CO2Meter.com

Sampling Data Logger / Sample Draw Meter / Data Logger w/ Display Manual for Operation

Contents

IMPORTANT SAFEGAURDS

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:

1. READ ALL INSTRUCTIONS BEFORE USING THE DEVICE
2. Pay special attention to polarity of batteries when inserting into the unit. Inserting the batteries the wrong direction can cause permanent damage to the unit.
3. Use only the supplied power supply to operate the unit.
4. Ensure that when sampling in a closed environment that the tubes are securely fashioned to the device.
5. Do not operate with a blocked off sample path.
6. Do not operate the device if it is malfunctioning.
7. Do not install the device outside in exposed conditions. Due to the nature of the design the enclosure cannot be made water-tight and the unit must not be exposed to water.
8. Do not operate the device with the cover detached.

SAVE THESE INSTRUCTIONS

SPECIFICATIONS

Input Voltage

Voltage Maximum	9VDC
Voltage Minimum	6VDC
Power Consumption	~.5Watt Average (pump running)
	DC voltage accepted

Pump (optional)

Maximum Flow (STP)	.30 LPM
Maximum Vacuum	150 mbars
Maximum Pressure	500 mbars
Maximum System Pressure	~ 1 atm

Sensor Ratings

Life Expectancy	>15 years
Maintenance Interval	No maintenance required
Warm-up Time	< 1 min (measurements immediately)

0-1%

Range	0-10000ppm
Repeatability	±20ppm, ±1% measured value
Accuracy	±30ppm, ±5% measured value

0-30%

Range	0-30% vol
Repeatability	±0.1%, ±2% of measured value
Accuracy	± 0.2%, ± 3% of measured value

0-5%, 0-65%, 0-100%

Range	0-5%, 0-65%, or 0-100% vol
Accuracy	± 0.5%, ± 3% of measured value

PACKAGE CONTENTS

Please verify the contents of your package before using the product.

- 1- Unit
- 1- Rubber Boot (optional)
- 1- 6’ USB Cable
- 1- Power supply

Sampling Units

- 1- 10’ length 1/8 tubing
- 2- 1/8” Barb tubing bulkhead fitting
- 2- 1/8” Barb-10-32 fittings
- 2- Particulate Filter
- 2- Hydrophobic Filter
- 1- Moisture Trap

MINIMUM SYSTEM REQUIREMENTS

To utilize our software your Windows-PC must meet the following requirements:

- Windows XP SP3 or higher
- Microsoft .Net Framework 3.5 SP1
- Pentium 4 2.4Ghz or higher processor
- 1GB of RAM
- Sufficient disk space for logs and application files (20MB minimum, 200MB+ recommended)

Software is compatible with 64-bit operating systems and is fully tested under Windows 7.

SETUP

The sampling device will require minimal setup and is designed to be portable. The most important aspect of setup involves connecting the sampling hoses and ensuring proper environmental setup.

Figure 1 below shows the labeled components of the unit, referred to throughout the remainder of this manual.

Display
Shows CO2 Concentration and optional data logging status.

Removable Protective Boot
Gently peel boot from top of unit to access batteries and USB connector for connection to PC. (optional)

Power Switch
Depending on whether unit has data logging capabilities, either turns the unit On/off, or disables/enables data logging

Barb Connections
Connect to sampling system for closed loop sampling.

Configuring the Device for the First Time

IMPORTANT: INSTALL DESKTOP SOFTWARE FIRST BEFORE CONNECTING UNITS TO YOUR PC

Visit CO2Meter.com and go the downloads page (http://www.co2meter.com/pages/downloads). Download and install our DAS software package. By installing this package first you will ensure the drivers and software to use your unit is properly installed on your computer before connecting it.

Sampling-Only Model

For sampling of closed-loop CO2 systems and collection of real-time data.

There is no initialization required. Units may be powered by the AC Adapter or batteries. While sampling the unit may be connected to a PC and used with our DAS software to record samples, or it can be used as a stand-alone sampling device.

Data Logger Model

These products feature internal memory capable of reading and storing data when not attached to a personal computer. Due to the nature of their design, they should be connected to your computer first, before operation, to initialize and set the logging period, and real-time clock.

0-1%, 0-30% Data Logger

Insert 4 AA batteries into this unit. Connect the unit to the computer, ensuring the data logging switch is in the off position. Once the unit has been connected, open DAS and click on the "Configure Sensor" button, on this screen select "Configure Internal Sensor, and finally set the data logging period and desired pump interval. We recommend leaving the pump interval to the default 10 second period.

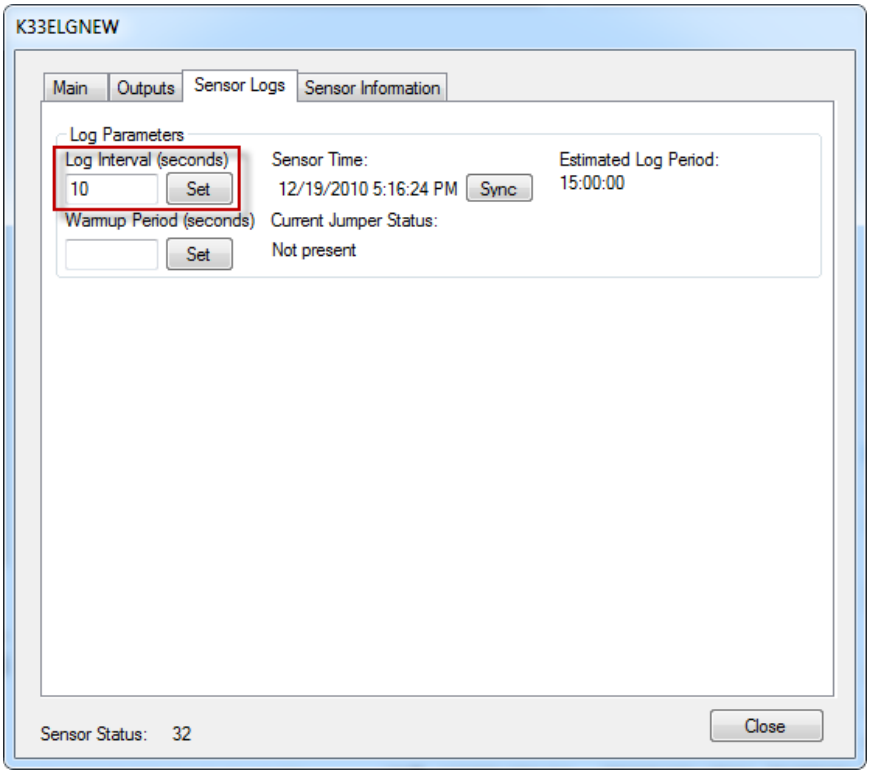

Figure 2 – Log Interval Screen

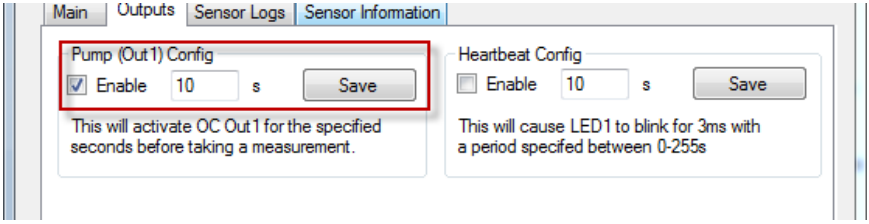

Figure 3 – Pump period (recommended 10 or more seconds)

0-5%, 0-65%, or 0-100% Data Logger

Insert 4 AA batteries into this unit, or connect the unit to the included external power supply. In order to initialize data logging functionality the unit MUST be connected to the computer with data logging off, and DAS software started. Once the unit has been connected click on the "Configure Sensor" button in DAS, set the data logging period and desired pump period.

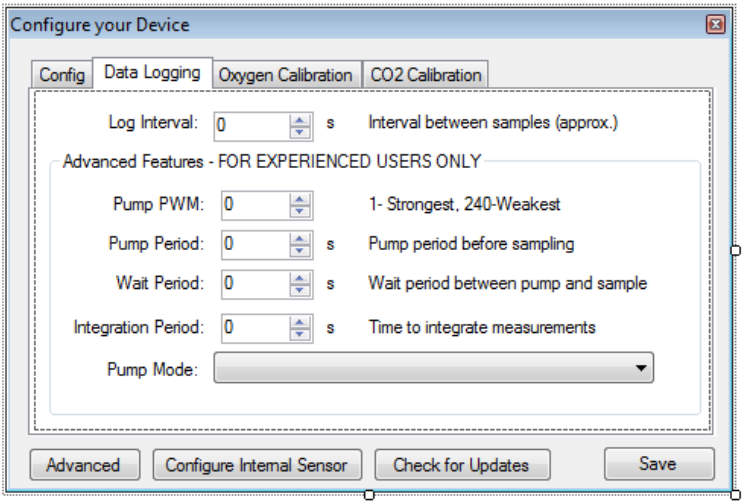

Figure 5 – Data Logging Configuration Screen

Logging Parameters

- Log Interval – Total time interval between samples
- Pump PWM – Strength of the pump, 1- Strongest, 255- Weakest
- Pump Period – How long the pump will be on
- Wait Period – Time between pumping and sampling
- Integration Period – How long the unit will average data for. Set to zero to disable averaging.
- Pump Mode- Determines the operational pump parameters.

The pump PWM period can be tweaked for advanced applications, with 1 being full duty cycle, and values approaching 255 being the shortest duty cycle.

All models have an internal coin cell CR-2032 3V battery backup for the real-time clock. This battery is inserted in the factory for your convenience and should last the lifetime of the product.

Powering the Unit

The unit can be powered either by 4-AAs or by the included power supply. **The unit cannot be powered from the included USB power.** Testing has shown that USB power tends to not produce a consistent supply voltage, and degrades sensor accuracy.

In the models without data logging the switch on the front of the unit will turn power on/off to the entire unit, allowing for storage with the batteries installed for long periods of time.

In models with data logging the switch in the front has been dedicated to enabling/disabling data logging. As long as batteries or the AC adapter is connected, the unit will be operating. When the unit will not be used for a long period of time batteries should be removed.

USAGE (SAMPLERS ONLY)

To use the unit one must attach hoses to the inlet and outlet. The pump will draw air from the inlet in a vacuum configuration, push it through the sensing chamber, and exhaust the air out through the outlet.

Closed Loop Operation

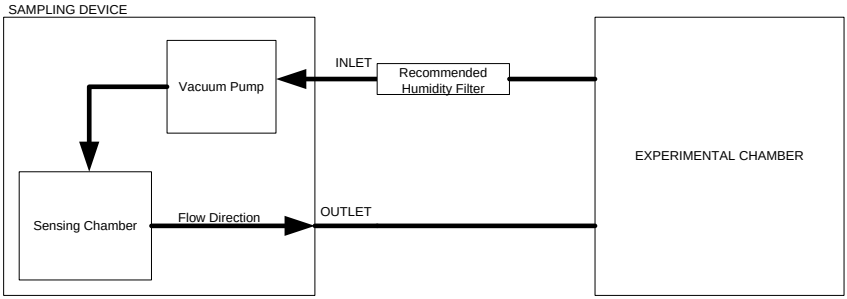

Figure 6 – Closed loop sampling setup

Open Loop with Environmental Exhaust

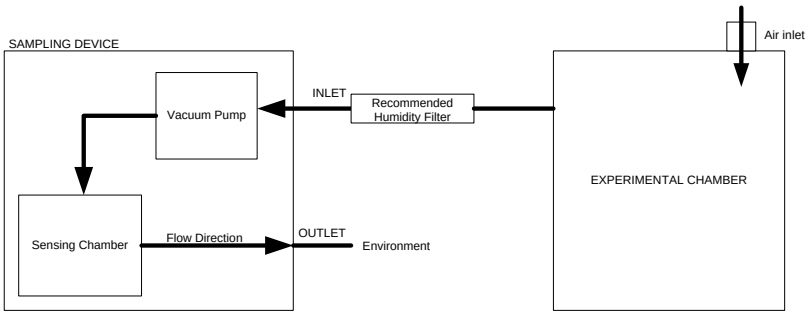

Figure 7 – Open loop sampling setup

We recommend installing the included moister, particulate, and water filter to ensure the sensing chamber and pump baffle stays clear and corrosion free. See the diagram on the next page for installation

Figure 8 – Recommended sampling setup

THEORY OF OPERATION

The CO2 sensor inside this device uses non-dispersive infrared technology to sense, as a function of transmitted light, the concentration of CO2 in the air. It has been factory calibrated to operate within the specified accuracy and precision.

CALIBRATION

Calibration procedure is dependent on the type of unit, and whether it has optional data logging functionality.

All units are factory calibrated with multiple reference points of gas, and have been verified to be accurate within their specified performance before shipment, however, if severely jolted or otherwise mechanically disturbed calibration can occasionally drift.

To compensate for this drift all calibration procedures are based around a procedure that consists of a single calibration point, effectively shifting the zero-point of the CO2 sensor.

0-*1% or 0-30% Sampling Unit*

Calibration can be performed using either 0% CO2 calibration gas (typically nitrogen, available directly from CO2Meter), or using a fresh-air source, assumed to be approximately 400ppm.

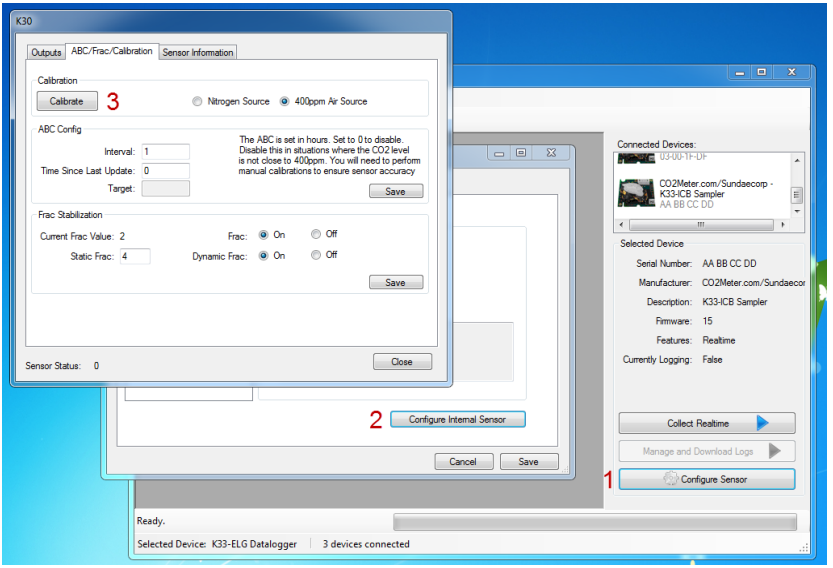

Figure 8 – 0-1% / 0-30% Sampling Calibration Screen

Attach calibration gas and connect the unit to a PC. Open the calibration screen in DAS. Click the calibrate button after selecting the applied calibration gas. As long as the gas concentration was stable the unit should instantly reflect the calibrated value. This can be confirmed by watching the display.

To see the calibration in real time we recommend starting a real time capture before opening the configuration screen.

0-1% or 0-30% Sampling Unit w/ Data Logging

Calibration can be performed using either 0% CO2 calibration gas (typically nitrogen, available directly from CO2Meter), or using a fresh-air source, assumed to be approximately 400ppm.

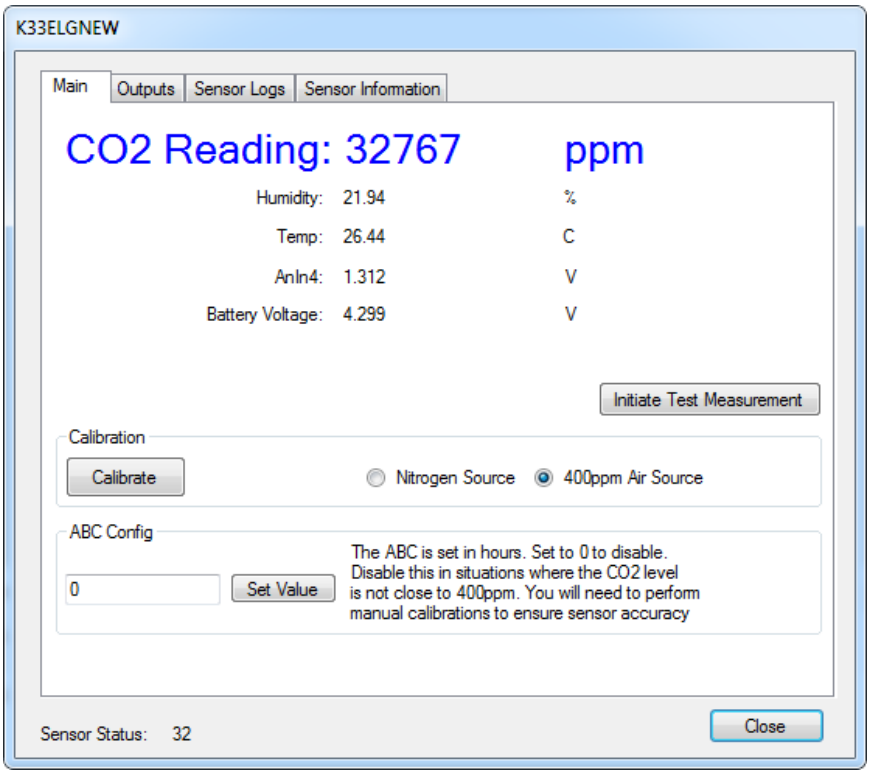

Figure 9 – 0-1% / 0-30% Datalogger Calibration Screen

To calibrate follow these steps:

1- Apply calibration gas, either expose the unit to 400ppm atmosphere or connect it with a demand regulator to nitrogen.
2- Click the initiate test measurement button and wait 25 seconds to collect a sample measurement, write down this value as the “before” value.
3- Click the calibrate button after selecting your calibration gas.
4- Click the initiate test measurement button and wait 25 seconds again, this time the unit will take a sample, and use data from this sample to adjust calibration values. The displayed measurement will not reflect the new calibration data.
5- Click the initiate test measurement button a final time, and wait 25 seconds. The newly displayed data will now reflect the new sensor calibration. If the sensor is still operating outside of its specified accuracy repeat this procedure. When the readings vary too greatly the calibration will silently fail and may need to be performed again.

0-5%, 0-65%, 0-100% Sampling Unit w/ or w/o Data Logging

The 0-100% units do not feature automatic background calibration due to the nature of the scale they measure. To ensure the highest accuracy we recommend calibrating them with calibration gas (available from CO2Meter) close to the concentrations being measured. Alternatively a 0% or ambient 400ppm calibration can be performed.

To perform a calibration attach the unit to your computer, power it with the wall adapter, and either expose it to atmosphere or supply it with your calibration gas, fed with a demand-flow regulator.

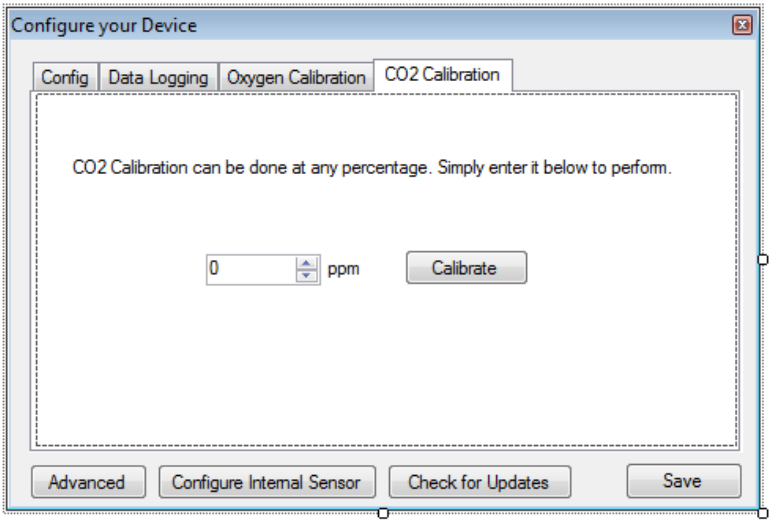

Figure 10 – Datalogger / Sampler Calibration Screen

Open DAS, and click the Configure Sensor button. For data logging units, set the pump mode to Continuous Operation and power cycle the unit before calibrating.

Enter the actual concentration of the gas in the calibration dialog and click the calibrate button. The sensor should instantly reflect the calibrated value.

WARRANTEE

This unit comes with a 90 day warranty.

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 option) 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.

SUPPORT

The quickest way to obtain technical support is via email. Please send all support enquires to support@co2meter.com. In your email please include a clear, concise definition of the problem and any relevant troubleshooting information / steps for so we can duplicate the problem and quickly answer any questions.

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