CO2 Sampling Data Logger

User's Manual
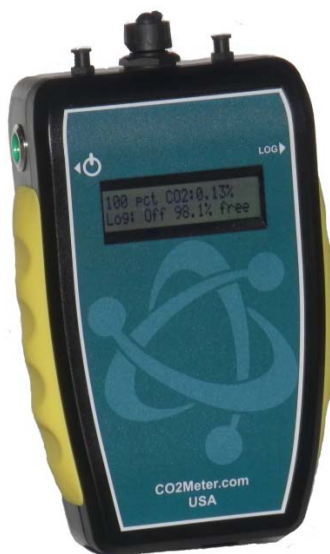
Models

CM-0001	CM-0002	CM-0003
CM-0010	CM-0050	CM-0056

See page 7 for details

Save meter information for future reference

Model Number: _____

Serial Number: _____

Purchase Date: _____

WARNING!

Install our complimentary GasLab® software before connecting your CO2Meter product(s) to your computer. Failure to do so may affect the ability for GasLab® to detect your meter. If this happens, please follow the instructions in the "*USB Driver Installation Instructions*" section on page 16.

CONTENTS

WELCOME

Thank you for purchasing our meter. CO2Meter, Inc. is a Florida based business specializing in the design and manufacturing of gas detection and monitoring devices – mainly CO2. Our approach is one based in the science of gas and how best to accurately and repeatedly measure that gas for the end users purposes. Our business partners in Agriculture, Medical, Pharmaceuticals, Science, Beverage, and other fields find our devices to be highly accurate and cost effective.

We approach each customer's application as a unique opportunity to understand, educate, and provide product solutions that meet the customers' needs while exceeding their expectations for reliability and service. Our continued product innovation in combination with our "customer first" focus allows CO2Meter, Inc. to continue to provide solutions for the future.

Based in Ormond Beach, FL, CO2Meter, Inc. is committed to the success of our customers; the health, welfare, and prosperity of our talented employees; and the continued development of our local community.

CO2Meter, Inc. appreciates your business and looks forward to working with you and your team in the future.

Please take some time to read through this manual in order to become familiar with the meter. Also, please pay special attention to the important safeguards.

IMPORTANT SAFEGUARDS

To reduce the risk of fire, electrical shock and/or injury to persons, basic safety precautions should always be followed when using electrical appliances, including the following:

- READ ALL INSTRUCTIONS BEFORE USING THIS METER.
- INSTALL GasLab® SOFTWARE BEFORE CONNECTING METER TO A COMPUTER.
- Use only the included power supply to operate this meter. Inappropriate voltage supply could cause irreparable damage to this device.
- Do NOT use rechargeable AA batteries.
- Duracell brand AA Alkaline batteries are recommended
- Do not store the meter with the AA Alkaline batteries installed to prevent the potential for battery leakage.
- Make sure that the tubes are securely attached to the meter before sampling a closed environment.
- Do not operate with an obstructed sample path.
- This meter is not designed for outdoor use.
- Do not expose this meter to water or any liquids.
- Do not operate this meter if the enclosure is opened.
- Do not operate the device if it is malfunctioning.

SAVE THESE INSTRUCTIONS!

PACKAGE CONTENTS

Please verify that your package contains the following items before using the meter:

ALL UNITS:
- (1) Meter
- (1) Protective rubber grips
- (1) 6-foot USB cable
- (1) International power supply
- (1) High-impact carrying case
- (1) Certificate of calibration
- (1) User manual
- (1) 10-foot long 1/8" tubing
- (2) ¼ 28 UNF Locking Nut
- (2) ¼ 28 Panel Mount Connector
- (2) Male Luer Lock Connectors
- (2) Luer Lock Caps
- (2) 1/8" Barb tubing bulkhead
- (2) 1/8" Barb 10-32 UNF fittings
- (2) Particulate filter (CM-0117)
- (2) Hydrophobic filter (CM-0118)
- (1) Moisture trap (CM-0112)

Figure 1: Basic kit - all units

Optional Accessories

If the meter is to operate in environments where humidity is very high (>95% RH), an *Extreme Moisture Filter* (CM-0103) can be purchased separately. This filter will allow free flow of sampled air while keeping moisture out of the meter. A 10,000 Hr. pump is also available at the time of purchase.

Note: Please contact our technical support staff for more details about these accessories.

NOTE: We strongly recommend allowing GasLab® to install drivers for the meter automatically.

GASLAB® SOFTWARE

Our GasLab® software allows you to:

- Manage and download logs
- Configure the sensor(s)
- Adjust logging intervals
- Calibrate the meter
- Automatic data logging when meter is powered ON
- Data logging session status displayed on LCD screen
- Collect data real-time

GasLab® Software Installation

IMPORTANT: **MAKE SURE TO INSTALL SOFTWARE BEFORE CONNECTING YOUR METER TO YOUR COMPUTER.**

Minimum System Requirements

To utilize our complimentary software, the computer must meet the following minimum requirements:

- 1GHz processor with 1GB RAM, 1GB free disk space (2GB free disk space for 64-bit systems).
- Windows XP*/7/8/8.1 with Microsoft .NET Framework 4.0** or later.
- On Intel-based Mac computers, GasLab® software can run using a Windows 7/8 virtual machine software such as *VMware Fusion*® or similar.

 *Microsoft .NET is not supported on Media Center or Tablet editions.
**Installer will optionally install .NET Framework.

Visit **www.co2meter.com/pages/downloads** to download our complimentary GasLab® software to your computer. You can also download the GasLab® user manual in PDF from this page.

Please read the GasLab® user manual carefully to become more familiar with how the software works so that you can get the maximum benefit from this useful tool.

Install the GasLab® software first to ensure that the proper driver, necessary for the meter, is installed on your computer before connecting the meter.
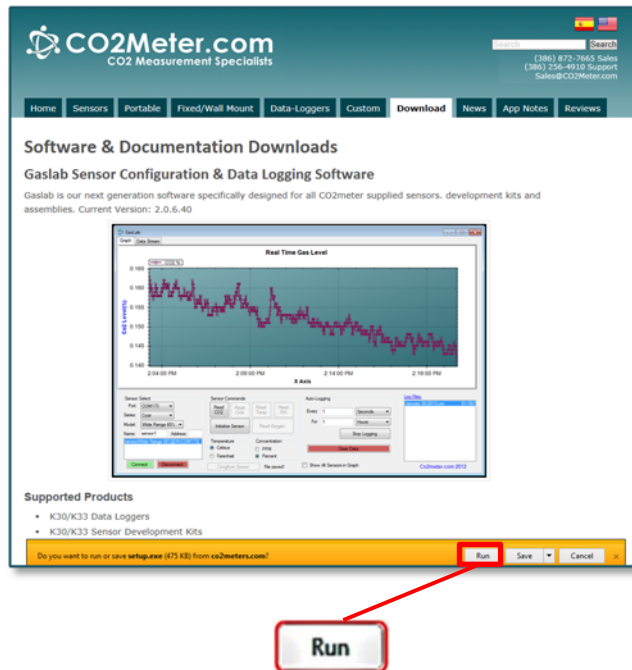
Figure 2: GasLab® download page (Internet Explorer 11 shown)

Follow the steps and instructions prompted by your computer's operating system. Make sure you have administrator privileges in order to install this program.

PRODUCT OVERVIEW

This portable battery-powered CO2Meter, Inc. meter is designed to measure carbon dioxide (CO2) in real time in inaccessible areas for applications such as, but not limited to fermentation vats & barrels, biological incubators, and CO2 leak detection.

Meters with logging capabilities are designed to record CO2 concentration level data over periods of time. It stores up to 60,000 collected data points to its internal memory to be retrieved at a later time for analysis. When combined with our GasLab® software, you can also see real-time data on your computer's screen. These meters are ideal for applications such as, but not limited to CO2 monitoring of products with modified atmosphere packaging (MAP), monitoring of mold production in areas used to store grains, and testing of fire suppression systems.

Its built-in 1,000 hours sampling micro-pump (10,000 Hr. optional) ensures reliable operation for persistent readings based on user-selected time intervals.

Scientific devices such as this sampling meter require users to have intimate knowledge of the meter's features, limitations, operation, required software, and specifications prior to use. CO2Meter, Inc. highly recommends reading this user's manual before operating this meter, especially the *Important Safeguards* section on page 4.

The table below shows all available models and their respective characteristics.

Table 1: Meter models covered in this manual

Model # (P/N)	CO2 Level
CM-0001	1%
CM-0002	30%
CM-0003	100%
CM-0010	10%
CM-0050	60%
CM-0056	5%

Principal of Operation

The CO2 sensor inside this meter uses proven NDIR (non-dispersive infrared) technology to sense, as a function of transmitted light, the concentration of CO2 in the air.

Air from the tube inlet port is pulled into the sensor's CO2 molecule detection chamber by a micro-pump, then expelled out the tube outlet port.

The measured CO2 level is shown on the LCD in real time and/or logged into memory with a date/time stamp for later retrieval.

The meter is factory calibrated to operate within the specified range and precision.

Instrument Overview

USB Connector (covered)
Connect included USB cable to communicate with unit.

USB Connector (cover removed)

Barb Fitting (x2)

Power Switch
Turns the meter ON/OFF.

LOG Switch
Turns logging & pump ON/OFF.

Outlet   Inlet

100 pct CO2:0.14%
Log: Off 97.9% free

Rubber Boot (x2)
Protects meter and improves grip.

Display
Shows CO2 concentration level, data logging and free memory space.

Power Jack
Connect included power supply.

LCD Display

The Liquid Crystal Display (LCD) shows the following features:

- CO_2 concentration level in parts-per-million (ppm) for 1% and 5% models
- CO_2 concentration level in percentage format (##.##%) for all other models
- Logging ON/OFF
- Percentage of free memory

QUICK START GUIDE

IMPORTANT: MAKE SURE TO INSTALL GASLAB SOFTWARE BEFORE CONNECTING YOUR METER TO YOUR COMPUTER.

1. Install fresh set of AA batteries (Duracell brand recommended) or connect the included power supply.
2. Install filters and tubing included as shown on Figure 6 as required.
3. Turn the meter ON by pressing the power switch once.
4. Turn logging ON by pressing the LOG switch once. Once the sampling process is completed, data can be downloaded to your computer using our GasLab® software.

Powering the Meter

This meter can be powered by four (4) AA size batteries (not included) but sampling units can also be powered by the included 6VDC international wall power supply. These units should NOT be powered using the included USB cable since it supplies inconsistent voltage to the meter, which degrades sensor accuracy.

If the unit is not going to be used for an extended period of time, batteries should be removed to prevent damage due to potential battery leakage.

The POWER switch ⏻ on the left side of the meter turns the unit ON/OFF. The LOG switch on the right side of the meter enables/disables data logging and pump function.
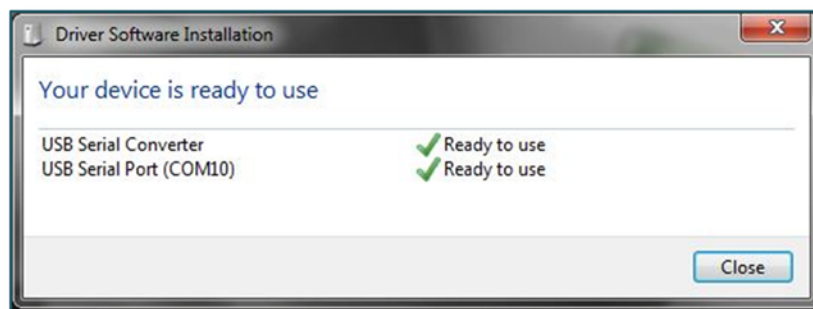
OPERATION

Make sure you read through these instructions thoroughly before using the meter. This guide will help you become more familiar with the meter in order to be as productive as possible in a short period of time. Please read the *Important Safeguards* on page 4 before continuing.

IMPORTANT: Follow these instructions to ensure proper set up:

1. Download the GasLab® software to your computer as shown in the *GasLab® Software* section on page 6.
2. Power the meter using the included universal power supply. Turn *ON* ⏻ the meter.
3. Wait until the display changes colors to visually confirm it has reset successfully after connecting it to a computer.

Connecting the Meter to your PC

The first time the meter is connected to your computer, the operating system will install the necessary USB drivers as shown in **Figure 3.** This process could take a few minutes.

Figure 3: USB Driver Installation.

Data Storage

This meter features an internal memory capable of storing 60,000 data points. Due to the nature of their design, these meters will need to be initialized before operation and its logging period and real-time clock will need to be set under the "Settings" menu.

Once the GasLab® software has been installed and the meter is connected to the computer, you can gather data in a variety of ways. Data can be collected in real time, data logs can be downloaded from the meter's memory and saved to the computer, and data can be reviewed on the meter's LCD display.

For each logging session:

1. Turn the meter ON.
2. The meter must be started at least 1 minute prior to deployment and data logging to allow the CO2 sensor time to warm-up and calibrate.
3. Start logging by pressing the "Log" button on the right side of the meter.
4. When data logging is completed, turn the "Log" OFF.

NOTE: Refer to the GasLab® User's Manual for more information.

DATA LOGGING

These models feature an internal memory capable of storing data when not connected to a computer. This allows you to simultaneously read and store CO2 concentration level data. You can download the data logs by connecting the data logger to GasLab®.

• Data logging is only available when the meter is turned ON.

• Start data logging by pressing the switch on the right hand side of the device. When the switch is depressed to the ON position, it will activate the pump and start data logging. This button is the only way to turn on the pump and data logging.

• When the same switch is pressed again and raised to the OFF position, the pump and data logging will stop.

All CM Data Loggers are preconfigured to sample the air from the inlet tube port once every five seconds. If this does not work for your application, contact a CO2Meter technician for instructions on how to modify the sampling rate.

IMPORTANT: ALTERING THE PUMP PERIOD, DATA LOGGING INTERVAL, PWM PERIOD OR PUMP MODE IN GASLAB® TO CHANGE THE SAMPLE RATE WITHOUT SPEAKING WITH A CO2METER TECHNICIAN FIRST MAY VOID YOUR WARRANTY.

SETTINGS

Settings – allows you to access all the parameters, options, outputs, communications, and date/time settings to be changed or programmed.

Display Settings

Here you can change the brightness and color theme (3 available) on the device and you can also activate a Screen Timeout to save power. This setting will not affect the meter's functionality but will affect the battery life depending on how you set this parameter.

Port Settings

Here you can configure and activate ports that control additional accessories such as the device Modbus address. Please call technical support for guidance and important information before making changes to the configuration of any of these ports.

Time/Date Settings

Here you can change the date and time on the meter for more accurate reference on the records. The default time of your meter could vary depending on your location. **Review these settings before you start using the meter.**

Logging Settings

All CM Data Loggers are preconfigured to sample once every five seconds. If this does not work for your application, contact a CO2Meter technician for instructions on how to modify the sampling rate.

IMPORTANT: ALTERING THE PUMP PERIOD, DATA LOGGING INTERVAL, PWM PERIOD OR PUMP MODE IN GASLAB® TO CHANGE THE SAMPLE RATE WITHOUT SPEAKING WITH A CO2METER TECHNICIAN FIRST MAY VOID YOUR WARRANTY.
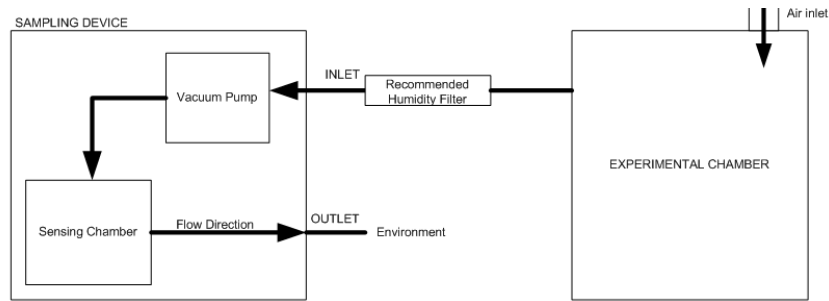
USING THE FILTERS

In order to use this meter properly, hoses/tubing must be attached to the inlet and outlet barb fittings securely. The pump will draw air from the inlet by vacuum effect, push it to the sensing chamber through the sensor, and then exhaust the air outside the meter through the outlet.

Closed Loop Operation
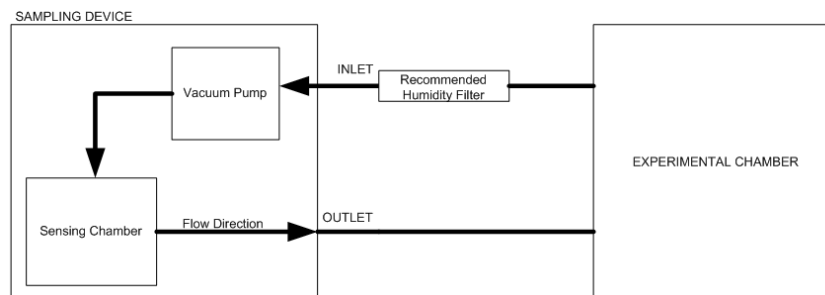
Figure 4: Closed Loop

Open Loop with Environmental Exhaust

Figure 5: Open Loop

We recommend installing the included humidity/contaminant filters to ensure the sensing chamber and pump baffle stays clear and corrosion-free. Replacements filters are available on CO2meter.com.

Figure 6: Filter Installation and Orientation

CALIBRATION

All units are shipped factory-calibrated. Over time all CO2 sensors require recalibration. When it is time to re-calibrate, you have two choices. You can ship your Sampling Data Logger to us for recalibration, or you can calibrate it yourself.

Why is Calibration required?

Our Sampling Data Loggers use non-dispersive infrared (NDIR) carbon dioxide sensors. These rely on an infrared light source and detector to measure the number of CO2 molecules in the sample gas between them. Over time, both the light source and the detector deteriorate, resulting in slightly lower CO2 molecule counts.

To combat sensor drift, during calibration a sensor is exposed to a known gas source, multiple readings are taken, an average is calculated, and the difference between the new reading and the original reading when the sensor was originally calibrated at the factory is stored in EPROM memory. This "offset" value is then automatically added or subtracted to any subsequent readings taken by the sensor during use.

Factory Calibration

Factory calibration is a pre-paid service CO2Meter offers. It not only corrects for sensor drift, but provides a Certificate of Calibration. A Certificate of Calibration is required for products in ISO 9000, FDA-regulated, government contracted, or other industries that requires traceability.

To order factory calibration, you must first get a Return Material Authorization (RMA) number. This number insures we know your unit is coming back to CO2Meter and returned to you the same day if possible. To obtain an RMA number, call (877) 256-4910 M-F 9-5pm EST or send an email to: support@co2meter.com. Please have your original order number ready. You will receive an authorization code to access the RMA system.

Once you have an authorization code, go to http://rmasupport.net/rma2.aspx. Fill in the form, enter the authorization code you were provided and an RMA number will be assigned to you.

Please use the original packaging (if available) when returning the meter to CO2Meter. Include the provided RMA number on the outside of the box, preferably on the shipping label. Secure the meter inside the package properly to prevent any damage during transit. Ship the meter to the address listed on your RMA paperwork.

When we receive your Sampling Data Logger, we will run a diagnostic test, then contact you with a total cost for recalibration, return shipping, and repair/replacement (if required) of any non-working parts required to complete the calibration. Once calibration is complete, your meter will be returned with a Certificate of Recalibration.

All applicable duties, tariffs, taxes and brokerage fees are the responsibility of the customer.

Ordering a Factory Certificate of Calibration during Purchase

In some cases, you may need an original Certificate of Calibration when you place your order. You can save time by ordering your calibration certificate at the same time you place your order.

https://www.co2meter.com/products/certificate-calibration

User Calibration - CM-0003 100% Sampling Data Logger

The CM-0003 is calibrated using 100% CO2 Gas

1. Connect CM-0003 to 6V power adapter.
2. Connect data cable from GasLab computer to CM-0003.
3. Turn "ON" CM-0003 Power switch.
4. Turn "ON" CM-0003 LOG switch.
5. Run GASLAB program.
6. Select highest COM port from "Port" menu.
7. Select "CM-0003" from "Product" menu.
8. Select the Green "Connect" button.
9. Connect 100% CO2 gas to the "IN" port of the CM-0003.
10. Allow CO2 Gas to flow for 1 minute.
11. When CO2 readings are stable, select "Configure Sensor" button.
12. In the "Configure AQ500 Window", under "Span Calibration", type "1000000".
13. Select "Calibrate to:" button.
14. Select "OK" button.
15. Select "Close" button.
16. CM-0003 display will read approximately 100% CO2.
17. Disconnect CO2 gas from the "IN" port.
18. Your CM-0003 is calibrated.

User Calibration – All Other Models

CO2 Sampling Data Logger is calibrated using 400 ppm CO2 Fresh Air

1. Connect Data Logger to 6V power supply.
2. Connect Data Cable from GasLab Computer to Data Logger.
3. Press Data Logger "ON" button.
4. Press Data Logger "LOG" button.
5. Run GASLAB program.
6. Open "Port:" menu and select correct COM port.
7. Open "Product:" menu and select Data Logger Part Number.
8. Select the Green "Connect" button.
9. Expose Data Logger to Clean Outdoor Air for 2 minutes.
10. Select the "Configure Sensor" button.
11. Select "Calibrate to Fresh Air 400 ppm CO2" button.
12. Select "Close".
13. Data Logger should display approximately 400 ppm (0.04% CO2).
14. Your Data logger is calibrated.

METER SPECIFICATIONS

	CM-0001	CM-0002	CM-0003	CM-0010	CM-0050	CM-0056
Range	1%	30%	100%	10%	60%	5%
Accuracy	±30 ppm, ±3% of measured value	±5000 ppm ±3% of measured value	±300 ppm ±5% of measured value	±100 ppm, ±1% of measured value	±70 ppm ±5% of measured value	±70 ppm, ±5% of measured value
Repeatability	±20 ppm, ±1% measured value	±1000 ppm, ±2% of measured value	±300 ppm ±5% of measured value	±100 ppm ±1% of measured value	±70 ppm ±5% of measured value	±70 ppm ±5% of measured value

General	**Warm-up Time**	<1 min. (instant measurements)
	Life Expectancy	>15 years
	Maintenance Interval	No maintenance required
Data Logging	**Data Points**	60,000
	Programmable Interval Data	Date, time, CO2, O2 (every 15 seconds to 18 hours)
	Response Time (T1/e)	< 20 seconds tube IN/OUT (0.2 l/min gas flow) NOTE: Response time dependent on length of tube
	Pressure Dependence	± 1.6% reading deviation per k Pa (from atmospheric pressure, 100 k Pa) / 0.13% of reading per mm Hg

Pump Characteristics	**Max. Flow (STP)**	500 ml/min @ Standard Temperature & Pressure
	Max. Vacuum	150 mbar
	Max. Pressure	500 mbar
	Max. System Pressure	~101.3 KPa (1 atmosphere)
	Life Expectancy	1,000 (standard) depending on sampling interval
Power	**Input Voltage**	6 VDC
	Method	Power supply or 4x AA batteries
	Power Consumption	~0.5 Watt Avg. (pump running)
Dimensions	**WxHxD** in(mm)	4.8 in. (122mm) x 7.1 in. (181mm) x 2.1 in. (55mm)

TROUBLESHOOTING GUIDE

Symptom / Issue	Possible Cause / Resolution
Meter not recognized by computer/OS	Your device's batteries might be depleted. Replace the batteries with fresh ones, or make sure the power supply is connected properly (use the included power supply only).
Device doesn't power ON	Make sure the power supply is connected properly and that there is power in the outlet the adapter is connected has the appropriate voltage. If using batteries, make sure they are not depleted.
The GasLab® software doesn't start *	Your software might be out of date. Update your software by either visiting our download webpage at http://www.co2meter.com/pages/downloads or by selecting the "**Check for Updates**" under the *Help* menu. Make sure your PC meets the minimum requirements.
Slow response	Check the air flow channels to make sure they are not obstructed.
Reading doesn't change	Make sure the meter is in maximum or minimum mode.
"Bat" and green LED keep flashing	The power supply output voltage is inappropriate or batteries depleted. Please use the included power supply only or replace batteries with a fresh set.

*For more troubleshooting tips on GasLab® software, see its manual located at www.co2meter.com/pages/downloads.

USB Driver Installation Instructions

To install the appropriate USB port drivers compatible with your meter, follow these steps:

1. Go to http://www.ftdichip.com/Drivers/VCP.htm and download the package appropriate for the version of Windows installed in your computer.
2. Move the file you downloaded to a location you can easily access. Make sure you have administrator privileges.
3. Extract the file by right clicking on it and selecting **extract here.**
4. Go to your computer's Device Manager in the **Control Panel**.
   - For Windows 8, press the Windows key and 'x' at the same time to bring up the start menu then click on **Device Manager**.
   - For Windows 7, open the start menu and type **Device Manager** in the search bar.
5. Find the **Unrecognized USB Device** in the list (it usually, but not always, has a yellow triangle icon).
6. Right click the **Unrecognized USB Device** item and select **Update Driver Software**.
7. Select **Browse My Computer** and point to the folder where you extracted the driver files to (step #3).

This will install the necessary drivers to your computer and allow you to use your meter with GasLab®. If you have multiple sensors you should only have to perform this procedure once; the operating system will automatically find the driver for all the other sensors.

SUPPORT

The quickest way to obtain technical support is via email. Please send all support inquires to **support@co2meter.com**.

Please include a clear, concise definition of the problem and any relevant troubleshooting information or steps taken so far, so we can duplicate the problem and quickly respond to your inquiry.

WARRANTY

This meter comes with a 1YEAR (warranty period) limited manufacturer's warranty, starting from the date the meter was shipped to the buyer.

During this period of time, CO2Meter.com warrants our products to be free from defects in materials and workmanship when used for their intended purpose and agrees to fix or replace (at our discretion) any part or product that fails under normal use. To take advantage of this warranty, the product must be returned to CO2Meter.com at your expense. If, after examination, we determine the product is defective, we will repair or replace it at no additional cost to you.

This warranty does not cover any products that have been subjected to misuse, neglect, accident, modifications or repairs by you or by a third party. No employee or reseller of CO2Meter.com's products may alter this warranty verbally or in writing.

LIABILITY

All liabilities under this agreement shall be limited to the actual cost of the product paid to CO2Meter.com. In no event shall CO2Meter.com be liable for any incidental or consequential damages, lost profits, loss of time, lost sales or loss or damage to data, injury to person or personal property or any other indirect damages as the result of use of our products.

RETURNS

If the product fails under normal use during the warranty period, a RMA (Return Material Authorization) number must be obtained from CO2Meter.com. After the item is received CO2Meter.com will repair or replace the item at our discretion.

To obtain a RMA number, call us at or email us at (386) 256-4910 support@co2meter.com. When requesting a RMA please provide reason for return and original order number.

If we determine that the product failed because of improper use (water damage, dropping, tampering, electrical damage etc.), or if it is beyond the warranty date, we will inform you of the cost to fix or replace the product.

For more information visit our website: www.CO2Meter.com/pages/faq

CONTACT US

We are here to help!

For information or technical support, please contact us.

✉ support@co2meter.com

📞 (386) 256-4910 (Technical Support)
📞 (386) 872-7665 (Sales)

🖥 www.co2meter.com

See CO2Meter, Inc. Terms & Conditions at,
www.CO2Meter.com/pages/terms-conditions

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