CO190 CARBON MONOXIDE METER

INSTRUCTION MANUAL

MARTINDALE ELECTRIC

⚠ **ALWAYS READ THESE INSTRUCTIONS BEFORE PROCEEDING**

Thank you for buying one of our products. For safety and a full understanding of its benefits please read this manual before use. Technical support is available from 01923 441717 and support@martindale-electric.co.uk.

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1. SAFETY INFORMATION

⚠ **REMEMBER: SAFETY IS NO ACCIDENT**

These instructions contain both information and warnings that are necessary for the safe operation and maintenance of this product. It is recommended that you read the instructions carefully and ensure that the contents are fully understood. Failure to understand and to comply with the warnings and instructions can result in serious injury, damage or even death.

Particular attention should be paid to the Warnings, Precautions and Technical Specifications.

Please keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk

1.1 Meaning of Symbols and Markings

⚠ **Caution - refer to instructions**

CE **Equipment complies with relevant EU Directives**

🗑 **End of life disposal of this equipment should be in accordance with relevant EU Directives.**

1.2 Precautions

The CO190 must only be used by a skilled and competent person who is familiar with the relevant regulations, the safety risks involved and the consequent normal safe working practices, and under the conditions and for the purposes for which it has been constructed and specified.

Before use check the unit for cracks or any other damage. Make sure the unit is free from dust, grease and moisture. Also check any associated leads and accessories for damage. Do not use if damaged.

The sensor in particular must be protected from exposure to water or dust as contamination can alter the performance characteristics of the unit. Always replace the CO190 in its storage case when not in use.

Avoid severe mechanical shock or vibration and extreme temperature.

To avoid corrosion from leaking batteries, remove the batteries when the unit is not in use for an extended period.

1.3 Effects on Health from CO Exposure
The table below shows some effects on health due to prolonged exposure to various concentrations of CO.

Level of CO ppm	Effect on health
0-1	Normal background level
9	Maximum indoor air quality level
50	Maximum concentration for continuous exposure in any 8 hour average level
200	Mild headache, fatigue, nausea and dizziness
400	Frontal headache, life threatening after 3 hours
800	Death within 2 hours
1600	Nausea within 20 minutes, death within 1 hour
12800	Death within 1 to 3 minutes

2. INTRODUCTION

2.1 Inspection
Examine the shipping carton for any sign of damage. Inspect the unit and any accessories for damage. If there is any damage then consult your distributor immediately.

2.2 Description
The CO190 has the following functions and features:
- LCD display with backlight
- Display hold
- Auto power off
- Alarm mode
- Temperature measurement
- Max value measurement
- Hold mode

2.3 Accessories
The CO190 comes with the following accessories:
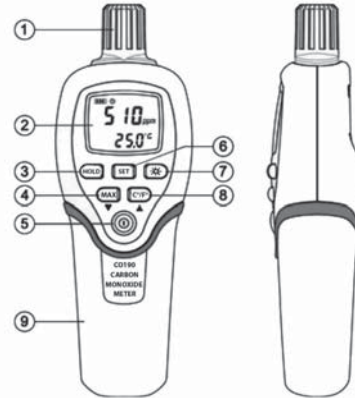- Storage case
- 4 x 1.5V AA LR6 batteries
- Instructions

2.4 Battery Installation
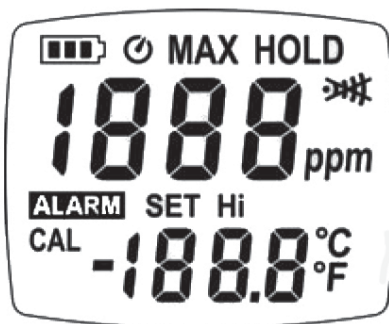Refer to Section 4.1 (Battery Replacement).

3. OPERATION

3.1 Description of Press Buttons and CO190 Elements

1		Sensor
2		LCD display
3	HOLD	The user can hold the measured value displayed on the screen
4	MAX	Stores the highest measured value
5	①	Turns the CO190 On/Off
6	SET	Set-up button for the CO alarm threshold
7	☀	Turns the backlight on/off
8	°C / °F	Changes the unit of measurement between C or F
9		Battery cover

3.2 Description of LCD symbols

🔋	Battery capacity indicator
⊘	Auto power off is active
MAX	Maximum recorded reading is displayed
HOLD	Hold mode is active
1888	CO level measured result
⚡	Beeper Off indication
Hi	Alarm Level
ppm	Unit indication
°C °F	Temperature unit of measurement
-188.8	Temperature measured result
SET	SET alarm
ALARM	Alarm Indication

3.3 Low Battery Indication
If the ▭ symbol is displayed, the battery needs replacing as measurement accuracy can no longer be guaranteed (See section 4.1 Battery Replacement).

3.4 Power On/Off
Press the ① button to switch on the meter. Hold the ① button for 3 seconds to switch off the CO190.

The CO190 will perform a self-test calibration check when powered up. If the meter detects CO levels of 0-3ppm, the LCD will decrease from the initial value to zero. During the self- test, the display counts down from 60 to 0 and will beep when complete. If the CO190 passes the self-test, it will begin monitoring and shows a reading on the display.

3.5 Auto Power Off
If the unit is inactive for a period of 30 minutes, the CO190 will automatically power off.

To disable this function, press and hold the button while switching on the CO190. The HOLD symbol will disappear from the LCD to confirm the auto power off is disabled.

3.6 Backlight
Press the ☀ button to turn on the display backlight. It will automatically turn off after 30 seconds if there is no further operation of the unit.

3.7 Unit of Measurement
When the CO190 is switched on, it defaults to °C. Press the °C / °F button to switch between Celsius (°C) and Fahrenheit (°F).

3.8 Max Value Measurement

Press the [MAX] button to enter the MAX mode. The CO190 will simultaneously store the maximum value to the memory and is updated with every new reading.

Pressing the [MAX] button will display the **MAX** indicator and the maximum recorded value on the LCD. Press the [MAX] button again and the indicator flashes and the current measured value is displayed. To exit the MAX mode, press and hold the [MAX] button for two seconds.

3.9 Hold Mode

To enter the HOLD mode, press the [HOLD] button while in measurement mode. The **HOLD** symbol will appear on the LCD. To exit display hold, press the [HOLD] button again.

3.10 SET Alarm Mode

The default alarm threshold is set to 35ppm. The alarm can be set from 0 to 1000 ppm in this function. Press and hold the [SET] button to enter the CO high alarm threshold mode. The **ALARM**, **SET** and **Hi** symbols should be displayed on the screen with the current alarm threshold value flashing. While holding the [SET] button, press the ▲ [°C / °F] to increase the required alarm threshold or the ▼ [MAX] button to decrease the value. When the required value is displayed on the screen, release the [SET] button to save it. This value will be stored until further changes are made to the alarm mode.

The alarm beeper gives audible indication, speeding up with CO concentration and becoming a continuous tone above 200 ppm (the recommended 15 minute exposure limit). Above 1000 ppm, the

alarm beeper sounds continuously with a high frequency tone. The LCD will display **OL** to indicate an over range reading.
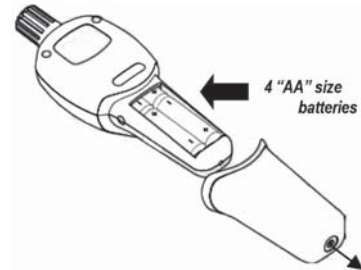
3.11 Alarm Off

Press and hold the [☀] button and then switch on the meter. The mute beeper icon ⨳ will appear on the display. To re-enable the beeper, power off the CO190 and then switch it back on.

4. MAINTENANCE

4.1 Battery Replacement

The battery compartment is on the rear of the unit. To gain access, undo the retaining screw and lift the cover away from the back of the unit.

4 "AA" size batteries

Replace with 4 new AA batteries (IEC LR6, NEDA 15A), observing correct polarity. Replace the battery cover.

Note: Do not mix old and new batteries.

4.2 Calibration

To maintain the integrity of measurements made using your instrument, Martindale Electric recommends that it is returned at least once a year to an approved Calibration Laboratory for recalibration and certification.

Martindale Electric is pleased to offer you this service. Please contact our Service Department for details.
Email: service@martindale-electric.co.uk
Tel: 01923 650660

The CO190 should be regularly checked to ensure it is reading correctly. Martindale recommends an annual recalibration and regular checks with a test gas.

4.3 Cleaning

This instrument must be kept in a clean condition.
If contamination is found, clean with a damp soft cloth and if necessary a mild detergent or alcohol. Do not use abrasives, abrasive solvents, or detergents which can cause damage to the unit. If a mild detergent is used, the unit should subsequently be thoroughly cleaned with a water dampened soft cloth. After cleaning, dry and allow to remain in a dry environment for 2 hours before use.

4.4 Repair & Service

There are no user serviceable parts in this unit other than those that may be described in section 4. Return to Martindale Electric if faulty. Our service department will quote promptly to repair any fault that occurs outside the guarantee period.

Before the unit is returned, please ensure that you have checked the unit and batteries.

4.5 Storage Conditions

The instrument should be kept in warm dry conditions away from direct sources of heat or sunlight, and in such a manner as to preserve the working life of the unit. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

5. WARRANTY AND LIMITATION OF LIABILITY

This Martindale product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of receipt by the end user. This warranty extends only to the original buyer or end-user customer, and does not apply to fuses, disposable batteries, test leads or to any product which, in Martindale's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation, handling or storage. Martindale authorised resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Martindale.

Martindale's warranty obligation is limited, at Martindale's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Martindale within the warranty period.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Martindale shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory.

Since some jurisdictions do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any part of any provision of this warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision or other part of that provision.

Nothing in this statement reduces your statutory rights.

Specification
CO190 Carbon
Monoxide Meter

All specified accuracies are at 23°C
Temperature coefficient:
    0.1 x (specified accuracy) per °C
    (0-22°C, 24-50°C)
Measurement ranges:
    Carbon monoxide: 0 to 1000ppm
    Temperature: -20°C to 70°C (-4°F to 158°F)

Carbon Monoxide

Range	Accuracy
0-1000 ppm	±5% reading or ± 5 ppm (whichever is greater)

Temperature

Range	Accuracy
-20°C to 70°C	±0.8°C
-4°F to 158°F	±1.5 °F

General
Digital display: 4 digit, 30mm, liquid crystal display
Sampling rate: twice per second
Sensor type: electrochemical carbon monoxide gas sensor
Temperature sensor type: thermistor
Resolution: 1ppm, 0.1°C/0.1°F
Response time: (at T90 in slowly moving air)
        carbon monoxide: 60 seconds
        temperature: 10 seconds

Specification
CO190 Carbon
Monoxide Meter

Power: 4 x 1.5V, AA alkaline batteries (IEC LR6, NEDA 15A)
Battery Life: 200 hours continuous approx.
Auto power off: after approx. 30 minutes
Dimensions: 190 (L) x 65 (W) x 45 mm (H)
Weight: 235g approx.
Includes: 4 x 1.5V AA alkaline batteries and instructions

ENVIRONMENTAL
Temperature & Humidity
    (Operating): 0°C to 50°C (32°F to122°F) 10-90% R.H.
    (Storage): -20°C to 70°C (-4°F to 158°F) 0-80% R.H.

EMC
Conforms to BS EN 61326-1

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- Continuity Testers
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- Phase Rotation Testers
- Proving Units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm Testers (4 & 5kV)
- Specialist Drummond Testers

CE