



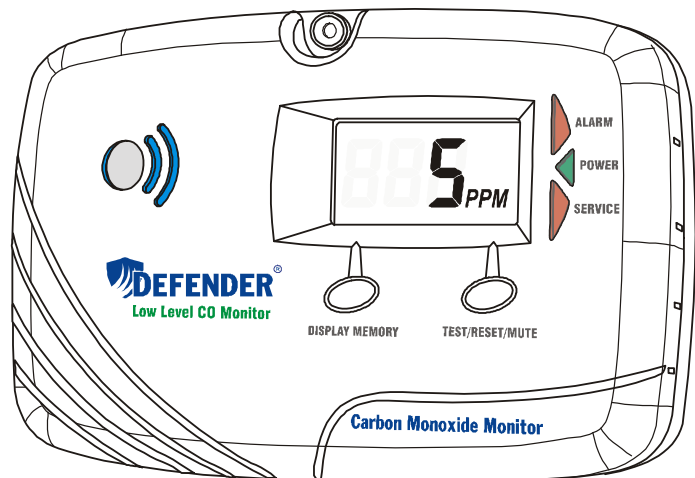
Low Level CO Monitor

Owner's Manual

Sealed Lithium Battery Powered

LL6270

Sealed Lithium Battery Powered
Low Level CO Monitor with LCD
Digital Display, Single Station



The UL 2034 standard for residential carbon monoxide (CO) alarms does not permit listed CO alarms to automatically display or alarm at CO levels below 30 ppm. The Defender LL6270 is designed to provide added protection for older adults, pregnant women, young children, and persons with medical conditions who may be more vulnerable to lower CO levels, and is not UL listed. When installed in residential applications, this monitor should supplement, not replace, a UL listed CO alarm.

ATTENTION: Please read all instructions before installation and save this manual for future reference.

Manual P/N: OM3-6270-90


2024-10-02

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1. IMPORTANT MESSAGE AND INSTRUCTIONS

 **CAUTION!** THIS MONITOR WILL ONLY INDICATE THE PRESENCE OF CARBON MONOXIDE GAS AT THE SENSOR. CARBON MONOXIDE GAS MAY BE PRESENT IN OTHER AREAS. THIS CARBON MONOXIDE MONITOR IS DESIGNED TO DETECT CARBON MONOXIDE GAS FROM ANY SOURCE OF COMBUSTION. IT IS NOT DESIGNED TO DETECT SMOKE, FIRE OR ANY OTHER GAS. THIS DEVICE IS DESIGNED TO HELP PROTECT INDIVIDUALS FROM THE EFFECTS OF CHRONIC EXPOSURE TO LOW LEVELS OF CARBON MONOXIDE, THOUGH IT MAY NOT FULLY SAFEGUARD INDIVIDUALS WITH SPECIFIC MEDICAL CONDITIONS. IF IN DOUBT, CONSULT A MEDICAL PRACTITIONER.

 **CAUTION!** CO detection is best achieved by the installation of CO monitors and alarms in all conditioned areas and rooms of the building.

IMPORTANT! This monitor must be replaced after five years from installation date. Write the replacement date on the “REPLACE BY” label located on the bottom of the monitor.

IMPORTANT! *If service is required, do not try to repair this CO monitor yourself. Refer to the instructions in Section 14 for service.*

Add the telephone numbers of the local emergency service provider and a qualified technician to the self-adhesive labels provided. Place one label next to the monitor, and the other label near a source of fresh air where you plan to gather when the carbon monoxide monitor signals are activated.

After installation is completed, **TEST** the monitor by pressing the **TEST/RESET/MUTE** button for at least 2 seconds. Detailed testing instructions are outlined in Section 9.

DO NOT TRY TO TEST THIS MONITOR IN ANY OTHER WAY: If no alarm sounds, or low or erratic sound emits from the monitor during a test, the unit may be defective and should be returned for service. Refer to Sections 14 and 16 for details.

CLEANING THE MONITOR: You can clean the monitor by using a vacuum cleaner brush to vacuum around the openings on the monitor. The exterior of the monitor may be wiped with a cloth slightly dampened with water only. After cleaning, confirm that the LCD displays [**0 PPM**], and test the monitor by operating the **TEST/RESET/MUTE** button.

DO NOT PAINT ON OR NEAR THE MONITOR: Paint can damage the sensor or block the vents affecting the monitor function.


DO NOT SPRAY AIR REFRESHENER, CLEANING SUPPLIES, OR INSECT KILLER ON OR NEAR THE MONITOR: Certain aerosol chemicals can damage the sensor and cause improper operation. Ensure the building is well-ventilated when using cleaning supplies or similar contaminants.

2. WARNING MESSAGES

 **WARNING!** Actuation of this device indicates the presence of carbon monoxide (CO) which can KILL YOU.

 **WARNING!** Test the CO monitor at least once a week

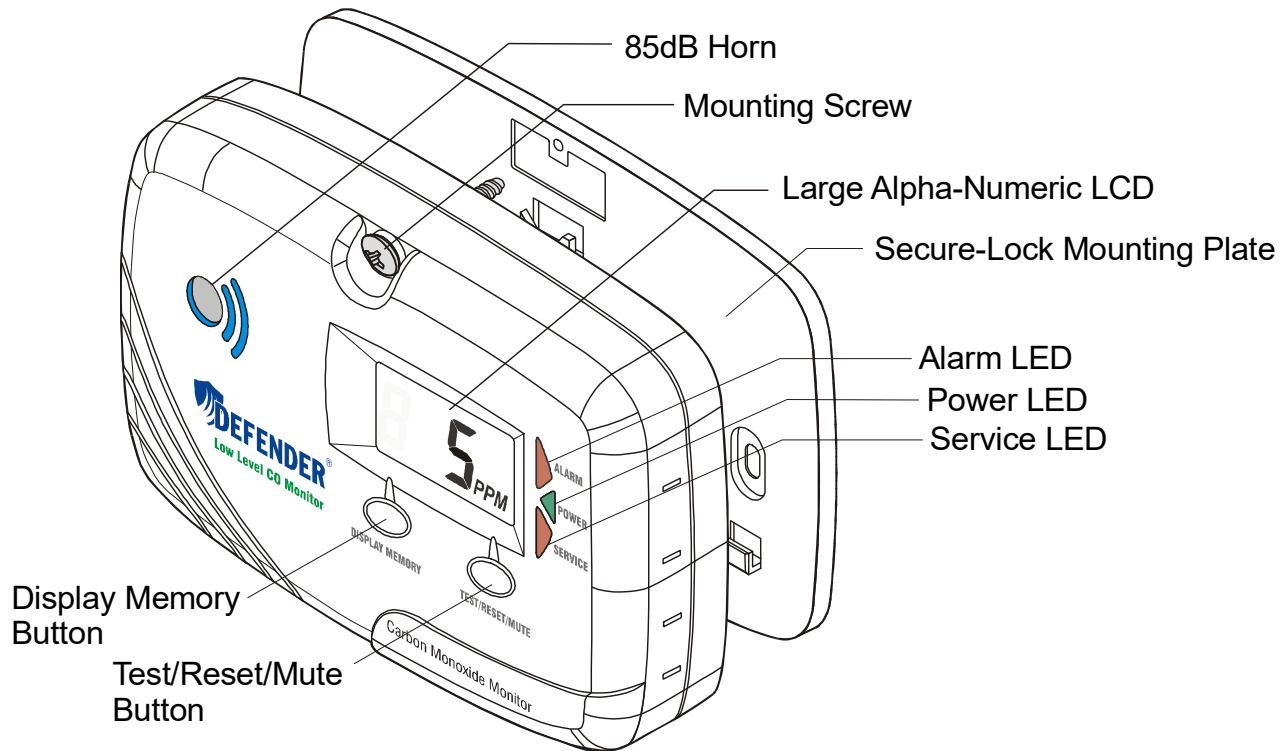
 **WARNING!** Test the CO monitor immediately after the building has been vacant.

 **WARNING!** The loudness of the alarm sound may cause you to feel uncomfortable. Cover the horn opening with the palm of your hand to reduce the volume while testing the monitor.

 **WARNING!** Constant exposure to high or low temperature, or high humidity, may shorten battery life.

3. FEATURES AND SPECIFICATIONS

- Low Level Carbon Monoxide Monitor
- Factory Sealed Lithium Batteries with Soldered Connections
- Accurate and Reliable Water-Based Electrochemical Sensor
- Integrated Filter for Removing Nuisance Gases
- Samples for Carbon Monoxide (CO) Every 5 Seconds
- Large Alpha-Numeric LCD Readout
- Continuously Displays CO Levels Detected of 5 ppm or more
- Automatic Visual Alert Signals at 9 ppm
- Automatic Audible and Visual Alarm Signals at 15 ppm
- Manually Displays Peak CO Levels Detected from 5 to 500 ppm
- Manually Displays Duration of Peak CO Level from 1 to 999 minutes
- Separate Memory and Test Buttons
- Separate Alarm, Power and Service LED's
- Automatic and Manual Battery Activation
- Self-Diagnostic Circuitry and Sensor Life Monitor
- Secure Mounting System
- Complies with ACGIH, NIOSH and OSHA Exposure Limits
- Three Year Limited Warranty for Monitor and Batteries



SPECIFICATIONS

Visual CO Alert Signals

5 - 500 PPM within 1 minute of detection:

- LCD continuously displays the current CO level detected of 5 ppm or higher.
- LCD flashes [**500 PPM**] when CO levels detected above 500 ppm.

9 - 14 PPM within 10 minutes of detection:

- **ALARM** red LED flashes 4 times every minute.
- Alert signal can be suspended for 8 hours by pressing the **TEST/RESET/MUTE** button.

15 - 500 PPM at any time detected:

- **ALARM** red LED flashes 4 times every minute.
- Alert signal cannot be suspended by pressing the **TEST/RESET/MUTE** button.

Visual and Audible CO Alarm Signals

15 - 24 PPM within 60 minutes of detection:

- Beeps 4 times every minute
- **ALARM** red LED flashes in sync with beep.

25 - 149 PPM:

- 25 - 49 PPM within 30 minutes of detection
- 50 - 99 PPM within 15 minutes of detection
- 100 - 149 PPM within 5 minutes of detection
- Beeps 4 times every 6 seconds for 5 minutes, then beeps 4 times every minute
- **ALARM** red LED flashes in sync with beep.

150 - 500 PPM at any time detected:

- Beeps 4 times every 6 seconds for 5 minutes, then beeps 4 times every 20 seconds
- **ALARM** red LED flashes in sync with beep.

Audible Mute Duration:

15 - 24 PPM: Mute button silences audible alarm signal for 8 hours; **ALARM** red LED continues to flash 4 times every minute. Mute is overridden and audible signal reactivated within 1 minute if CO level detected rises above 24 ppm

25 - 49 PPM: Mute button silences audible alarm signal for 5 minutes; **ALARM** red LED continues to flash 4 times every minute. Mute is overridden and audible signal reactivated within 1 minute if CO level detected rises above 49 ppm

50 - 99 PPM: Mute button silences audible alarm signal for 5 minutes; **ALARM** red LED continues to flash 4 times every minute. Mute is overridden and audible signal reactivated within 1 minute if CO level detected rises above 99 ppm

100 - 149 PPM: Mute button silences audible alarm signal for 5 minutes; **ALARM** red LED continues to flash 4 times every minute. Mute is overridden and audible signal reactivated immediately if CO level detected rises above 149 ppm

150 - 500 PPM: Mute function is disabled

Sensor Type:

Electrochemical

Operating Temperature and Humidity:

40°F to 100°F @ 10% to 95% RH

Audible Signal:

Buzzer Horn Sounds 85 dB at 10 feet

Visual Signals:

- **POWER** green LED Indicates Low Power
- **ALARM** red LED Indicates CO Alert or Alarm
- **SERVICE** red LED Indicates Service Required

Detection Frequency:

Samples for CO every 5 seconds

LCD Digital Display:

- Automatically Displays Current CO Level Detected from 5 to 500 ppm
- Manually Display Peak CO Level Detected within last 7 Days from 5 to 500 ppm
- Manually Display Duration of Peak CO Level from 1 to 999 minutes
- Display Resolution 1 ppm
- Display Accuracy $\pm 15\%$, plus $\pm 2\%$ each succeeding year, or 5 ppm, whichever is greater, from 20 to 500 ppm @ 50% RH, 72°F $\pm 5^\circ$
- Because CO sensors typically lose sensitivity over time, it is recommended that this monitor be replaced every three years in order to maintain display accuracy
- Sensor and display accuracy may be affected by environmental conditions and other circumstances beyond manufacturer's control

Sensor Life Monitor

Activates sensor expiration signal after five years of operation

Factory Sealed Lithium Batteries

Two non-removable, non-replaceable lithium batteries for up to five years of operation under normal conditions

Electrical Rating:

6VDC

4. INFORMATION ABOUT CARBON MONOXIDE

WHAT IS CARBON MONOXIDE?

Carbon monoxide (CO) is a highly toxic, invisible, odorless, tasteless gas.

HOW IS CO GENERATED?

Carbon monoxide is generated through incomplete combustion of fuel in various appliances. Poorly ventilated furnaces, boilers, water heaters, space heaters, fireplaces and wood burning stoves are the major cause of high CO levels in a building. Automobile and small engine exhaust are another source of CO.

HOW DOES CO POISON PEOPLE?

The human body depends on oxygen for the burning of fuel (food) to provide us with the energy that allows our cells to live and function. Oxygen makes up approximately 21% of the atmosphere and enters our lungs when we breathe. In our lungs the oxygen combines with the hemoglobin in the blood (oxyhemoglobin), and is carried in the blood stream throughout the body where it releases oxygen to the cells.

Carbon monoxide is dangerous because it bonds more tightly to the hemoglobin (carboxyhemoglobin, COHb) than oxygen does. When CO combines with hemoglobin, the hemoglobin's ability to combine with oxygen is lost. As the COHb concentration rises, people become nauseous, unconscious and ultimately die (see below).

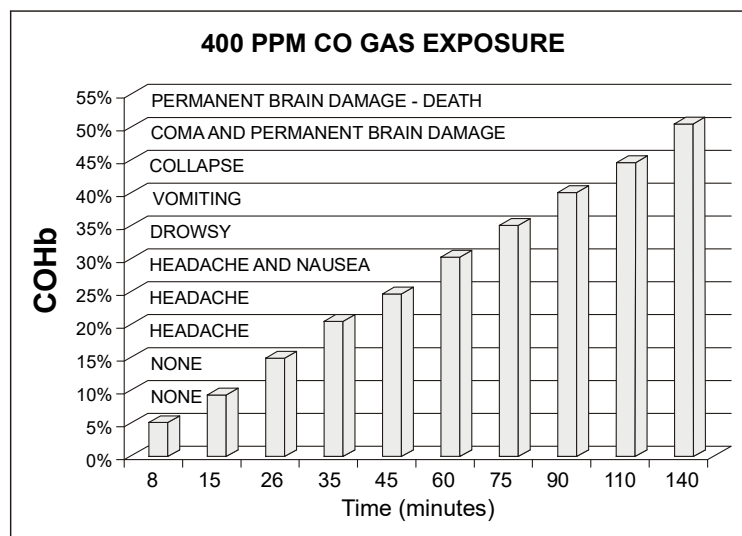
WHAT ARE THE SYMPTOMS OF CARBON MONOXIDE POISONING?

Many people often confuse carbon monoxide poisoning with the flu due to their similar initial symptoms. Different concentrations of CO over various lengths of time cause different symptoms.

The following symptoms may indicate *CARBON MONOXIDE POISONING* and should be discussed with EVERYONE.

MILD EXPOSURE:	Slight headaches, nausea, vomiting, running nose, sore eyes, fatigue (often described as "Flu-like" symptoms).
MEDIUM EXPOSURE:	Severe throbbing headache, dizziness, drowsiness, confusion, fast heart rate.
EXTREME EXPOSURE:	Unconsciousness, convulsions, cardiorespiratory failure, brain damage, death

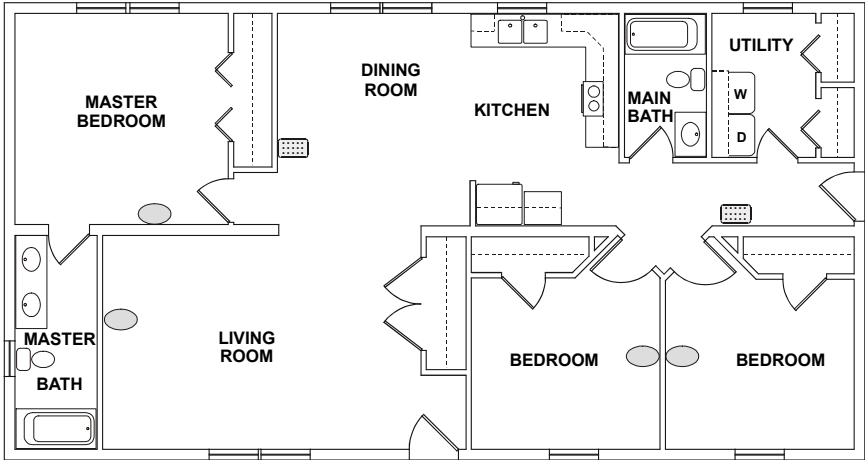
Many cases of CARBON MONOXIDE POISONING indicate that while victims are aware they are not well, they become so disoriented that they are unable to save themselves by either exiting the building or calling for assistance. The elderly, pregnant women, young children, and persons with medical conditions are typically the first affected.





5. RECOMMENDED LOCATION OF MONITORS

CO poisoning can occur anywhere in the building. CO monitors should be installed on an interior wall, five feet off the floor, and on every heated and air conditioned level of the building. At the minimum, install CO monitors:

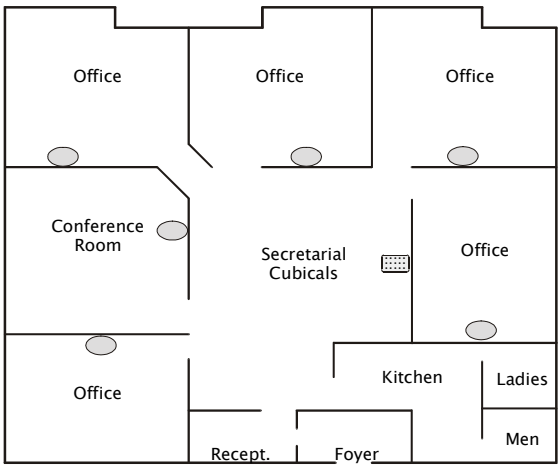
1. On every floor, and inside or near every area or room that may be occupied.
2. Inside any room where someone may sleep with the door closed, or that is occupied by individuals more vulnerable to CO poisoning, such as older adults, pregnant women, young children, and persons with medical conditions.
3. Near the entry to any room that contains combustion equipment.



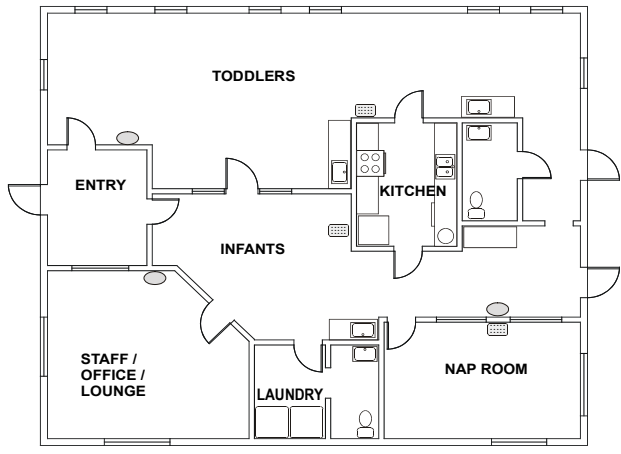
 Recommended CO monitor location for minimum protection

 Additional CO monitor location for added protection

HOUSE



OFFICE



DAY CARE

6. LOCATIONS TO AVOID

NEAR A COOKING AREA: Do not install the monitor within five feet of any cooking appliances. CO may be generated during cooking and cause nuisance alarms. Also, cooking grease buildup can lead to monitor failure. Monitor near commercial cooking area should be cleaned at least once a month, or more frequently if necessary.

WITHIN FIVE FEET OF A FURNACE, BOILER, WATER HEATER, OR SPACE HEATER: These devices often spill out small amounts of CO when they first turn on.

IN GARAGES: Automobile exhaust contains CO and can trigger the alarm.

IN DUSTY AREAS: Dust accumulation can impair the monitor's functionality.

IN CLEANING SUPPLY ROOMS: Chemicals and painting supplies may cause false alarms.

IN UTILITY OR BATH ROOMS: Avoid installation inside or within three feet of rooms with a bathtub, shower, spa or washer/dryer. Excessive moisture may trigger false alarms.

IN VERY HOT OR COLD AREAS: Avoid installing the monitor on exterior wall or in areas below 40°F or above 100°F.

IN DEAD AIR SPACE: Do not install monitor within one foot of where wall meets the ceiling or floor.

IN HAZARDOUS LOCATIONS: This monitor is not suitable for installation in a hazardous location, as defined in the National Electrical Code.

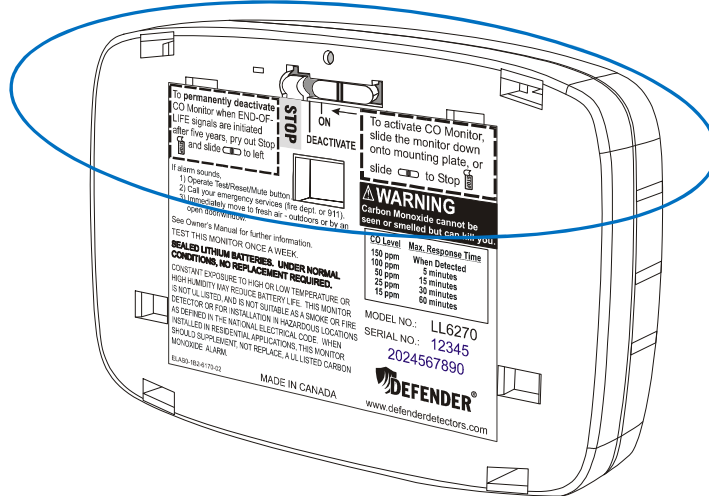
NEAR WIRELESS DEVICES: Do not install the monitor within one foot of wireless devices. Radio Frequencies (RF) may interfere with the CO monitor's operation.

7. INSTALLATION INSTRUCTIONS

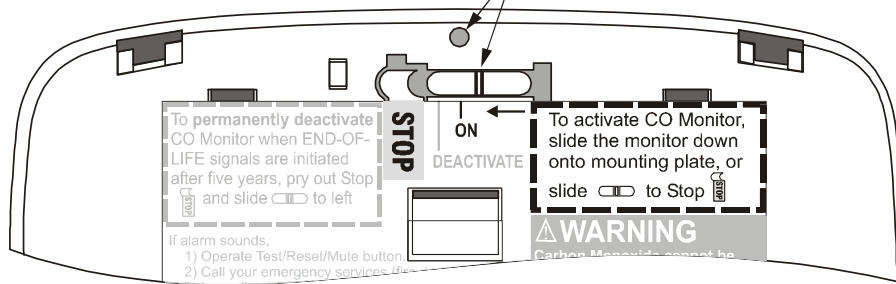
Follow these steps to install the monitor:

1. **Review Section 5: *RECOMMENDED LOCATIONS OF MONITORS***
2. **Review Section 6: *LOCATIONS TO AVOID***
3. **Mount the Monitor:** Fasten the mounting plate to the wall at eye level. Slide monitor down onto mounting plate. The monitor will be automatically activated.
4. **Activation Without Mounting Plate:** If the provided mounting plate is not used, slide the activation switch at the back of monitor to the left until it meets the “**Stop**”, or “**ON**” position, as shown in diagram (B).
5. **Operational Lifespan:** Once activated, the CO monitor should operate for up to five years without battery replacement.
6. **Test the Monitor:** Press and hold test button until monitor starts to beep, then release. The monitor should beep four times, pause, and then beep four times again. The **ALARM** red LED should flash simultaneously.
7. **Secure the Monitor:** Secure the monitor to mounting plate using the Phillips head screw provided. Insert the screw through the mounting hole on top of the monitor.

8. **Ensure Clear Visibility:** Ensure the monitor is not obstructed by furniture, drapes, or other objects.

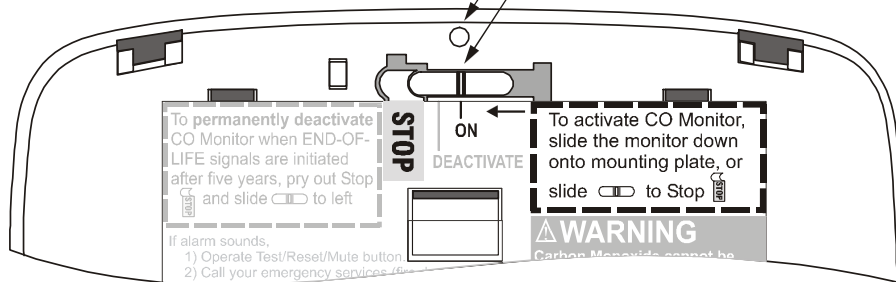


Mounting hole is closed when switch is in initial position



(A) Activation switch is not initially in the ON position

Mounting hole is open when switch is in ON position




(B) Monitor is activated when the switch is in the ON position

If the activation switch is not set to the ON position, as shown in diagram (A), the mounting hole at the top of the monitor will be blocked, and the CO monitor will not be activated.

The Defender LL6270 is a wall-mounted Low Level CO Monitor powered by two lithium batteries. The battery cells are permanently sealed with soldered connections and cannot be removed. No battery replacement is required, and the factory-sealed batteries should power the monitor for up to five years under normal operation.

8. FUNCTIONS AND OPERATION

OPERATION: The CO monitor activates when the activation switch is set to ON. The LCD displays “**0 PPM**” continuously or the current CO level if 5 ppm or more is detected.

LOW BATTERY CONDITION: When battery power drops, the monitor chirps once per minute, flashes the **POWER** green LED once per minute, and displays a low battery symbol  on the LCD. The monitor will continue to operate for up to one more month or until battery voltage is too low. For service details, see Section 14.

SERVICE CONDITION: The LL6270 continuously monitors its sensor and components. If there is an internal failure, the monitor chirps twice per minute (BEEP - BEEP), flashes the **SERVICE** red LED in sync with the beeping, and displays [**Err**] on the LCD. This malfunction condition indicates a problem with the unit. See Section 14 for information regarding service.

SENSOR END-OF-LIFE CONDITION: Once activated, the monitor tracks its total powered time. When the sensor reaches the end of its expected lifespan, the monitor will chirp once per minute (BEEP), **SERVICE** red LED will light for 1 second in sync with the beep, and LCD will display [**End**]. Replace the monitor when this condition occurs. For more details, see Section 14.


ALERT CONDITION: The LCD will display the current CO level within 1 minute of sensor detecting 5 to 500 ppm. The **ALARM** red LED will also flash 4 times every minute within 10 minutes of sensor detecting 9 to 14 ppm, and at any time more than 14 ppm is detected. If the LCD displays [**14 PPM**] or less, flashing **ALARM** red LED can be suspended for eight hours by pressing the **TEST/RESET/MUTE** button, but the suspension will be overridden, and **ALARM** red LED will continue to flash, if CO levels rise above 14 ppm.

Once alarm is activated, and after any manual suspension, the flashing **ALARM** red LED will continue until the LCD displays [**0 PPM**] for 7 consecutive days, at which point the visual alert will automatically turn off.


Once the LCD displays [**0 PPM**], the flashing **ALARM** red LED can be stopped at any time by pressing the **TEST/RESET/MUTE** button or by clearing Memory (Press **DISPLAY MEMORY** button, release, and while peak readings are displayed, press **TEST/RESET/MUTE** button).

ALARM CONDITION: The horn will sound 4 short beeps every minute within 60 minutes of sensor detecting 15-24 ppm, or every 6 seconds within 1-30 minutes of sensor detecting over 24 ppm. The **ALARM** red LED will flash in sync with the beeping sound, and LCD will display current CO level detected.

After repeatedly beeping for 5 minutes, the alarm pattern will change to 4 short beeps every 60 seconds for CO levels detected between 15-149 ppm, or every 20 seconds for CO levels detected of 150 ppm or more. The alarm signal can be either manually or automatically reset. See Section 10 for “**WHAT TO DO WHEN THE MONITOR SOUNDS**”.

TEST/RESET/MUTE BUTTON: This button serves three functions. The **TEST** function checks monitor operations. The **RESET** function suspends or cancels the flashing **ALARM** red LED. The **MUTE** function silences the horn temporarily during an alarm (except at 150 ppm or more), a low battery symbol , or an End-of-Life signal [**End**]. Refer to Section 9 for detailed instructions.

LCD DISPLAY FUNCTION: Under normal conditions, the LCD displays [**0 PPM**] or current CO level when 5-500 ppm is detected, or flashes [**500 PPM**] when over 500 ppm is detected.

In a **SERVICE** condition, the LCD displays a low battery symbol  if battery power is low, [**Err**] if there is an internal failure, or [**End**] when sensor life has expired.


DISPLAY MEMORY BUTTON: To manually display the highest CO level detected, press the **DISPLAY MEMORY** button once. The LCD will display the recorded data in the following order:

1. The highest (peak) CO level detected within the last 7 days from 5 to 500 PPM.
2. The total length of time the highest CO level was detected, within 10% of the peak, from 1 to 999 minutes.

Each reading will appear for five seconds. The LCD will display [**--- PEAK**] if at least one minute of data has not been collected; try again later. To erase the record in memory, press the **DISPLAY MEMORY** button, release, and then press the **TEST/RESET/MUTE** button while the readings are being displayed. The monitor will burst a long beep, and LCD will display [**CLr**].







9. TEST AND MUTE MONITOR

TESTING THE MONITOR:

Cover the horn opening with your hand to dampen the sound. Press and hold the **TEST/RESET/MUTE** button for at least 2 seconds, or until the monitor beeps and the **ALARM** red LED flashes. Release the button. The monitor simulates a CO concentration of about 100 ppm. If functioning correctly, the monitor will sound 4 short beeps and flash the **ALARM** red LED, followed by a 6-second pause, then repeat the sequence. Note that the test function is disabled when monitor is in **SERVICE**  condition.

MUTING THE AUDIBLE HORN:

- **During Alarm Signal** (horn emits 4 short beeps, followed by a 5, 19, or 59-second pause, 4 short beeps, etc.)
Press the **TEST/RESET/MUTE** button. The **ALARM** red LED will flash 4 times, LCD will display [**OFF**] for 5 seconds, and horn will be temporarily silenced. The audible alarm signal will be automatically reactivated within 8 hours if a CO level of 15-24 ppm continues to be detected, or within 5 minutes if 25 ppm or more. The alarm mute feature is disabled at CO levels of 150 PPM or more. See Section 10 for "**WHAT TO DO WHEN THE MONITOR SOUNDS**".

- **During Low Battery Signal Displays**  (horn emits one chirp per minute)
 Press the **TEST/RESET/MUTE** button. The **POWER** green LED will flash once, LCD will display [**OFF**], and horn will be temporarily silenced for 24 hours. The **POWER** green LED will continue to flash once per minute, and LCD will display  and current CO level if 5 ppm or more is detected.
 When the audible signal reactivates, press the button again to mute for an additional 24 hours. The horn can only be muted during the first 7 days of a low battery signal activation. After 7 days, the monitor will return to its normal low battery signal condition (, one chirp and **POWER** green LED flash per minute).
 To test the monitor during a low battery condition, press and hold **TEST/RESET/MUTE** button for minimum 2 seconds when monitor is not beeping.
- **During END-OF-LIFE Signal Displays**  (horn emits one chirp per minute)
 Press the **TEST/RESET/MUTE** button. The **SERVICE** red LED will light for 1 second, LCD will display [**OFF**], and horn will be temporarily silenced for 60 hours.
 When the audible signal reactivates, press the button again to mute for an additional 60 hours. The horn can only be muted during the first 30 days of the “End-of-Life” signal activation.
 After 30 days, the monitor will return to normal End-of-Life signal condition (, one chirp and **SERVICE** red LED flash per minute)
 To test the monitor during an End-of-Life condition, press and hold **TEST/RESET/MUTE** button for minimum 2 seconds when monitor is not beeping.
- **During SERVICE Signal Displays**  (horn emits two chirps per minute)
 The audible signal cannot be muted during a **SERVICE** signal. The monitor chirps twice (BEEP - BEEP) per minute, **SERVICE** red LED flashes twice at the same time, and the LCD continuously displays [**Err**]. See Section 14 for information regarding service.

10. WHAT TO DO WHEN THE MONITOR SOUNDS

- A. If **ALARM SIGNAL** sounds (4 quick beeps with a pause of 5, 19, or 59 seconds):
- 1) Operate **TEST/RESET/MUTE** button;
 - 2) Call your emergency services (tel. no. _____)
[fire department or 911];
 - 3) Immediately move to fresh air - outdoors or by an open door or window. Do a head count to check that all persons are accounted for. Do not re-enter the premises or move away from the open door/window until the emergency services responders have arrived, the premises have been aired out, and the monitor remains in its normal condition.
 - 4) After following steps 1- 3, if the alarm reactivates within a 24 hour period, repeat steps 1-3 and call a qualified appliance technician

(telephone no. _____) to investigate for sources of CO from fuel burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection, have the equipment serviced immediately. Note any combustion equipment not inspected by the technician and consult the manufacturers' instructions, or contact the manufacturers directly, for more information about CO safety and this equipment. Make sure that motor vehicles are not, and have not been, operating in an attached garage or adjacent to the building.

If the alarm sounds upon returning to a vacant building, do not enter. Call the Fire Department from another location. *Do not re-enter the building until you have been assured it is safe.*

MANUAL RESET:

Press the **TEST/RESET/MUTE** button to temporarily silence the alarm. The **ALARM** red LED will flash 4 times, and the LCD will display [**OFF**] for 5 seconds to indicate the audible alarm signal is turned off. The LCD will continue to display the current CO level detected from 5 to 500 ppm, and the **ALARM** red LED will flash 4 times every minute. The audible alarm signal will be automatically reactivated within 8 hours if a CO level of 15-24 ppm continues to be detected, or within 5 minutes if 25 ppm or more. Do not wait to see if the alarm is reactivated; follow above instructions immediately. Note that the alarm mute feature is disabled at CO levels of 150 PPM or more.

AUTOMATIC RESET:

If an **ALARM** signal is not manually reset, the alarm horn will automatically reset and return to normal operation if the detected CO level drops below 9 ppm. The **ALARM** red LED will continue flashing to indicate chronic CO levels of 9 ppm or more were detected earlier. This visual alert signal will automatically turn off when the LCD displays [**0 PPM**] for 7 consecutive days; otherwise, visual alert must be manually cancelled by pressing the **TEST/RESET/MUTE** button.

B. If LOW BATTERY SIGNAL sounds (one chirp per minute):

Press the **TEST/RESET/MUTE** button to temporarily silence the horn for 24 hours, and refer to Section 9 for details. If the monitor is placed in a cold area, move it to a warmer area above 68°F (20°C). If the monitor beeps again after 24 hours at room temperature, see Section 14 for service instructions.

C. If END-OF LIFE SIGNAL sounds (one chirp per minute):

Press the **TEST/RESET/MUTE** button to temporarily silence the horn for 60 hours, and refer to Section 9 for details. The monitor may alarm when exposed to CO during End-of-Life signal, but it is recommended to replace it as soon as possible. See Section 14 for instructions on how to deactivate and dispose of the monitor.

D. If SERVICE SIGNAL sounds (two quick beeps per minute):

The monitor has a problem and requires immediate service. See Section 14 for service instructions.

11. POSSIBLE CAUSES OF CO DETECTED

Conditions that can lead to CO exposure include:

- 1) Excessive spillage, venting malfunctions, or reverse venting of fuel burning appliances due to outdoor conditions, such as:
 - Wind direction and velocity, including high gusts
 - Heavy air in vent pipes (cold/humid air with extended periods between cycles)
 - Negative pressure differential caused by exhaust fans.
 - Simultaneous operation of multiple fuel burning appliances competing for limited internal air.
 - Vibrating or loose vent pipe connections at furnaces, boilers, water heaters, clothes dryers, etc.
 - Obstructions or unconventional vent pipe designs aggravating these issues.
 - Poorly designed or maintained chimneys and vents.
- 2) Extended use of unvented fuel-burning devices like range and oven.
- 3) Temperature inversions that trap exhaust gases near the ground.
- 4) Idling vehicles in an open or closed attached garage, or near the building.

12. LIMITATIONS OF CARBON MONOXIDE MONITORS

Carbon monoxide monitors respond to the presence of CO but do not detect smoke. If the alarm activates, follow instructions in Section 10: ***“WHAT TO DO WHEN THE MONITOR SOUNDS”***.

Carbon monoxide monitors are devices that can provide an early warning of the presence of CO gas at a reasonable cost. However, monitors have sensing limitations and may not always sound a warning in the presence of CO. The monitor will not operate if the battery power is too low or dead. CO monitors must be tested regularly to ensure that they are receiving power and operating properly. Carbon monoxide monitors cannot sense CO that does not reach the monitor, and therefore CO monitors may not detect CO which is in another area of the building. Furthermore, if the monitor is located on a different level of the building, or on the other side of a closed door, it may not alert the occupant. The use of drugs and alcohol may impair one’s ability to hear the alarm. If you have a multi-level building, install CO monitors on each level. If the monitor is installed in a hallway and an occupied room’s door is kept closed, also install a CO monitor within that room.

Although CO monitors can help save lives by providing an early warning to the presence of carbon monoxide, they are not a substitute for an insurance policy. Property owners, leaseholders and renters should have adequate insurance to protect everyone’s health, lives and property.

13. GOOD SAFETY HABITS

DEVELOP AND PRACTICE A PLAN OF ESCAPE:

Make a floor plan indicating all doors and windows, and at least two escape routes from each room within the building.

Have a meeting with everyone to discuss your escape plan and show what to do in case an alarm sounds.

Determine a place outside the building where everyone can meet if an alarm sounds.

Familiarize everyone with the sound of the alarm and train them to leave the building immediately when they hear it.

Conduct a CO fire drill at least once every six months. Practicing allows you to test your plan before an emergency occurs. Ensure that everyone knows what to do, even if you can't reach them during an emergency.

Discuss the symptoms related to *CARBON MONOXIDE POISONING* with everyone. (See Section 4: "**WHAT ARE THE SYMPTOMS OF CARBON MONOXIDE POISONING?**")

Make a floor plan indicating all doors and windows and at least two escape routes from each room within the building.

Have a meeting with everyone to discuss your escape plan, and show what to do in case an alarm sounds.

Determine a place outside the building where you can all meet if an alarm sounds.

Familiarize everyone with the sound of the alarm and train them to leave the building when they hear it.

Practice a CO fire drill at least once every six months. Practice allows you to test your plan before an emergency. You may not be able to reach everyone. *It is important that they all know what to do.*


Discuss the symptoms related to *CARBON MONOXIDE POISONING* with everyone. (See Section 4 **WHAT ARE THE SYMPTOMS OF CARBON MONOXIDE POISONING?**)

14. MONITOR END-OF-LIFE AND SERVICE

End-of-Life Signal:

The monitor has a five year life expectancy, and will emit an End-of-Life signal five years after activation. The monitor will chirp once per minute, **SERVICE** red LED will light for 1 second at the same time, and LCD will continuously display [**End**]. The monitor must be replaced once the End-of-Life signal has been activated. See below procedures to remove and deactivate the monitor, and discharge the batteries. The monitor can be disposed of using the same method for disposing of discharged batteries.

Low Battery Signal:

Should the low battery voltage signal (, one chirp and **POWER** green LED flash per minute) occur in less than five years after initial activation, the battery power capacity may be low due to long-term storage prior to installation, exposure to low or high temperatures or high humidity during storage or operation, or abnormal use.

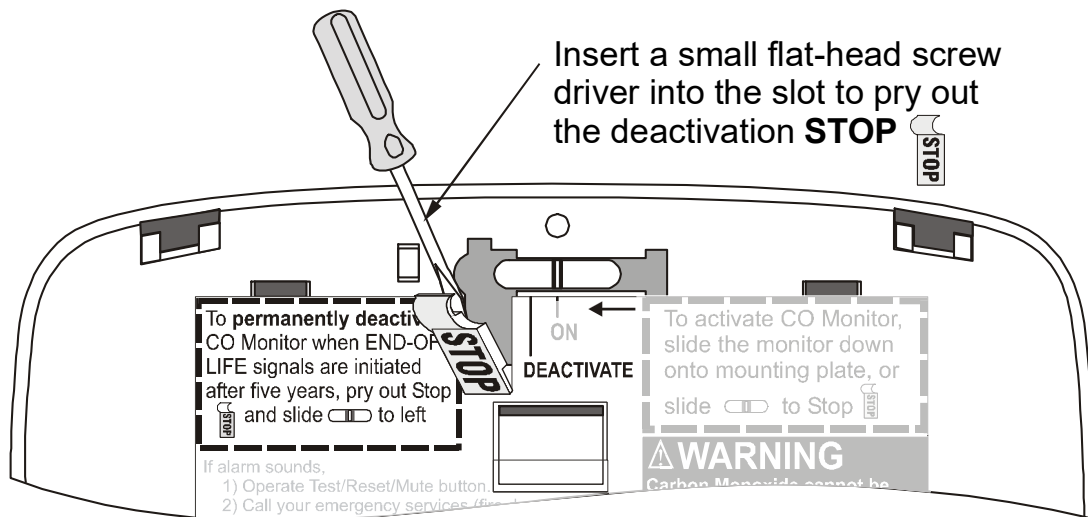
If the low battery voltage signal is activated in less than three years under normal conditions, press the **TEST/RESET/MUTE** button to mute the audible low battery voltage signal, and place the monitor in an environment at 68°F or warmer. If the low battery voltage signal resumes within 24 hours, follow the steps below to deactivate the monitor, and see Section 16 for the "**Return Instructions**" to return the unit for warranty service.

Service Signal:

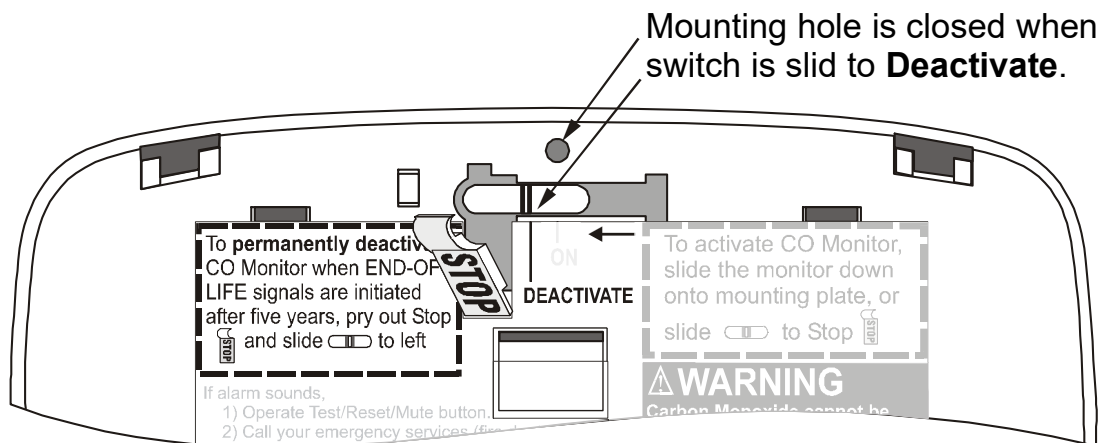
In the event of any malfunction of the unit, the monitor will beep twice per minute, **SERVICE** red LED will flash twice simultaneously, and LCD will continuously display [**Err**]. Do not attempt to repair the monitor. This product should be serviced by a qualified service technician. Follow the steps below to deactivate the monitor, and see Section 16 for the "**Return Instructions**" to return the unit for warranty service.

Removing and Deactivating the Monitor:

1. Unscrew the mounting screw from the top center of the monitor, and slide the monitor up and off the mounting plate.
2. Insert a small flat-head screwdriver into the slot above the **STOP**, pry **STOP** away from back of unit, and slide the power switch behind and past the **STOP** to deactivate the monitor. The switch moves in one direction only and cannot be moved back.
3. Once deactivated, the batteries will be fully discharged and the monitor will no longer work.














- (C) Monitor is activated and “ON” when the switch is at **STOP** and the mounting hole is open



- (D) Monitor is permanently deactivated when the switch is moved to left past **STOP** and mounting hole is closed

15. DESCRIPTION OF AUDIBLE AND VISUAL SIGNALS

Condition	LCD Display	LEDs	Horn
Normal Operation	[0 PPM]	All LEDs off	Silent
CO Alert Signal (see page 5)	Current CO level detected	ALARM red LED flashes 4 times per minute	Silent
Press RESET Button to Suspend CO Alert Signal	 for 5 seconds	All LEDs off	Silent
During CO Alert Signal Suspension	Current CO level detected	ALARM red LED is off	Silent
CO Alarm Signal (see page 5 for alarm levels)	Current CO level detected	ALARM red LED flashes 4 times in sync with horn	4 quick beeps, pause, 4 quick beeps, etc
Press MUTE Button to Mute Audible Alarm Under 150 ppm	 for 5 seconds	ALARM red LED flashes 4 times	Silent
During Audible Alarm Mute Period	Current CO level	ALARM red LED flashes 4 times per minute	Silent
Press TEST Button to Test Monitor	[0 PPM] or current CO level detected	ALARM red LED flashes 4 times in sync with horn	4 quick beeps, 5-second pause, then repeats
Press DISPLAY MEMORY Button to Display Memory	Peak CO level and duration stored in memory	None	Silent
Memory Displayed When Peak Data Is Not Available		None	Silent
Press RESET Button to Clear Peak Memory While Data Displayed		Stops the flashing ALARM red LED	Bursts a long beep
Low Battery Signal	 continuously	POWER green LED flashes once per minute	Chirps once per minute
Press MUTE Button to Mute Low Battery Signal	 for 5 seconds	POWER green LED flashes once	Silent
During Low Battery Mute Period	 continuously	POWER green LED flashes once per minute	Silent
End-of-Life Signal	 continuously	SERVICE red LED lights for 1 second every minute	Chirps once per minute
Press MUTE Button to Mute End-of-Life Signal	 for 5 seconds	SERVICE red LED flashes once	Silent
During End-of-Life Signal Mute Period	 continuously	SERVICE red LED lights for 1 second every minute	Silent
Service (Malfunction) Signal	 continuously	SERVICE red LED flashes twice every minute	Two quick beeps per minute

16. THREE-YEAR LIMITED WARRANTY

Defender carbon monoxide monitors are manufactured in Canada under stringent ISO 9001 quality management practices. The manufacturer warrants that, for a period of three years from the date of purchase, this carbon monoxide monitor will be free from defects in material and workmanship, and the factory sealed lithium batteries will power the CO monitor for at least three years.

Warranty Coverage:

- 1. Repair or Replacement:** The manufacturer, at its option, will repair or replace this product or any component found to be defective during the warranty period. Replacement will be made with a new or re-manufactured product or component. If the original product is no longer available, replacement may be made with a similar product of equal or greater value.
- 2. Original Purchaser:** This warranty is valid only for the original retail or end-user purchaser from the date of initial purchase from an authorized distributor, dealer or contractor, and is not transferable. Proof of purchase, such as the original sales receipt, is required to obtain warranty service.
- 3. Limitation:** This warranty does not cover normal wear of parts or damage resulting from improper storage, negligent use or misuse of the product, use contrary to the operating instructions, operation in unconditioned space (below 40°F or above 100°F), disassembly, or repair or alteration by anyone other than the manufacturer or an authorized service center. Additionally, the warranty does not cover acts of God, such as fire, flood, earthquakes, hurricanes and tornadoes.
- 4. Exclusions:** The manufacturer shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty, except to the extent prohibited by applicable law.
- 5. Legal Rights:** This warranty gives you specific legal rights, and you may also have other rights that vary from state to state, or jurisdictions to jurisdictions.

Warranty Service:

If warranty service is required, do not return the product to your supplier. Contact our U.S. manufacturer's representative at (800) 253-1529, Monday through Thursday, from 8 AM to 4 PM MST to obtain a Return Authorization (RA) number. Please have the model number, serial number, and date of purchase available when calling.

Return Instructions:

Prior to returning the product, deactivate the monitor per the instructions in Section 14, pack it carefully in a padded box, and ship it freight prepaid with your original sales receipt, an explanation of the problem, and your return address.

