



Macurco™ CM-E1 Carbon Monoxide Detector

User Instructions



Important: These User Instructions are to be provided to the homeowner/end user upon product installation. Each person installing or using this equipment must read and understand the information in these User Instructions before use. Installation of this equipment by untrained or unqualified persons, or use that is not in accordance with these User Instructions may adversely affect product performance and **result in sickness or death**. For proper use see User Instructions or call Macurco Technical Service.

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GENERAL SAFETY INFORMATION

Intended Use

The CM-E1 is a low voltage (9-32 VDC) detector of Carbon Monoxide (CO). The CM-E1 is designed for connection to UL Listed Fire Alarm/Burglary Control Panels. **NOTE:** Any time the words "Control Panel" or "Alarm Panel" or "Alarm Control Panel" are used in these instructions, they refer to a UL Listed Fire Alarm/Burglary Control Panel. Alarm control panels that work on 12 or 24 VDC can provide battery backup to the CM-E1 detectors. This carbon monoxide detector is designed to detect CO gas from ANY source of combustion. It is NOT designed to detect smoke, fire or any other gas.

List of Warnings and Cautions within these *User Instructions*

WARNING

- Each person using this equipment must read and understand the information in these *User Instructions* before use. Installation of this equipment by untrained or unqualified persons, or use that is not in accordance with these *User Instructions* may adversely affect product performance and **result in sickness or death**. For proper use see *User Instructions*, or call Macurco Technical Service.
- Use only for monitoring the gas which the sensor and detector are designed to monitor. Failure to do so may result in exposures to gases not detectable and **cause sickness or death**. For proper use see *User Instructions*, or call Macurco Technical Service.
- Do not cover or obstruct audible alarm opening or visual alarm LED. Doing so may adversely affect product performance and **result in sickness or death**.
- Do not disassemble unit or attempt to repair or modify any component of this detector. This detector contains no user serviceable parts, and substitution of components may adversely affect product performance and **result in sickness or death**.
- This detector helps monitor for the presence and concentration level of carbon monoxide gas. Misuse may produce an inaccurate reading, which means that higher levels of the gas being monitored may be present and could result in overexposure and **cause sickness or death**. For proper use, see supervisor or *User Instructions*, or call Macurco Technical Service.
- When the unit is turned on it performs a self-test, which activates the audible and visual alarms. If the self-test fails, or all the alarms do not activate, do not use. Failure to do so may adversely affect product performance and **result in sickness or death**.
- Immediately exit the environment if it causes an alarm condition on the detector. **Failure to do so may result in sickness or death**.

UL 2034

The CM-E1 may not function effectively below 40°F (4.4°C) or above 100°F (37.8°C). Using the detector outside of this temperature range may adversely affect product performance and **result in sickness or death**.

This product is intended for use in ordinary indoor locations of family living units and office workspaces. The CM-E1 is not designed to measure compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards.

To help avoid false alarms, the CM-E1 is not intended for low level detection (below 30ppm) of carbon monoxide, per UL 2034.

Individuals with certain medical problems may consider using warning devices that provide audible and visual signals for carbon monoxide concentrations below 30 ppm.

The following symptoms are related to CARBON MONOXIDE POISONING and should be discussed with ALL members of the household:

- Mild exposure: Slight headache, nausea, vomiting, fatigue (often described as "Flu-like" symptoms).
- Medium Exposure: Severe throbbing headache, drowsiness, confusion, fast heart rate.
- Extreme Exposure: Unconsciousness, convulsions, cardio respiratory failure, and death.

Many cases of reported CARBON MONOXIDE POISONING indicate that while victims are aware they are not well, they become so disoriented they are unable to save themselves by either exiting the building or calling for assistance. Young children and household pets may be the first affected.

Transient CO situations can occur:

1. Excessive spillage or reverse venting of fuel burning appliances caused by outdoor ambient conditions, such as:
 - a) Wind direction and/or velocity, including high gusts of wind. Heavy air in the vent pipes (cold/humid air with extended periods between cycles).
 - b) Negative pressure differential resulting from the use of exhaust fans.
 - c) Simultaneous operation of several fuel-burning appliances competing for limited internal air.
 - d) Vent pipe connections vibrating loose from clothes dryers, furnaces, or water heaters.
 - e) Obstruction or unconventional vent pipe designs, which can amplify the above situations.
2. Extended operation of un-vented fuel burning devices (range, oven, fireplace, etc.).
3. Temperature inversions, which can trap, exhaust gasses near the ground.
4. Car idling in an open or closed attached garage, or near a home.

CAUTION: This detector will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas. Accommodation spaces should be well ventilated when household cleaning supplies or similar contaminants are used.

CAUTION

- Avoid the use of harsh cleaning materials, abrasives and other organic solvents. Such materials may permanently scratch the surface, damage the sensor, labels, or instrument housing.
 - If you have any doubts about the applicability of the equipment to your situation, consult an industrial hygienist or call Macurco Technical Service.
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USER INSTRUCTIONS AND LIMITATIONS

WARNING

Each person using this equipment must read and understand the information in these *User Instructions* before use. Installation of this equipment by untrained or unqualified persons, or use that is not in accordance with these *User Instructions* may adversely affect product performance and **result in sickness or death**. For proper use, see supervisor or *User Instructions*, or call Macurco Technical Service.

Use For

The CM-E1 is a low voltage (9-32 VDC) detector of Carbon Monoxide (CO). The CM-E1 is designed for connection to UL Listed Fire Alarm/Burglary Control Panels. Alarm control panels that work on 12 or 24 VDC can provide battery backup to the CM-E1 detectors. This carbon monoxide detector is designed to detect CO gas from ANY source of combustion.

WARNING

Use only for monitoring the gas which the sensor and detector are designed to monitor. Failure to do so may result in exposures to gases not detectable and **cause sickness or death**. For proper use, see supervisor or *User Instructions*, or call Macurco Technical Service.

Do Not Use For

The CM-E1 is NOT intended for use in industrial applications such as refineries, chemical plants, etc. The CM-E1 is NOT intended for use in parking garages as the controller of exhaust systems. Do NOT use the CM-E1 for monitoring for gases other than Carbon Monoxide (CO). The CM-E1 is NOT designed to detect smoke, fire or any other gas. Do NOT mount the unit in the garage. Do NOT mount the CM-E1 where the normal ambient temperature is below 40°F (4.4°C) or exceeds 100°F (37.8°C), or within 5 feet (1.5 meters) of a cooking or heating appliance. The Alarm Control Panel must be dedicated to CO detection or have alarm devices that provide a distinctive alarm for carbon monoxide detection. Do not connect the CM-E1 to Fire Alarm Circuits.

WARNING

CM-E1 may not function effectively below 40°F (4.4°C) or above 100°F (37.8°C). Using the detector outside of this temperature range may adversely affect product performance and **result in sickness or death.** (UL 2034)

General Description

The CM-E1 is for use with UL Listed Fire Alarm/Burglary Control Panels that have 12 to 24 VDC power and 12 to 24 VDC alarm initiating circuits. The CM-E1 is intended for installation in buildings in non-hazardous locations such as residences, retail stores, office buildings, and institutional buildings.

Features

- Listed to UL standard 2075 for the Standard For Safety for Gas and Vapor Detector and Sensors
- Tested to UL 2075 using UL 2034 Sensitivity limits for carbon monoxide gas.
- Surface mounts to a wall using the supplied enclosure rear housing.
- Flush mounts in a 2 x 4 (1-1/2 inch deep minimum) [5.08 cm x 10.16 cm (3.81 cm deep minimum)] single gang switch, or handy electrical box.
- Small, low profile, attractive unit in a white plastic case.
- Detector alarms at multiple levels of exposure to **carbon monoxide** based on time weighted averages of the gas present.
- Inexpensive, easy to install. Microcomputer control allows mostly automatic operation.
- Test & Reset switch conducts internal tests and actuates alarm relay.
- Visual display: GREEN - Normal operation.
- FLASHING AMBER - Trouble Contact your installer or Macurco Tech Support
- RED - Danger! Move to fresh air (hazardous condition is present.)
- Highly linear electrochemical sensor
- N.O. or N.C. SPST Alarm Relay and N.C. SPST Trouble relay to connect to Alarm Control Panels
- Buzzer: Produces repeating loud tone bursts during alarm, and chirps if sensor trouble is found.

SPECIFICATIONS

- Voltage: 9-32 VDC
- Current (normal / alarm): 15mA / 35mA @ 9-32V
- Size: 3-1/8 X 5-1/8 X 1-1/2 inch (7.94 x 13.02 x 3.81 cm)
- Alarm Relay: SPST, 100mA, 40VDC
- Trouble Relay: SPST, 100mA, 40VDC
- Buzzer Rating: 85 dBA at 10 Feet
- Shipping Weight: One pound
- Operating Temp. Range: 40°F (4.4°C) to 100°F (37.8°C)
- Alarm Setting: Per UL 2034
- Color: White
- Designed for use with a UL Listed Fire Alarm/Burglary Control Panel

INSTALLATION AND OPERATION INSTRUCTIONS

The following instructions are intended to serve as a guideline for the use of the Macurco™ CM-E1 Carbon Monoxide Detector. It is not to be considered all-inclusive nor is it intended to replace the policy and procedures for each facility, residence or office.



This detector helps monitor for the presence and concentration level of carbon monoxide gases. Misuse may produce an inaccurate reading, which means that higher levels of the gas being monitored may be present and could result in overexposure and **cause sickness or death.** For proper use, see supervisor or *User Instructions*, or call Macurco Technical Service.

LOCATION

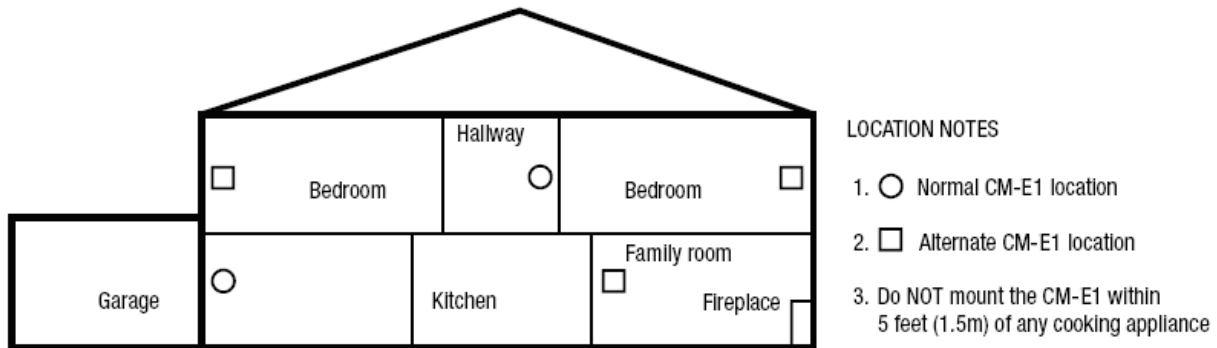
There are two usual sources of CO - defective heat sources (furnaces or wood burning stoves) and automobiles running in adjoining garages. The CM-E1 can detect CO from these sources, as well as any other sources of CO.

For best operation, mount a CM-E1 in the hallway near each bedroom or office area. In addition, another CM-E1 may be mounted just inside the door from the adjoining garage. Consider placing another detector in a bedroom or office that is adjacent to a furnace room.

! WARNING

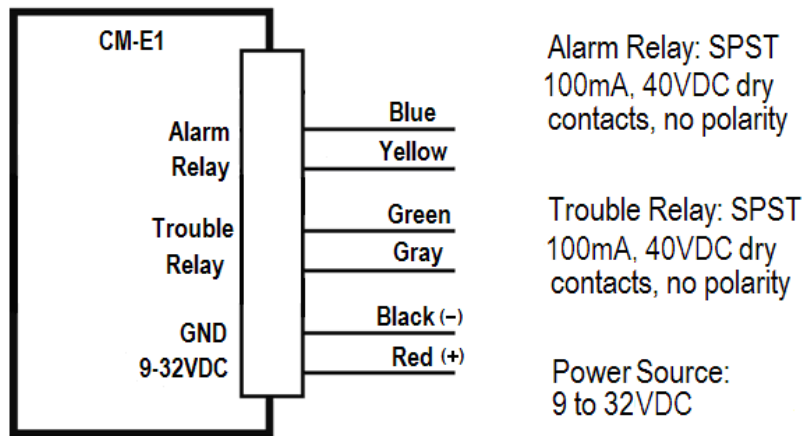
This product is intended for use in ordinary indoor locations of family living units and office workspaces. The CM-E1 is not designed to measure compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards. (UL 2034)

Do NOT mount the unit in the garage. Do NOT mount the CM-E1 where the normal ambient temperature is below 40°F (4.4°C) or exceeds 100°F (37.8°C), or within 5 feet (1.5 meters) of a cooking or heating appliance.



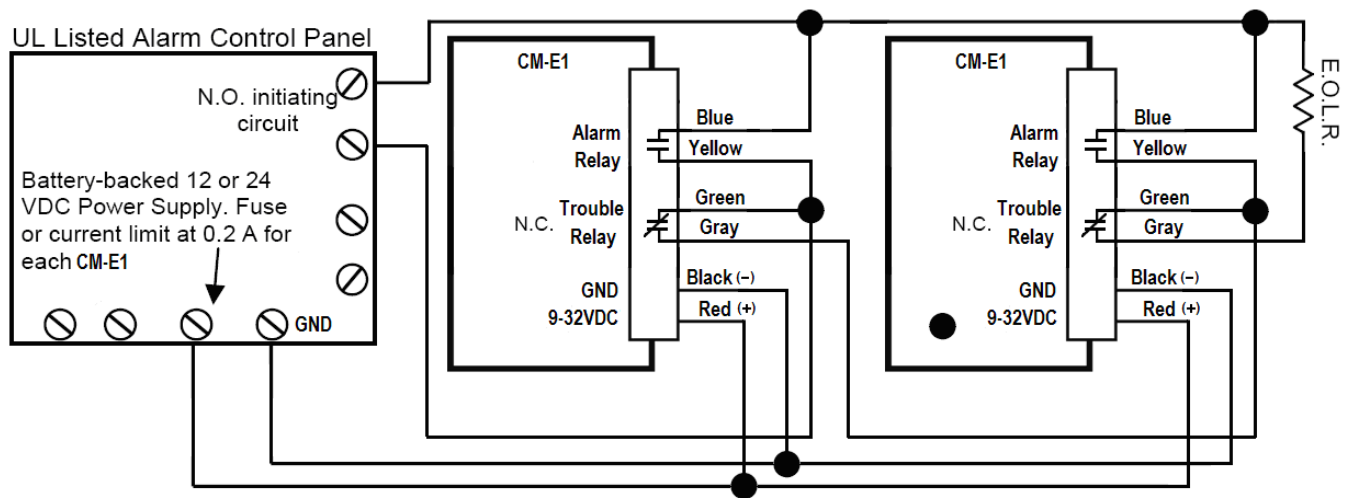
INSTALLATION

- As shipped, the CM-E1 faceplate is mounted on the enclosure's rear-housing component. This enclosure configuration allows the unit to be surface mounted flush on a wall. Wiring is routed through an access area on the base of the rear housing.
- A thin mid-plate enclosure component is also supplied with the CM-E1. Using the supplied screws, this mid-plate component is used to mount the CM-E1 on a 2 x 4 inch (5.08cm x 10.16 cm) switch box - single-gang or "handy", provided by the installer. The CM-E1's faceplate component (with the detector attached) is then mounted on the mid-plate component.
- The detector may be installed on either a ceiling or a wall. If installed on a peaked, gabled, or sloped ceiling, it should be located about 3 feet (1 meter) from the highest point. The unit can be placed vertically or horizontally on a wall, so the information on the front of the CM-E1 can be read in a normal manner (not upside down). Do NOT mount the CM-E1 in a corner. Use the same spacing as for smoke detectors-- 30 foot (9 meters) centers, 900 sq. feet (83 sq. meters) per detector.
- Electrical connections to the CM-E1 are made via the supplied six-conductor pigtail cable. The pigtail cable is first connected to the control panel wiring by means of wire-nuts (refer to the diagrams for proper pigtail wiring). The pigtail cable's connector then snaps into the mating connector on the back of the CM-E1 detector, allowing easy installation and replacement of the CM-E1. For proper detector operation, ensure that the CM-E1 is connected to a **continuous** source of power (not controlled by a wall switch). The CM-E1 current draw figures represent worst-case conditions and will **not** vary as the applied DC voltage varies.
- The alarm control panel zone inputs must be terminated with end of line resistors (E.O.L.R.), which are provided with the panel.
- When using the CM-E1 with normally closed initiating circuits, remove the jumper.
- See wiring diagram for information below on connections of the CM-E1. Macurco™ recommends a minimum of 22 AWG wire for runs up to 200 ft. (6096 m), and 18 AWG wire for longer runs.



Note: There is a jumper on the PCA to change the alarm output. Remove the jumper for N.C. or leave the jumper in place for N.O.

Typical connection of two CM-E1 detectors to an alarm control panel



The relay of the CM-E1 is a dry contact and rated at 100mA, 40VDC. It is **not suitable for fan control** use. When connecting the units to remote buzzers or other devices (all buzzers or "other devices" must be UL approved), make sure that the load does not exceed the relay's rating. External buzzers must be capable of generating a sound output greater than 85 dBA at 10 ft (3.048 M).

Power Up

WARNING

When the unit is turned on it performs a self-test, which activates the audible and visual alarms. If the self-test fails, or all the alarms do not activate, do not use. Failure to do so may adversely affect product performance and **result in sickness or death**.

When the detector is first powered, the status light will alternate between RED and GREEN as the unit performs a 2-1/2 minute warm-up cycle and self-test procedure. The buzzer on the CM-E1 will cycle once, emitting its characteristic 4-chirp tone. At the end of this 2-1/2 minute cycle, the status light will turn GREEN to indicate normal operation and air below the danger levels of carbon monoxide. The alarm relay is not energized during the 2-1/2 minute warm-up cycle.

Operation

The CM-E1 continuously monitors the ambient air at the sensor. If the CM-E1 measures levels of CO greater than the danger level, the RED light will turn on, the Alarm Relay will switch to actuate the alarm circuits in the control panel, and the buzzer on CM-E1 units will sound. The CM-E1 is programmed to alarm if the danger levels of carbon monoxide are exceeded, which are time and concentration-related. The alarm points are: 70 ppm of CO after 60 to 240 minutes, 150 ppm of CO after 10 to 50 minutes, and 400 ppm of CO after 4 to 15 minutes, in accordance with the provisions of UL Standard 2034.

 **WARNING**

Individuals with certain medical problems may consider using warning devices that provide audible and visual signals for carbon monoxide concentrations below 30 ppm. (UL 2034)

ALARMS

 **WARNING**

Immediately exit the environment if it causes an alarm condition on the detector. **Failure to do so may result in sickness or death.**

INSTALLER NOTE: It is required that the following UL information below be posted near the control/alarm panel or a copy provided to the customer.



WARNING: Actuation of your CO alarm indicates the presence of carbon monoxide (CO) which can KILL YOU. If alarm signal sounds:

- 1) Operate the reset/silence button;
- 2) Call your emergency services (_____) [fire department or 911];
- 3) Immediately move to fresh air - outdoors or by an open door/window. **DO A HEAD COUNT TO CHECK THAT ALL PERSONS ARE ACCOUNTED FOR - DO NOT RE-ENTER PREMISES NOR MOVE AWAY FROM THE OPEN DOOR/WINDOW UNTIL THE EMERGENCY SERVICES RESPONDERS HAVE ARRIVED, THE PREMISES HAS BEEN AIRED OUT, AND THE ALARM REMAINS IN ITS NORMAL CONDITION**
- 4) After following steps 1 - 3, if your alarm reactivates within a 24-hour period, repeat steps 1 - 3 and call a qualified technician (_____) 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, consult the manufacturers' instructions or contact the manufacturer directly for more information about CO safety and the equipment
Make sure that motor vehicles are not, and have not been operating in an attached garage or adjacent to the residence. (UL 2034)

 **WARNING**

The following symptoms are related to CARBON MONOXIDE POISONING and should be discussed with ALL members of the household:

- Mild exposure: Slight headache, nausea, vomiting, fatigue (often described as "Flu-like" symptoms).
- Medium Exposure: Severe throbbing headache, drowsiness, confusion, fast heart rate.
- Extreme Exposure: Unconsciousness, convulsions, cardio respiratory failure, and death.

Many cases of reported CARBON MONOXIDE POISONING indicate that while victims are aware they are not well, they become so disoriented they are unable to save themselves by either exiting the building or calling for assistance. Young children and household pets may be the first affected.

Transient CO situations can occur:

1. Excessive spillage or reverse venting of fuel burning appliances caused by outdoor ambient conditions, such as:
 - a) Wind direction and/or velocity, including high gusts of wind. Heavy air in the vent pipes (cold/humid air with extended periods between cycles).
 - b) Negative pressure differential resulting from the use of exhaust fans.
 - c) Simultaneous operation of several fuel-burning appliances competing for limited internal air.
 - d) Vent pipe connections vibrating loose from clothes dryers, furnaces, or water heaters.
 - e) Obstruction or unconventional vent pipe designs, which can amplify the above situations.
2. Extended operation of un-vented fuel burning devices (range, oven, fireplace, etc.).
3. Temperature inversions, which can trap, exhaust gasses near the ground.
4. Car idling in an open or closed attached garage, or near a home.

(UL 2034)

The CM-E1 will automatically stop alarming once the air clears, timing will depend on the CO exposure time and the CO level.

RESET/SILENCE SWITCH

The switch on the front of the CM-E1 labeled "TEST/RESET," performs four functions.

- 1.) A short press of switch, less than 5 seconds, will place the unit into self test mode with no alarm relay activation. The buzzer will sound for two complete alarm cycles, the status light will turn red for 5 seconds and then it will alternate slowly between green and amber while the self-test executes. The controlling software simulates a 3000 ppm CO environment and causes the unit to alarm after approximately one minute has elapsed. When this happens, the status light turns red and the buzzer will sound two complete alarm cycles. The unit will then return to normal operation.
- 2.) A long press of switch, 5 or more seconds long, will place the unit into self-test mode with alarm relay activation. Pressing and holding the switch will cause the buzzer to sound for two complete alarm cycles and status light to turn red for 5 seconds and then switch to solid amber. The alarm relay will then be activated and the switch can be released. After about 5 seconds, the alarm relay will turn off and the status light will alternate slowly between green and amber while the self test executes. The controlling software simulates a 3000 ppm CO environment and causes the unit to alarm after approximately one minute has elapsed. When this happens, the status light turns red and the buzzer will sound two complete alarm cycles. The unit will then return to normal operation.
- 3.) If the CM-E1 is in an alarm condition due to the detection of carbon monoxide, one push of the switch will cause the alarm buzzer to mute for five minutes. After the five-minute period, if CO is still present, the status light will again switch to RED, the alarm relay will close and the buzzer will sound. If after the five-minute period, the detected CO level has dropped below 70ppm, the CM-E1 unit will reset.
- 4.) If the CM-E1 is at the end of its seven year life the TEST/RESET switch can be used to temporarily silence the buzzer function. See section "End-of-life Indicator"



Do not cover or obstruct audible alarm opening or visual alarm LED. Doing so may adversely affect product performance and result in sickness or death.

TROUBLE INDICATOR

Internal failure of the CM-E1 will cause an open circuit in the normally closed (NC) Trouble Relay to provide for actuation of the control panel circuits. The status LED will flash AMBER and the CM-E1 buzzer will emit a short "chirp" every 50 seconds. See ERRORS section. The CM-E1 microprocessor continuously monitors various detector parameters. Failure of the CM-E1's internal power supply or a lack of power to the detector will result in the status light remaining OFF (not illuminated). In this case, the most common cause of detector trouble would be a break in the wiring between the control panel and the CM-E1.

END-OF-LIFE INDICATOR

Seven years after the CM-E1 is installed the end-of-life signal will be activated indicating that the CM-E1 has reached the end of its service life and needs to be replaced. The end-of-life signal will cause an open circuit in the normally closed (NC) Trouble Relay to provide actuation of the signal circuits. The status LED will flash alternate AMBER and OFF every 2 seconds and the CM-E1 buzzer will emit a short "chirp" every 50 seconds. The end-of-life buzzer can be silenced for 48 hours by pressing the "TEST/RESET" button. The silencing of the buzzer also resets the Trouble Relay to the Normally Closed (NC) position. The silence function will continue to be available for 29 days after the CM-E1 initiates an end-of-life signal. After this 29 day period the CM-E1 can no longer be silenced and must be replaced.

ERRORS

The CM-E1 continuously monitors various internal operating parameters. If a problem is found, the unit will switch to Trouble mode. See TROUBLE INDICATOR section. To reset the unit for normal operation, press the TEST/RESET switch, or remove power to the unit, wait a few seconds, then re-apply unit power. If this problem persists, your detector requires repair; contact the alarm panel installer or Macurco Tech Support for advice. If repair is required, return the unit to manufacturer to comply with warranty.

MAINTENANCE

WARNING

Do not disassemble unit or attempt to repair or modify any component of this detector. This detector contains no user serviceable parts, and substitution of components may adversely affect product performance and **result in sickness or death.**

The CM-E1 has a highly linear electrochemical sensor. The CM-E1 has an expiry function associated with the installation date which will cause the unit to indicate "end-of-life" when the sensor has expired. See section "End-of-life Indicator" All maintenance and repair of products manufactured by Macurco are to be performed at the Macurco Service Center. Macurco does not sanction any third-party repair facilities.

TESTING

The CM-E1 should be tested monthly by pushing the TEST/RESET switch; see TEST/RESET switch section. Normally this will be the only test required for the CM-E1 and is the recommended way to test the unit or units after installation. All CM-E1 units are factory calibrated and 100% tested for proper operation. The unit also has the ability to automatically self test and does so every 2 1/2 minute cycle. If the unit detects an improper voltage or inoperable component it will default into Trouble mode. See TROUBLE INDICATOR section. Check that the CM-E1 status indicator light is illuminated, (GREEN) continuously. If not, do not proceed with the tests. Though there is no field calibration procedure for this unit, there is an optional field test procedure.

CLEANING

The CM-E1 should be cleaned using the soft brush attachment of your vacuum cleaner. The CM-E1 should be tested after cleaning to ensure the unit is operating normally.

SENSOR POISONS

The gas sensor in the detector is designed with extreme sensitivity to the environment. As a result, the CO sensor may be damaged if it is exposed to a direct spray from aerosols such as paints, silicone vapors, etc., or to a high density of corrosive gases such as hydrogen sulfide or sulfur dioxide for an extended period of time. The sensor may react to chemicals such as ammoniated cleaning agents, volatile solvents and hydrogen gas. In sufficient concentration, these chemicals may cause a false alarm.

WARNING

CAUTION: This detector will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas. Accommodation spaces should be well ventilated when household cleaning supplies or similar contaminants are used. (UL 2034)

LIMITED WARRANTY

The Macurco CM-E1 Carbon Monoxide Detector is warranted to be free from defective material and workmanship for a period of two (2) years from the date of manufacture (stamped on the unit). If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty express or implied arising out of or related to the use of said equipment. Manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

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