

MAP Headspace O₂/CO₂ Analyzer

Model 9001 **User Manual**

REV 010622



MAP Headspace O₂/CO₂ Analyzer

Operating Instructions

1. Initial set-up.

Install the black sample line to the ¼ turn Luer Lock fitting at the right side of the analyzer case.

Install the white 25mm diameter filter to the end of the sample line.

Install the sample needle to the input filter.

2. Power On / Self Test

Switch the Power Switch, located on the right side of the analyzer, to the “on” position by moving the toggle switch arm towards the power connector.

The analyzer will perform a self test, indicated by temporarily lighting all display elements and running the pump. At the end of the self test, the pump will be off and the display will show dashes, indicating successful completion of self-test and awaiting operation.

Operation begins when the operator initiates the first zero.

3. Zeroing the Analyzer

The most important thing to remember is that the accuracy of the analyzer is assured by periodically “zero-ing” the analyzer on room air. When the analyzer is zeroed, the CO₂ measurement channel is set to zero, and the oxygen channel is calibrated to ambient O₂ = 20.9%.

This function may be performed at any time by simply pressing the “Zero” button for ½ second with the sample needle exposed to room air. The Zero function takes 30 seconds to complete, and is fully automatic.

3.1 First “Zero” after power-up

Initiate the first zero by pressing the “Zero” button on the display panel. The pump will start, the display will flash dashes, and zero will begin. The CO₂ zero / O₂ Cal is fully automatic and takes approximately 30 seconds to complete.

At the end of the zero sequence, the analyzer will show gas readings and the pump will remain on. (The operator may note the CO₂ display counting down to “00.0” as an indication of the readiness of the analyzer.)

3.2 Periodic Zero Requests

At 5 minutes from power on and every 30 minutes thereafter, the analyzer will alternate gas readings with dashes. This is the “Zero Request” indication. The operator should zero the analyzer when convenient after the dashes appear.

3.3 Oxygen Detector Test - 'Lo' indication on O2 Display

As part of the analyzer 'Zero' routine, the analyzer tests the oxygen detector for correct output when calibrating it to 20.9% with room air. If a low output cell is detected, the analyzer will alternately display 'Lo' and the current oxygen reading on the O2 display. The **Lo** O2 warning may be cleared by pushing any button on the front panel.

The analyzer will typically remain functional for 15 to 30 days after the low oxygen detector output is detected, but the operator should make plans to replace the oxygen detector at some time during this period.

New oxygen detectors should last for approximately 1 year in use, and are available from Bridge Analyzers, Inc. (See the 'Spare Parts and Consumables' section of this manual.)

4. Taking Gas Measurements

4.1 Continuous Measurement Mode

After the first zero from power on, the analyzer will be in the continuous measure mode. The pump will be on, and gas sample will be continuously drawn from the sample line, measured, and displayed on the analyzer. The analyzer will remain in this mode until the operator selects "Sample Measurement Mode" below.

This mode may be used for continuous or manual testing under direct operator control. For automatic sample testing, the analyzer should be set into the Sample Measurement Mode.

4.2 Sample Measurement Mode

Sample measurement mode is intended to be the normal analyzer test mode. In this mode, the analyzer draws approximately 50cc of gas for measurement over 10 seconds, then turns the pump off and freezes the display. The displayed values are held until the next sample is taken.

The Sample Measurement Mode is entered by pressing the yellow 'UP Arrow' button on the front panel after the first zero is complete. When the button is pressed for the first time, the analyzer will turn the pump off after 10 seconds and freeze the display as described above – indicating that it is in the Sample Measurement Mode.

Consecutive samples may be tested by pushing the 'UP Arrow' button.

4.3 Changing the sample time from 10 seconds.

The sample time used in the sample measurement mode may be adjusted by the operator from the factory default value of 10 seconds.

This is done by first putting the analyzer in 'continuous measurement mode' by pushing the DOWN button instead of the UP button when the display is frozen.

Then pushing the UP and DOWN button together will cause the analyzer to display 'SEC' in the O2 display, and the sample time in seconds in the CO2 display. The sample time may be increased or decreased at this time in one second increments by using the UP and DOWN arrows. Once the desired sample time is displayed, press the CAL button, and the new value will be stored and used. The new value is saved in power-safe memory, so it will be used subsequently even if the analyzer is powered down.

5. Periodic Maintenance

5.1 Daily: Recharge the Battery

The battery provided with the analyzer provides 8 hours of operation under fully charged conditions. Battery life is maximized if it is kept fully charged. To charge the battery, simply plug the wall-mounted 12V supply / charger into the analyzer case. Plug the wall supply into any 110 VAC power source.

The 12V supply provides two functions – operating the analyzer from a 110V power source, and charging the battery. When the power switch is in the on position, the analyzer will draw power from the 12V supply. When in the off position, the 12V supply will charge the battery.

The battery is 80% charged in approximately 5 hours, with a full charge requiring 8 hours

You may leave the battery charger plugged in and continue to charge the battery while using the analyzer. The analyzer will run from the battery charger until it is turned off, at which time it will continue to charge the battery.

5.2 **Daily: Inspect the sample filter**

Your portable O₂/CO₂ Gas Analyzer comes with a 25 mm diameter sample filter which should last approximately 2 months in normal use. The sample filter should be visually inspected before the analyzer is used. Excessive discoloration or indication of restricted flow through the filter is an indication that the sample filter should be replaced.

Daily: Inspect the sample needle

Your portable O₂/CO₂ Gas Analyzer comes with a special 'pencil point cross-drilled' needle. Inspect this needle periodically for any signs of blockage of the gas entry ports at the needle tip.

NOTE: The use of other than Bridge approved sample filters and needles may seriously degrade the analyzer performance and cause the warranty to be voided. Only use authorized Bridge sample supplies.

5.3 **Every 3 months: Verify Accuracy with Cal Gas - Gas Calibration**

The Bridge O₂/CO₂ gas analyzer does not need frequent gas calibration for the analyzer to operate within the accuracy specification, as the CO₂ and O₂ gas accuracy are generally maintained by the "Zero" procedure. However, it is considered good practice to periodically verify analyzer accuracy with calibration gas containing known quantities of CO₂ and O₂, and make calibration adjustments if necessary.

NOTE: This procedure should be performed only by trained and qualified technical personnel, as it will permanently change the analyzer calibration.

The calibration function is used to set the CO₂ channel of the analyzer to correctly measure a known quantity of CO₂.

Because the O₂ sensor is automatically calibrated to ambient air - 20.9% O₂ - every time a zero is performed, additional calibration of the O₂ sensor is not necessary.

6.0 **Customer Span "Cal" and Cal Verification Procedure**

Power up the analyzer and perform scheduled zeros. Allow it to operate normally with the sample pump continuously on for at least 30 minutes.

Use calibration gas that can be regulated to produce a low flow sample that can be drawn by the gas analyzer at ambient pressure. Do not directly connect the calibration gas tank to the analyzer. Instead, allow the analyzer to draw a sample of the gas through a 'Tee' fitting or the equivalent. The analyzer draws a sample at approximately 350 ml/min flow, so very little gas flow is required to ensure correct delivery of calibration gas.

Note: Inaccuracies can result and damage to the gas analyzer may occur if the cal gas is directly delivered to the analyzer under pressure. Always make sure that cal gas is delivered at atmospheric pressure.

Verify that the calibration gas measurement is stable before attempting a gas calibration. (Check for leaks, sample dilution, etc.) The service technician should confirm that calibration gas is being measured correctly before attempting to re-calibrate the analyzer.

Note: The gas analyzer should be in the 'continuous measurement mode' during the calibration process so that gas measurement stability may be confirmed.

6.1 Enter Calibration Mode

Press both the "Cal" and "Zero" buttons on the analyzer front panel for 1 second. When "CAL" appears on the O₂ display, the analyzer is in the calibration mode.

6.2 Calibrate the CO2 Channel

Using of the UP and DOWN arrows, correct the displayed CO2 value to equal the cal gas CO2 ' tag' value.

6.3 Accept the CO2 Channel Calibration

Press both the "Cal" and "Zero" buttons on the analyzer front panel for 1 second. When "CAL" disappears on the O2 display, the new calibration values have been accepted and stored in the analyzer.

7.0 WHEN THINGS GO WRONG – OPTIONS FOR SAFELY EXITING CALIBRATION MODE:

7.1 Abort the CO2 Channel Calibration

If for any reason you feel that the calibration procedure was not performed correctly, you may press the "Zero" button on the analyzer front panel to abort the calibration procedure. When normal numeric values appear on the O2 display, the calibration has been aborted and the analyzer has been returned to normal operating mode. **Any changes to calibration settings made after entering the calibration mode will not be saved.**

7.2 Reset the CO2 Channel Calibration to Factory Settings

If you suspect that the analyzer has been miscalibrated and wish to revert to the factory calibration, you may do so by pressing the UP and DOWN arrows together for 1 second while in the Calibrate mode. When normal numeric values appear on the O2 display, the calibration has been aborted and the calibration constants have been reset to original factory values.

Spare Parts and Consumables

The following spare parts and consumables can be purchased from Bridge Analyzers.

<u>P/N</u>	<u>Part Name</u>	<u>Expected Life</u>
000202	Sample Filter – Single	2 months
102026	Sample Filter – 6-pack	12 months
000120	Oxygen Detector	1 year
000617	Pencil Point Needle	1 year
000424	12V Battery	2 years

BRIDGE ANALYZER Model 9001-X Specifications

Gases Measured: Oxygen (O2), Carbon Dioxide (CO2)

Reporting Range:
9001-2 O2: 0-25.0%, CO2: 0-25.0%,

Reporting Range:
9001-3 O2: 0-100.0%, CO2: 0-100.0%,

Reporting Range:
9001-4 O2: 0-100.0%, CO2: 0-25.0%,

Reporting Range:
O2: 0-25.0%, CO2: 0-100.0%,

9001-5

Resolution:	O2: 0.1%, CO2: 0.1%,
Accuracy:	All channels 5% relative.
Repeatability:	All channels 3% relative.
Warm-up:	5 minutes.
Operating Temperature:	-10 to +40 degrees C.
Power:	Self contained rechargeable battery , 8 hours operation
Battery Charger External Supply:	110 VAC/60 Hz
Weight:	Less than 5 lbs.
PC Interface:	DB9 RS-232 Serial Connector, 9600 baud.

Technical Support, Warranty and Service

Technical Support:

Unlimited no-charge technical support is available from Bridge Analyzers, Inc. at the telephone numbers and email address below. Please feel free to make use of this service in case you have any questions.

Warranty Service Policy:

Your **BRIDGE GAS ANALYZER** is covered by a one-year parts / labor warranty.

In order to return the analyzer for service, please contact Bridge Analyzers for an RMA (Returned Material Authorization) at:

Bridge Analyzers, Inc.
1805-B Clement Ave., Bldg 28
Alameda, CA 94501
USA

(510) 337-1605 (voice)
(510) 337-0388 (FAX)
email: sales@bridgeanalyzers.com

For product returned under warranty, the customer pays freight charges for product return. Bridge will repair or replace the analyzer within 1 working day of receipt, and return the analyzer freight prepaid to the customer by the same shipping method used to return the analyzer to Bridge. There will be no charge for parts, labor, or outbound freight for products under warranty.

Non-Warranty Service Policy:

For product not under warranty, the customer pays freight charges for product return. Bridge will repair or replace the analyzer within 5 working days of receipt, and will return the analyzer to the customer by the same shipping method used to return the analyzer to Bridge. The customer will be charged for parts, labor, and outbound freight for products not under warranty.