Macurco™ CM-E1

Carbon Monoxide Gas Detector
Installation & Operation Manual

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.

1 General Safety Information

1.1 List of warnings

⚠ WARNING
Each person using this equipment must read and understand the information in these User Instructions before use. Use 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**.
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.
CM-E1 may not function effectively below 40 °F or above 100°F (4.4°C-37.8°C). Using the detector outside of this temperature range may adversely affect product performance and **result in sickness or death**. (UL 2034)
This detector helps monitor for the presence and concentration level of certain specified airborne 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.
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.
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**.
Individuals with certain medical problems may consider using warning devices that provide audible and visual signals for carbon monoxide concentrations below 30 parts per million (ppm). (UL 2034)
Immediately exit the environment if there is an alarm condition on the detector. Failure to do so may **result in sickness or death**.
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**.
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)
If you have any doubts about the applicability of the equipment to your job situation, consult an industrial hygienist or call Macurco Technical Service.

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, cardiorespiratory 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.

2 Use Instructions and Limitations

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.

NOTE: Any time the word "CM-E1" is used it refers to either the rectangle and round model options

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.

⚠ WARNING
Each person using this equipment must read and understand the information in these User Instructions before use. Use 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**.

2.1 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. It is NOT designed to detect smoke, fire or any other gas.

⚠ 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.

2.2 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 32 °F or above 120°F. Using the detector outside of this temperature range may adversely affect product performance and **result in sickness or death.**

2.3 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.
- Rectangle - Surface mounts to a wall/ceiling using the supplied enclosure rear housing.
- Round - Surface mounts to a wall/ceiling using the enclosure rear housing – sold separately (CM-E1 Round Base 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

2.4 Specifications

- Voltage: 9-32 VDC
- Current (normal / alarm): 15mA / 35mA @ 9-32V
- Rectangle Flush: 3.318 X 5-1/8 X 1/3 (7.94 x 13.02 x 0.85 cm)
- Rectangle Surface: 3-1/8 X 5-1/8 X 1-1/2 inch (7.94 x 13.02 x 3.81 cm)
- Round Flush: 5-1/2" x 1/2" (13.97 cm x 1.27)
- Round Surface: 6-1/4" x 1-3/4" (15.875 cm x 4.445) – base sold separately
- 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
- End-of-Life Indication: 10 years after installation

3 Installation and Operating 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.

⚠ WARNING
This detector helps monitor for the presence and concentration level of certain specified airborne 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.

3.1 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.

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.
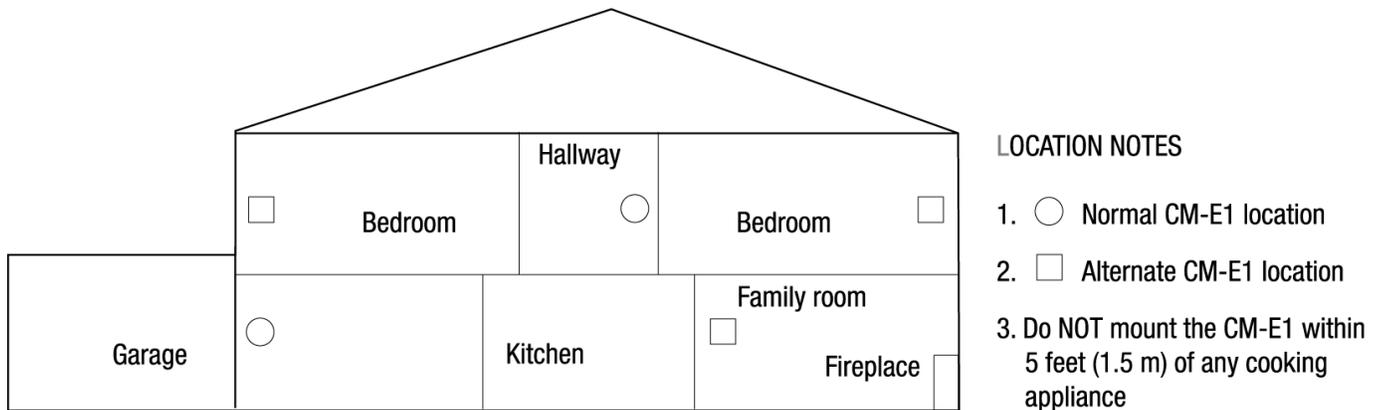

Figure 3-1 – Typical Install Locations

3.2 Installation

1. The CM-E1 wall/ceiling base enclosure configuration allows the unit to be surface mounted flush on a wall/ceiling. Wiring is routed through an access area on the base of the rear housing. **The round version base sold separately.**

2. A thin mid-plate enclosure component is also supplied with the CM-E1 for both rectangle and round options. Using the supplied screws, this mid-plate component is used to mount the CM-E1 on a 2x4 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.

3. 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.

4. Electrical connections to the CM-E1 are made via the supplied eight-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.

5. 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.

6. To meet the requirements of ANSI/UL 2075, Second Edition, the CM-E1 carbon monoxide detector employs duplicate power leads (Red and Black) where the first pair of power leads goes into the first carbon monoxide detector and the second pair of power leads goes to the next detector on the loop.
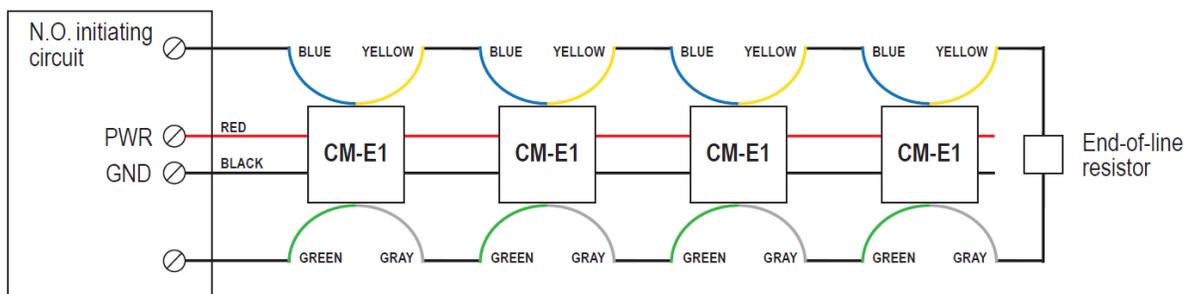

Figure 3-2 – Series Wiring

7. The alarm control panel zone inputs must be terminated with end of line resistors (E.O.L.R.), which are provided with the panel. The CM-E1 has an optional internal audible sounder and should be connected to a Fire Alarm/Burglary Control Panel with an audible device that provides at least 85 dBA sound output. See BUZZER option in the OPERATION section.

8. When using the CM-E1 with normally closed initiating circuits, remove the Alarm Relay jumper located on the back of the CM-E1 detector near the eight-conductor pigtail cable connector. Removing the Alarm Relay jumper changes the normally open relay of the CM-E1 to a normally closed relay.

9. 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. (61 m), and 18 AWG wire for longer runs.

NOTE: There is an Alarm Relay jumper on the PCA to change the alarm relay configuration. Removing the Alarm Relay jumper changes the normally open alarm relay of the CM-E1 to a normally closed alarm relay.

10. 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).
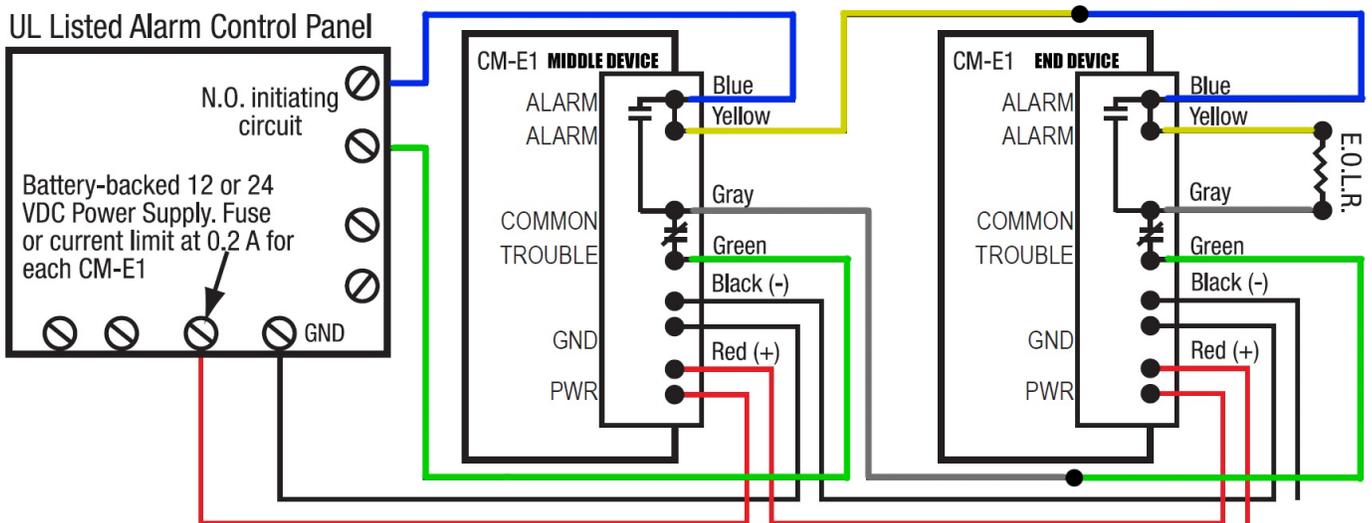

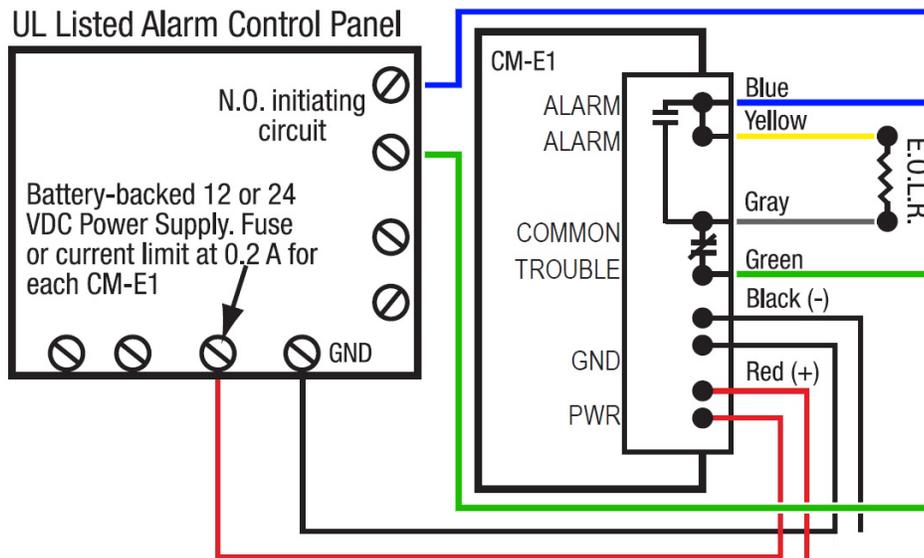Figure 3-3 – Typical Connection of two CM-E1's in series to an alarm control panel

Figure 3-4 – Typical Connection of a Single CM-E1 to an Alarm Control panel

3.3   Wiring Connections

Typical wiring for the CM-E1 detector will use a 4 conductor from an Alarm / Security Panel to the device. Multiple units may be wired in series (multiple units per zone) or each unit home run to the panel (single unit per zone). The 4-conductor wire will be 2 for power (positive / negative) and 2 for signal, signal is not polarity sensitive. The device is designed to provide both Alarm and Trouble indication back to the panel. This is accomplished using a 2 wire and resistor by providing one of three states to the panel. With the J2 Jumper in place (normally open Alarm Relay) using the panel will see the resistor in normal operation, a closed circuit in an alarm condition or an open circuit in a trouble condition.

3.3.1   Power Connection

The device's wiring harness has two RED wires and two BLACK wires. Connect one Red to an incoming positive power source (such as from the fire alarm control panel) and connect one Black to the negative side of the same power source. The additional Red and Black wires can be capped off separately from each other or can be used to provide power to the next detector in the series.

3.3.2   Trouble Relay Connection

The contacts used for the trouble relay consists of the GREEN and GRAY wires. When wired in series the GREEN becomes the Signal in and the GRAY becomes the Signal out. The trouble relay is a Normally Closed relay. When trouble is detected, the trouble relay will open the connection between the wires.

3.3.3   Alarm Relay Connection

The contacts use for the alarm consists of the BLUE and GRAY wires. The YELLOW wire is common to the BLUE wire and is used in series wiring where the BLUE wire becomes the signal in and the YELLOW wires becomes the signal out. The alarm relay status is controlled by the J2 Jumper. If the jumper is in place the alarm contact is Normally Open, If the jumper is removed or on a single pin the alarm contact is Normally Closed.

3.4 Jumper Placement
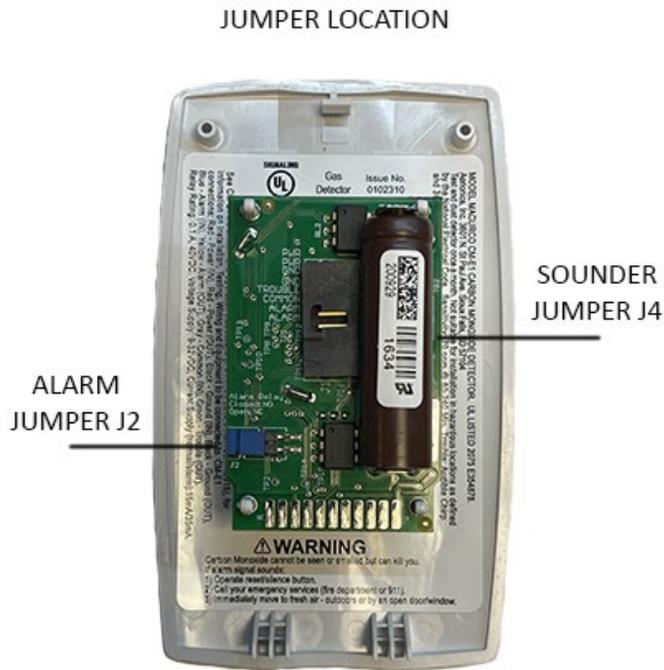
*rectangle housing used for reference

Figure 3-5 – Jumper location

Figure 3-6 – Alarm Relay Jumper J2 Location

Figure 3-7 – Sounder Jumper J4 Location

4 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 (if the BUZZER is enabled) . 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 parts per million (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)

In the configuration, as shipped from the factory, the CM-E1 has an internal audible sounder. A jumper on the circuit board can be removed to disable the internal audible sounder. If the Buzzer jumper on the circuit board is removed the CM-E1 should be connected to a Fire Alarm/Burglary Control Panel with an audible device that provides at least 85 dBA sound output. The CM-E1 can be modified, either before or after installation, to disable the internal audible sounder. Locate the blue jumper labeled "Buzzer" on the printed circuit board under the buzzer. Remove this jumper to disable the internal audible sounder.

4.1 Power Up

⚠ WARNING
When the unit is powered up it performs a self-test during which the green LED light blinks for a period of one and one half to two minutes. Afterwards, the green LED light will turn on continuously to indicate the unit is in normal operation (ARMED). If the self-test fails or the green LED light does not turn on continuously 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 (if the BUZZER is enabled), emitting its characteristic temporal 4 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.

⚠ 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)

Figure 4-1 – UL Information Form

⚠ 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, cardiorespiratory 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).

4.2 Reset/Silence Switch

The switch on the front of the CM-E1 labeled "TEST/RESET," performs five 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 (if the BUZZER is enabled). 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 (if the BUZZER is enabled) 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 (if the BUZZER is enabled). The unit will then return to normal operation.

3. Quickly pressing the TEST/RESET button 5 times within 4 seconds enters the unit into Field Test Mode. Starting from Normal Mode (LED is steady Green) and quickly press the TEST/RESET button 5 times within 4 seconds. When the Field Test Mode is started the buzzer will double beep once and the LED will flash Amber (see Field Test section).

4. 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 the BUZZER is enabled). If after the five-minute period, the detected CO level has dropped below 70ppm, the CM-E1 unit will reset.

5. If the CM-E1 is at the end of its ten-year life, the TEST/RESET switch can be used to temporarily silence the buzzer function. See section "End-of-life Indicator".

⚠ WARNING
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**.

4.3 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 (if the BUZZER is enabled). 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.

4.4 End-of-Life Indicator

Ten 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 (if the BUZZER is enabled). 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.

4.5 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.

⚠ 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.

5   Testing

The CM-E1 should be tested monthly by pushing the TEST/RESET switch; see TEST/RESET switch section. This is the recommended way to test the unit or units after installation. Though there is no field calibration procedure for this unit, there is a field test procedure. The CM-E1 should be tested annually by using the CME1-FTG aerosol carbon monoxide field test gas; see FIELD TEST section. 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.

5.1   Field Test

The Macurco CME1-FTG is an aerosol carbon monoxide field test gas that can be used with the CM-E1 carbon monoxide detectors. This field test gas allows users and installers to do a quick functionality test of the CO sensor. The CME1-FTG is an 11liter (L), 500ppm CO/Air mixture in an aerosol can. The flow rate of the CME1-FTG is 10 liters per minute (LPM) so there is enough gas to test 20-30 sensors.

1.   To enter in Field Test Mode, start from Normal Mode (LED is steady Green) and quickly press the TEST/RESET button 5 times within 4 seconds. When the Field Test Mode is started the buzzer will double beep once and the LED will flash Amber

NOTE: If the button press does not follow the pattern required to enter Field Test Mode, the CM-E1 will simply enter the 2 ½ minute Self-Test Mode as if the test button was pressed once for less than 5 seconds. If anytime during Field Test Mode there is a trouble, the LED flashes Red and buzzer double beeps every 15 seconds.

2.   With the LED flashing Amber, aim the nozzle of the aerosol can at the buzzer grate area. Direct the gas into the housing by placing the nozzle of the aerosol can into one of the buzzer grate holes and pull the trigger to spray the gas into the housing for 2-3 seconds.

NOTE: The detector waits to pass the Field Test for a maximum of 5 minutes. If after 5 minutes Field Test is not passed detector enters in trouble mode when the LED flashes Red and buzzer double beeps every 15 seconds. If Field Test is passed the LED displays flashing Green and buzzer double beeps every 15 seconds indicating that the test was successful.

3.   Wait for a few seconds. The LED should begin to flash Green rapidly and the buzzer should double beep every 15 seconds indicating a pass of the field test.
4.   Press the button once to return to Normal Mode.

NOTE: If the LED does not change within 10 seconds indicating a pass of the field test, there are four possibilities:

   a.   The gas cylinder is empty, replace the gas cylinder.
   b.   The gas was not directed into the housing. Direct the gas into the housing by placing the nozzle of the aerosol can into one of the buzzer grate holes and pull the trigger to spray the gas into the housing for 2-3 seconds.
   c.   The gas is expired or degraded. Replace the gas cylinder.
   d.   Detector is in need of servicing. Return unit to factory for servicing.

5. After the test is done the detector displays the test result (on the LED and buzzer) for another 10 minutes after which it will reset, returning to NORMAL MODE. Pressing the TEST/RESET button will also return the CM-E1 to NORMAL MODE.

⚠️ 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)

5.2 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.

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.

5.3 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.

6   Appendix A – Table of Figures

7   Appendix C – Old to New wire harness

Units manufactured prior to mid-2015 would have used a 6-wire harness to connect the unit. This harness would have a white connector on the circuit board. These units would have had a 7-year sensor life. See Figure C-1.
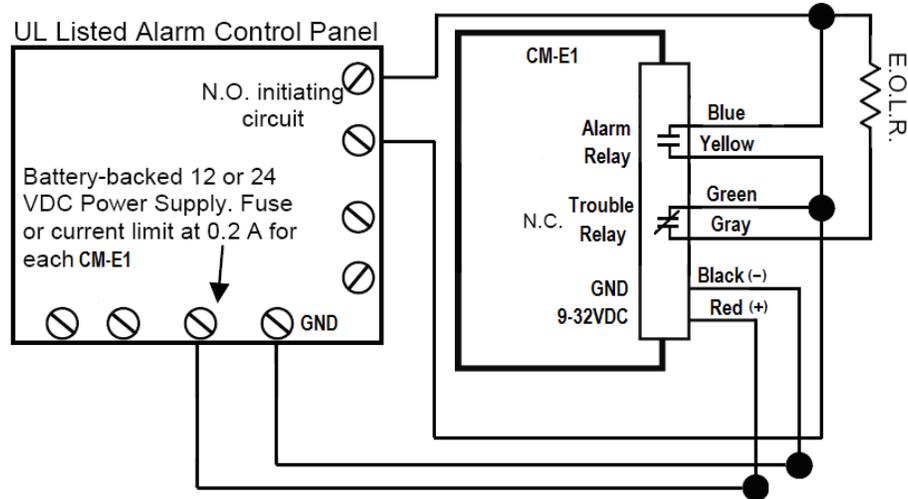

Figure C-1 – 6-wire harness and connector (Early 2015 and older)

Units manufactured since mid-2015 will come with and use an 8-wire harness to connect the unit. This harness would have a thin black connector on the circuit board. These units would have a 10-year sensor life. See Figure C-2.
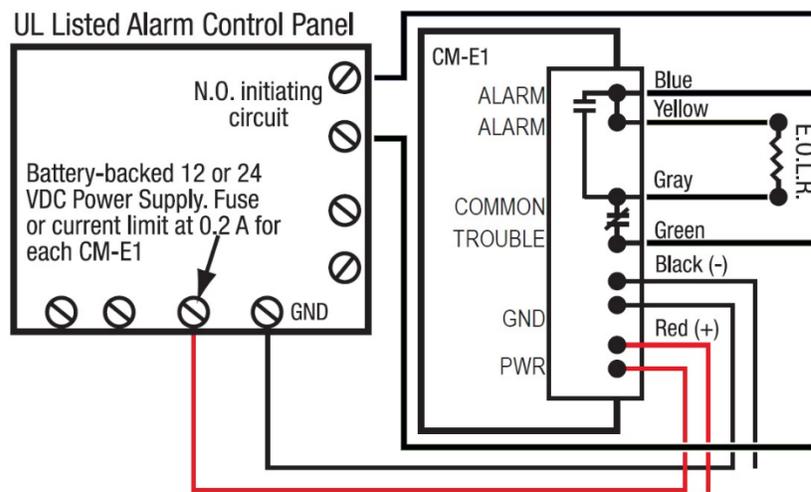

Figure C-2 – 8-wire harness and connector (Mid 2015 and newer)

To change out the older units for a new CM-E1, please follow the information and diagram below.

7.1 Existing wiring

The 6-pin model would have wired to the alarm panel using a 4-wire connection, 2 for power and 2 for signal, with and end of line resistor. There are three typical scenarios for wiring, Stand alone, Alarm only, Alarm and Trouble.

Stand Alone: Power wires are connected with no other wires used. This setup will power the device and device will sound alarm locally, no signal is sent to a panel.

Note: This is not a recommended setup for this device.

Alarm Only: Power wires are connected along with the Blue and Yellow wires. This setup will power the device as well as send an alarm signal, Open or Closed, back to a fire alarm or security panel.

Alarm and Trouble: Power wires are connected along with all four signal wires. This setup will power the device as well as send an alarm or trouble signal, Open or Closed, back to the fire alarm or security panel. This may be done with the use of an end of line resistor or the use of 6 wires back to the panel.

On the 6-wire harness, the wire colors are:

- Red   Positive power (+)
- Black   Negative power (-)
- Green   Trouble signal (no polarity)
- Gray   Trouble signal (no polarity)
- Yellow   Alarm signal (no polarity)
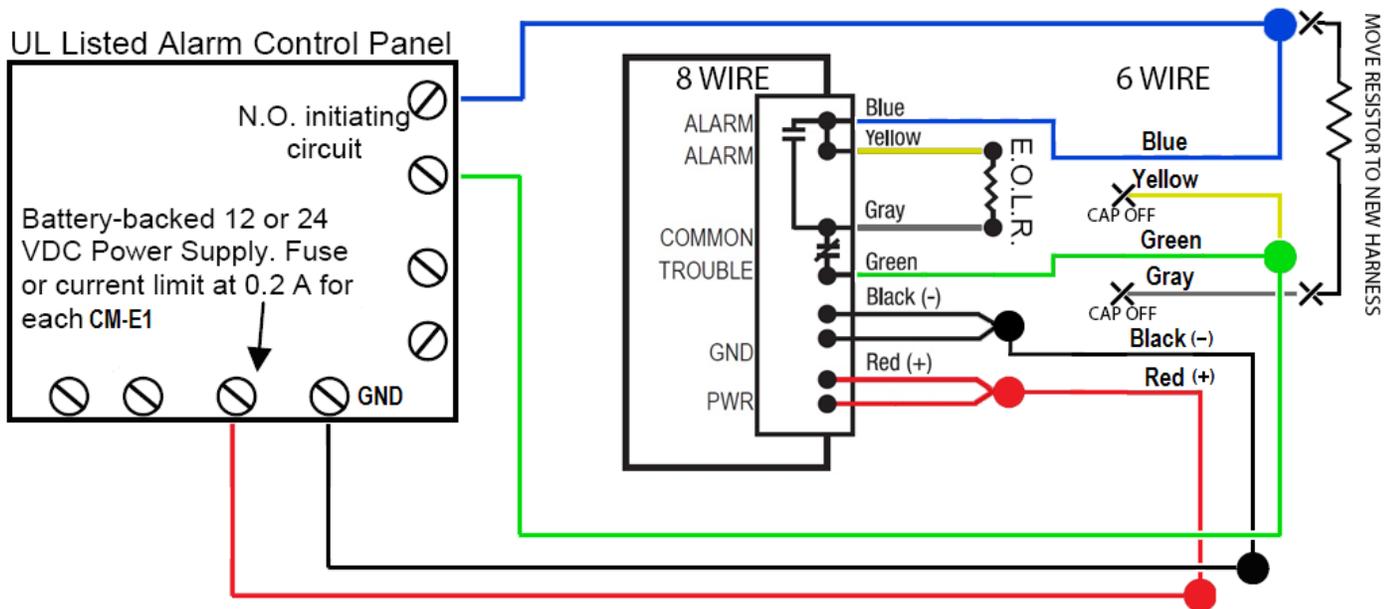- Blue   Alarm signal (no polarity)

Figure C-3 – 6 pin to 8 pin wiring diagram.

7.2   Replacement wiring

Depending on how the 6-wire was connected will determine how the new 8-wire harness will need to be connected. Follow the information below to connect the new replacement unit. The 8-wire harness is setup for a "wire-in / wire-out" scenario, because of this the harness has redundant power wires (two Red, two Black). If the unit is wired in a series one red can be used as positive in and the other red as positive out. Same would apply to the negative, black, wires. If the unit is wired as a single unit, either stand alone or back to a panel, both positive (red) and both negative (black) wires can be used together or use one and cap the other, so it does not short.

On the 8-wire harness, the wire colors are:

- Red   Positive power (+)
- Red   Positive Power (+)
- Black   Negative power (-)
- Black   Negative power (-)
- Green   Trouble signal (no polarity)
- Gray   Common (no polarity)
- Yellow   Alarm signal (no polarity)
- Blue   Alarm signal (no polarity)

> **Stand Alone:** Power wires are connected with no other wires used. This setup will power the device and device will sound alarm locally, no signal is sent to a panel.

Connect the Red and Black wires to the positive and Negative power wires. The CM-E1 is DC voltage only so power connections are polarity sensitive.

Note: This is not a recommended setup for this product.

> **Alarm Only:** Power wires are connected along with the Blue and Yellow wires. This setup will power the device as well as send an alarm signal, Open or Closed, back to a fire alarm or security panel.

Connect the Red and Black wires to the positive and negative power wires. The CM-E1 is DC voltage only so power connections are polarity sensitive. Connect the Blue and Gray wires to the alarm signal wires. Signal wiring is not polarity sensitive.

> **Alarm and Trouble:** Power wires are connected along with all four signal wires. This setup will power the device as well as send an alarm or trouble signal, Open or Closed, back to the fire alarm or security panel. This may be done with the use of an end of line resistor or the use of 6 wires back to the panel.

Connect the Red and Black wires to the positive and negative power wires. The CM-E1 is DC voltage only so power connections are polarity sensitive. Connect the Blue and Green wires to the signal wires. Signal wiring is not polarity sensitive. Connect the Yellow and Gray wires each to one end of the resistor.

Note: If the old unit was using 6 wires to communicate back to the panel, depending on the panel setup, this may be changed to a 3-wire connection where Blue is the alarm, Green is the trouble and Gray becomes the common. If the panel does not support the common neutral wire, changing to the Alarm only or Alarm and Trouble with 2 wire and resistor may be needed.

7.3   Jumper Placement

Verify the jumper configuration is set to match what the old unit was set to or what the panel is configured for. See section 3.4 of this manual for more information.

8   Macurco Gas Detection Product limited warranty

Macurco warrants the CM-E1 gas detector will be free from defective materials and workmanship for a period of two (2) years from the date of manufacture (indicated on inside cover of the CM-E1), provided it is maintained and used in accordance with Macurco instructions and/or recommendations. 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 FROM THE PURCHASE DATE. 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 gas detector. The manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are the return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

Macurco Inc.

1504 W 51st St.
Sioux Falls, SD 57105

Technical Support Contact Information

Phone: 1-844-325-3050
Fax: 1-605-951-9616
Email: support@macurco.com
Website: www.macurco.com/support/

General Contact Information

Phone : 1-877-367-7891
Fax : 1-605-951-9616
Email: info@macurco.com
Website: www.macurco.com

REV – 1.2.0
Issue Date: 1.18.2023
Document No: 34-8703-3249-0
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