak CO concentration, press and hold the Peak Level Button for 3 seconds, the device will beep, the LED will flash green, and the peak CO concentration will be reset with LCD displaying "0".
NOTES:
1. If the carbon monoxide concentration is lower than 30 ppm, it will not be recorded in the peak CO concentration.
2. To show the peak value, you need to press the Peak Level Button briefly (less than 3 seconds). If you press it for a long time (3 seconds or more), the peak display will not be triggered.

4.4 Memory Mode

If the device has triggered a carbon monoxide alarm, but the CO concentration has decreased and the device has automatically reset the alarm, the device will retain an alarm memory. There will be two different states depending on whether the event occurred within the last 24 hours or more than 24 hours ago.
Within 24 hours: The LED will flash red once every 5 seconds, but no alarm sound will be emitted.

After 24 hours: The device will no longer actively issue any alerts. However, if the Test/Silence Button is briefly pressed, after the self-test is completed, the LED will stay on red for 2 seconds (this effect will not occur if the self-test is done within 24 hours).

When the device has an alarm memory, the user should inspect the area where the alarm is located to identify and resolve any potential safety hazards that may have triggered the alarm, in order to prevent similar dangers from happening again. If the hazard has been resolved, or it is confirmed that the previous alarm was a false alarm, the user can press the test/silence Button on the device 3 times in succession to clear the alarm memory. Once cleared successfully, the device's LED will stay on red for 1 second, indicating that the alarm memory has been cleared.

NOTES:
1. After the device is turned off, it will automatically clear the alarm memory.
2. The device only stores the most recent alarm memory; any new alarm memory will overwrite the previous record.

4.5 Silence Mode

If there is a false alarm, you can temporarily silence it by pressing the Test/Silence Button on the device or in the app. You will receive an instant notification from the app telling you that the device has been temporarily silenced. The LED will flash red 4 times every 5.8 seconds to remind you that the alarm has been silenced. The alarm will automatically exit silence mode after 9 minutes.

During silence mode, if the carbon monoxide concentration remains greater than 70 ppm after 6 minutes, the device will be triggered again; if not, the device will automatically exit the silence mode after 9 minutes.

In the alarm mode, pressing the Test/Silence Button on the initially triggered device will silence all devices in the network (including the base station). Pressing the Test Button on a passively triggered device or the button on the base station will only silence all passively triggered devices (including the base station); initially triggered devices will continue to sound and flash.

If the device is connected to the app, during the alarm mode, you can tap the "Silence" button in the app to stop the beeping sound. The LED will continue to flash red 4 times every 5.8 seconds. Alternatively, you can tap the "Locate" button in the app to silence the base station and all passively triggered devices, leaving only the initially triggered devices sounding and flashing, helping users locate the CO source through the alarm sound.

4.6 Low-Battery Mode

If the battery is low, the unit will beep once, and the LED indicator will flash yellow once every 60 seconds to indicate that the battery needs replacement. A low battery notification will be sent to your smartphone by the app.

If you press the Test Button when the battery is low, the beep will temporarily stop for 10 hours, but the LED flashes yellow once every 60 seconds; if you press the Test Button again, the unit will enter the test mode and then exit silence mode during low battery.

4.7 Fault Mode

When the device sensor fails (including sensor open circuit and short circuit), the LED will flash yellow twice every 60 seconds, accompanied by two alarm sounds.

The fault code E04 indicates a short circuit, while E03 indicates an open circuit.

4.8 End-of-Life Mode

Once the maximum lifetime (10 years) is reached, the alarm will emit 3 beeps and the LED indicator will flash yellow 3 times every 60 seconds. This end-of-life signal can be silenced temporarily for 22 hours by pressing the Test Button. During the silence period, the LED will flash yellow 3 times every 60 seconds.

The end-of-life silence feature can only be used for a total of 30 days. After 30 days, the end-of-life signal cannot be silenced. During this end-of-life hush period, your alarm continues monitoring CO and providing protection as usual.

4.9 Long-Term Low-Level Monitoring

Long-term exposure to low levels of CO can be harmful to health, potentially causing chronic hypoxia, neurological effects, cardiovascular stress, weakened immune function, and reproductive and developmental issues. Therefore, if the device detects that the low-level CO concentration exceeds the specified thresholds over a certain period, an app notification will be sent to the user, and a corresponding icon will appear in the device list to provide a timely reminder.

Based on the recommendations of OSHA, NIOSH, the German MAK Commission, EU-OSHA, HSE, EPA, ASHRAE, and other organizations, the app will send notifications when the following thresholds are exceeded:

1. 7-day average concentration exceeds 9 PPM (the monitoring period is adjustable, with default setting of 7 days; available options include 1 day, 3 days, 7 days, 14 days, and 30 days).

2. 8-hour time-weighted average (TWA) concentration exceeds 30 PPM.

NOTES:

1. If the CO concentration reaches the threshold in any monitoring cycle, you will receive an app notification in every cycle.

2. The indicator icon in the device list will remain visible until the environmental CO concentration returns to acceptable levels. If the CO concentration continues to exceed the threshold, the icon will persist.

3. This feature can be enabled or disabled in the app settings, and it is enabled by default.

5 Daily Maintenance

To keep your alarm in good working order, you should adhere to the following steps:

1. Test the alarm once a week by pressing the Test/Silence Button.
2. Vacuum the alarm cover once every three months to remove any accumulated dust.
3. Never use detergents or solvents to clean the alarm. Chemicals can permanently damage or temporarily contaminate the sensor.
4. Avoid spraying air fresheners, hair spray, paint or other aerosols near the alarm.
5. Do not paint the unit. Paint may clog the openings to the sensing chamber and prevent the unit from operating properly.

⚠ **WARNING:**DO NOT TAMPER WITH THE APPARATUS, AS THERE IS A RISK OF ELECTRIC SHOCK OR MALFUNCTION.

6 Audio-Visual Indicators

While detecting CO, the LCD will display different indicators to inform you of the alarm status, as shown below:

Mode		LCD Display	LED Indicator	Audible Alarm	Remarks
Powering On		- - - (Backlight on)	Runs through 2 cycles (red/yellow/green/blue) in sequence.	1 quick beep.	Make sure the battery insulating film is removed and the device is turned on.
Standby Mode		CO 0 PPM (No backlight)	Flashes green once every 60 seconds.	None.	None.
Pairing Mode (Connect to Base Station)	Pairing Period	CO 0 PPM (Backlight on)	Flashes blue rapidly.	1 quick beep.	Pairing transmission status.
	Successfully Connected	CO 0 PPM (No backlight)	Stops flashing blue.	1 quick beep.	The device is successfully connected to the base station.

Pairing Mode (Devices Interconnecting)	(Backlight on)	Flashes blue slowly.	1 quick beep.	Pairing status
	(Backlight on)	Flashes blue rapidly.	1 quick beep.	Pairing transmission status.

Alarm Mode	(Backlight on) Displays actual values.	A CO concentration ranging from 70 to 999 ppm has been present for a certain time period. And the LED indicator flashes red 4 times every 5.8 seconds.	4 quick beeps repeating every 5.8 seconds.	Dangerous CO concentration is detected, and has reached the alarm status. Please refer to "**What to Do When the Alarm Sounds**".
	(No backlight) Displays actual values.	A CO concentration level ranging from 70 to 999 ppm has been detected, but for less than the required detection period.	None.	Dangerous CO concentration is detected, but has not reached the alarm status. Potential dangerous CO conditions exist. Please locate the CO source immediately.

Mode	Sub-mode	Display	LED	Buzzer	Description
Test Mode	Test a single unit	CO 0 PPM (Backlight on)	Flashes red once first, then 2 sets of 4 red flashes.	The buzzer beeps once first, then 2 sets of 4 quick beeps.	The LED flashes red and the buzzer beeps simultaneously.
	Test all interconnected units	CO 0 PPM (Backlight on)	Flashes red once every second.	Continuous short beeps.	Initially triggered alarm. Hold down the Test/Silence Button on one unit in the network.
		CO 0 PPM (Backlight on)	Flashes alternately red and green once every second.		Other passively triggered alarms in the network.
Peak Level Check		Peak Level: CO 300 PPM Clear to zero: CO 0 PPM (Backlight on)	None.	None.	LCD backlight remains lit for 5 seconds; if the Peak Level Button is pressed and held for more than 3 seconds during the 5-second display, the device emits a beep, the LED flashes green once, and the existing recorded data is reset to zero. The peak CO level recorded since the previous reset.

Mode	Display	LED	Buzzer	Description
Silence Mode	CO 124 PPM (Backlight on) Displays actual values.	Flashes red 4 times every 5.8 seconds.	None.	CO silence mode: After 9 minutes, the unit will exit silence mode.
	CO Lb / CO 0 PPM (No backlight)	Flashes yellow once every 60 seconds.	None.	Silence mode during low battery: After 10 hours, the unit will exit silence mode.
	CO End PPM (No backlight)	Flashes yellow 3 times every 60 seconds.	None.	Silence mode at the end of the cycle: After 22 hours, the unit will exit silence mode.
Low Battery	CO Lb / CO 0 PPM (No backlight)	Flashes yellow once every 60 seconds.	1 quick beep every 60 seconds.	The battery must be replaced immediately.

Fault Mode	`CO E03 PPM` `CO E04 PPM` (No backlight)	Flashes yellow twice every 60 seconds.	2 beeps every 60 seconds.	If the "E03/E04" message is still displayed, the unit has malfunctioned and must be replaced immediately.
End-of-Life Mode	`CO End PPM` (No backlight)	Flashes yellow 3 times every 60 seconds.	3 quick beeps every 60 seconds.	Replace the unit immediately.
Memory Mode	Within 24 hours	`CO 0 PPM` (No backlight)	Flashes red once every 5 seconds.	None.	The device has triggered an alarm within 24 hours.
	After 24 hours	`CO 300 PPM` (No backlight)	Stays on red for 2 seconds.	None.	This function can only be activated via a self-test mode if the device detected an alarm event at least 24 hours earlier.

7 Troubleshooting

Serial Number	Problem	Possible Causes	Solution
1	The device cannot be powered on and the LCD shows nothing.	The device isn't powering on properly.	Open the battery compartment and remove the battery insulating film; if the battery ran out, please replace it.
2	After the test is completed, instead of displaying "PAS", it shows "Lb", "E03/E04", or "End".	Self-test abnormal.	Look at what's shown on the LCD to figure out why there's a problem. It might be because the battery is low, there's an error, or the device has reached its end of life.
3	There is no response when the Test/Silence Button or Peak Level Button is pressed.	The button is not pressed properly.	Make sure the button is pressed firmly. When the button is pressed properly, you will hear beeps or the LCD backlight will turn on.
		The Peak Level Button was held down for an extended period; it only works when pressed briefly.	Press the Peak Level Button briefly, do not hold it down.
4	After the device detects CO, pressing the Peak Level Button again still shows a concentration of "0".	When the CO concentration is below 30 ppm, it will not be recorded in the historical peak data.	None.

5	The LCD no longer displays numerical values, instead showing "Lb", while the LED flashes yellow once every 60 seconds paired with a single alarm sound.	When the battery voltage is below the threshold, the product enters low battery warning mode.	Replace the battery.
6	The LCD no longer displays numerical values, instead showing "E03" or "E04", while the LED flashes yellow twice every 60 seconds paired with two alarm sounds.	The device malfunctions, displaying "E04" for short circuit and "E03" for open circuit.	Replace the device.
7	The LCD no longer displays numerical values, instead showing "End", while the LED flashes yellow 3 times every 60 seconds paired with 3 alarm sounds.	The device has reached its end of life.	Replace the device.

8	In the presence of a CO environment, the device is not triggered.	The CO concentration is not high, or the duration of exposure is insufficient to trigger an alarm.	Ensure there is a sufficient CO concentration and maintain exposure for an adequate duration.
		The device is in a fault state.	Check if the corresponding error code appears on the LCD. If so, the device needs to be replaced.
9	The device shows a reading of "0" on the LCD in the presence of a CO environment.	The LCD does not display the specific data when the CO concentration is below 30 ppm.	None.
10	The app prompts an operation failure.	The battery ran out.	Replace the battery.
		The base station is not within the network coverage of the router.	The distance between the base station and the router should be within 164 ft (50 m), Please ensure that the base station is always within the network coverage of the router.
		The communication between the alarm and base station is not stable or they are too far apart.	Reduce the obstacles between the alarm and base station. The maximum distance between them in an open environment is 1,640 ft (500 m).
		The network connection of the router and the mobile phone is abnormal.	Make sure the network connection of the router and the mobile phone is working normally.

		The base station's Wi-Fi connection is disconnected.	Make sure that the router network connected to the base station is working normally.
11	The app shows that the base station is offline.	The base station is powered off.	Check that the base station is properly connected to the power supply.
12	The app shows the carbon monoxide alarm is offline.	The battery ran out.	Replace with a new battery.
		The communication between the carbon monoxide alarm and the base station is obstructed or the distance is too far.	Reduce obstacles between the carbon monoxide alarm and the base station, including metal doors and thick walls. The maximum allowable distance between carbon monoxide alarm and the base station in an open environment is 1,640 ft (500 m).
13	The LCD shows the concentration value, but the app neither pushes notifications nor shows the concentration value.	The CO concentration is below 100 ppm and has not yet reached the alarm threshold duration.	To prevent frequent pre-alarm notifications from disturbing customers and to save battery power, the device will not send pre-alarm notifications or display concentration values in the app when CO concentration is below 100 ppm. However, if the CO concentration remains below 100 ppm but reaches the alarm duration threshold, the carbon monoxide alarm will still be triggered and send normal alarm notifications.

8 Limitations of CO Alarm

1. CO alarms may not wake up all individuals. If children or others do not readily awaken to the sound of the CO alarm, or if there are infants or family members with mobility limitations, make sure that someone assists them in the event of an emergency.
2. This CO alarm will not sense carbon monoxide that does not reach the sensor. It will only detect CO that reaches the sensor. CO may be present in other areas. Doors or other obstructions may affect the rate at which CO reaches the CO alarm. For this reason, if bedroom doors are usually closed at night, it is recommended that you install a CO alarm in each bedroom and in the hallway between them.
3. CO alarms may not sense CO on another floor of the house. For example, a CO alarm on the second floor, near the bedrooms, may not sense CO in the basement. For this reason, one CO alarm may not give an adequate warning. Complete coverage is recommended by placing CO alarms on each floor of the house.
4. CO alarms may not be heard. The alarm buzzer noise level is over 85 dB at a distance of 3 m (10 feet). However, if the CO alarm is installed outside the bedroom, it may not awaken a sound sleeper or one who has recently used drugs or has been drinking alcohol. This is especially true if the door is closed or only partially open. Even persons who are awake may not hear the alarm horn if the sound is blocked by distance or closed doors. Noise from traffic, stereos, radios, televisions, air conditioners, or other appliances may even prevent alert persons from hearing the alarm horn. This CO alarm is not intended for people who are hearing impaired.
5. CO alarms are not a substitute for a smoke alarm. Although fire is a source of carbon monoxide, this CO alarm does not sense smoke or fire. This CO alarm senses CO that may be escaping unnoticed from malfunctioning furnaces, appliances, or other possible sources of incomplete combustion. The installation of a smoke alarm is required for an early warning of fire.
6. CO alarms are not a substitute for life insurance. Though these CO alarms warn against increasing CO levels, we do not warrant or imply in any way that they will protect lives from CO poisoning. Homeowners and renters must still insure their lives.
7. CO alarms have a limited life. Although the CO alarm and all of its parts have passe many stringent tests and are designed to be as reliable as possible, any of these parts could fail at any time. Therefore, you are strongly recommended to test your CO alarm weekly.
8. CO alarms are not foolproof. Like all other electronic devices, CO alarms have limitations. They can only detect CO that reaches their sensors. They may not give early warning of rising CO levels if the CO is coming from a remote part of the house, or is at some distance from the CO alarm.

9 Statement

FCC Statement

1.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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Note: This equipment has been tested and found to comply with the limits for a Class B digital device. 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 or more 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.

3. Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

4. The distance between user and products should be no less than 20 cm.

ISED Statement:

English: This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.The digital apparatus complies with Canadian Canadian CAN ICES-3 (B)/NMB-3(B).

Radiation Exposure Statement

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

French: Cet appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux CNR exempts de licence d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes :

(1) Cet appareil ne doit pas causer d'interférences.

(2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil. L'appareil numérique est conforme à CAN CAN ICES-3 (B) / NMB-3 (B).

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environne ment non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

Environmental Protection

The crossed-out wheeled-bin symbol on your product, literature, or packaging reminds you that all electrical and electronic products, batteries, or accumulators must be taken to designated collection locations at the end of their working life. Do not dispose of these products as unsorted municipal waste. Dispose of them according to the laws and rules in your area.

10 Manufacturer and Service Information

X-Sense Electronics Co., Ltd.
Address: Room 402, Building 4, No. 9, Jinshagang 1st Road, Shixia Village, Dalang Town, Dongguan City, 523750 Guangdong, P.R. China
Email: support@x-sense.com
Website: www.x-sense.com