

OPERATION MANUAL

Desktop CO2, Temperature & Relative Humidity Monitor

TIM-12



INTRODUCTION

Thank you for purchasing the TIM12 desktop CO2 monitor. It measures carbon dioxide levels, air temperature and humidity. This makes it ideal for indoor air quality (IAQ) diagnosis and HVAC system performance verification.

Poor indoor air quality is considered unhealthy. It can lead to drowsiness, inability to concentrate, and even illness.

IAQ monitoring of CO2 levels is widely used in public areas such as offices, classrooms, factories, hospitals and hotels. It is also recommended for industrial hygiene in some countries. (See appendix).

Product Features:

- Large display shows CO2 level, temperature, humidity, date and time
- 15 degree tilt angle makes the display easy to see and read
- Indoor air quality level indication: Good, Normal, and Poor
- Stable NDIR sensor for CO2 detection
- Visible and audible CO2 warning alarm
- ABC (Automatic Baseline Calibration) or manual CO2 calibration
- Maximum or minimum CO2 level recall
- Sampling rate from 1 sec. to 4:59:59.

MATERIALS SUPPLIED

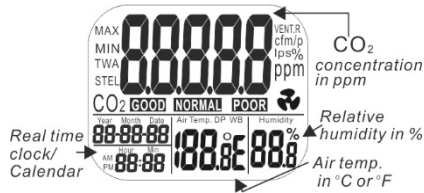
This package contains:

- Meter
- Power Supply (5V +/- 10%, >= 0.5A)
- USB cable and software CD
- Manual


POWER SUPPLY

The meter is powered by an AC adaptor (5V/0.5A output).

LCD DISPLAY



Symbols

ppm	CO2 level in parts-per-million
GOOD	CO2 is in good level
NORMAL	CO2 is in normal level
POOR	CO2 is in poor level
Air Temp.	Air temperature
Humidity %	Unit of air relative humidity
°E (C/F)	Celsius/Fahrenheit of temp.
MAX/MIN	Maximum/Minimum readings
	CO2 alarm icon

NOTE:

TWA / STEL / VENT.R / are vain icons on this model.

KEYPAD

- SET** -Enter setup mode
 - Save and finish settings
- ESC**-Exit setup page / mode
 - Terminate calibration/data logging
- RESET** - Clear MAX/MIN values
- LOG▲**- Select mode, increase value at setup
 - Start data logging
- MIN/MAX▼** -Activate MAX, MIN function
 - Select mode or decrease value during setup
- SET+▲+MIN/MAX▼** - CO2 calibration mode

OPERATION

POWER ON/OFF

Plug the wall adaptor into an appropriate receptacle. The meter will turn on automatically after a short beep. The lit LED indicates full power. If the voltage is too high or low, "bAt" will display on the LCD and the LED will flash. See page 14 for trouble shooting.

During normal operation, the LCD will display the current CO2 level in ppm, air quality level, air temperature, humidity, and the current date and time (Fig.1).



Fig. 1

TAKING MEASUREMENTS

The meter starts taking measurements immediately after it is turned on and updates the readings every second. In the event the operating environment is quickly changed (for example, from high to low temperature), it will take approximately 2 minutes for the CO2 and temperature to adjust and 10 minutes for humidity to stabilize.

NOTE: Do not hold the meter close to your face as your breath will affect the CO2 level.

MIN/MAX

While the meter is powered on, press the "MIN/MAX▼" button to see the minimum and maximum CO2 level, temperature, and humidity in turn. Each press of "MIN/MAX" will display the MIN and MAX values in order, then return the meter to normal mode (Fig.2).

During normal operation or while viewing MIN/MAX levels, press and hold the "RESET" key for more than 1 second to clear the stored minimum and maximum values.



Fig. 2

INTERNAL DATA LOGGING

Press "LOG▲" for 2 seconds under normal mode to start logging. The green LED blinks to indicate the logging status and the LCD shows the real time CO2 value and "rEC". Lower displays are the real time temperature, humidity and clock.

To terminate data logging, press "ESC" for 2 seconds, The LED light will stop blinking and the display will show "End" and CO2 reading interchangeably. Hold down "ESC" for 2 seconds again, and it will return to normal measurement mode.

The meter can save CO2, temperature and humidity levels over time in internal memory. The memory capacity is 15,999 points. The sampling rate can be from 1 second to 4 hours 59 minutes and 59 seconds (See SETUP). Minimum and Maximum recall is still available during logging.

HIGH CO2 ALARM

ALARM

The meter features an audible alarm that warns the user when the CO2 concentration exceeds the programmed limit. Users can set 2 limits: a CO2 level that requires ventilation (See P1.3 in setup for setting alarm limits) and a lower CO2 level when ventilation is no longer required (See P1.2 in setup CO2 normal limit).

During high alarm, the meter emits an 80dB beep and displays the fan icon on the LCD. The alarm can be temporarily stopped by pressing any button, or it will automatically stop when the CO2 level falls below the lower limit.

If the alarm is temporarily silenced, it will resume if the CO2 level fall below the lower limit then rises above the upper limit again, or if the "RESET" button is pressed to re-activate the alarm.

The fan icon remains flashing even if the beeps are silenced. The icon only stops flashing when the CO2 level fall below the lower limit (Fig.3)



Fig.3

SETUP

There are 5 setup modes: P1-CO2 alarm levels, P2-temperature (C or F), P3-date/time, P4-factory reset and P5-Logging. When you press "SET" the setup mode will be shown in the lower right corner of the screen.

To enter setup, while in normal mode, hold down the "SET" button for 3 seconds. To exit setup, press "ESC" while P1.0, P2.0, P3.0, P4.0 or P5.0 is displayed.

P1.1 SET CO2 GOOD LEVEL

Press "SET" to display P1.0 and "CO2" (Fig.4) on the LCD. Press "SET" again to set the CO2 GOOD level. The current set value will be blinking on LCD (Fig.5).



Fig.4

Fig.5

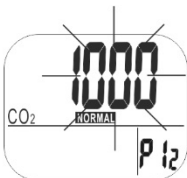


Fig.6

decrease the value. The GOOD alarm range is from 0 to 700ppm in 100ppm increments. Once the preferred CO2 level is selected, press "SET" to continue on to P1.2 to set the NORMAL level (Fig.6) or press "ESC" to return to P1.0 without saving changes.

P1.2 SET CO2 NORMAL LEVEL

P1.2 is the upper limit of the CO2 NORMAL level. The current value will flash on the LCD (Fig.6). Press "▲" to increase or "MIN/MAX▼" to decrease the value. The NORMAL level can be set between 700 and 1,000ppm. Once the preferred value is selected, press "SET" to save P1.2 and continue on to set the P1.3 POOR + ALARM threshold setting (Fig.7) or press "ESC" to return to P1.0 without saving changes.

P1.3 SET CO2 POOR LEVEL + ALARM

P1.3 is used to set the CO2 alarm threshold. The current set value will blink on the LCD (Fig.7). Press "▲" to increase or "MIN/MAX▼" to decrease the value. The POOR level can be set between 1,000 to 5,000ppm. Press "SET" to confirm P1.3 and continue to P1.4 (Fig.8) or press "ESC" without saving to return to P1.0

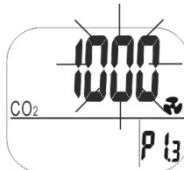


Fig.7

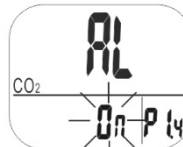


Fig.8

P1.4 SET ALARM ON/OFF

P1.4 is used to set alarm on and off. When entering P1.4, the default "On" will be blinking on the LCD (Fig.8).

Press "▲" or "MIN/MAX▼" to switch the alarm to "Off". Then press "SET" to confirm P1.4 and return to P1.0 (Fig.4) or press "ESC" to return to P1.0 without saving.

CAUTION:

Although the TIM12 alarm can be set up to 5,000ppm, the accuracy of the CO2 reading is only specified up to 2,000ppm. Alarm values higher than 2,000ppm are for reference only and should not be used for personal safety.

P2.0 SET TEMPERATURE UNITS

Hold down the "SET" button for at least 3 seconds to enter setup mode, then press "▲" in P1.0 mode to access P2.0 to set the temperature scale (Fig.9). Press "SET" again to show temperature in °C or °F on the display (Fig. 10). Press "▲" or "MIN/MAX▼" to change units, then press "SET" to save or "ESC" to exit without saving and return to P2.0



Fig.9



Fig.10

P3.0 SET REAL TIME CLOCK

The TIM10 can display time in either 24 hour or 12 hour (am/pm) format. Hold down the "SET" button for at least 3 seconds to enter setup mode, then press "▲" twice to access the P3.0 real-time clock (rtc) setup (Fig.11).

To start, press "SET" to display P3.1 with "rtc" and the blinking year digits (Fig.12) in the lower left corner of the display. To change the year, press "▲" or "MIN/MAX▼" to change the value, then press "SET" to save the year and continue, or press "ESC" to exit without saving.

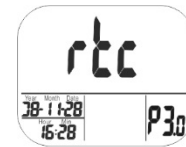


Fig. 11



Fig.12

Continue to press "SET" to change to the month, and then the day. After you press "SET", press "▲" or "MIN/MAX▼" while the year, month or day values are flashing to set the correct date. Press "SET" to save and move forward to set the time, or press "ESC" to return to P3.0 mode without saving.

To set the clock, in P3.4 mode with the hours flashing, press "▲" or "MIN/MAX▼" to change from 12 to 24 hour time format (Fig11). Press "SET" to save and move forward to P3.5 mode to set the time, or press "ESC" to return to P3.0 mode without saving.



Fig. 13



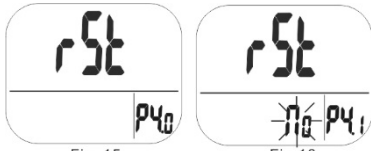
Fig.14

While in P3.5 mode, the current hour setting will blink (Fig.14). To change the setting, press "▲" or "MIN/MAX▼" to adjust the time. Press "SET" to save the setting or press "ESC" to return to P3.0 mode without saving.

P4.0 RESET

Hold down the "SET" button for at least 3 seconds to enter setup mode, then press "▲" 3 times to access P4.0 mode to revert the meter to the factory default state (Fig.15). Press "SET" to go to P4.1 mode. "No" will be

blinking on the display (Fig.16). Press “▲” or “MIN/MAX▼” to change to “Yes”, then press “SET” to save the setting. Press “ESC” to return to P4.0C without saving.



If you choose “Yes”, the meter is reset to the following factory defaults:

Parameter	Default
P1.1	700ppm
P1.2	1000ppm
P1.3	1000ppm
P2.1	°C
P4.1	No
P5.0	

P5.0 SET SAMPLING RATE

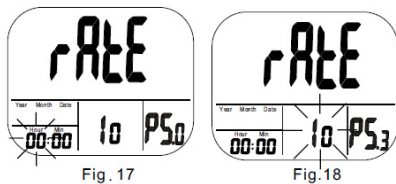
Go into P5.0 to set the data logging sampling rate (Fig.17). The range is from 1 second to 4 hours 59 minutes and 59 seconds.

Press “SET” to see P5.1 blinking hour digits on the lower left display. To change the digit, press “▲” or “MIN/MAX▼” to adjust the hour sampling rate. Press “SET” to save the setting.

After the hours are set, you will see P5.2 and the minutes digits will flash. To change the digits, press “▲” or “MIN/MAX▼” Press “SET” to save the setting and go to P5.3.

After the minutes are set, you will see P5.3 and the seconds digits will flash (Fig.18). To change the digits, press “▲” or “MIN/MAX▼” Press “SET” to save the setting and return to P5.0.

Press “ESC” at any time to exit without saving your last changes and return to P5.0.



CO2 CALIBRATION

The meter is calibrated at 400 ppm (parts-per-million) CO2 concentration at the factory. 400 ppm is comparable to fresh outdoor air. There are 2 types of calibration available: ABC (Automatic Baseline Calibration) or manual calibration. One or the other should be used regularly to maintain good accuracy.

Note:

If TIM10 accuracy becomes a concern after long use or other special conditions, return the meter to the dealer for calibration.

CAUTION:

Do not calibrate the meter with air or bottled gas that contains an unknown CO2 level. The meter will assume it is 400 ppm CO2 and will give inaccurate measurements.

ABC Calibration

ABC (Automatic Baseline Calibration) is designed to eliminate the zero drift over time of the infrared CO2 sensor. The ABC function is enabled by default from the factory.

For ABC to work properly, the meter must continuously monitor CO2 levels for at least 7.5 days (power on). During that time, it will record the lowest CO2 level and set that as the 400 ppm baseline for future readings. Therefore, it is critical when using ABC calibration that the meter be exposed to fresh air at least once every 7.5 days. If this is not possible, then manual calibration is recommended.

Manual Calibration

Manual calibration requires fresh, dry outdoor air when CO2 levels are approximately 400 ppm. Do not calibrate during rainy days. High humidity will affect the CO2 levels in air.

During manual calibration, avoid placing the meter in areas crowded with people or close to structures that might give off CO2 like air ventilation pipes, chimneys, or automobiles.

To manually calibrate the meter, place it outdoors, and turn it on for at least 2 minutes. Then hold down “SET”, “▲” and “MIN/MAX▼” simultaneously more than 1 second to enter CO2 calibration mode. 400 ppm and “CO2” will blink during calibration.



Wait about 30 minutes until the blinking stops. Calibration is completed automatically. To stop manual calibration, press “RESET” for at least 1 second.

Note:

Keep the meter away from any animals, humans or plants which might affect the CO2 concentration nearby during the calibration.

RH CALIBRATION

This humidity accuracy of this desktop CO2 meter is set at the factory, and cannot be re-calibrated.

TROUBLESHOOTING

Cannot power on

Check whether the adaptor has power and that the meter is firmly plugged in.

Slow response

Check that the air flow channels on the rear of the meter are not blocked.

No change in readings

Check whether the meter is in maximum or minimum mode. Reset factory defaults.

“BAT” and green LED keep flashing

The adaptor output voltage is too high or too low. Use the supplied adaptor with correct 5V (+10%) >=0.5A ratings.

Error Codes

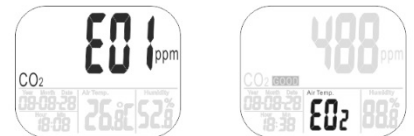


Fig.A

Fig.B



Fig.C

Error Code	Problem	Solution
CO2 Reading (See example of Fig. A)		
E01	CO2 sensor is damaged	Send back for repair
E02	CO2 reading is under the lower limit	Re-calibrate the CO2. If it still appear, send back for repair
E03	CO2 reading is above the upper limit	Put the meter in fresh air and wait for 5minutes. If it still appear, re-calibrate the meter. If above two methods are failed, send back for repair
E17	ABC mode of CO2 sensor is failed and might cause wrong CO2 readings	Send back for repair
Error Code Problem Solution		
Air Temp. Reading (See example of Fig. B)		
E02	Air temp. measurement is under the lower limit	Put the meter in regular room temperature for 30 minutes, if it still appear, send back for repair
E03	Air temp. measurement is over the upper limit	Put the meter in regular room temperature for 30 minutes, if it still appear, send back for repair
E31	Temp. sensor or measuring circuit is disconnected.	Send back for repair
Measuring Range	CO2 : 0 - 9999 ppm Air Temp. : -10°C - 60°C (14°F - 140°F) Air RH% : 20.0%RH - 99.9%RH	
Resolution	CO2 : 1ppm Air temp. : 0.1°C / 0.1°F Air RH% : 0.1%RH	
Accuracy	CO2 : 50ppm ±5% of reading Air temp. : ±0.6°C; ±0.9°F; Air RH% : ±5%RH (at 25°C, 10 - 90% RH) ±7%RH (at 25°C, <10% & >90% RH)	
Response	CO2 : <2 mins (90% step change) Air temp. : <2 mins (90% step change) Air RH% : <10 mins (90% step change)	
Max/Min function	Included	
Air quality level	Good: <700ppm (Programmable by user)	
CO2 concentration	Normal: 700-1000ppm (Programmable by user) Poor: > "Normal".	
Alarm	Alarm: >1000ppm (Programmable by user)	
Operating Condition	-10~50°C, 5~80%RH (Be sure to avoid condense)	
Storage Condition	-20~60°C, 5~90%RH (be sure to avoid condense)	
Display	LCD & green LED	
Power Supply	DC5V (+/-10%)>=500mA.	

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 or steps taken so far, so we can duplicate the problem and quickly respond to your inquiry.

Warranty

This unit comes with a 1YEAR (warranty period) limited manufacturer's warranty, starting from the date the unit 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.

Returns

If the product fails under normal use during the warranty period, an 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 an RMA number, please call CO2Meter.com at (877) 678-4259 Toll Free or (386) 310-4933. When requesting an RMA number, please provide the reason for return and original order number.

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

If you are returning your device due to a warranty claim (with an RMA number) and you still have the unit original package, please use it to ship your unit to us. Please make sure to include the provided RMA number on the outside of the box, preferably on the shipping label. Make sure you secure the unit inside the package properly to prevent any damage during transit that could void your device's warranty. Finally, please ship your device to the address shown under the "Contact Us" section below. CO2Meter will not, under any circumstances, be responsible for your shipment expenses and no refund will be issued for shipping charges necessary for you to ship the unit to us.

Liability

All liabilities under this agreement shall be limited to the actual cost of the product paid to CO2Meter.com. In no event shall we 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.

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](mailto:support@co2meter.com)

(386) 256-4910 Technical Support

(386) 872-7665 Sales

Monday-Friday 9:00am-6:00pm EST



CO2Meter, Inc.

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Appendix

CO2 LEVELS AND GUIDELINES

Non-Enforced Reference levels

NIOSH recommendations

250-350 ppm: normal outdoor ambient concentrations

600 ppm: minimal air quality complaints

600-1000 ppm: less clearly interpreted

1000 ppm: indicates inadequate ventilation; complaints such as headaches, fatigue, and eye/throat irritation will be more widespread. 1,000 ppm should be used as an upper limit for indoor levels.

EPA Taiwan: 600ppm and 1,000 ppm

Type 1 indoor areas such as department stores, theaters, restaurants, libraries, the acceptable CO2 concentration for an 8 hours average (TWA) is 1,000ppm.

Type 2 indoor areas with special requirements for good air quality such as schools, hospitals, and day care centers, the suggested CO2 level is 600ppm.

Regulatory Exposure limit

ASHRAE Standard 62-1989: 1,000ppm

CO2 concentration in occupied building should not exceed 1,000ppm.

Building bulletin 101 (Bb101): 1,500ppm

UK standards for schools state that CO2 levels over a day (i.e. 9 am to 3.30 pm) should not exceed 1,500ppm.

OSHA: 5000ppm

Time weighted average over an 8-hour work day should not exceed 5,000ppm.

Germany, Japan, Australia, UK: 5,000ppm

Occupational exposure limit is 5,000ppm over an 8 hour work day.