CO2 Monitor Operating Instructions
Model: RAD-0102-6 UL Listing

1. Product Overview

Thank you for selecting the RAD-0102-6 CO2 Storage Safety Alarm. This monitor is designed to detect Carbon Dioxide levels in the ambient air to protect employees and customers. CO2 monitors are required in most jurisdictions by code. High concentrations of CO2 in confined spaces are dangerous and may lead to health problems ranging from headaches and fatigue to asphyxiation and death. This monitor has 3 audible and visual alarm levels with relays that are triggered at 5,000 ppm TWA, 15,000 ppm, and 30,000 ppm and can control a ventilation fan or signal the fire panel to send an alarm to the fire department or monitoring company. These standards meet IFC, NFPA, and NBIC requirements for monitoring.

RAD-0102-6 CO2 Monitor is cost-effective and includes these features:

1.) Multiple RDU's can be connected for additional alarm points.
2.) Large digital LCD display clearly indicates the ambient CO2 concentration, relative humidity, and temperature.
3.) 3 independent relay outputs can automatically control vent fan or be wired to the fire alarm panel.
4.) Audible and visual alarm indications.
5.) Automatic altitude compensation (can be turned on/off).
6.) 4-20 mA output for offsite monitoring.
7.) 100% clean look by burying all cables in the wall.
8.) Allows for field upgrades with strobe package at a later date.

2. Package Content & Unit Layout

The RAD-0102-6 package comprises the following parts:
SEU (Main Unit), RDU (Remote Unit), Power Supply (1 Piece), CAT 5 Communication Cable (1 piece), Relay Cables (3 pieces), Wall Plug Safety Strap (1 piece), Mounting Brackets (2 pieces), Screws (13 pieces), Wall Anchors (12 pieces), Cable Clips (10 pieces), International Power Adaptors (3 pieces), Warning Signs (6 pieces), User Manual (1 piece).

SEU (Main Sensor Unit)
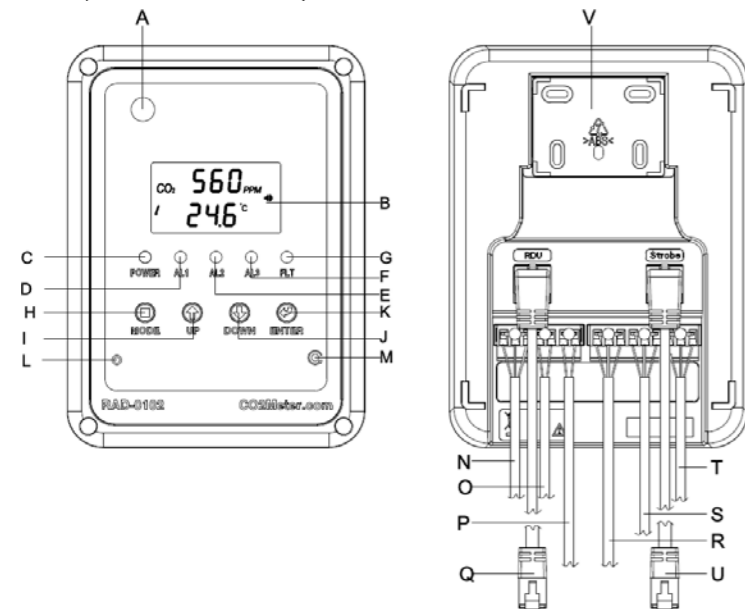
A. CO2 Sensor	B. LCD display	C. Power (Green LED)
D. AL1 (Red 1 LED)	E. AL2 (Red 2 LED)	F. AL3 (Red 3 LED)
G. Fault (Yellow LED)	H. Mode Button	I. UP Button
J. Down Button	K. Enter Button	L. Buzzer
M. Reset Button	N. 4-20mA Output	O. Battery
P. DC Power Supply	Q. RDU Cable (RJ45)	R. Relay 3 (AL3)
S. Relay 2 (AL2)	T. Relay 1 (AL1)	U. Strobe Cable (RJ45)
V. Panel Holder		

RDU (Remote Display Unit)
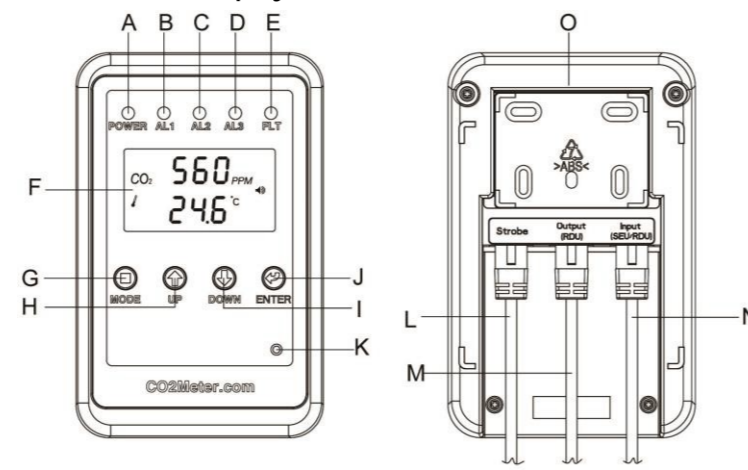
A. Power (Green LED)	B. AL1 (Red 1 LED)	C. AL2 (Red 2 LED)
D. AL3 (Red 3 LED)	E. Fault (Yellow LED)	F. LCD display
G. Mode Button	H. UP Button	I. Down Button
J. Enter Button	K. Buzzer	L. Strobe Cable (RJ45)
M. Output Cable to RDU (RJ45)	N. Input Cable from SEU/RDU (RJ45)	O. Panel Holder

3. LCD Display Symbol

Symbol	Meaning	Description
CO_2 450ₚₚₘ	CO2 Concentration ppm (Parts Per Million)	Ambient CO2 Concentration
🔊	Alarm	Alarm Icon
DIAG	Diagnose	Test communications between the SEU and RDU (see 9.1)
AL1	CO2 5,000 TWA	Relay 1 will trigger when CO2 concentration exceeds 5000ppm TWA (Time Weighted Average). The AL1 (Red 1 LED) will flash but buzzer will not sound. (see 9.2)
AL2	2nd CO2 Alarm Level	Relay 2 will trigger when CO2 concentration exceeds the 2nd alarm level. (Preset at 15,000ppm). The AL2 (Red 2 LED) will flash. The buzzer will sound. (see 9.3)
AL3	3rd CO2 Alarm Level	Relay 3 will be triggered when CO2 concentration exceeds the 3rd alarm level. (Preset at 30,000ppm) The AL2 (Red 2 LED), AL3 (Red3 LED), and Fault LED will flash. The buzzer will sound. This status will be latched. (see 9.4)
CALI	Calibration	To calibrate the CO2 sensor when the accuracy deviates from the actual CO2 concentration. (see 9.5)
RCFS	Recover Factory Setting	To recover default settings and remove any customized settings. (See 9.6)
Hi	High	CO2 concentration is above 5% (50,000 ppm)
🌀	Fan Icon	CO2 levels exceeds Alarm2, the fan icon will appear. If connected via Relay 2, this would turn on a ventilation fan.

4. SEU (Main Sensor Unit)

The SEU (Main Sensor Unit) should be placed in a room where CO2 is likely to accumulate, a room where CO2 is stored, like an area with CO2 beverages. The large LCD displays the ambient CO2 concentration.

The SEU has "DIAG", "AL1", "AL2","AL3", "CO2 CALI", "RCFS" functions:

"DIAG" function executes communication tests between the SEU and RDU.

"AL1" is a fixed 5000ppm TWA.

"AL2" and "AL3" are two CO2 alarm levels. These alarm levels are adjustable.
 - AL2 has CO2 level of: 5000, 1.0%, 1.5%, 2.0%, 2.5%, 3.0%. (AL2 default is 1.5%)
 - AL3 has CO2 levels of: 2.0%, 2.5%, 3.0%, 3.5%, 4.0%. (AL3 default is 3.0%)

"CALI" function allows the user to perform calibration, when necessary.

"RCFS" function allows the user to re-set the unit to the original factory settings.

When the RAD-0102-6 detects a CO2 TWA (average in 8 hours) value that exceeds 5,000ppm, the AL1 (Red 1 LED) will blink and Relay 1 will be triggered.

When the CO2 TWA value drops below 5000ppm (with 5% hysteresis), AL1 (Red1 LED) will stop blinking and Relay 1 will be inactive.

When the RAD-0102-6 detects a CO2 value that exceeds the AL2 CO2 level, AL2 (Red 2 LED) will blink, the buzzer will sound and Relay 2 will be triggered.

When the CO2 value drops below the AL2 CO2 level, AL2 (Red 2 LED) will stop blinking, the buzzer will stop and Relay 2 will be inactive.

If the CO2 concentration continues to rise and exceeds the AL3 CO2 level, AL2 (Red 2 LED) and AL3 (Red 3 LED) will flash together. The tempo of the flashing and buzzer will increase. RAD-0102-6 will latch after this event. When the CO2 value drops below the AL3 CO2 level and then below the AL2 CO2 level, the flashing and buzzer will stop, but the Fault LED will remain flashing. The RAD-0102-6 must be reset, by means of reset button of RAD-0102-6 (see item L in Section 2 SEU layout) or power cycle the unit.

The Power (Green LED) will light continuously when the power is normally supplied. If the device is powered by a battery, the Power (Green LED) will flash and battery indicator will appear and change with the battery voltage.

If the communication cable between the SEU & RDU is not connect well, the communication cable is loose or disconnected from the (RJ45) connectors, the fault LED of SEU will blink as a reminder for the user to reconnect the cable. If the communication cable is inserted into the wrong port on RDU, after about one minute, the "Er7" will flash on the RDU LCD. Please plug the cables into the correct ports on RDU and the unit will work normally.

5. RDU (Remote Display Unit)

The RDU displays the data from the SEU and provides visual and audible indication that the SEU is in alarm status. The RDU is NOT an external/second sensor. The RDU is connected to the SEU with a CAT5 cable. A 25-foot CAT5 cable is provided. Users can source additional cable lengths as needed. The RDU should be placed where it can be conveniently observed (eye level) before entering the room/space. The "DIAG" function can test the communication between the SEU and RDU (see 9.1). Resetting the RAD-0102-6 CO2 Monitor is only available from SEU.

6. Strobes

The RAD-0102-6 can be equipped with strobes for additional visual alarms. Using CAT5 cables, connect the strobes to the correct RJ45 ports on the SEU and RDU. If CO2 levels exceed AL2, the strobe will flash. If the CO2 level exceeds AL3, the strobe tempo increases.
Please visit www.CO2Meter.com for strobe package. Part Number: CM-1026.

7. Power

The RAD-1020-6 comes pre-wired with a 12V power supply that plugs in to a wall outlet. The 12V power supply can be removed and 24V DC can be wired directly to the device through the terminal block. Please use a 24V DC power converter to properly convert your AC power source.

8. Installation Instructions

Please carefully remove all items from the package and follow the Step-by-Step Installation Instructions:

1. Choose a suitable location to install the SEU. Fix the panel holder on the wall with the four screws. Install the SEU 18 inches from floor and close to the CO2 source.
2. Put the SEU on the panel holder, making sure that they are connected tightly.
3. Fix another panel holder in a suitable location outside the monitored space at eye level. Place the RDU onto panel holder, and stick the warning signs next to RDU.
4. Route the 25-foot CAT5 cable between the SEU and RDU. CAT5 cable can be run through the wall/conduit or fixed to the wall using cable clips. Plug the CAT5 cable into the designated ports. Communication between the SEU and RDU is complete.
5. The RAD-0102-6 has 3 relay outputs connected to the programmed alarm settings. All relays are normally open/closed dry contacts. Any of the relays can be used to control an external device (fan, HVAC system, etc.) or can be wired to the fire alarm panel directly. The relays will trigger when the CO2 concentration exceeds the programmed alarm level.
6. When the power has been connected, The SEU and the RDU will begin to work.
7. Please use the "DIAG" function to verify the communication between SEU and RDU, the five LED's will blink and buzzer will sound on SEU & RDU, after that the communication is ready. The units will display the same information.
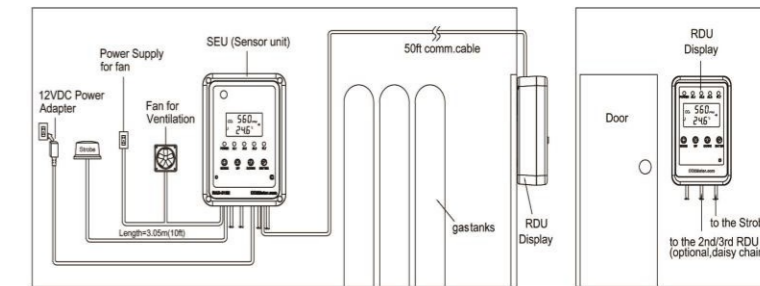
9. Advanced Management Settings

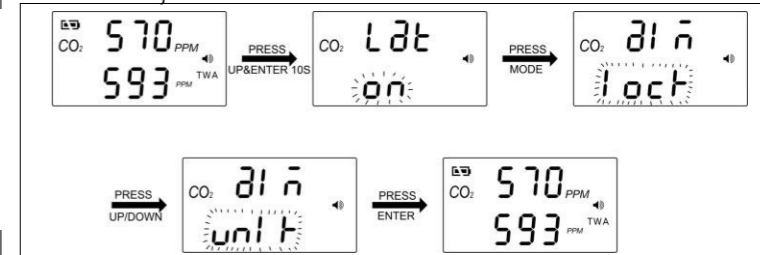### 9.1) Latch function: On/Off. Default is On.
Fault light will keep flashing if AL3 is activated, indicating unit went into alarm status.
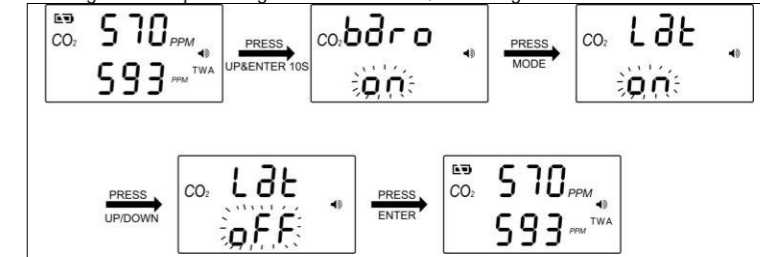
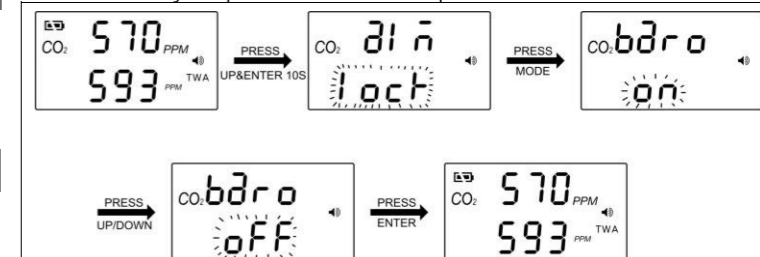| |
|---|
| 1. Press Up & Enter button for 10 seconds |
| 2. Change to Advance Mode by pressing Mode, and choose Lat Mode |
| 3. Press Up/Down to set Latch Mode On or Off. |
| 4. Press Enter to Save |

9.2) Alarm Level Lock: Lock/Unlock.
User cannot adjust the alarm levels when Locked. Default is Lock.

1. Press Up & Enter button for 10 seconds
2. Change to Advance Mode by press Mode, and choose Alm Mode
3. Press Up/Down to set Alm level Lock or Unlk.
4. Press Enter to Save.

9.3) Barometric compensation: On/Off. Default is On.
Unit automatically compensates for barometric pressure / altitude.

| |
|---|
| 1. Press Up & Enter button for 10 seconds |
| 2 Change to Advance Mode by press Mode, and choose Baro Mode |
| 3. Press Up/Down to set Baro Mode On or Off. |
| 4. Press Enter to Save. |

10. Customizing the Settings

When power has been connected, all LEDs will flash and buzzer will beep 4 times, at this time, the LCD will show all icons for about 4 seconds.
After that, the SEU and RDU will begin to monitor the CO2 concentration.
In order to the get timely alarm safety information and meet the personal requirements, it is advisable to set up the customizing parameter.
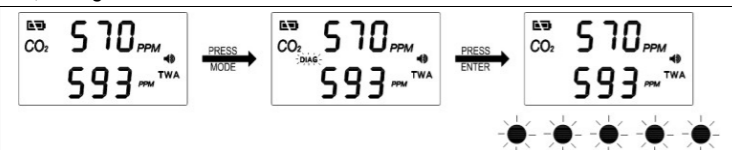**Select Temperature Unit ºC/ºF:** Press "Up" to switch between ºC and ºF

**Select Barometric hPa/inHg:** Press "Down" to switch between hPa and inHg
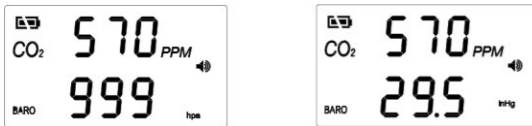
10.1) Using the DIAG function: Will test the communication link from SEU & RDU.
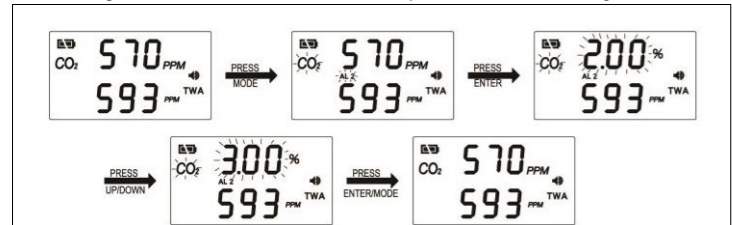

1. Press Mode until the "DIAG" icon flashes
2. Press Enter, the SEU's five LEDs will blink and the buzzer will sound
3. The RDU's five LEDs will blink and buzzer will sound simultaneously

10.2) Checking the AL1 - CO2 TWA parameter: Not user configurable
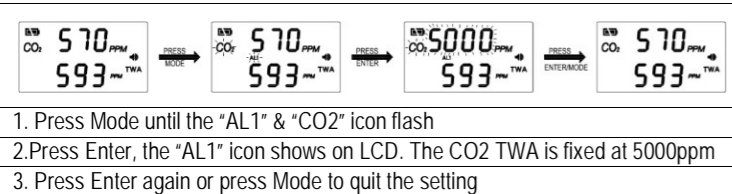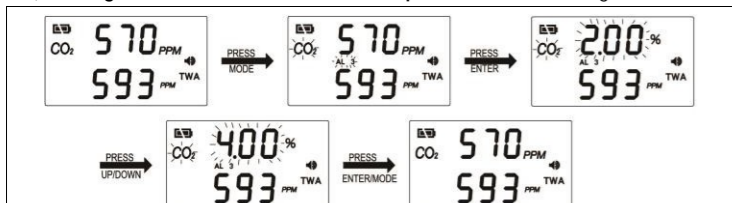

1. Press Mode until the "AL1" & "CO2" icon flash
2. Press Enter, the "AL1" icon shows on LCD. The CO2 TWA is fixed at 5000ppm
3. Press Enter again or press Mode to quit the setting

10.3) Setting the AL2 – 2nd CO2 Alarm Level parameter: User configurable

1. Press Mode until the "AL2" & "CO2" icons flash
2. Press Enter, the "AL2" icon shows on LCD, default AL2= 1.5%
3. Press Up/Down to go through "5000,1.0%,1.5%,2.0%,2.5%,3.0%" alarm level.
4. Press Enter again to save the setting after selection or press Mode to quit the setting

## 10.4) Setting the AL3 – 3rd CO2 Alarm Level parameter: User configurable

1. Press Mode until the " AL3" "CO2"icon flashes
2. Press Enter, the "AL3" icon shows on LCD. Default AL3=3.0%
3. Press Up/Down to go through "2.0%,2.5%,3.0%,3.5%,4.0%" alarm level
4. Press Enter again to save the setting after selection or press Mode to quit the setting

10.5) Calibration using the CO2 CALI function:

1. You will need a gas cylinder of pure Nitrogen (0 ppm CO2).

Note: Please pump N2 (zero CO2) into the CO2 Sensor Entry (Item A in section 2) and wait about 3 minutes before calibration, then execute the "Zero" calibration.

---
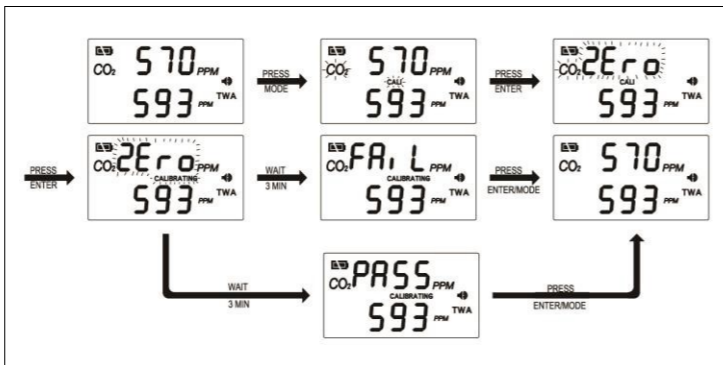
1. Hold the tubing from the Nitrogen (0ppm CO2) gas cylinder to the CO2 sensor opening (on the top left-hand corner).
2. Open the gas regulator. Flow rate should be between 0.15-0.50 liters per minute.
3. Wait until the CO2 reading on the SEU settles consistently at or near 0ppm CO2.
4. Press the Mode button 5 times, the "CO2" and "CALI" icon will start flashing on the SEU.
5. Press Enter to view the calibration settings. The SEU screen will now display a flashing "ZEro" and "CO2".
6. Press Enter again to begin the calibration. "CALIBRATING" will begin flashing.

   After approximately 3 minutes, the LCD will display either "PASS" or "FAIL".
7. If the LCD reads "FAIL", repeat the steps again. If it displays "PASS", press Enter. The display should now show 0ppm.
8. Remove the nitrogen cylinder.
9. Reset the unit by either pressing the reset bottom (bottom right-hand corner with a round arrow) or power cycling the unit.
10. If your unit fails the "ZEro" calibration, please follow the procedure again before calling support.

10.6) Using the Recover factory setting function:

Note: If the user has set the customer parameters or calibrates the RAD-0102-6 incorrectly, please use the ReFactSet (recover the factory Setting) to recover the default factory setting
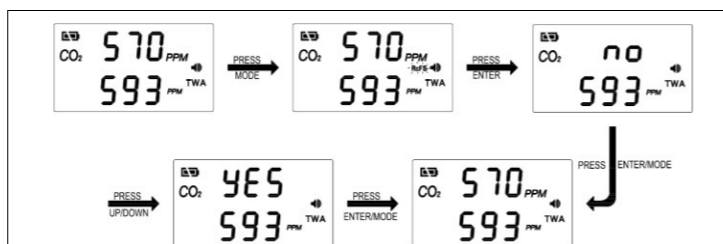
1. Press Mode until the "ReFactSet" icon flashes.
2. Press Enter Up/Down to choose either "Yes" or "No".
3. Press Enter again to save the setting or press Mode to quit the setting.

11. Safety Notice

Warning: Your safety is very important to us. To ensure the proper and safe use of the device, please read all warnings and the entire User Manual before using the device. Otherwise, the protection provided by the equipment may be impaired. These warnings provide important safety information and should be observed at all times.

1. Please handle the device carefully; do not subject the product to impact or shock. Otherwise, this may cause the accuracy drift.

2. Do not place the unit near a heat source. Heat can cause distortion of the unit, which may result in an explosion or fire.
3. Please keep working space clear at all times. Provide access and working space distances around electrical equipment and enclosures to permit ready and safe operation and maintenance.

---

4. Do not touch the exposed electronic circuitry of the device under any circumstances, as there is the dangerous of electric shocks.
5. Please take care of cable connection between SEU and RDU. Make sure the cable from SEU is connected into the INPUT port of RDU.
6. Please ensure the external power supply is normally supplied to ventilation fan while the relay is working. If there has no normally power supply to the fan, the relay will not work, which may result in potential danger with high CO2 concentration in confined space.

12. Product Care

To make sure to receive the maximum benefit from using this product, please observe the follow guidelines.
1.Repair - Do not attempt to repair the product or modify the circuitry by yourself. Please contact your local dealer or a qualified repairman if the product needs servicing, including the replacement or calibration of sensor.
2.Cleaning - Disconnect the power before cleaning. Use a damp cloth. Do not use liquid cleaning agents such as benzene, thinner or aerosols, as these will damage the device.
3. Maintenance – We recommend users to test the communication between the SEU and RDU under 'DIAG' function to verify the working conditions or the SEU and RDU. If these five LEDs blink and the buzzer of SEU and RDU sound simultaneously, it indicates that SEU and RDU work normally.

13. Specifications

■ CO2 & Temperature specification:

CO2 Specification	
Measurement Range	0 - 50,000ppm (5%) display
Display Resolution	10ppm at 0~10,000ppm; 100ppm at 10,001~50,000ppM
Accuracy	+/-200ppm or +/-10% reading
Pressure Dependence	Auto pressure compensation, built in barometer. (50 to 110 kPa)
Response Time	CO2: <2min by 90%
CO2 AL1 (TWA)	5000ppm fixed
CO2 AL2	5000, 1.0%, 1.5%, 2.0%, 2.5%, 3.0%. Default AL2= 1.5%.
CO2 AL3	2.0%,2.5%,3.0%,3.5%,4.0%. Default AL3= 3.0%
Sound Alarm	80db@10cm
Warm-Up Time	<60 seconds at 22°C
Temperature Specification:	
Temperature Range	0°C to 50°C (32°F to 122°F)
Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F
Accuracy	±1.5°C(±2.7°F) when CO2 level is below first alarm level
Response Time	20-30 minutes (case must equalize with environment)
Operating Conditions:	
Temperature	0°C to 50°C (32°F to 122°F)
Humidity Range	0 ~ 95% RH non-condensing
Storage Conditions:	
Storage Temperature	-20°C to 60 °C (-4°F to 140°F)

■ Power Supply

Power Supply	DC	9~32VDC (12~32VDC recommended), 2A.
	AC adapter	Input: 100~240 VAC,50/60Hz, 0.6A Output: 12VDC, 2000mA.
Battery	Voltage	6VDC (5.4V~7.0V), recommended capacity is 12AH

■ Relay output

Relay 1	Operates at CO2 TWA
Relay 2	Operates at Alarm 2 level for CO2
Relay 3	Operates at Alarm 3 level for CO2

The Peak current for all relays is less than 2A@30 VDC or 250 VAC, SPDT.

■ 4-20mA Outputs

CL01:4-20mA	CO2: 0~50,000ppm
CL02:4-20mA	Temp: 32 to 122°F (0-50°C)

■ Weight and Dimension

SEU	Weight	1 lb
	Dimensions (LxWxD)	6.69 x 4.96 x 2.73 inches
RDU	Weight	0.4 lb
	Dimensions (LxWxD)	5.51 x 3.54 x 1.89 inches

14. Fault Codes &Troubleshooting Guide

This section includes a list of Frequently Asked Questions for problems you may encounter with the RAD-0102-6 CO2 Monitor.

No	LCD Fault Icon	Description (of the fault)	SEU Indication	RDU Indication	Suggested Actions
1	Er3	Ambient temperature exceeded the temperature range 0°C to 50°C (32°F to 122°F)	"Er3" flash, Fault LED blink	"Er3" flash, Fault LED blink	This error will disappear when the temperature returns to the range between 0°C and 50°C (32°F to 122°F)
2	Er5	EEPROM System Problem	"Er5" flash, Fault LED blink	"Er5" flash, Fault LED blink	Power on again or press reset button, if the "Er5" always appear, please contact CO2Meter.
3	Er7	Internal Data Transmission Error	"Er7" flash, Fault LED blink,	"Er7" flash, Fault LED Blink	Check the RJ45 plug is connected into the INPUT port of RDU, if the "Er7" displays on the RDU only. Press reset button on SEU or power cycle the unit

15. Support & Warranty

Contact us: We're here to help!

If the troubleshooting guide above doesn't help you solving your problem or for more information, please contact us using the information below.

✉ Support@CO2Meter.com
📞 (386) 256-4910 (M-F 9:00am–5:00pm EST)
🌐 www.CO2Meter.com

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

CO2Meter, Inc.
131 Business Center Drive
Ormond Beach, FL 32174
Phone: 386-872-7665 | Fax: 866-422-2356
Email: Sales@CO2Meter.com

⚠ CE 🗑 ♻ Ref. No.:062017

11. Avis de sécurité

Avertissement: Votre sécurité est très importante pour nous. Afin de garantir l'utilisation appropriée et sécuritaire du produit, veuillez lire ces avertissements et tout le manuel d'utilisation avant de vous en servir. Autrement, la protection offerte par l'équipement pourrait être dégradée. Ces avertissements fournissent d'importantes informations sur la sécurité et doivent être suivis en tout temps.

1. Veuillez manipuler l'appareil avec soin. Le produit ne doit pas subir des impacts ou des chocs. Autrement, une déviation de la précision pourrait se produire.

2. Ne placez pas l'appareil près d'une source de chaleur. La chaleur peut causer la distorsion de l'appareil et peut provoquer une explosion ou un incendie.

3. Veuillez garder l'espace de travail propre en tout temps. Prévoyez suffisamment d'espace de travail et d'accès autour de l'équipement électrique et des enceintes afin de garantir le fonctionnement et l'entretien sécuritaires.

4. Ne touchez pas les circuits électroniques accessibles puisqu'il existe un risque de décharge électrique.

5. Veuillez assurer le branchement adéquat du câble entre le SEU et le RDU. Veuillez vous assurer que le câble à partir du SEU est branché au port INPUT (entrée) du RDU.

6. Veuillez vous assurer que l'alimentation électrique est fournie adéquatement au ventilateur afin que le relais puisse fonctionner normalement. Si le ventilateur n'est pas alimenté adéquatement, le relais ne fonctionnera pas, ce qui pourrait causer la baisse de la concentration de l'oxygène dans un espace clos.

12. Entretien du produit

Afin de profiter pleinement du produit, veuillez suivre les directives suivantes.

1. Réparation: N'essayez pas de réparer vous-même le produit ni de modifier les circuits électroniques. Veuillez communiquer avec le détaillant de votre région ou avec un technicien qualifié si le produit nécessite un entretien, y compris le remplacement ou la calibration du capteur.

2. Nettoyage: Débranchez le câble d'alimentation avant de procéder au nettoyage. Utilisez un chiffon humide. N'utilisez pas des liquides nettoyants tels que le benzène, les diluants et les aérosols, puisqu'ils peuvent endommager l'appareil.

3. Entretien: Nous recommandons aux utilisateurs de vérifier la communication entre le SEU et le RDU à l'aide de la fonctionnalité « DIAG » afin de s'assurer du fonctionnement adéquat de ces deux modules. Si les cinq voyants clignotent et les avertisseurs sonores du SEU et du RDU retentissent simultanément, cela signifie que le SEU et le RDU fonctionnent normalement.