



8505

9 Volt Battery Powered Commercial CO Monitor

OWNER'S MANUAL

IMPORTANT! READ ALL INSTRUCTIONS BEFORE INSTALLATION AND SAVE THIS MANUAL FOR FUTURE REFERENCE

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.

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WARNING! A DISCONNECTED OR LOW VOLTAGE BATTERY WILL RENDER THIS UNIT INOPERATIVE.

Do not try to repair this CO monitor yourself. Refer to the instructions in SECTION 11 for service.

1. 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 a byproduct of the incomplete combustion of fuel. Faulty ventilation of furnaces, boilers, water heaters, kitchen appliances, and space heaters are a major cause of high CO levels in a building. Automobile, forklift and small engine exhaust are another potential 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.

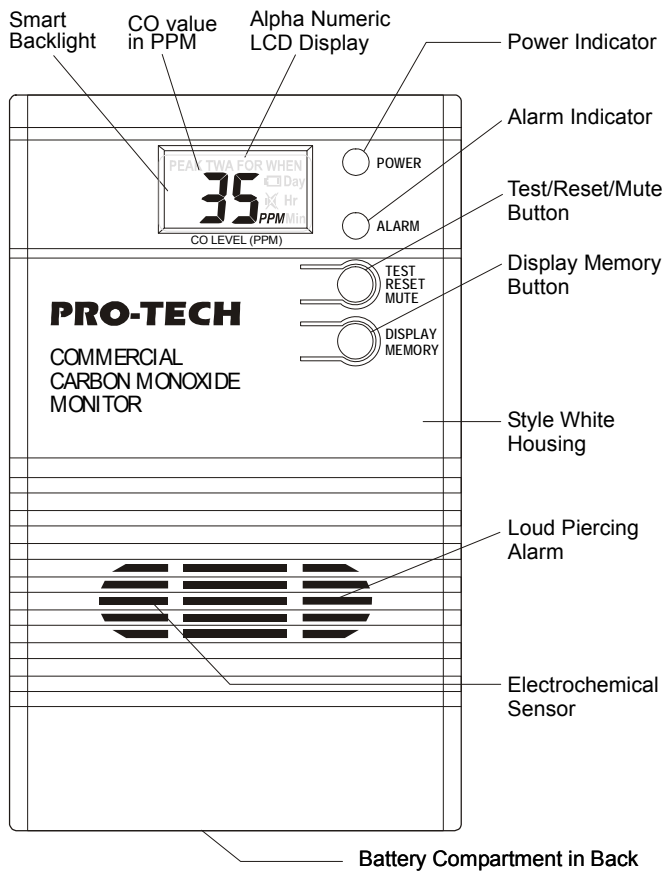
Many cases of carbon monoxide poisoning indicate that while the victims were aware that they were not well, they were too disoriented to save themselves by either calling for assistance or exiting the building. Also, due to size, small children and pets are generally the first affected.

The following are the symptoms related to *CARBON MONOXIDE POISONING*. Discuss them with all persons that may be affected.

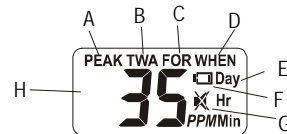
MILD EXPOSURE:	Headaches, running nose, sore eyes, often described as "flu"-like symptoms.
MEDIUM EXPOSURE:	Dizziness, drowsiness, vomiting.
EXTREME EXPOSURE:	Unconsciousness, brain damage, death

2. CO MONITOR FEATURES

- Complies with OSHA and NIOSH Exposure Limits
- Alpha Numeric LCD Readout with “Smart” Back Light
- Continuous Display of Current CO Levels of 10 PPM or more
- Records and Displays Peak CO Level with Duration and When Occurred
- Calculates and Displays 8-Hour Time-Weighted Average (TWA) Concentration
- Accurate and Reliable Electrochemical Sensor
- Self Diagnostic Circuitry and Sensor Life Monitor
- Audible and Visual Alarm Signals
- 9VDC Battery Powered with Low Battery Signal
- One Year Limited Factory Warranty



Alpha Numeric LCD Display



- A. **PEAK** Highest CO level detected
- B. **TWA** Average CO level detected for previous 8 hours
- C. **FOR** Duration of Peak CO in Hr. and Min.
- D. **WHEN** How long ago Peak detected, in Day, Hr, and Min.
- E. **Day Hr Min** For how long or how long ago event occurred
- F. Low Battery Voltage icon
- G. Muted Alarm icon

H1. **888** 3-digit display for CO level and event timing

H2. **Err** Monitor malfunction signal. Service required

H3. **End** End of sensor life signal. Replace monitor

H4. **Clr** Monitor's memory has been cleared

SPECIFICATIONS

- Commercial carbon monoxide monitor
- Battery powered: 9VDC
- Sensor type: electrochemical
- Display: continual LCD readout of CO levels detected from 10-500ppm
- Sample frequency: every 5 seconds
- Display resolution: 1ppm
- Accuracy: +/-5% or 5ppm, whichever is greater*
- Peak Level Memory: records actual peak CO level detected, duration, and when occurred
- Memory history: prior seven days
- Time-Weighted Average (TWA): calculates average CO concentration for prior 8 hours
- Display backlight: automatic for alarm, manual for memory and testing functions
- REL alarm level: 30ppm \leq 7 hrs TWA
- PEL alarm level: 45ppm \leq 6 hrs TWA
- Acute alarm level: 95ppm \leq 1 hr TWA
- Ceiling alarm level: 190ppm @ 15 seconds
- Power on: flashing green LED
- Visual alarm signal: flashing Red LED
- Audible alarm signal: 85dB at 10 feet
- Mute button: silences audible signal for up to 5 minutes, green LED blinks once/min
- Malfunction signal: displays "Err", red LED blinks twice/min, two chirps/min
- Sensor expiration signal: displays "End", red LED blinks once/min, one chirp/min
- Low battery signal: low battery icon, green LED blinks once/min, one chirp/min
- Test functions: self diagnostic circuitry and manual test button
- Storage temperature: 30°F to 120°F
- Operating temperature: 40°F to 100°F
- Operating Humidity: 10% ~ 90% RH
- Unit weight w/battery: 8 oz
- Unit dimensions: 5-9/16"h x 3-7/16"w x 1-5/16"d
- Color: White
- Life expectancy: 2 years
- Warranty: One year limited factory warranty

** The accuracy of the display is an estimate for the first year only. The accuracy may also be affected by environmental conditions and other circumstances beyond manufacturer's control.*

This fixed CO monitor is designed to activate audible and visual alarm signals before the immediate area reaches the Recommended (REL) and Permissible (PEL) Time Weighted Average (TWA) carbon monoxide Exposure Limits established by the National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA), respectively. Workers who are known to be at high risk to CO exposure should also wear personal gas monitors.

3. RECOMMENDED LOCATION OF CO MONITORS:

CO poisoning can happen anywhere in a building. At the minimum, CO monitors should be located on every level of the building, near the persons who may be potentially affected by CO poisoning, and where they can hear any alarm.

More than one CO monitor may be required within different areas of the building. A space which contains fuel burning equipment, and areas and rooms adjacent to this space or any parking garage, should also have a CO monitor installed.

If the monitor is installed in a hallway and any doors are kept closed, install a CO monitor in each of these rooms. If the monitor is installed in a large open area, one monitor should be installed for every 1000 square feet of vertically unobstructed space.

Mount CO monitors on the wall at eye level, or 5 feet from the floor.

DO NOT install unit within 5 feet of combustion equipment.

DO NOT install unit on any outside wall, or near any exterior door or window.

Conditions which can result in CO production or exposure:

- 1) Excessive spillage 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) Several fuel burning appliances competing for limited internal air.
 - iv) Vent pipe connections vibrating loose from furnaces, boilers or water heaters.
 - v) Obstructions or unconventional vent designs which amplify the above situations.
 - vi) Poorly designed or maintained chimneys and/or vents.
- 2) Extended operation of unvented fuel burning devices.
- 3) Temperature inversions which can trap exhaust gases near the ground.
- 4) Truck, car or forklift operating or idling in an open or closed attached garage or warehouse, or near a building.

CAUTION! CO detection is best achieved by installing monitors in all rooms and areas of the building.

4. WARNING! LOCATIONS TO AVOID:

NEAR A KITCHEN: 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.

CLOSE TO A FURNACE, BOILER, SPACE HEATER, OR WATER HEATER: These devices often spill out CO when they first turn on.

IN DUSTY AREAS: Dust can build up on the monitor and cause failure to alarm.

IN CLEANING SUPPLY ROOMS: Painting supplies and chemicals used in cleaning can cause nuisance alarms.

IN VERY HOT OR COLD AREAS: Do not install the monitor in unconditioned spaces or areas which are below 40°F (4.4°C) or above 100°F (37.8°C).

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 1 foot of wireless devices. Radio Frequencies (RF) may interfere with the CO monitor's proper operation.

5. INSTALLATION INSTRUCTIONS:

NOTE: REVIEW SECTION 3, *RECOMMENDED LOCATIONS OF CO MONITOR* AND SECTION 4, *LOCATIONS TO AVOID*, PRIOR TO INSTALLING YOUR CO MONITOR.

The proper power for the 8505 commercial CO monitor is a 9V battery.

Constant exposure to high or low humidity may reduce battery life.

BATTERY INSTALLATION AND REPLACEMENT:

Slide down and remove battery door, and attach a new 9 Volt battery to battery cable. Battery must snap firmly onto both connectors. Use Duracell MN1604 alkaline or Ultralife U9VLJ lithium battery only. Do not use rechargeable battery or any other type of battery.

Place the battery in the battery compartment, and slide the battery door upward and over the compartment until the door latches firmly in place.

Press the **TEST/RESET/MUTE** button to verify activation. (See TESTING in section 6)

MOUNTING INSTRUCTIONS:

After selecting the proper location as described in SECTION 3, drive one screw into the wall at eye level and an optional second screw 3 $\frac{1}{8}$ inches directly below it. Leave the screw-heads about $\frac{1}{4}$ inches from the wall.

Hang monitor onto the top screw-head and gently pull down to secure. Slide bottom of monitor from right to left until it seats firmly onto the lower screw, if installed.

After installation, **TEST** your CO monitor by pressing the **TEST/RESET/MUTE** button for two seconds. Complete instructions regarding testing are outlined in SECTION 6.

6. OPERATION, TESTING:

OPERATION:

The CO monitor is operational once a battery is installed and testing is complete. The green LED will blink once per minute.

SERVICE CONDITION:

The internal microcontroller continuously monitors the sensor and other critical components. If an internal failure of any of these components should occur, the CO monitor will double chirp once per minute, the red LED will blink twice per minute, and "Err" will appear on the LCD display. The trouble condition indicates a problem with the unit, and it will not alarm if exposed to CO. See SECTION 11 for service information.

SENSOR LIFE MONITOR:

The electrochemical sensor has a life expectancy of 2 years, however, the monitor's CO readings will decrease in accuracy after the first year. A microcontroller counts the total time that the CO monitor is under power. After 2 years, the "Sensor End-of-Life" signal will activate, indicating that the sensor life has expired. The CO monitor will chirp once per minute, the red LED will blink once per minute, and "End" will appear on the LCD display. When the sensor life expires, the monitor may still work for a period of time, but it may not alarm when exposed to CO. It is recommended that you replace the monitor annually, but, once the sensor life expires, you must replace the monitor immediately.

LOW BATTERY CONDITION:

When the battery voltage drops below an acceptable level, the monitor will chirp once per minute, the green LED will blink once per minute, and the low battery voltage icon will appear on the LCD display. Replace the battery immediately in order to provide uninterrupted protection. Please see SECTION 5 for information regarding battery replacement.

ALARM CONDITION:

When CO gas is detected at a level and duration specified in SECTION 2, the monitor will alarm and the red LED will flash. The monitor will sound 4 short beeps every 5 seconds for 5 minutes, and thereafter 4 short beeps every minute until the **TEST/RESET/MUTE** button is pressed and the CO level detected drops below 20ppm.

DISPLAY PEAK CO EXPOSURE RECORD:

To display the highest CO level detected, press the **DISPLAY MEMORY** button for 2 seconds. The LCD will display the recorded data in the following order:

1. The highest CO level detected; displays **PEAK** and ppm,
2. The duration of peak exposure; displays **PEAK**, **FOR**, and number of **Hr**, and **Min**,
3. How long ago the peak level occurred; displays **PEAK**, **WHEN**, and number of **Day**, **Hr**, and **Min**
4. The average CO exposure over the previous 8 hours; displays **TWA** and ppm

The monitor maintains the 7 most recent days of peak CO level history, and the most recent TWA value. To manually erase the record, press **TEST/RESET/MUTE** button once while the peak CO level is being displayed. The monitor will sound one short beep and “CLr” will appear on the LCD display. Disconnecting the battery will not erase memory.

TESTING:

To test your monitor, press the **TEST/RESET/MUTE** button for 2 seconds. The red LED will flash and the monitor's horn will beep 4 times, remain silent 5 seconds, then beep 4 times again if horn and electronic circuitry are working properly. The current CO level detected will be displayed. If the unit is already in the “service” condition, the monitor will double beep and display “Err”, and must be serviced immediately.

LCD DISPLAY FUNCTION:

In normal operation, the LCD screen will display the current CO level detected, and update the detected value every 5 seconds. The number 0ppm will be displayed if less than 10ppm CO is detected. The LCD will display the CO level detected up to 500ppm. Above 500ppm, the LCD will flash “500ppm”. The display accuracy may be affected by environmental conditions and other circumstances beyond manufacturer's control.

LCD BACKLIGHT FUNCTION:

In normal operation, the LCD backlight is turned off to preserve battery life. The backlight will automatically turn on for 5 minutes when alarm is activated. The backlight will also turn on when the **TEST/RESET/MUTE** button is pressed to test the monitor, or the **DISPLAY MEMORY** button is pressed to read the peak CO level and TWA record. The backlight will automatically turn off when the TEST or DISPLAY MEMORY functions are completed.

DO NOT TRY TO TEST THIS CO MONITOR IN ANY OTHER WAY.

If no alarm sounds during a test, check battery power. If monitor still does not sound, the unit may be malfunctioning and should be returned for service (SEE SECTION 11).

TEST THE CO MONITOR *WEEKLY* TO ENSURE PROPER OPERATION.

Erratic or low sound coming from your CO monitor may indicate a malfunctioning unit, and it should be returned for service (SEE SECTION 11).

RESET/MUTE:

Once the CO monitor activates an alarm, it will not automatically reset itself. You can temporarily silence the monitor by pressing the TEST/RESET/MUTE button once. The muted alarm icon will be displayed, the green LED will blink once per minute, and the current CO level will be displayed. If the monitor continues to detect CO levels of 20 ppm or more, the alarm signals will reactivate automatically within 5 minutes if below 190 ppm, or within 15 seconds if 190 ppm or more. If CO levels drop below 20 ppm, the alarm will not reactivate.

7. WARNING:

Carbon monoxide monitors respond to the presence of CO. They do not detect smoke.

IF YOU HAVE BEEN AWAY FROM THE BUILDING AND RETURN TO FIND THE ALARM(S) SOUNDING, DO NOT ENTER THE BUILDING. CALL THE 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.

8. MAINTENANCE: CLEANING YOUR MONITOR

You can clean your CO monitor by using a vacuum cleaner brush to vacuum around the openings on the CO monitor. The outside of the CO monitor can be wiped with a soft cloth slightly dampened with water only. **AFTER CLEANING, TEST YOUR CO MONITOR TO MAKE SURE THAT IT IS WORKING PROPERLY.**

9. LIMITATIONS OF CARBON MONOXIDE MONITORS

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 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 CO monitor is located on a different level of the building or on the other side of a closed door, it may not alert everyone at risk. The use of drugs and alcohol may impair ones 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 any doors are kept closed, install a CO monitor in each room. If the monitor is installed in a large open area, one monitor should be installed for every 1000 square feet of vertically unobstructed space.

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. Owners and renters should have adequate insurance to protect their lives and property.

10. GOOD SAFETY HABITS:

DEVELOP AND PRACTICE A PLAN OF ESCAPE:

Make a floor plan indicating all doors and windows and at least two (2) escape routes from each room. Second story and higher windows may need a fire escape built to local code.

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

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

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

Practice a CO and 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 they know what to do.*

WHAT TO DO WHEN THE ALARM SOUNDS:

If alarm signal sounds (the red LED will flash and the alarm will sound 4 short beeps every 5 seconds):

- 1) Operate **TEST/RESET/MUTE** button to temporarily silence alarm;
- 2) Immediately move to fresh air - outdoors or by an open door or window. Check that all persons are accounted for. Do not re-enter the premises or move away from the open door/window until the premises have been aired out, and your monitor remains in its normal condition;
- 3) After following steps 1 and 2, if the alarm reactivates within a 24 hour period, repeat steps 1 and 2 and call a qualified appliance technician, if you have not already. Fuel burning equipment, appliances and vehicles must be inspected for proper operation, and the source of CO must be investigated. 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 or forklifts are not, and have not been, operating in an attached garage or warehouse, or adjacent to the building.

11. SERVICE AND WARRANTY:

IMPORTANT! SAFETY INSTRUCTIONS:

In the event of any malfunctions with the monitor, do not attempt to repair the unit. This product should be serviced by a qualified service technician. Return the monitor for service to the address listed below.

ONE-YEAR LIMITED WARRANTY

The manufacturer, PPI, warrants to the original consumer purchaser that this commercial CO monitor shall be free from defects in materials and workmanship from the date of purchase for one year.

If this CO monitor is determined to be defective in original materials or workmanship during the warranty period, return the monitor to the address indicated below with delivery costs prepaid. Do not attempt to repair this product yourself. If determined to be defective in original materials or workmanship, the CO monitor will be repaired or replaced, at the sole discretion of the manufacturer.

This warranty is void if the CO monitor's plastic case has been opened or the product has been damaged by accident, modification of the unit, unreasonable use, neglect, tampering or other cause not arising from defects in original materials or workmanship.

The liability of the manufacturer, or of any of its parent or subsidiary corporations, arising from the sale of this product or under the terms of this limited warranty shall not in any case exceed the cost of the replacement of the CO monitor. In no case shall the manufacturer or any of its parent or subsidiary corporations be liable for consequential loss or damages resulting from the failure of the CO monitor to activate, or for the breach of this or any other warranty, expressed or implied, even if the loss or damage is caused by the manufacturer's negligence or fault. These limitations or exclusions may not apply in some states where limitations on the duration of an implied warranty or exclusions or limitations of incidental or consequential damages are not allowed.

This warranty extends to the original consumer purchaser only, and may not be altered by any agents, representatives, dealers, distributors or employees.

To return this product for service, pack carefully in a padded container. Include a copy of your original sales receipt, an explanation of the problem, and your return address. Ship prepaid and insured to:

Pro-Tech Safety Products

P.O. Box 493727

Redding, CA 96049

Tel: 877-955-TECH (8324)

www.protechsafety.com

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