PERSONAL CO2 SAFETY MONITOR AND DATA LOGGER

User Manual

SAN-10

Rev. 3

GASLAB.COM
SENSOR SPECIALISTS

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INTRODUCTION

Congratulations on your purchase of the SAN-10 Personal CO2 Monitor and Data Logger. It is designed to alert employees who work in enclosed areas where carbon dioxide buildup may cause personal harm. If CO2 buildup occurs, it will show the level on screen, flash, alarm and vibrate. In addition the SAN-10 includes built-in data logging and a man-down alarm that uses an accelerometer to set off the alarm if a sudden shock to the unit (like the wearer falling down) occurs.

The SAN-10 uses a non-dispersive infrared CO2 sensor to provide long term stability. It is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

FEATURES

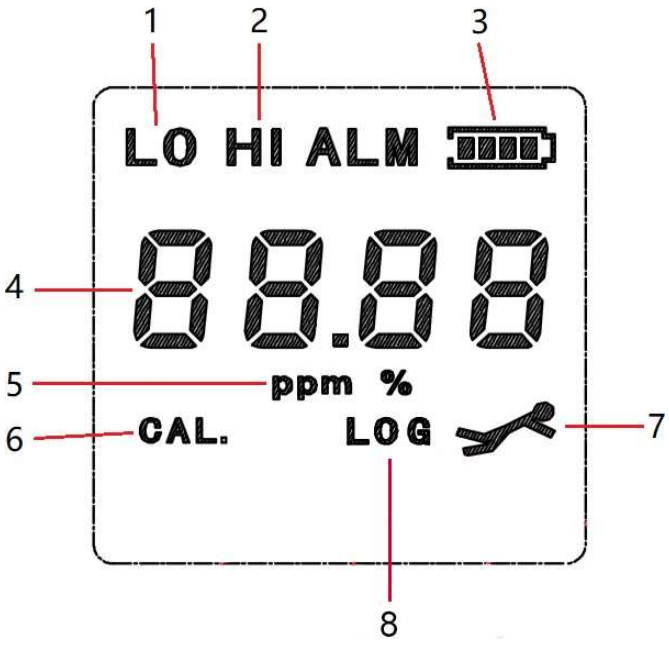
- Audible, visual strobe and vibrating alarms
- Large LCD display
- Rugged design with protective rubber enclosure
- Heavy duty metal clip
- Front facing sensor unit
- Micro USB cable and Wall USB charger
- Rechargeable Li-Ion battery – 72+ hours per charge
- Man down alarm - leveraging accelerometer technology
- Dual calibration methods: Ambient Air (300-600ppm) and Nitrogen (0-200ppm)
- Automatic atmospheric pressure compensation for CO2 concentrations
- No over-exposure or negative memory effects
- Stable NDIR sensor for CO2 detection
- CO2, and alarm log data logging with time stamping
- Up to 149,500 time-stamped records in internal memory. Data can be exported via USB

MONITOR

1. Visual alarm/strobe
2. Front facing sensor
3. Charging indicator
4. LCD display
5. Power button
6. Menu button
7. USB port and charging inlet (b
8. Heavy duty metal clip
9. Factory reset button

LCD DISPLAY

1. Low alarm indicator
2. High alarm indicator
3. Battery indicator
4. CO2 concentration
5. CO2 concentration units
   (ppm or % when > 9,999 ppm)
6. Calibration icon
7. Man down alarm
8. Data logging indicator



OPERATION

Power button

1. When the Monitor is turned off, press the power button to turn on the unit.
2. When the Monitor is turned on, press the power button for 3 seconds to turn off the unit.

When the unit is first turned on, it performs 5 seconds countdown for Monitor warm up, then enters normal display with current CO2 reading displayed. The monitor starts taking measurements when power on and updates readings every 2 seconds.

Menu Status

Press the menu button for **5** seconds to enter into the **Menu options**.

Once in the menu, there are six menu options that can be accessed by pressing the menu button momentarily to cycle between them: **AIR**, **N2**, **Hx.x**, **Lx.x**, **AON/AOFF**, **SC**, **Px**, **LOG** and **E** (exit).

The menu items are described in the following table.

Menu Items	Functional Description
AIR (“AIR”)	**Ambient Air Calibration**. User presses the power button to implement **Ambient Air Calibration** (300~600ppm).
N2 (“n2”)	**Nitrogen Calibration**. Press the power button to start nitrogen calibration (0~200ppm).
H0.5, H0.5T, H1.0, H1.5 H2.0, H2.5, H3.0, H3.5, H4.0	**High Alarm Threshold** setup. Press the power button to switch the high alarm threshold: H0.5 (5,000 ppm), H0.5T (5,000 ppm TWA), H1.0 (1%), H1.5 (1.5%), H2.0 (2%), H2.5 (2.5%), H3.0 (3%), H3.5 (3.5%) or H4.0 (4%).
L0.5, L0.5T, L1.0, L1.5, L3.0	**Low Alarm Threshold** setup. Press the power button to switch the low alarm threshold: L0.5 (5,000 ppm), L0.5T (5,000 ppm TWA), L1.0 (1%), L1.5 (1.5%) or L3.0 (3%).
A ON A OFF	**Man down alarm** set on/off. Press the power button to switch “A ON” to turn on the man down alarm or “A OFF” to turn off.

SC (“SC”)	**Real time clock** setup Press the power button to enter the real time clock setup: a. Press the °F/°C button to switch between Year (Y), Month (0), Day (d), Hour (h), Minute (i), Second (S) and E. to exit. b. Press the power button to increase the value until the correct time is set. This value is a cyclic change. Press the power button again to save and exit the menu status. For example, set the month to February by pressing the power button in “0”: 0 2
Px	**Data logging period** setup Press the power button to switch the data logging period between: P30 (30 seconds), P60 (60 seconds), P120 (120 seconds or 2 minutes), P300 (300 seconds or 5 minutes), P600 (600 seconds or 10 minutes) or P900 (900 seconds or 15 minutes).
Log (“LOG”)	**Data logging memory** operation Press the power button to switch the data logging memory operation between: • EP (Export data logging by USB) • RES (Reset the memory) • E (Exit without operation).
E	**Exit**. Press the power button to exit the menu status.

Alarm Threshold

The SAN-10 is equipped with audible, visual and vibration alarms to alert users when the ambient oxygen concentration exceeds either of the two factory preset alarm levels:

- **Danger High Alarm:** LED will flash and audible alarm will sound 3x / sec.
- **Warning Low Alarm:** LED will flash and audible alarm will sound 2x / sec.

There are high and low alarm thresholds. Both high and low alarm has five thresholds: 5,000 ppm, 5000 ppm TWA (time-weighted average over 8 hours), and 1.0-4.0% in 0.5% CO2 by Vol. increments.

The high alarm threshold cannot be less than the low alarm threshold. However, they can be the same.

Automatic Atmospheric Pressure Compensation

The CO2 measurement is affected by atmospheric pressure or altitude changing. When users are at high altitude, compensation is made internally to assure maximum monitor accuracy.

This device has automatic atmospheric pressure compensation for CO2 concentrations by means of a digital atmospheric pressure sensor integrated in the unit.

Man Down Alarm

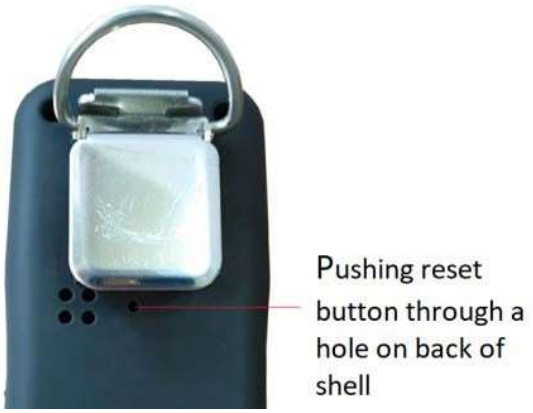
Falling by breathing dangerous gases can cause serious injury and even fatality to workers. If the Man down alarm function in SAN-10 is set on it will detect a drop or fall which will activate the audible and visual alarms to alert other people in the area.

The man-down detection uses a three-axis accelerometer to automatically monitor the user's movements in order to identify a sudden fall or impact and a lack of movement for a period of 6 seconds.

Once alerted, you can turn off the man-down alarm by pressing either of the two buttons.

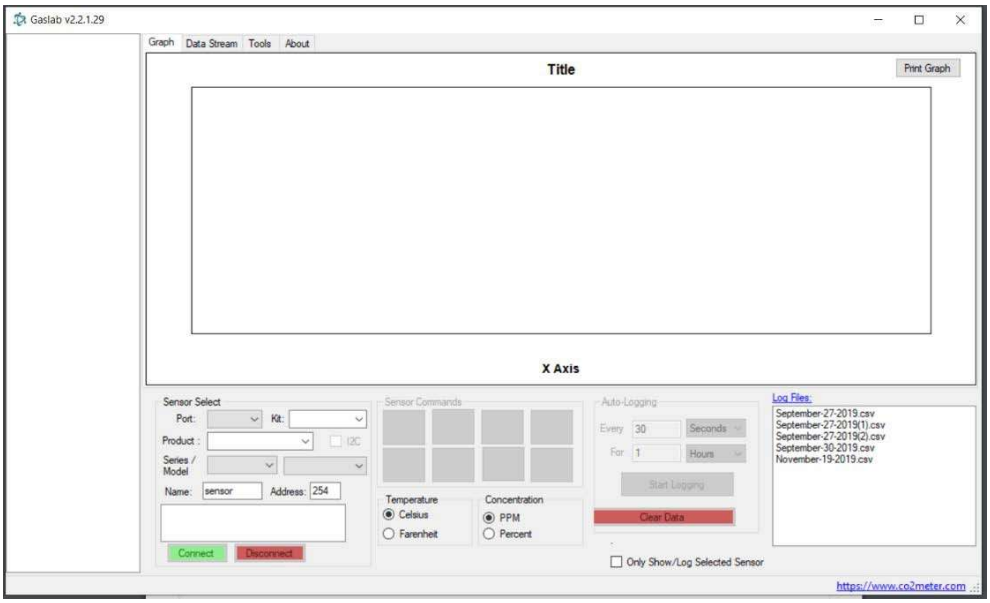
Reset Button

Users can reset the unit by pushing a reset button through a hole on back of shell.

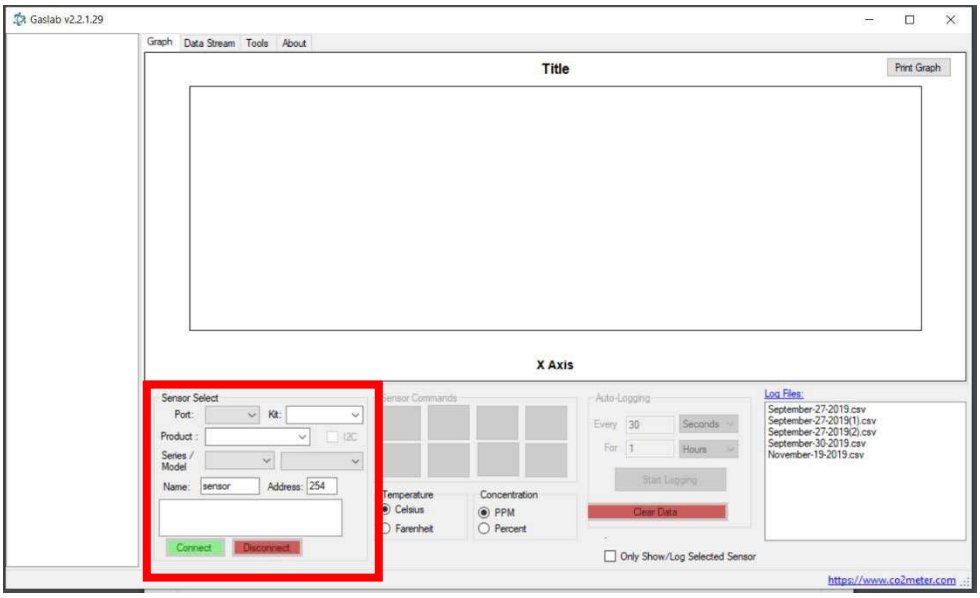


DOWNLOADING DATA LOGS

1. Download latest version of GasLab®: https://gaslab.com/pages/software-downloads
2. Power on the SAN-10 device
3. Wait for 5 second warm up countdown
4. Connect the SAN-10 to your Windows PC with the USB cable
5. Open the Gaslab software

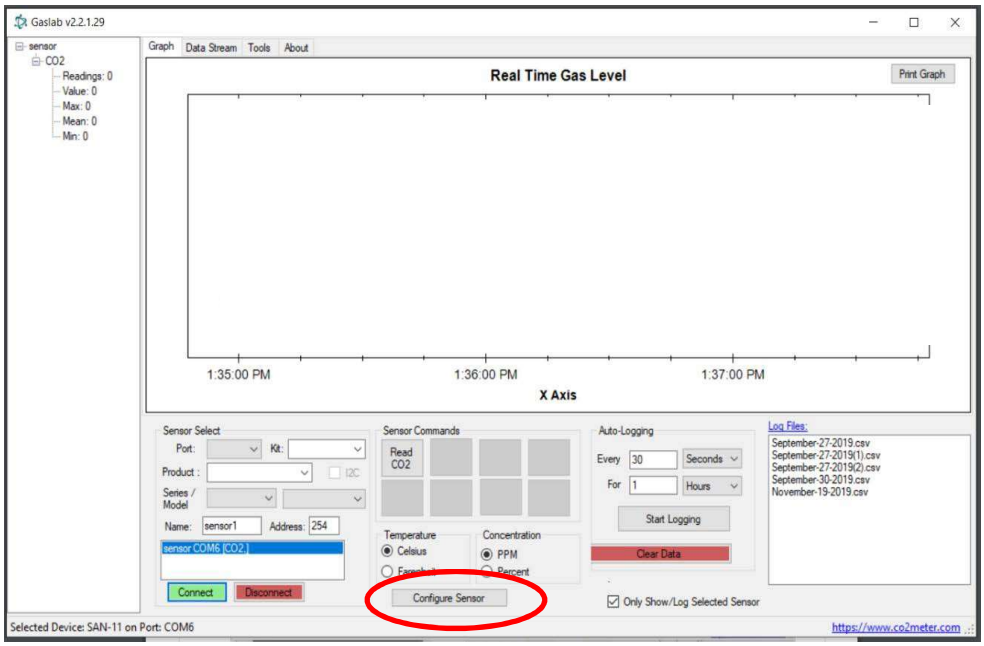


6. Set Sensor Select options.

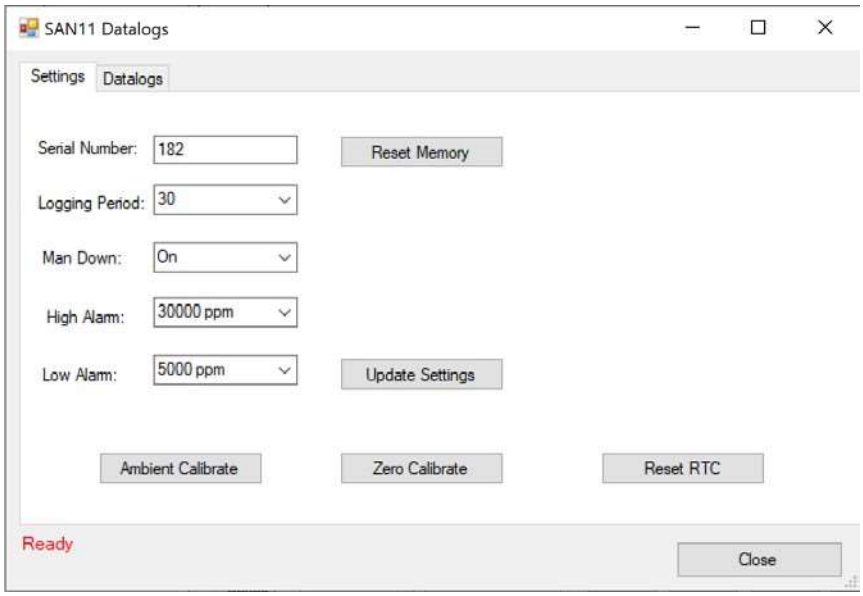


7. Select the Port in which your SAN-10 device is connected.
8. Do not select a Product.
9. Select SAN-10 under Series/Model.

10. Click “Connect.” When connected the window should appears as shown below:

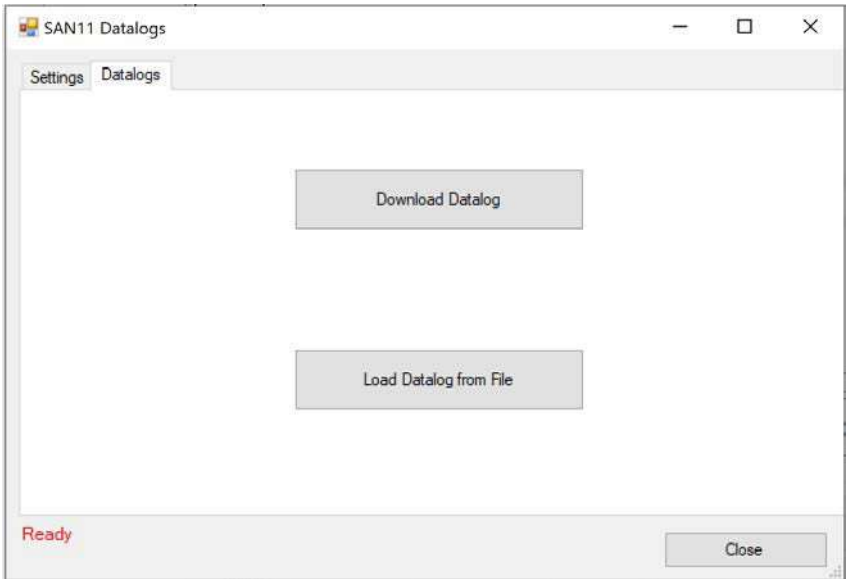


11. Click “Configure Sensor” and the following page will appear:



12. Make sure the Serial Number matches the one found on the back of your device.

13. Select the Datalogs tab.



14. Click the “Download Datalog” button. Select a file folder and file name to save your file.

Data logs are .CSV (common separated values) files which can be opened or imported into any spreadsheet program.

CALIBRATION

Step 1. Power the unit on by pressing and holding the power button for 3 seconds

Step 2. Press and hold the Menu button for 5-10 seconds to open the first menu

Step 3. Press the Menu button briefly to scroll through the first menu and select one of the first 2 options:

1. AIR (Ambient Air Calibration Option)
2. N2 (Zero Nitrogen Calibration Option)
3. L 0.5 (Low alarm threshold)
4. H 3.0 (High alarm threshold)
5. A ON (Alarm option. Turns the alarm on and off)
6. E (To exit the menu and return to home screen)

Step 4. Perform AIR or N2 calibration

"AIR" Ambient air calibration	"N2" Nitrogen calibration
• Follow above instructions to access the menu • The "AIR" option is the first to appear • Bring the unit OUTSIDE or use 400ppm CO2 • Press the power button to start the calibration • If the screen reads "FAIL" repeat until the calibration passes *IF THE MONITOR DOES NOT READ IN THE 300-600 PPM RANGE BEFORE PERFORMING THE CALIBRATION, IT WILL NOT CALIBRATE IN THE FIRST MENU.	• Follow above instructions to access the menu • Go to the "N2" option • Expose the device to 100% nitrogen gas • Press the power button to start the calibration • If the screen reads "FAIL" repeat until the calibration passes *IF THE MONITOR DOES NOT READ IN THE 0-200 PPM RANGE IT WILL NOT CALIBRATE IN THE FIRST MENU.

Reset Calibration - USE ONLY IF THE DEVICE FAILS TO CALIBRATE ABOVE

Reset calibration ignores the limitations of standard calibration by going to a second menu. To open the second menu, press and hold the menu button while in the first menu. This menu will allow you to calibrate without range limitations. The second menu will read:

- -AIR (Ambient Air Calibration Option without limits)
- -N2 (Zero Nitrogen Calibration Option without limits)
- E (To exit the menu and return to home screen)

Calibrate using Step 4 above. When calibration is complete make sure the unit is reading within the span values. You can test by turning on the SAN outdoors in fresh air which should read approximately 400ppm CO2.

MAINTENANCE

Calibration

The SAN-10 comes pre-calibrated from the factory. However, the CO2 sensor should be calibrated at least once a year, or as described in your company's safety procedures. You can perform the calibration yourself, or you can return it for factory calibration at a nominal fee.

Cleaning and Storage

Apply cleaning solution sparingly with a soft cloth and allow it to dry completely before using. Do not use soap, alcohol, aromatic hydrocarbons or chlorinated solvents for cleaning.

SPECIFICATIONS

Dual Beam NDIR (Non-dispersive-Infrared) CO2 diffusion sensor with Automatic Background Calibration (ABC) turned off.

Device Specifications

Operating Environment	32°F~122°F (0°C~50°C), <95% RH non-condensing
Storage	14°F~140°F (-10°C~60°C), <99% RH non-condensing
Power Supply	Li-ion battery (4.2V,1500mAh),Micro USB cable w. Wall USB charger
Dimensions	3.9x2.0x1.7 Inch (98x50x42mm)
Weight	4.76 oz. (135 grams)

Out of range of operating conditions will impact the accurate of CO2 measurement.

CO2 Sensor Specifications

Measurement Range	0~50,000ppm (5% CO2 by Vol) display
Display Resolution	1ppm / 0.01%
Accuracy	±70ppm or ±5% of reading
Repeatability	±20ppm @ 400ppm
Temperature Dependence	Typ. ±0.3% of reading per °C or ±4ppm per °C, whichever is greater, referenced to 25 °C
Pressure Dependence	500mBar to 10Bar
Response Time	~ 2 min for 90% step change
Warm-up Time	<5 seconds at 22°C
Measurement interval	2 seconds

TROUBLESHOOTING

Symptom / Issue	Possible Cause / Resolution
Cannot power on	Press the Power Button for more than 5 seconds
	Check that the Li-ion battery is charged
	If monitor is charged but will not turn on, contact support
Monitor is not recognized by computer or software	Verify that software and drivers are installed correctly before attaching monitor to PC.
	Verify the software and drivers were installed before the monitor was plugged into the PC with the USB cable.
	Verify that the ftd2xx.dll file is in the same folder as the executable program.
	Try using a different USB cable.
Windows reports "unknown device" error	Follow these instructions for troubleshooting GasLab driver installation.
Slow response	The log file stored in internal memory is very large. The monitor needs time to transfer data to your computer.
Readings do not change	Confirm the monitor is correctly connected to the computer. Make sure the computer recognizes your monitor and connects with your monitor successfully.

SUPPORT & WARRANTY

The quickest way to obtain technical support is via email. 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.

For warranty information visit our website:

https://gaslab.com/pages/faqs#warranty

We are here to help!

For more information or technical support, please contact us.

support@gaslab.com

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