

FLUKE®

CO-220
Carbon Monoxide Meter

Instruction Sheet

Introduction

The CO-220 Carbon Monoxide Meter (hereafter referred to as “the Meter”) detects the presence of carbon monoxide (CO) and measures concentrations between 1-1000 parts per million (PPM).

The Meter indicates the presence of carbon monoxide in two ways:

- By a reading on the LCD in PPM.
- By a beeper tone.

Contacting Fluke

To contact Fluke, call one of the following telephone numbers:

USA: 1-888-99-FLUKE (1-888-993-5853)

Canada: 1-800-36-FLUKE (1-800-363-5853)

Europe: +31 402-675-200

Japan: +81-3-3434-0181

Singapore: +65-738-5655

Anywhere in the world: +1-425-446-5500

Or, visit Fluke's Web site at: www.fluke.com.

PN 690559 (English)

May 1998 Rev.2, 4/04

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⚠ Safety Information - Read First

- ⇒ Do not use the Meter as a personal safety monitor.
- ⇒ Learn and recognize the effects of CO poisoning.

0-1 PPM	Normal background levels.
9 PPM	ASHRAE Standard 62-1989 for living areas.
50 PPM	OSHA enclosed space 8-hour average level.*
100 PPM	OSHA exposure limit.*
200 PPM	Mild headache, fatigue, nausea and dizziness.
800 PPM	Dizziness, nausea and convulsions. Death within 2 to 3 hours.
* U.S. Department of Labor, Occupational Safety & Health Administration (OSHA) Regulation 1917.24: The CO content in any enclosed space shall be maintained at not more than 50 PPM (0.005%). Remove employees from enclosed space if the CO concentration exceeds 100 PPM (0.01 %).	

What the Meter Does

The Meter indicates the presence of CO by a reading on the LCD and a beeper tone.

Above 1000 PPM, the LCD reads "OL" to indicate an out of range condition.

The beeper functions much like clicking of a Geiger counter:

- The higher the concentration of CO, the faster the beeper sounds.
- Above 200 PPM, the beeper sounds continuously, while the frequency of the tone increases with the concentration of CO.

Turning the Meter On


Install the battery. (See "Installing and Replacing the Battery.")

To turn the Meter on, press the green button.

The Meter beeps twice, then performs a self-test. During the self-test, the display counts down from "10" to "0", while the Meter emits a series of 2 beeps followed by a pause.

If the Meter passes the self-test, the Meter begins monitoring, which is indicated by a beep every two seconds, and shows a reading on the display.

Self-Test

The Meter tests the sensor and the battery each time it is turned on and continuously monitors the battery. If the battery is low,  is shown on the LCD.

If battery power is below the level required to power the Meter, or if the sensor fails, the Meter emits a series of five beeps, followed by a long pause, and another series of five beeps. The Meter then turns itself off.

If after replacing the battery, the alarm condition persists, the sensor may have failed. Contact an authorized Fluke service center for information on how to replace the sensor.

Establishing a Baseline

Before testing for CO, establish a baseline against which the Meter compares other environments.

Do this by turning on the Meter. If the Meter detects between 0-3 PPM of CO, the beeper sounds and the Meter establishes a new baseline.

If the Meter detects more than 3 PPM, it does not establish a new baseline, but starts taking CO measurements.

Storing Maximum Readings (Max/Hold)

In the Max/Hold mode, the Meter stores the maximum CO level it has detected.

In this mode, the Meter continuously monitors the level of CO, which is indicated by the beeper, while displaying only the highest level detected on the LCD.

To enable or disable the Max/Hold mode, press the MAX button; the beeper emits two quick tones when the Max/Hold mode is enabled and disabled. When the Max/Hold mode is enabled, "MAX" is shown on the LCD.

Auto-Back-light

If the ambient light is too low (making the LCD difficult to read), the LCD back-light automatically turns on. The back-light automatically turns off when sufficient light is present.

Automatic Power-Off

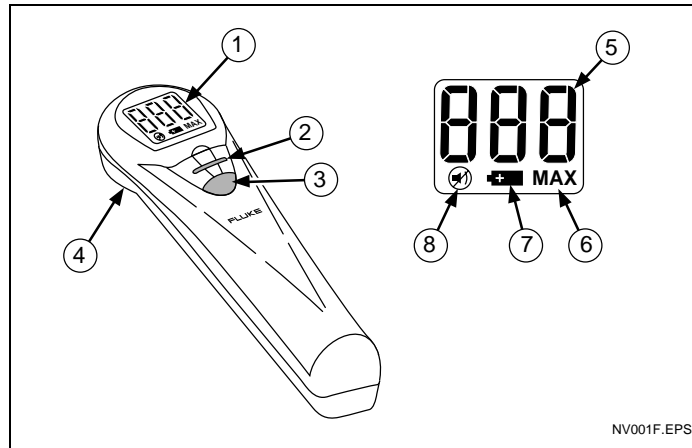
The Meter automatically turns itself off after 20 minutes.

Muting the Beeper

To mute the beeper, press the ON/OFF switch for more than 2 seconds when turning the instrument on.

The mute beeper icon is shown on the display.

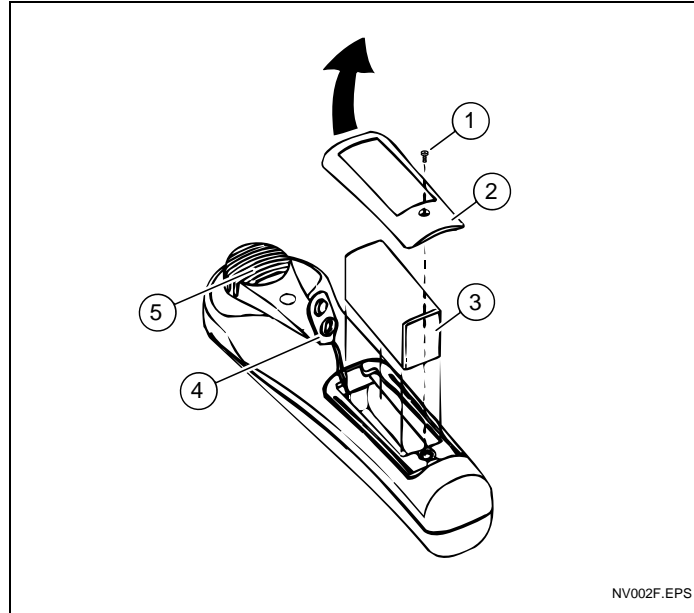
To re-enable the beeper, turn the Meter off and then turn it back on.



①	LCD (Liquid Crystal Display)
②	Max/Hold button
③	ON/OFF button
④	Sensor (Fluke PN 689497)
⑤	Digital reading in parts/million (PPM)
⑥	Max/Hold mode (display shows maximum reading)
⑦	Low battery indicator
⑧	Beeper turned off

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Installing and Replacing the Battery



①	Screw
②	Battery Door
③	Battery, 9 V NEDA or IEC 6LR61, or equivalent
④	Battery Connector
⑤	Sensor

Common Sources of CO

Common sources of potentially dangerous levels of CO are:

- Poorly maintained furnaces, gas heaters, or fireplaces.
- Dirty or plugged chimneys, or flue exhausts.
- Poorly maintained gas, oil, or kerosene appliances.
- Internal combustion engines (e.g., automobiles, lawnmowers, blowers).

CO and Appliance Malfunctions

The following table identifies typical problems that can produce high levels of CO.

Appliance	Fuel	Typical Problems
Gas furnaces Room heaters	Oil, natural gas, or LPG (liquefied petroleum gas)	<ol style="list-style-type: none"> 1. Cracked heat exchanger. 2. Not enough air to burn fuel properly. 3. Defective/blocked flue. 4. Maladjusted burner. 5. Building not properly pressurized.
Central heating furnaces	Coal or kerosene	<ol style="list-style-type: none"> 1. Cracked heat exchanger. 2. Not enough air to burn fuel properly. 3. Defective grate.
Room heaters Central heaters	Kerosene	<ol style="list-style-type: none"> 1. Improper adjustment. 2. Wrong fuel (not K-1). 3. Wrong wick or wick height. 4. Not enough air to burn fuel. 5. System not properly vented.
Water heaters	Natural gas or LPG	<ol style="list-style-type: none"> 1. Not enough air to burn fuel properly. 2. Defective/blocked flue. 3. Maladjusted burner. 4. Building not properly pressurized.
Ranges Ovens	Natural gas or LPG	<ol style="list-style-type: none"> 1. Not enough air to burn fuel. 2. Maladjusted burner. 3. Misuse as a room heater. 4. System not properly vented.
Stoves Fireplaces	Gas, wood, coal	<ol style="list-style-type: none"> 1. Not enough air to burn fuel properly. 2. Defective/blocked flue. 3. Green or treated wood. 4. Cracked heat exchanger. 5. Cracked firebox.

Specifications

Temperature Operating: Storage:	0 °C to +50 °C -30 °C to +50 °C
Humidity (non-condensing) < 3 weeks > 3 weeks	0-99 % RH 0-90 % RH
Measurement range	0 to 1000 PPM
Measurement resolution	1 PPM for 0 - 200 PPM; 5 PPM for 200 - 1000 PPM
Accuracy	5 % or ± 2 PPM (whichever is greater)
Sensor type	Stabilized electrochemical Gas-specific (CO)
Typical sensor life	3 years
Temperature Coefficient	Add 0.4 % per °C > 25 °C Add 0.6 % per °C < 20 °C
Self Test	< 20 seconds
Battery	9 V, NEDA 1604A or IEC 6LR61, or equivalent.
Typical battery life	500 hours
Certification	CE

Calibration or Service

The Meter should be calibrated once a year by an authorized Fluke service center.

During normal use, the Meter does not require adjustment.

Any required adjustments are made at calibration. To replace the sensor, contact an authorized Fluke service center.

Warranty

LIMITED WARRANTY & LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, send your defective tester to the nearest Fluke Authorized Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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