GasLab Pro Multi Gas Sampling Data Logger

Operating Instructions
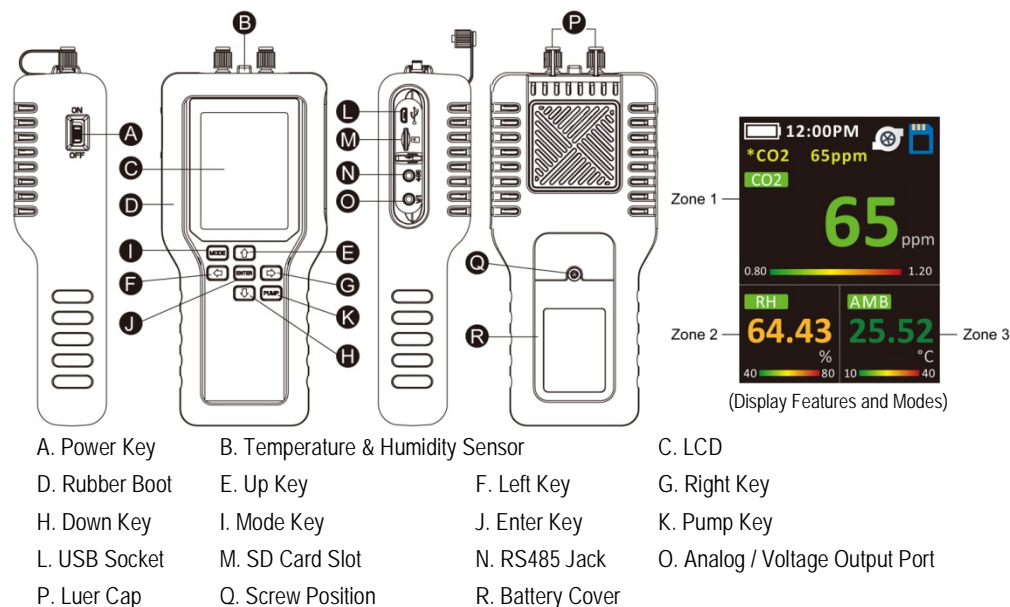
CM-1000

Thank you for selecting the CM-1000 multi gas sampling data logger. The CM-1000 is designed to simultaneously measure multiple gas concentrations through sampling methods. With long-term data storage, the user can assess the previous records. When the CM-1000 measures the gas concentration reaching the alarm setting or higher, the data display and alarm functions are activated. The CM-1000 is equipped with an RS485 interface for connecting to a computer for remote monitoring. The Multi Gas Sampling Data Logger can be used in a wide-range of industries and applications.

Features:

- ☑ Options for CO_2 measurement range: 1%, 5%, 10%, 20% 30%, and 100%
- ☑ Measure CO_2, CO, O_2, CH_4, RH, AMB, DP, ALTI
- ☑ Large LCD for easy reading of gas concentration and temperature and humidity.
- ☑ Audible alarm
- ☑ Data logging with SD card
- ☑ Through the RS485 interface connection, multiple CM-1000 units can be connected to the back-end computer system as a security monitoring application.
- ☑ Built-in LCD back light for easy reading in the dark.
- ☑ This device is supplied with Li- ion 18650 3.7V rechargeable batteries, can be used for a long time.

(Display Features and Modes)

A. Power Key	B. Temperature & Humidity Sensor	C. LCD
D. Rubber Boot	E. Up Key	F. Left Key	G. Right Key
H. Down Key	I. Mode Key	J. Enter Key	K. Pump Key
L. USB Socket	M. SD Card Slot	N. RS485 Jack	O. Analog / Voltage Output Port
P. Luer Cap	Q. Screw Position	R. Battery Cover	

Key description:

MODE (Ⓘ)	Enter the setting menu.
Up (Ⓔ) / Down (Ⓗ) / Left (Ⓕ) / Right (Ⓖ)	Change parameter values or select options.
Enter (Ⓙ)	Execute a command
PUMP (Ⓚ)	Start the pump or data logger.

LCD display symbol description:

Symbol	Meaning	Description
CO2	CO_2 concentration, parts per million (ppm)	The current CO_2 concentration
CO	CO concentration, parts per million (ppm)	The current CO concentration
O2	O_2 concentration, % (percent)	The current O_2 concentration
CH4	CH_4 concentration, parts per million (ppm)	The current CH_4 concentration
RH	Relative humidity	Relative humidity
AMB	Ambient temperature	Ambient temperature
DP	Dew point	The current dew point
ALTI	Atmospheric pressure	Compensate the pressure changes with appropriate altitude of location when measure.

Symbol	Meaning	Description
TWA	Time weighted average (8 hours)	CO_2, 8-hr time weighted average
STEL	Short-Term Exposure Limit (15 min. weighted average)	CO_2, 15 min. weighted average
MAX	Maximum value	Maximum value of gas measurement
MIN	Minimum value	Minimum value of gas measurement
0.80 1.20	High/low alarm	Customize the range of color Bar
(battery icon)	Battery capacity	Battery capacity without segment display.
12:00PM	Real-time display	12/24-hour time display
!	Warning	Need to calibrate the sensor or exceed the pump life time.
(pump icon)	Pump	The pump icon rotates to indicate that the pump has been started.
(SD icon)	Micro SD card	Micro SD card working status (When the icon flashes, it means that the Micro SD card is broken or full: when the icon remains stationary, it indicates normal operation.)

1. Power on:
Switch the Power Key (Ⓐ) on.

2. Measurement:
After power on, the device starts to measure and update the data every second.
Press Enter key (Ⓙ) to select zone. The selection order is: Zone 1→Zone 2→Zone 3. The selected zone will display a red frame. Press Left (Ⓕ) / Right (Ⓖ) key to select the parameter or sensor to be adjusted. The selected parameter or sensor displays the red background color, press Right key (Ⓖ) to proceed the setting and then press Up (Ⓔ) / Down (Ⓗ) key to edit the parameter value.
Zone 1 sensor display: CO_2, O_2, CO, CH_4
Zone 2 sensor display: O_2, CO, CH_4, RH
Zone 3 sensor display: CO, CH_4, AMB, DP, ALTI

Zone 1 parameter display and setting

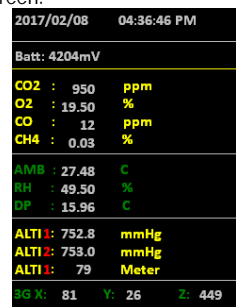| Item	Select 1	Select 2	Select 3	Select 4	Nothing
	MAX	MIN	STEL	TWA	
AL L / AL H	Press Up (Ⓔ) / Down (Ⓗ) key to edit the parameter value.		–		

Note: AL L and AL H are expressed as a percentage. Example: 0.04 = 400ppm

Zone 3 parameter unit selection:

Sensor	Unit 1	Unit 2	Unit 3	Unit 4
DP	DP=°C	DP=°F	–	–
AMB	°C	°F	–	–
ALTI	m	mf	mmHg	hpa

3. Display all sensor readings
Press and hold Enter key (Ⓙ) to display all sensor readings. Press Mode key (Ⓘ) to return to the main screen.

```
2017/02/08      04:36:46 PM
Batt: 4204mV

CO2  :   950    ppm
O2   :  19.50   %
CO   :   12     ppm
CH4  :  0.03    %

AMB   27.48     C
RH    49.50     %
DP    15.96     C

ALTI1: 752.8    mmHg
ALTI2: 753.0    mmHg
ALTI1:  79      Meter

3G X:  81   Y:  26   Z:  449
```

4. Setting
Press and hold Mode key (Ⓘ) to enter the setup menu, then press Mode key (Ⓘ) to continue to the next page. Press Up (Ⓔ) / Down (Ⓗ) key to select options or change parameter values. And then press Enter key (Ⓙ) to confirm it. Press and hold Mode key (Ⓘ) to return to the main screen.

The first page:

Date	01/01/2017 ~ 2099
Time	12/24-hour time

Continue alarm	Yes (The buzzer sounds continuously.) / No (The buzzer sounds once.)
Screen auto rotate	Yes / No
Backlight level	1~32 (The larger the number, the brighter the screen)
Background color	(There are a total of 4 background colors.)
Backlight time	10~999 sec (Backlight display time)
Auto power off	1~999 min
Graph line 2	CO_2/ O_2/CO/ CH_4 (The second trend line shows the gas measurements.)
About	CO2Meter – www.co2meter.com

The second page:

Analog for Zone 1	0-10V/4~20mA (Zone 1 voltage or current output)
Analog for 4-20mA	CO_2/O_2/CO/CH_4 (Another analog output option)
Data log time	Data logging interval time
Flow rate level	1~5 (The larger the number, the greater the pump output)
Exhaust time	10~240 sec
Ventilate time	0~120 sec
Gas compensation	Yes / No (CO_2 and O_2)
Sensor times info	Sensor recalibrated time and pump life time (The time is displayed in the countdown mode. If you need to calibrate the sensor or exceed the pump life time, the time will be displayed in red.) CO_2: 99999999 days O_2: 99999999 days CO: 99999999 days CH_4: 99999999 days Pump: 99999999 min
Reset to factory	Yes / No (Recover the factory setting to cancel customize setting.)
Sensor calibration (▲+▼)	Please refer to the calibration section.

5. Power off:
Switch the Power Key (Ⓐ) off.
Note: When the device is charged with USB, it cannot be turned off.

6. Calibration:
(1) Single-point calibration
After entering the setup menu, then press Mode key (Ⓘ) to continue to the next page. Press Down key (Ⓗ) to select "Sensor calibration (▲+▼)" and press Enter key (Ⓙ) to confirm it. Press Up (Ⓔ) and Down (Ⓗ) keys at the same time to proceed the calibration. Then, press Enter key (Ⓙ) to enter the sensor settings.

```
Sensor calibration
Target Sensor: CO2
Raw reading: 455
Offset:          0
Perform reading: 455
```

Target sensor	CO_2/O_2/CO/CH_4/AMB/RH
Raw reading	Unadjusted reading
Offset	The amount of offset
Perform reading	Adjusted reading

(2) Two-point calibration (calibrate by professional)
After entering the setup menu, then press Mode key (Ⓘ) to continue to the next page. Firstly, press and hold Up key (Ⓔ), then press Down key (Ⓗ). "1" will appear next to "Sensor calibration (▲+▼)". Press Down key (Ⓗ) to select "Sensor calibration (▲+▼) 1" and press Enter key (Ⓙ) to confirm it. Press Up (Ⓔ) and Down (Ⓗ) keys at the same time to proceed the calibration. Then, press Enter key (Ⓙ) to enter the sensor settings.

```
Sensor calibration
Target Sensor: CO2
Raw reading: 455
Level 1 input : 0
Level 2 input : 3000
Level 1 catch : 10
Level 2 catch : 2950
Cali Set : Start

Gain:         1.0000
Offset:            0
Perform reading: 455
```

Target sensor	CO_2/O_2/CO/CH_4/AMB/RH
Raw reading	Unadjusted reading
Level 1 input	Low concentration value of standard gas
Level 2 input	High concentration value of standard gas
Level 1 catch	Connect the low concentration gas to the device, and press Pump key (Ⓚ) to start the pump. (Set the data log time to less than 1 min). After the reading is stable, press Enter key (Ⓙ) to confirm it.
Level 2 catch	Connect the high concentration gas to the device, and press Pump key (Ⓚ) to start the pump. (Set the data log time to less than 1 min). After the reading is stable, press Enter key (Ⓙ) to confirm it.
Cali Set	When "Start" turns red, press Enter key (Ⓙ) to confirm the calibration.
Gain	The amount of Gain.
Offset	The amount of offset
Perform reading	Adjusted reading

Battery message:

‘Battery OK’:	‘Battery Low’:	‘Battery Exhausted’:
Measurements are possible	The battery needs to be recharged, measurements are still possible	Measurements are not possible

Battery installation:

This device is supplied with Li-ion 18650 3.7V rechargeable battery *3 pcs.

Please confirm whether batteries + polarity are Li ion18650 positive bump specification and install batteries in the correct polarity. If the battery polarity is reversed, the capacity will be insufficient and the battery life will be shortened.

Battery charging:

During battery charging, the temperature of the device will rise by 5°C~10°C. At this time, the measurements of temperature and humidity will be affected by temperature rise. Cause an impact on the accuracy of temperature when charging, please use a fan to blow toward the Temperature & Humidity Sensor (Ⓑ) directly in order to get a compensated balance of temperature and humidity between temperature sensor and surrounding area. (5V/1A USB adapter charger)

Safety Instructions

Warning: Your safety is very important to us. To ensure use of the device correctly and safely, we would like to draw your attention to read the warning and entire User Manual before using the device. These are important safety information and should always be observed .
1. Please handle the device lightly, do not subject the device to impact or shock.
2. Do not immerse the device in water. Water can cause electric shock, fire or malfunction which may result in damage.
3. Do not keep the device under the hot and moisture environment. Keep the device away from the heat source or near water.
4. Please use a standard USB power supply (such as PC's USB port, universal AC adapter with USB port). Improper power supply can cause serious damage to the device, or result in injury or death to the user.

Product Care

To ensure you receive the maximum benefit from using this device, please observe the follow guidelines.
1. The maximum capacity of the SD card is 16G.
2. During battery charging, the temperature of the device rises. The temperature and humidity sensors are affected. At this time, measurements are only for reference. After batteries are fully charged and the device cools down, measurements are reliable.
3. **Repair –** Do not attempt to repair the device or modify the circuitry by yourself. Please contact with the local dealer or a qualified repairman if the device needs servicing.
4. **Caution –** The CO sensor must be replaced every 3 years.
5. **Cleaning –** Disconnect the power before clean. Use a damp cloth, do not use the liquid cleaning agent, such as benzene, thinner or aerosols.
6. **Maintenance –** Recommend that the user conducts a comprehensive test and calibration every year to ensure the normal operation of the device.

Specifications

Measurement Range & Accuracy	CO_2: 1%, 5%, 10%, 20%, 30%, 100%
	CO: 0~1,000ppm
	O_2: 0~25%, < 2% FS / 0.1 mbar
	CH_4: 5% 0-1%: ≤±0.1%
	RH: 0~100%, ±3% @25°C (20~80%RH), others ±5%
	Temperature: 0~50°C,±1℃
	Barometer: 50~110kPa, ±0.4kPa
Display Resolution	CO_2: 10ppm
	CO: 1ppm
	O_2: 0.01%
	CH_4: 0.01%
	RH: 0.01%
	Temperature: 0.01°C
	Barometer: 0.1mmHg

Alarm Volume	80db±5%@10cm
Operating Conditions	0~50°C(32~122°F), 0~95%RH, non-condensing
Storage Temp.	-20~60°C(-4~140°F)
Comm. Interface	RS485 ModBus BR19200、N、8、1
Power Supply	Rechargeable Battery : Li-ion 18650 3.7V *3
	AC Adapter : 5V±5% >1A, 100~240 VAC, 50/60 Hz
Storage Capacity	depend on SD card capacity (max.16G SD card)
Weight	480g (without batteries)
Dimension	225.8x99.6x55 mm (8.9x3.9x2.2 inch)

Note: After power-on, it would take 20 minutes for the device to stably measure the temperature and relative humidity.

⚠ **EMC/RFI:** Readings may be affected if the unit is operated within radio frequency electromagnetic field strength of approximately 3 volts per meter, but the performance of the instrument will not be permanently affected.

Package contents

CM-1000 Multi Gas Sampling Logger
Manual
Batteries
USB 1.5M cable

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Ref.No. : 122018