https://breathmeter.com/instructions-for-use

Breathmeter.com

CO_2 Rebreathing Analyzer

Operating Instructions

Power

Use the provided external 12 volt DC 10 amp power supply, or equivalent.

Probe, Weight and Stand

Clamp the stand to the edge of a table or bench and position the ring at the end of the horizontal rod to hold the probe in a vertical orientation. Position the height of the horizontal arm to accommodate the specimen under study. The probe produces a force of 10 Newtons +/- 0.2 (990 to1010 grams on the scale).

Probe Connection

Connect the probe to the breathing machine using 40 cm of tubing with 6 mm inside diameter. The volume of this tube will influence the measurement.

Note: Longer tubing can be accommodated by adjusting the CO2 flow to achieve the correct 3.8% free-breathing baseline measurement.

Breathing Machine

Connect the power supply and switch the power on. Adjust the breathing rate to the desired value, using the adjustment on the back of the analyzer. (Nominal for sleeping infant = 45/minute)

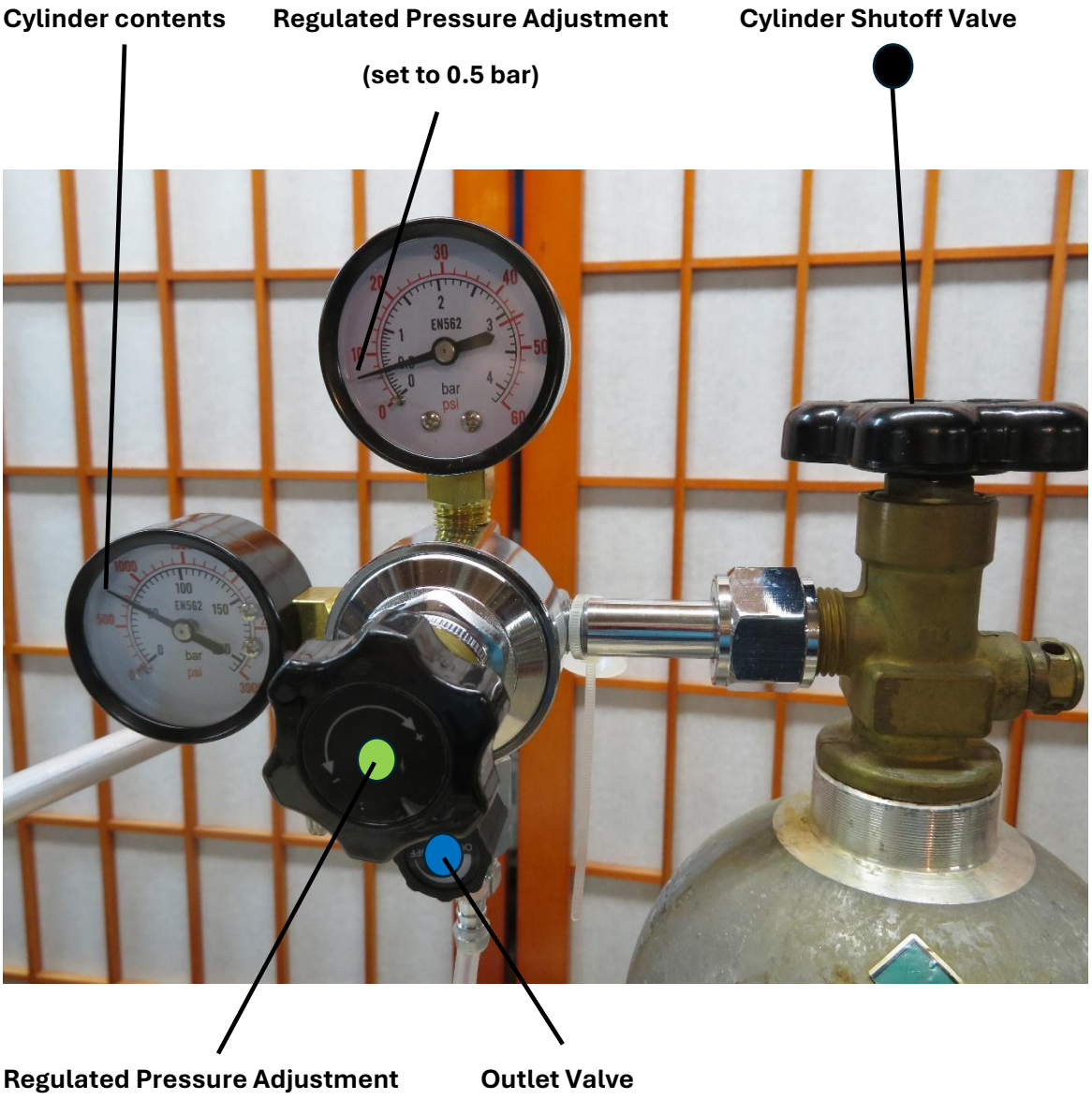
CO_2 Cylinder and Pressure Regulator

Connect the gas regulator to the cylinder using the little plastic gasket – make sure the gasket is in there – and tighten securely using a large wrench (spanner). The regulator can remain on the CO2 cylinder until the cylinder needs to be exchanged.

If you are unfamiliar with the use of gas cylinders and pressure regulators, please read below:

Compressed gas cylinders contain a very high-pressure gas and a pressure regulator is used to reduce the pressure to a working level. We use a nominal 0.5 bar (7 psi) which is important to keep constant. The regulator has a locking ring to prevent further adjustment.

- Keep the cylinder shutoff valve closed whenever you are not using gas
- Once set, leave the regulated pressure at about 0.5 bar and do not change it.
- When you open the outlet valve open it a full two turns – (the first turn is restrictive)
- Keep the unit powered before and after flowing gas to prevent flooding the analyzer with CO2
- A 5 pound (2.3 Kg) CO_2 cylinder should provide several hundred hours of operation. Food grade CO2 is acceptable.



Baseline Condition

The baseline measurement is established with the probe breathing freely. This can be achieved by elevating the probe at least 50 mm above any surface. A clamp on the probe stalk is provided for holding the probe in an elevated position.

CO2 Supply

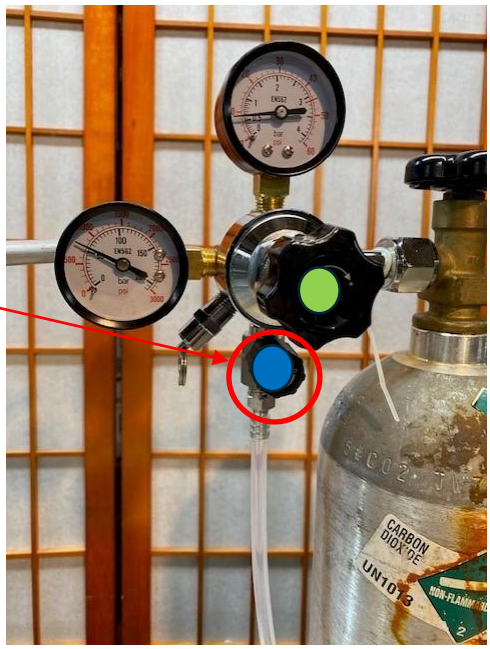
Open the valve at the top of the CO2 cylinder and confirm the outlet pressure is set to 0.5 Bar.

Connect the regulator output to the port on the bottom of the flowmeter. Diameter and length of the tubing will not influence the measurement – the tubing just needs to fit the connections without leaking.

Gas flow

Switch on the analyzer.

Open the little valve at the outlet of the gas regulator. Open two full turns.



Flowmeter

Using the control valve at the bottom of the flowmeter, set the flow to approximately 85 on the black ball scale. If the valve has been adjusted previously, it will retain its adjustment.

The meter displays the CO2 volume % concentration, measured in the lung. The CO2 indication takes several minutes to stabilize. Wait for the indication to remain stable for at least a minute before making any adjustments to the flow.

Note: Stability is indicated by no change greater than 0.05% CO2 concentration over 45 breathing cycles.

Baseline measurement

Breathing freely, the expected baseline measurement is between 3.75 and 3.95 % CO_2. Small adjustments of the CO_2 flow will be required to bring the measurement into this range. Make very small incremental adjustments and wait a minute to see the result.

When the CO_2 supply is shut off and later re-started, the flowmeter valve should retain its adjustment. Small corrections may still be required each time the CO2 supply is shut off and restored.

Note: Before shutting off the power, close the little valve at the outlet of the pressure regulator and close the big valve on top of the CO_2 cylinder. Wait for the CO_2 flow to stop before switching off the power. This will prevent 100% CO_2 from flooding the analyzer.

Material Measurement

Set the probe gently onto the test material in the vertical orientation, allowing gravity to apply the 10 Newton load. Adjust the stand to maintain the probe stalk in the vertical orientation.

Expect the measurement to slowly increase and become stable. Wait for the indication to remain stable for at least a minute before recording.

When measurements are completed, close the CO2 cylinder and outlet valve and switch off the power.

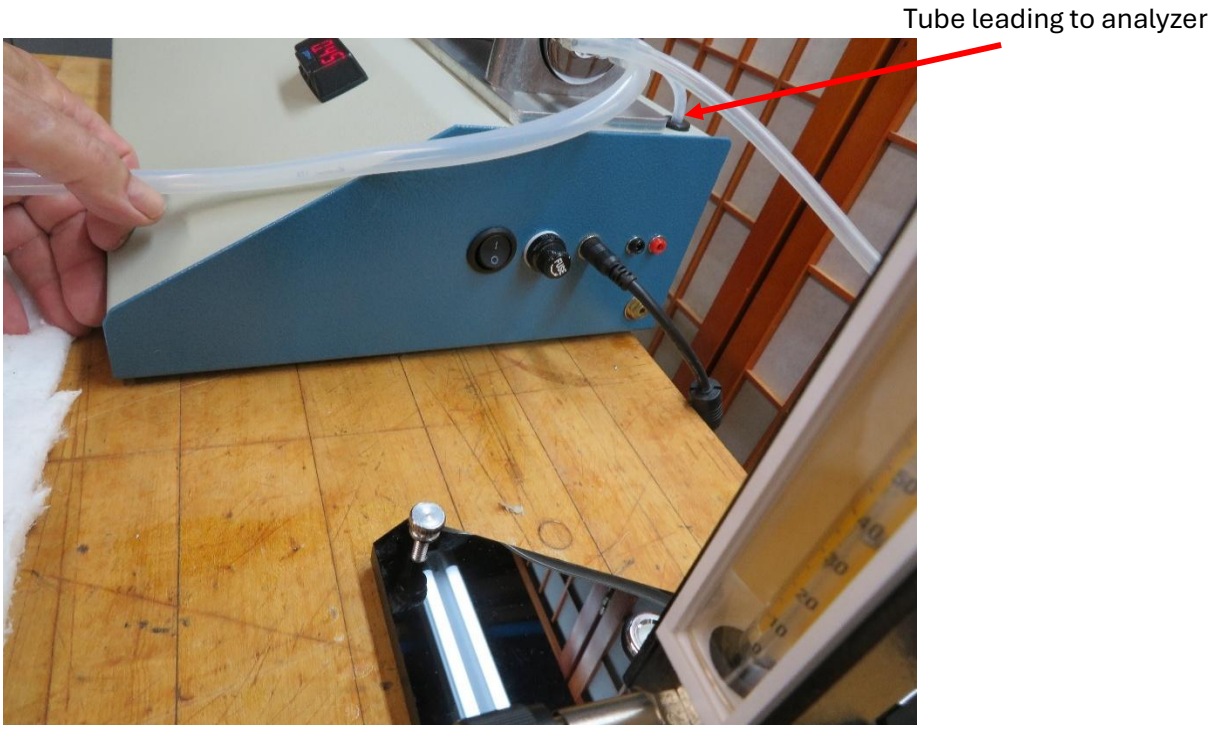
Note: Once set, the gas pressure, breathing rate and CO2 flowrate adjustments can be left in place. Next time the power is switched on and CO2 cylinder valve and outlet valve opened, the analyzer will be "tuned in" and ready to use after a few minutes.

Calibration

A Certificate of Calibration is provided with each unit. The indication on the panel meter has been calibrated against 10.00% reference gas and zero gas, and is very accurate, as reflected in the calibration certificate. The analog output on the side of the analyzer and digital output are uncorrected.

To check calibration: Using the port going to the analyzer, inject a low flow rate (<1 LPM) of calibration gas and wait for the output to become steady. Note the input gas concentration and analyzer output. Nitrogen may be used to check the zero calibration.

If the output is inexact and requires adjustment, please see more detailed instructions for programming the panel meter.



External Outputs

Analog and digital outputs are provided on the side of the machine. The digital output is compatible with GASLAB sotware.

Gaslab software

The digital output from Breathmeter can be connected to a PC using the USB port. Gaslab can be downloaded here:

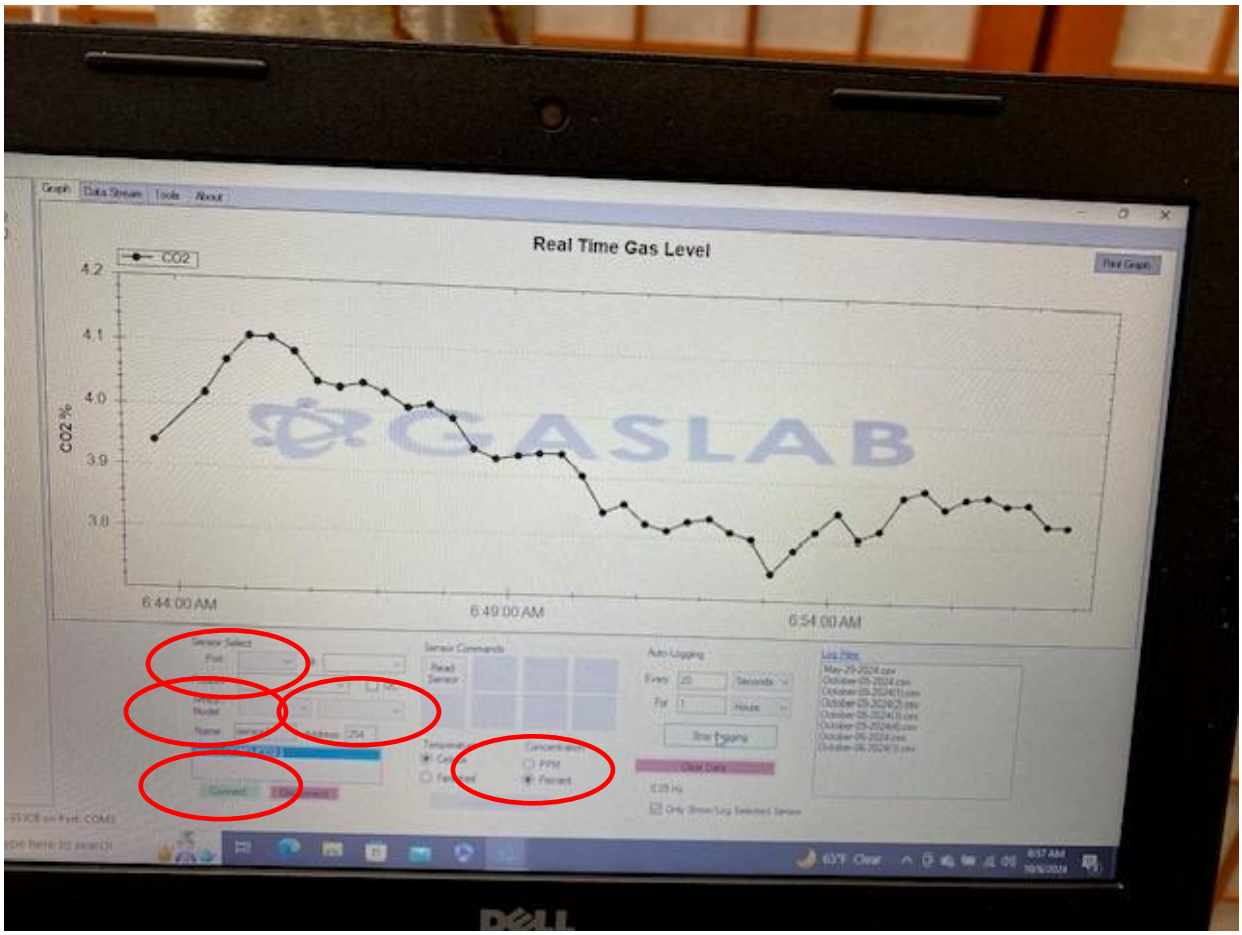
https://gaslab.s3.us-east-2.amazonaws.com/GasLabSetup.msi

The software developer's notes may be found here: https://www.co2meter.com/pages/downloads

Once you open the application and connect Breathmeter, perform the setup:

1. Select the port
2. Select Series/Model to K Series
3. Select K33 ICB
4. Select Connect
5. Select Percent
6. Start Logging

Gaslab is useful to evaluate whether the measurement is steady.



Secondary Measurement – Airflow Resistance

Resistance to airflow is indicated on the second panel meter, measured in inches of water pressure. This indication is important because CO2 rebreathing and airflow resistance can sometimes affect one another. Accordingly, it is important to measure and minimize both hazard measurements. The dynamic airflow resistance indication is an approximate prediction of the resistance when it is measured by the static method.

Warranty - 1 year