



Series 450 Carbon Monoxide Monitor

Instructions and Operation



***NOTE:** This instrument is shipped with a new 9V battery. However, there is a protective plastic cap installed on the battery terminals. This cap must be removed and the battery connected to the battery terminal before the instrument will function.

The **Series 450 CO Monitor** measures carbon monoxide from levels 0 to 2000 PPM. The unit is equipped with audible and visual indicators of CO concentration. The beacon indicator flashes in correspondence to the level of CO detected in the air. Perfect for HVAC applications such as servicing heaters, furnaces, appliances and for general building inspection.

BATTERY INSTALLATION

Remove two screws holding the bottom endcap labeled BATTERY in place and remove it. Connect the battery to the enclosed battery clip observing correct polarity. Insert the battery in the case. Be careful not to trap the wires between the case or foam pad, which retains the battery. This could make it difficult to install the battery or remove it later for replacement. Be sure the rubber gasket is properly seated in the gasket channel and

PHYSICAL DATA

Range: 0-2000 PPM.

Resolution: 1 PPM.

Accuracy: (using 200 PPM calibration gas, +/- 3% of reading +/- the accuracy of the calibration gas, at the time of calibration.

Response Time: <30 seconds to 90% of reading.

Operating Temperature: 32 to 104°F (0-40°C).

Humidity Conditions: 0-90% Relative Humidity Non Condensing.

Adjustments: Zero and Span via keypad.

Power*: 9V Battery.

Battery Life: 500 hours typical

Case Material: Anodized Aluminum with plastic end caps.

Dimensions: 6.8" L x 2.8" W x 0.9" D except add 0.5" D for sensor cover. (172.7 x 71.1 x 22.9 mm) (12.7mm).

Sensor Type: Field replaceable Electrochemical Cell.

Sensor Life: 2 years minimum.

Alarms: 2 Alarms, with audible and visual

replace the endcap. Note that the endcap only fit one way because the holes are slightly off-center. Place the "Z" shaped wrist strap in one of the screw recesses and replace screw. Do not overtighten. Attach the wrist strap to the clip.

Use only 9 Volt alkaline type batteries such as Duracell® MN1604, or Eveready® 522, equivalent. Zinc-carbon types, often labeled Heavy-Duty are not recommended because their shorter life and increased potential leakage. Alkaline batteries are a better value because they typically last up to three times longer in this device.

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Eveready® is a registered trademark of Eveready Battery Company.

LOW BATTERY INDICATION

When the 9V battery is reaching the end of its life, the "LOW BAT" indicator on the display will turn on.

FUNCTIONS ACCESSED DIRECTLY THROUGH KEYPAD

On Off Operation:

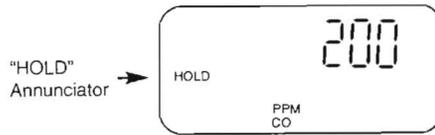
Pressing  turns power on, pressing again turns power off. The unit will automatically shut off if there is no activity for 20 minutes. To defeat the automatic shut off, when turning the unit on press and hold the  key down and then press .

Display Backlight:

Press  to turn the backlight on, again to turn the backlight off. The backlight will automatically turn off after 2 minutes to conserve battery power.

Display Hold:

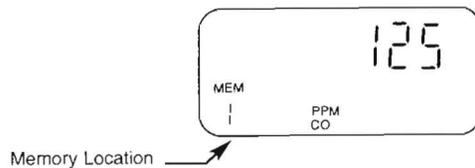
Pressing and releasing  will freeze the display and illuminate the "HOLD" annunciator.



Pressing  again will extinguish the "HOLD" annunciator and the display will again be updated.

To Store a Reading In Memory:

Up to 25 CO readings may be stored in memory. Pressing  will store the presently displayed value in memory. The active memory location will be displayed in the lower left, starting initially with "1". The MEM descriptor will turn on any time there are any values stored in memory.



As each reading is saved, the memory location is advanced to the next location. When 25 readings are stored in the memory location, it will begin at "1" again. After a reading is stored, the display will return to the home position.

FUNCTIONS ACCESSED THROUGH THE MENU

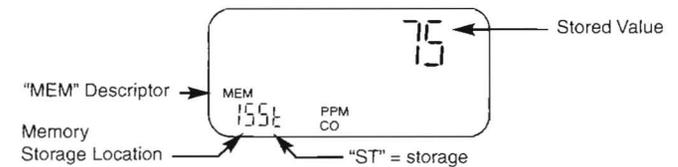
How to Use the Menu:

To access the menu, press  to enter the menu mode. Continue pressing  until the desired menu item is displayed. When the instrument is in the menu mode, the  key will function as the "INCREMENT" key, and the  key will function as the "DECREMENT" key.

When the desired menu item is displayed, use the  and  keys to modify the menu item to the desired value, then press  to store the value in memory. If the  key is not pressed, the original menu value will be retained in memory and not changed. To exit the menu, scroll to the home position. While in the menu mode, if no activity is detected for 30 seconds, the display will automatically return to the home position.

Reading a Stored Value:

Index the menu until the lower display reads $15t$. The lower left display shows the active memory location, upper display shows the memory value. Use  and  to sequence through the memory locations. To clear the memory, press and hold the  key for five seconds while in this menu location.



Reading the Peak Value:

The Peak feature stores the highest reading the monitor has measured since the last reset or Power On. At Power On PEA is reset to the present reading. To view the peak value, index the menu until the lower left display reads PEA.

When PEA is displayed, pressing the  key will reset the value to the present CO value.

ALARMS

The monitor is equipped with two alarms. Alarm 1 is the lower alarm value, and Alarm 2 is the higher alarm value. Alarm 1 is factory set 35 PPM, and Alarm 2 is factory set to 200 PPM. When the displayed value reaches the alarm setting, the appropriate alarm descriptor will turn on.

The lowest setting of Alarm 1 is limited to 35 PPM to avoid false alarms. Alarm 2 must be set a minimum of 100 PPM higher than Alarm 1.

To change an alarm setting, index the menu until the lower left display reads AL 1 or AL 2 and use the   keys to set the desired alarm setting. Press the  key to store the setting.

The monitor is equipped with both audio and visual alarms. When Alarm 1 is reached, the audio alarm will beep and the visual alarm will flash. The speed of the audio beeping and visual flashing will increase until Alarm 2 is reached. At this point the audio and visual alarms will be on continuously. The Audio and Visual alarms are factory set to be on. To turn the Visual alarm off, index the menu until ALF (Alarm Flasher) is displayed in the lower left display. Then use the  key to turn the Visual alarm off. The upper display will read OFF. Then press  to store the change. To turn the Visual alarm back on, press the  key, then press  to store the change. The Audio alarm may be turned off or on in the same way as the Visual alarm by indexing the menu until the lower left display reads ALb (Alarm Beeper).

Zero Adjustment:

Place the instrument in a CO free environment. Allow the instrument to stabilize at least three minutes. The instrument should read 0 PPM. If it reads >10 PPM, the sensor is bad and should be replaced. If it reads 1 to 9 PPM, the zero may be adjusted as follows:

1. Index the menu to CAL0.
2. Press the  and  keys simultaneously. Index the menu back to the home position. The display should now read 0 PPM.

CALIBRATION

IMPORTANT NOTE: Electrochemical CO sensors slowly lose sensitivity over time. A quick “bump test” should be performed with CO gas before each usage to ensure proper instrument performance. It is also recommended to perform a calibration at four month intervals to guarantee proper operation. A replacement sensor should be installed if the unit can no longer be calibrated. In order to perform a calibration, a calibration kit is required. This is available from Dwyer Instruments, see below to order.

CALIBRATION ACCESSORIES

A-405-1 Calibration Kit with Regulator: Includes Case, Regulator, Tubing & Adapter, A-405-2. For use with 17 Liter Gas Tank (not available from Dwyer Instruments). The regulator has a fixed flow rate of 0.5 L/min. If a different Calibration Kit is used, a flow meter is required that can verify setting the flow rate correctly to .5 L/min.

A-405-2 Calibration Adapter: Adapter connects the regulator to the sensor cover on the back of the CO Monitor.

A-450-3 Replacement Sensor

CALIBRATION PROCEDURE

1. Zeroing the Instrument: It is important that the instrument is in an area with zero concentration of CO gas. Turn the instrument on and allow it to stabilize for three (3) minutes. Press the  key until the display reads CAL0. The upper display should read between 0 and 12. If the upper display reads above 12, the sensor may be bad and should be replaced – refer to SENSOR REPLACEMENT. Press the  and  keys simultaneously. The display will momentarily blink to show the value has been stored.

2. Refer to FIG. A, “Calibration Kit Setup”. Attach the regulator to the calibration gas cylinder (make sure the valve is closed). Attach the hose from the calibration adapter kit to the regulator, then place the adapter cap over the sensor housing on the back of the instrument.

NOTE: The regulator used with the Dwyer Instruments Calibration Kit has a fixed flow rate of 0.5 Liters/Minute. If a different calibration kit is used, make sure the flow is set to approximately 0.5 Liters/Minute. A flow rate greater than 1 Liter/Minute will result in an inaccurate reading.

3. Span Calibration: Turn on the valve on the regulator and allow gas to flow for at least three minutes. Press the **INDEX** key until the display reads CAL0. Press and hold the **HOLD** and enter keys for five seconds until the lower display reads CAL1. Verify that the upper display reads between 125 and 400, then press the **STORE** and **ENTER** keys simultaneously. The display will blink to show the calibration value has been stored. If the value is <125 or greater than 400, the sensor is bad needs to be replaced. Refer to "SENSOR REPLACEMENT".

4. Index the menu back to the home position. The instrument should read 200 PPM +/- 2.

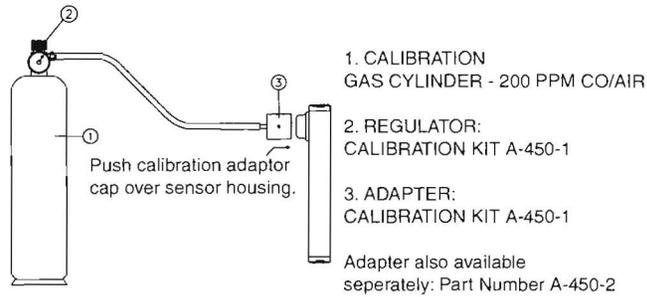


Fig. A

SENSOR REPLACEMENT

A replacement CO sensor is available from Dwyer Instruments.

Order part number: **A-450-3**

Replacing the sensor

1. Refer to FIG. B Remove the two MTG screws.
2. Carefully remove the sensor cap.
3. Remove and discard sensor.
4. Remove shorting wire spring from pins on new sensor.
5. Carefully install new sensor into instrument. Re-install cap and mounting screws.
6. New sensors must be recalibrated. Wait a minimum of 30 minutes after installing a new sensor before calibrating the instrument. The instrument has internal temperature compensation and the sensor must be at the same temperature as the instrument to calibrate properly.

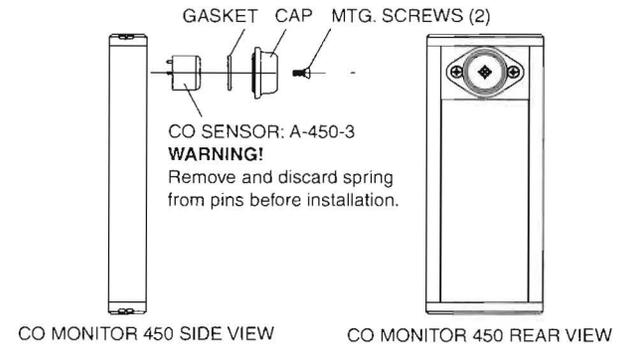


Fig. B

