



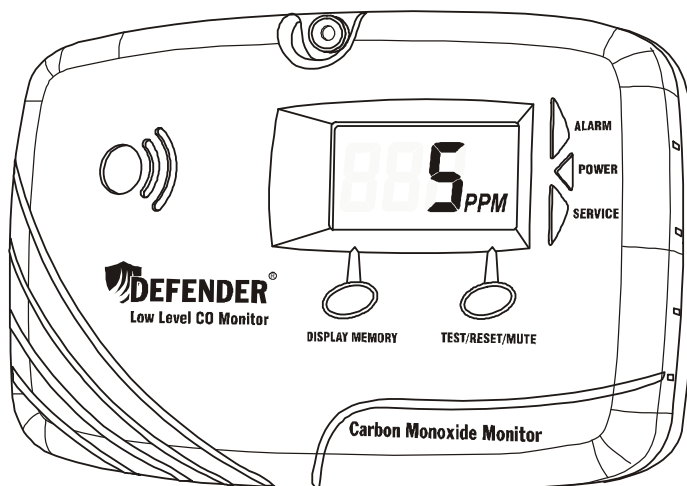
Low Level CO Monitor

Owner's Manual

Sealed Lithium Battery Powered

LL6170

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 LL6170 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.


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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 onto the “REPLACE BY” label affixed to bottom of monitor.

IMPORTANT! *If service is required, do not try to repair this CO monitor yourself. Refer to the instructions in Section 13 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. (See Section 13)

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

DO NOT PAINT ON OR NEAR THE MONITOR: The paint will damage the sensor or block the vents and affect the monitor function.


DO NOT SPRAY AIR REFRESHENER, CLEANING SUPPLIES, OR INSECT KILLER ON OR NEAR THE MONITOR: Certain kinds of aerosol chemicals will damage the sensor and cause improper operation. The building must be 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

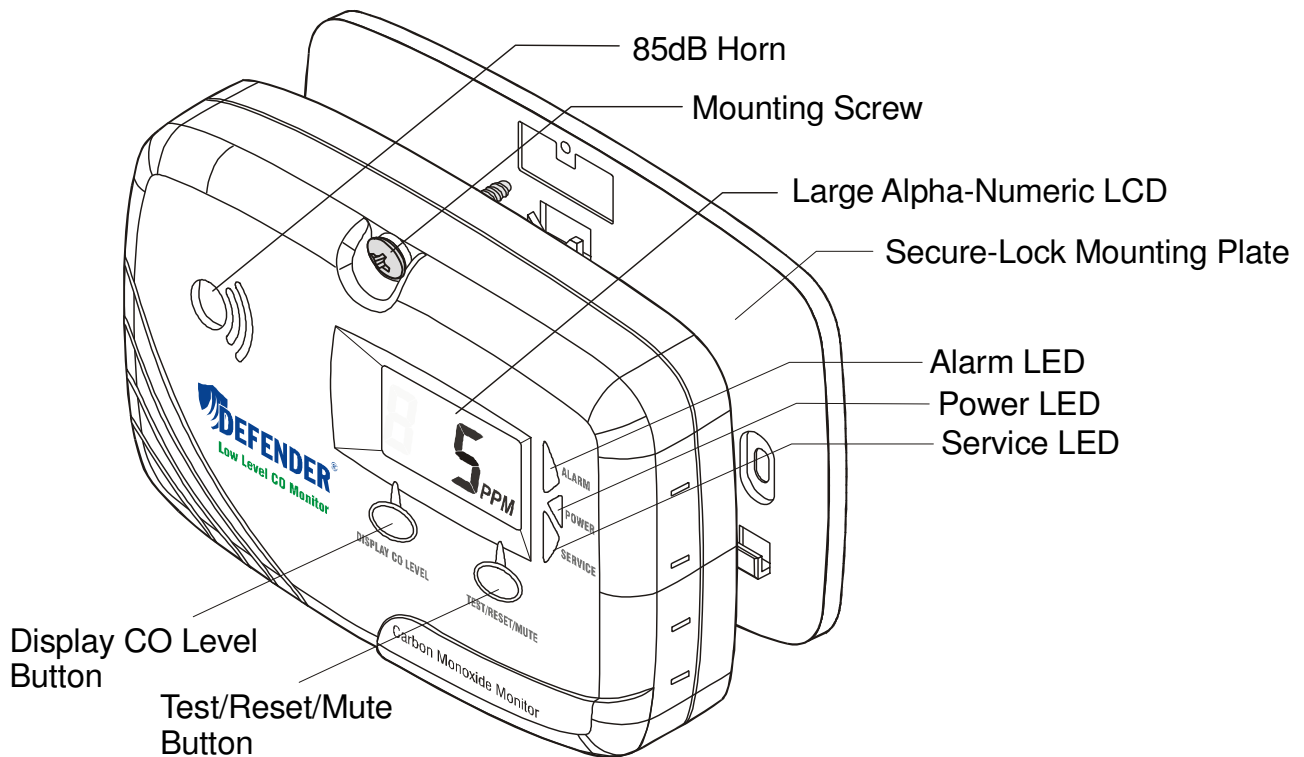
 **WARNING!** Test the CO monitor immediately after the building has been vacant.

 **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
- Three Year Limited Warranty for Monitor and Batteries



SPECIFICATIONS

Visual CO Alert Signals

5 - 500 PPM within 1 minute of detection:

Continuously displays current CO level detected of 5 PPM or more.

9 - 14 PPM within 10 minutes:

Displays CO level and **ALARM** red LED flashes 4 times every minute. Reset button suspends flashing **ALARM** red LED for eight hours. Suspension is overridden, and alarm signals are activated within 60 minutes, if CO level detected rises above 14 PPM.

Visual and Audible CO Alarm Signals

15 - 24 PPM within 60 minutes:

Displays CO level, beeps 4 times every minute, and **ALARM** red LED flashes in sync with beep.

25 - 49 PPM within 30 minutes:

Displays CO level, beeps 4 times every 6 seconds for 5 minutes then beeps 4 times every minute, and **ALARM** red LED flashes in sync with beep.

50 - 99 PPM within 15 minutes:

Displays CO level, beeps 4 times every 6 seconds for 5 minutes then beeps 4 times every minute, and **ALARM** red LED flashes in sync with beep.

100 - 149 PPM within 5 minutes:

Displays CO level, beeps 4 times every 6 seconds for 5 minutes then beeps 4 times every minute, and **ALARM** red LED flashes in sync with beep.

150 - 500 PPM at any time detected:

Displays CO level (above 500 PPM, flashes "500 PPM"), beeps 4 times every 6 seconds for 5 minutes then beeps 4 times every 20 seconds, and **ALARM** red LED flashes in sync with beep.

Audible Mute Duration:

15 - 24 PPM: Mute button silences audible alarm signal for eight 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 30 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
- The 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. Faulty ventilation of 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).

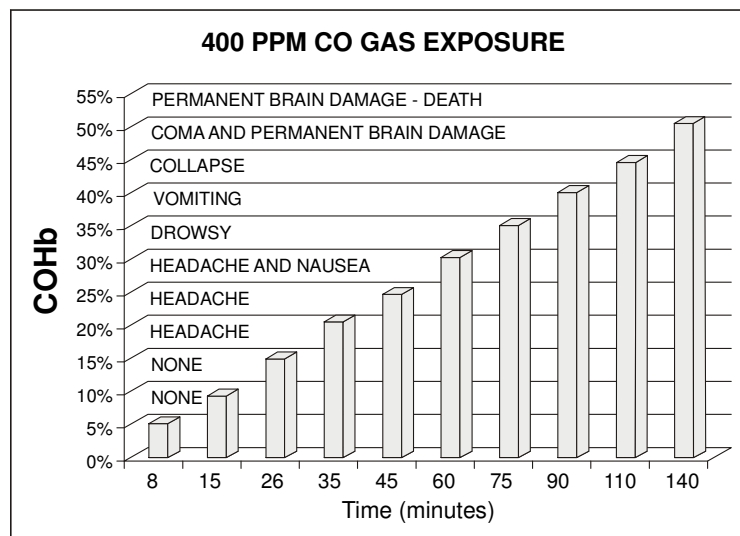
WHAT ARE THE SYMPTOMS OF CARBON MONOXIDE POISONING?

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

The following symptoms may be related to *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

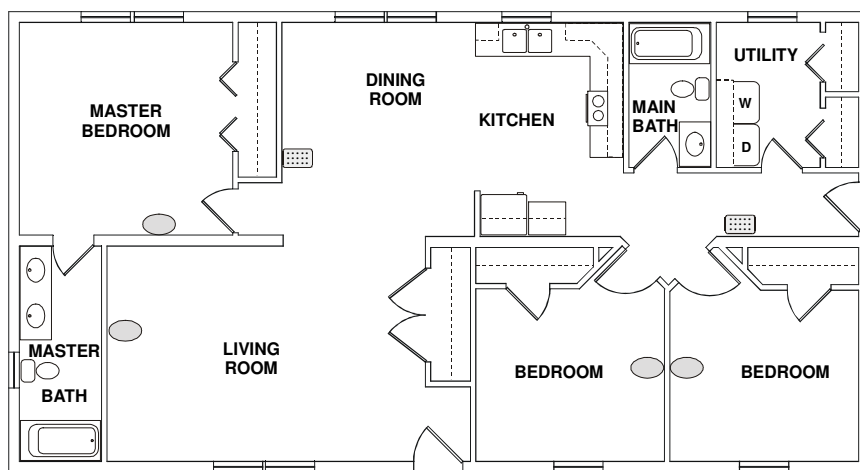
Many cases of CARBON MONOXIDE POISONING indicate that while victims are aware they are not well, they become so disoriented that they are unable to save themselves by either exiting the building or calling for assistance. The elderly, pregnant women, young children, and persons with medical conditions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



5. RECOMMENDED LOCATION OF MONITORS

CO poisoning can happen anywhere in the building. CO monitors should be installed onto 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 someone who may be 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.

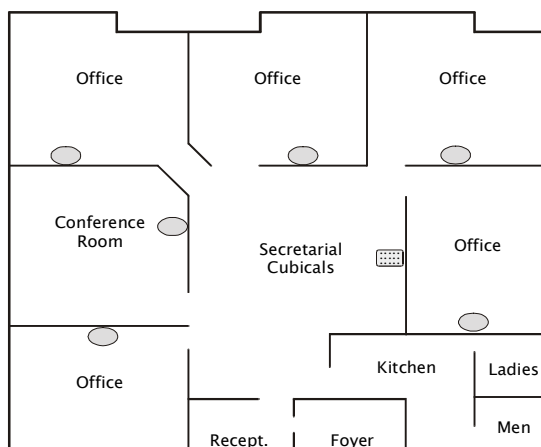


Recommended CO monitor location for minimum protection

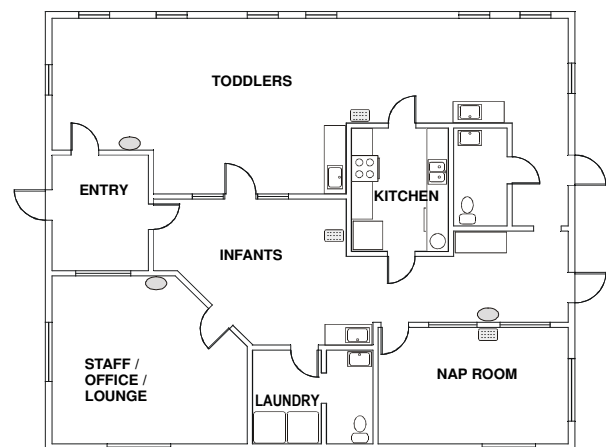


Additional CO monitor location for added protection

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 in the cooking process and cause nuisance alarms. Also, cooking grease can build up on the monitor and cause monitor failure. Any monitor that is installed near a commercial cooking area should be cleaned at least once every month, or more frequently if needed.

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 will activate alarm.

IN DUSTY AREAS: Dust can build up on monitor and prevent it from working properly.

IN CLEANING SUPPLY ROOMS: Cleaning chemicals and painting supplies may cause nuisance alarms.

IN UTILITY OR BATH ROOMS: Do not install the monitor inside or within three feet of a room with a bathtub, shower, spa or washer/dryer. Excessive moisture may cause nuisance alarms.

IN VERY HOT OR COLD AREAS: Do not install monitor onto any exterior wall or within areas which are below 40°F or above 100°F.

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

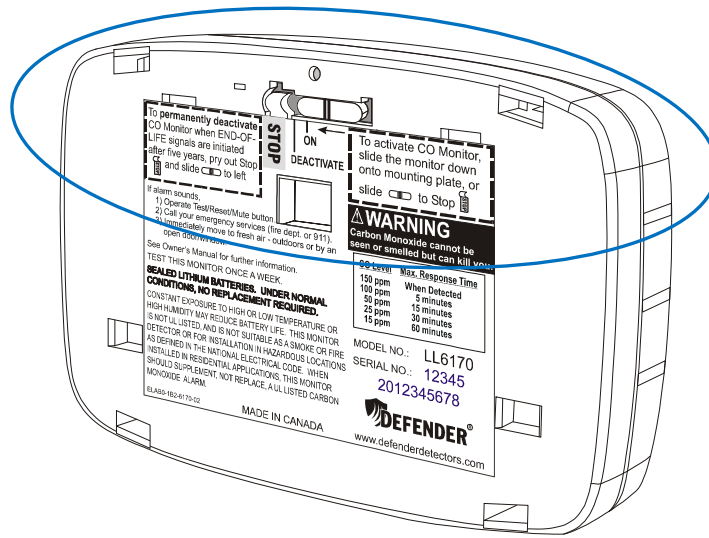
IN HAZARDOUS LOCATIONS: This monitor is not suitable for installation in a hazardous location, as defined in the National Electrical Code.

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

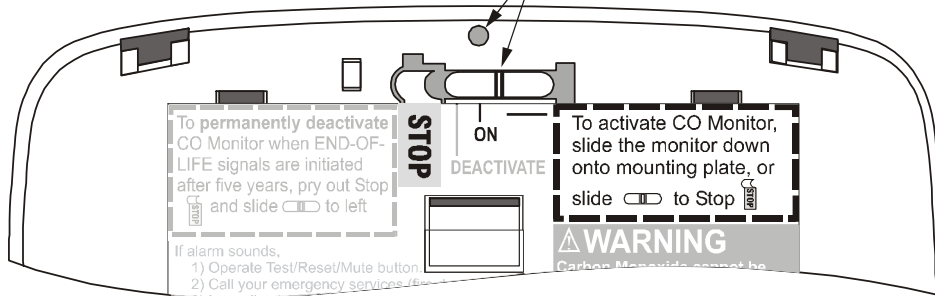
7. INSTALLATION INSTRUCTIONS

Follow these steps in this order to install the monitor:

1. Review Section 5, **RECOMMENDED LOCATIONS OF MONITORS**
2. Review Section 6, **LOCATIONS TO AVOID**
3. Fasten the mounting plate to the wall at eye level. Slide monitor down onto mounting plate. The monitor will be automatically activated.
4. It is important that you use the mounting plate provided. If the mounting plate is not used, you must slide the activation switch at the back of monitor to the left until it meets the Stop, or ON position, as in diagram (B).
5. Once activated, the CO monitor should operate for up to five years without battery replacement.
6. Press and hold test button until monitor starts to beep, then release. The monitor should beep 4 times, pause, and then beep 4 times again. **ALARM** red LED should flash at the same time.
7. Secure monitor to mounting plate, with Phillips head screw provided, through the mounting hole on top of monitor.
8. Be sure that the monitor is not obstructed by furniture, drapes, etc.

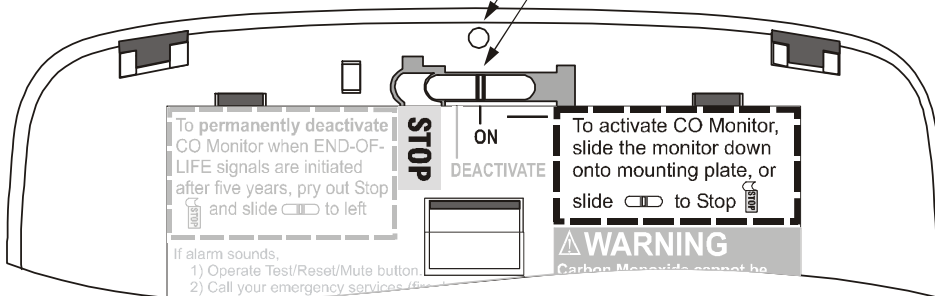


Mounting hole is closed when switch is in initial position



(A) Activation switch is not initially in ON position

Mounting hole is open when switch is in ON position




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


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


The Defender LL6170 is a sealed lithium battery powered wall mounted Low Level CO Monitor. Two lithium 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 is operational once the activation switch is slid to ON position. If the monitor's power is active, the LCD readout will continuously display 0 PPM, or the current CO level if 5 PPM or more is detected.


LOW BATTERY CONDITION: When battery power drops to a low voltage level, the monitor will chirp once per minute, **POWER** green LED will flash once every minute, and LCD will display  symbol. The monitor will continue to operate for up to one more month, or until battery voltage is too low. See Section 13 for information regarding service.

SERVICE CONDITION: An internal microcontroller continuously monitors the sensor function and other critical components. If an internal failure of any of these components should occur, the monitor will chirp twice (BEEP - BEEP) per minute, **SERVICE** red LED will flash twice at the same time, and LCD will continuously display . This malfunction condition indicates a problem with the unit. See Section 13 for information regarding service.

SENSOR END-OF-LIFE CONDITION: The electrochemical sensor has a five year service life. Once the batteries are activated, a microcontroller monitors the total time that the monitor is under power. After five years of service, the "End-of-Life" signal will be activated to indicate that the sensor life has expired and the monitor must be replaced; the LCD will continuously display , monitor will chirp once per minute and **SERVICE** red LED will light for 1 second at the same time. See Section 13 for handling an End-of-Life signal.


ALARM CONDITION: When the batteries are active, and CO gas is detected at a level and duration specified in Section 3, the horn will sound 4 short beeps every minute for CO levels detected between 15-24 PPM, or every 6 seconds if over 24 PPM. The **ALARM** red LED will flash in sync with the beeping sound, and the LCD will display the current CO level detected. After having alarmed for 5 minutes, the alarm signal 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 is either manually or automatically reset. See Section 10 **WHAT TO DO WHEN THE ALARM SOUNDS**.

TEST/RESET/MUTE BUTTON: The **TEST/RESET/MUTE** button is one button for three functions. It is used as a TEST button to check the monitor for proper operation, Reset button to suspend or cancel flashing **ALARM** red LED, and MUTE button to temporarily silence horn when an alarm, "Low Battery Voltage" () or "End-of-Life" () signal is activated. The MUTE feature is disabled when alarm is activated at CO levels of 150 PPM or more. See Section 9 for detailed instructions to test the monitor and mute the audible horn.

LCD DISPLAY FUNCTION: When monitor is operating normally, the LCD will display 0 PPM or the current CO level if 5 PPM or more is detected. Above 500 PPM, the LCD will flash "500 PPM". The LCD will display  symbol if batteries have low voltage.


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 30 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. To erase the record in memory, press the **DISPLAY MEMORY** button, and, while the readings are being displayed, press the **TEST/RESET/MUTE** button. The monitor will burst a long beep, and display .


9. TEST AND MUTE MONITOR

To test the monitor, place the palm of one hand over the horn opening to dampen the test signal, and press the **TEST/RESET/MUTE** button on the cover and hold it down for a minimum of 2 seconds, or until the monitor starts beeping and **ALARM** red LED flashes, then release. This test will simulate a CO concentration of approximately 100 ppm CO gas. If all of the electronic circuitry and buzzer are working correctly, the monitor will sound 4 short beeps and flash **ALARM** red LED at the same time, followed by a 6 second pause, and then repeat 4 more short beeps with flashing **ALARM** red LED. The test function is disabled when monitor is in **SERVICE** condition.


To mute the audible horn during an alarm signal, press the **TEST/RESET/MUTE** button. The **ALARM** red LED will flash 4 times, display will read  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 **WHAT TO DO WHEN THE ALARM SOUNDS**.

To mute the audible horn during a low battery signal () condition, press the **TEST/RESET/MUTE** button. The **POWER** green LED will flash once, monitor will display  at the same time, and horn will be temporarily silenced for 24 hours. The **POWER** green LED will continue to flash once every minute, LCD display , and readout display current CO level if 5 PPM or more is detected. When the audible signal reactivates, you can continue to mute the horn for an additional 24 hour period by again pressing the **TEST/RESET/MUTE** button. The horn can only be turned off 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; 1 chirp per minute, **POWER** green LED flash once per minute, continuously displays .

To test the monitor during a low battery signal condition, press and hold **TEST/RESET/MUTE** button for minimum 2 seconds when audible signal is not sounding.

To mute the audible signal during an “End-of-Life” condition, press the **TEST/RESET/MUTE** button. The **SERVICE** red LED will light for 1 second, monitor will display  at the same time, and horn will be temporarily silenced for 60 hours. When the audible signal reactivates, you can continue to mute the horn for an additional 60 hour period by again pressing the **TEST/RESET/MUTE** button. The horn can only be


turned off during the first 30 days of the “End-of-Life” signal activation. After 30 days, the monitor will return to its normal “End-of-Life” condition; 1 chirp per minute, **SERVICE** red LED lights for 1 second at the same time, and continuously displays “End”. To test the monitor during an “End-of-Life” condition, press and hold **TEST/RESET/MUTE** button for minimum 2 seconds when audible signal is not sounding.

The audible signal cannot be muted when monitor is in **SERVICE** condition; monitor chirps twice (BEEP - BEEP) per minute, **SERVICE** red LED flashes twice at the same time, and continuously displays . See Section 13 for information regarding service.

10. WHAT TO DO WHEN THE ALARM SOUNDS

If alarm signal sounds:

- 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.

MANUAL RESET: You can temporarily silence an audible alarm signal by pressing the **TEST/RESET/MUTE** button. The **ALARM** red LED will flash 4 times and display will read  for 5 seconds. The LCD will then continue to display the current CO level detected from 5 to 500 ppm, and **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. The alarm mute feature is disabled at CO levels of 150 PPM or more.

AUTOMATIC RESET: If a CO alarm activation is not manually reset, the horn will sound for at least 5 minutes. After 5 minutes, the alarm horn will automatically reset itself and return to normal operation if the CO level drops below 9 PPM. The flashing **ALARM** red LED will not automatically reset and must be manually cancelled or suspended, by

pressing the **Test/Reset/Mute** button, so that a supervisor or head of household will be alerted that an alarm was activated earlier.

If building has been temporarily vacant and you return to find a monitor sounding, do not enter building. Call Fire Department from another location. *Do not re-enter the building for any reason until you have been assured that it is safe to do so.*

Conditions which can result in transient CO situations:

- 1) **Excessive spillage, venting malfunctions, or reverse venting of fuel burning appliances caused by outdoor ambient conditions, such as:**
 - i) **Wind direction and/or velocity, including high gusts of wind. Heavy air in the vent pipes (cold/humid air with extended periods between cycles).**
 - ii) **Negative pressure differential resulting from the use of exhaust fans.**
 - iii) **Simultaneous operation of several fuel burning appliances competing for limited internal air.**
 - iv) **Vent pipe connections vibrating loose from furnaces, boilers, water heaters, clothes dryers, etc.**
 - v) **Obstructions in or unconventional vent pipe designs which can amplify the above situations.**
 - vi) **Poorly designed or maintained chimneys and/or vents.**
- 2) **Extended operation of unvented fuel burning devices (range, oven, etc.).**
- 3) **Temperature inversions which can trap exhaust gases near the ground.**
- 4) **Car idling in an open or closed attached garage, or near the building.**

If SERVICE or low battery signals are activated, see Section 13 for service and return instructions.

11. LIMITATIONS OF CARBON MONOXIDE MONITORS

Carbon monoxide monitors respond to the presence of CO. They do not detect smoke. If the alarm does activate, follow instructions in Section 10 ***WHAT TO DO WHEN THE ALARM 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.

12. 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 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?*)

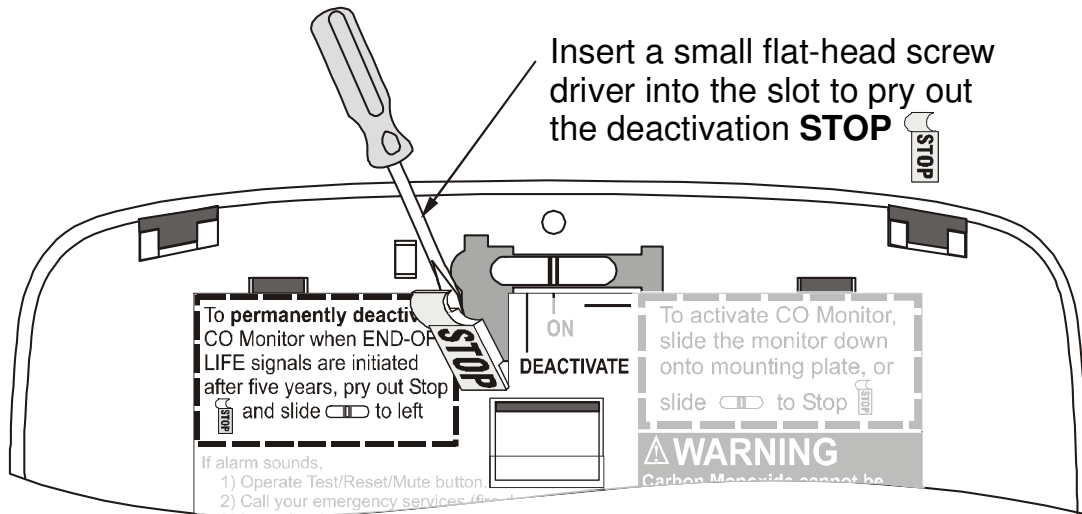
13. MONITOR END-OF-LIFE AND SERVICE

After the monitor has been activated for five years, the monitor reaches the end of its life and emits the End-of-Life signal. 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.

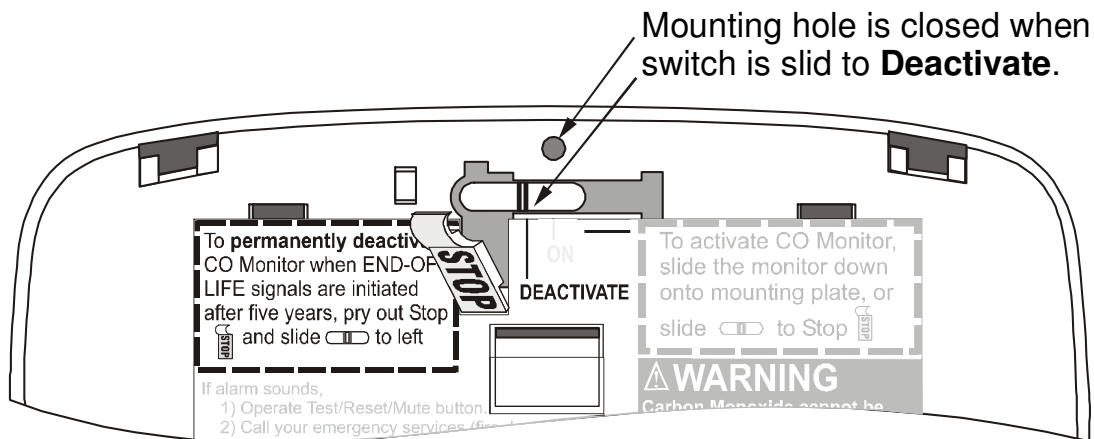
Should the low battery voltage signal occur in less than five years after initial activation, the battery power capacity may be low because of long-term storage prior to installation, exposure to low or high temperatures or high humidity during storage or operation, or abnormal usage. If the low battery 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 the instructions listed on the last page of this Owner's Manual to return the unit for warranty service.

In the event of any malfunction of the unit, the monitor will chirp twice per minute, **SERVICE** red LED will flash twice every minute, 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 the instructions listed on last page of this Owner's Manual to return the unit for warranty service.

- To remove the monitor for service or disposal, unscrew the mounting screw from the top center of the monitor, and slide the monitor up and off mounting plate.
- Insert a small flat-head screwdriver into the slot, pry out the deactivation Stop, and slide the switch to farthest left end to deactivate the monitor. The switch moves in one direction only, and cannot be moved back. Once monitor is deactivated, the sealed lithium batteries will be fully discharged and the monitor will no longer work.













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



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

14. DESCRIPTION OF AUDIBLE AND VISUAL SIGNALS

Condition	LCD Readout	LEDs	Horn
CO monitor is operational	Continuously displays 0 PPM	All LEDs are off	Silent
CO gas alert	Displays current CO level detected (see page 5)	ALARM red LED flashes 4 times every minute	Silent
CO gas alarm	Displays current CO level detected (see page 5 for more information about CO display levels)	ALARM red LED flashes 4 times in synchronous with horn	Beeps 4 times, pauses for 5 or 60 seconds. Repeats this pattern for first 5 minutes, then pause time changes to 60 seconds (20 seconds if CO is 150 PPM or more)
Suspend CO alert visual signal	Displays  for 5 seconds, then current CO level detected	Flashing ALARM red LED suspended for 8 hours	Silent
Mute CO alarm audible signals under 150ppm	Displays  for 5 seconds, then current CO level detected	ALARM red LED continues to flash 4 times every minute	Silent for 8 hours if under 25 PPM, or 5 minutes if 25 PPM or more
Testing monitor	Displays 0 PPM or current CO level detected	ALARM red LED flashes 4 times in synchronous with horn	Beeps 4 times, pauses for 5 seconds, then beeps 4 times again
Display Memory	Displays highest CO level detected, and duration of peak level. Each readout lasts 5 seconds	None	Silent
Clear Peak Memory	Displays 	None	Bursts a long beep
Low battery voltage	Displays  symbol	POWER green LED flashes once every minute	Chirps once per minute
Mute "low battery voltage" audible signal	Displays  for 5 seconds, then  symbol and 0 PPM or current CO level detected	POWER green LED flashes once every minute	Silent for 24 hrs during the first week
"End-of-Life"	Continuously displays 	SERVICE red LED lights for 1 second every minute	Chirps once per minute
Mute "End-of-Life" audible signal	Displays  for 5 seconds, then 	SERVICE red LED lights for 1 second every minute	Silent for 60 hrs during the first month
Service required	Displays  continuously	SERVICE red LED flashes twice every minute	Chirps twice (BEEP-BEEP) per minute

15. THREE-YEAR LIMITED WARRANTY

The 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. The manufacturer, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or re-manufactured product or component.

If the product is no longer available, replacement may be made with a similar product of equal or greater value. This warranty is valid 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. Keep the original sales receipt. Proof of purchase is required to obtain warranty service. Distributors, dealers or contractors selling Defender products do not have the right to alter, modify or in any way change the terms and conditions of this warranty.

This warranty does not cover normal wear of parts or damage resulting from any of the following: 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. Further, the warranty does not cover acts of God, such as fire, flood, earthquakes, hurricanes and tornadoes.

The manufacturer shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. Some states or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Warranty Service:

If service is required, do not return the product to your supplier. Contact our U.S. manufacturer's representative at (800) 221-4785, Monday through Thursday, from 7 AM to 4 PM PST to obtain a Return Authorization (RA) number. To assist in serving you, please have the model number, serial number, and date of purchase available when calling. An original sales receipt is required for warranty service.

Prior to returning, deactivate the monitor per the instructions in Section 13, pack carefully in a padded box, and ship freight prepaid with your original sales receipt, an explanation of the problem, and your return address.



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