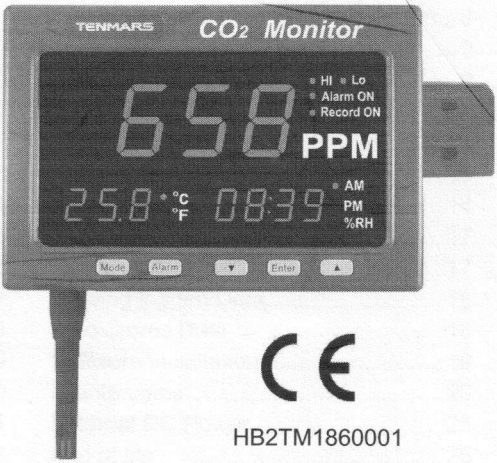
# TENMARS

## $CO_2$ Monitor

## TM-186/TM-186D
## TM-187/TM-187D




CE

HB2TM1860001

TENMARS ELECTRONICS CO., LTD

## INDEX

## 1. PREFACE

Thanks for your purchase. Please, read this user guide in details for the first time you operate this $CO_2$ Monitor.

## 2. CHARACTERISTICS

- LED display.
- It shows both the value of $CO_2$ ,temperature ,and humidity.
- The selection of °C or °F.
- Real time data.
- Data Hold function.
- Alarm function.

## 3. General Specifications

- Display : Double rows LED.
- $CO_2$ MAX reading : 9999.
- Temp MAX reading : 999.
- Humidity MAX reading : 999.
- $CO_2$ Sensor : Infrared.
- Temp sensor : Diode.
- Humidity Sensor : Capacitor Sensor.
- Sampling : 1 times/second.





- Power : AC to DC Adapter. (9~12V/1A).
- Backup Power : 9V battery、NEDA 1604、IEC 6F22 or JIS 006P(Only data logger use).
- Resolution : 1ppm, 0.1%RH, 0.1°C、0.1°F.
- Power : AC to DC Adapter. (9~12V/1A).
- Backup Power : 9V battery、NEDA 1604、IEC 6F22 or JIS 006P (Only data logger use).
- Resolution : 1ppm,0.1%RH,0.1°C,0.1°F.
- Size : 260x178x47mm（LxWxH）.
- Weight : 1000g.
- Operating Temperature and Humidity : -20°C ~ +70°C, <95% RH. (Non-condensing).
- Storage Temperature and Humidity : -10 to 60°C, <70% RH. (Non-condensing).
- Consumption Current : ≦700mA.
- Standard Accessories : User's manual,

9V battery, AC to DC Adapter, Carrying case, LCD Wall Mount.

- Accessories : Data logging Box. (Memory Size : 30,000 data sets).
- MINI USB 4P (MALE) to USB A Type cable.
- Install CD disk.

## 4. Electrical Specification

Measurement Range:

- $CO_2$ : 1~9999ppm
- Humidity : 5%~95%.
- Temp : -20.0°C～70.0°C (-4.0°F～158.0°F).
- $CO_2$ Accuracy : ±70ppm or ±5% of reading (0~2000ppm) whichever is greater Over 2000ppm ±7%
- Temp Accuracy : ±1.0°C/±1.8°F (0.0°C ~40.0°C /32°F ~104°F) ; other ±2.0°C /3.6°F.





- Humidity Accuracy : ±3%RH(at 25°C, 20%~80%) ±5.0%RH(at 25°C,<20%RH,>80%RH)

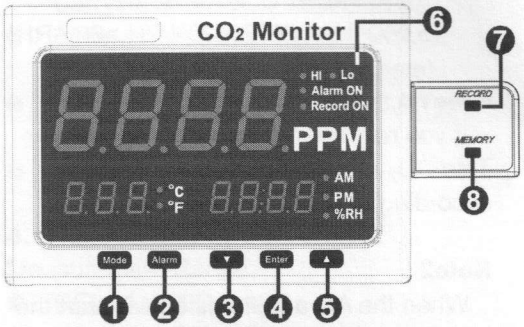
**Note1 :**

If you require more accurate reading, This $CO_2$ monitor can be adjusted according to your requirement.

**Note2 :**

When the AC adaptor is off will start the backup power only to provide Data Logger use, the LED won't be lightened.

## 5. Instrument description

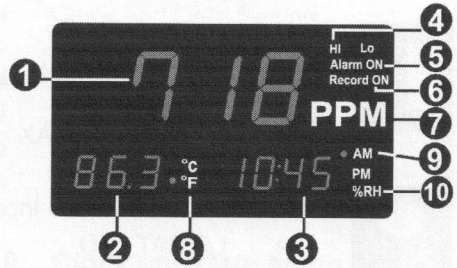



1. Time / Off Set Button.
2. Alarm Set Button.
3. Temp Unit (℃/℉) Button.
4. Time / Humidity Switch Button.
5. Data Hold Button.
6. LED Display.
7. Single Data Recode Button.
8. Read Recode Data Button.



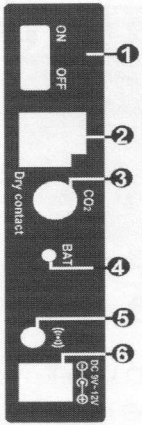


## 6. LED description




1. $CO_2$ Reading.
2. Temp Reading.
3. Time / Humidity Reading.
4. HI / LO Alarm symbol.
5. Alarm On symbol.
6. Data logger On symbol.
7. $CO_2$ unit symbol.
8. Temp unit symbol.
9. Time unit symbol.
10. Humidity unit symbol.

## 7. Terminal description




1. Power Switch.
2. Dry Contact (MAX input DC24V/1A).
3. Calibration Gas Input
4. LO BAT LED.
5. Alarm Signal Output (2KHZ@3.3V).
6. Power Jack (DC9V~12V/1A).

## 8. Disable/Enable Display

- Enter + Alarm to toggle Humidity Display on/off
- Enter + ▼ to toggle Temp Display on/off
- Enter + ▲ to toggle CO2 Display on/off

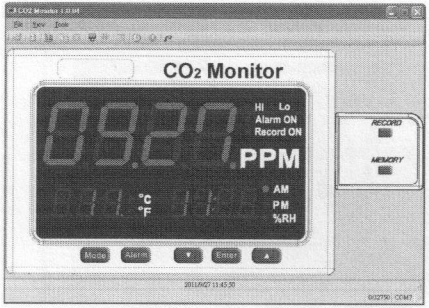




## 9. Mode Set Mode

- Clock and Date Setting.
- Buzzer ON/OFF.
- Temp Offset setting.
- Humidity Offset Setting.
- CO2 Offset Setting.
- Auto Recode Time Setting.

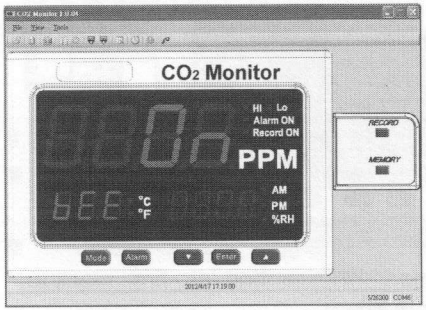
## 10. Clock and Date setup




- Push "Mode" button into time clock and date setup.
- Push "Alarm"button to select option to adjust.

- Push "▼"or "▲" button to change the digit.
- Push "Enter" button to store the setup then exit the mode, If not push "Mode" button then exit clock and data setup.
- This meter clock shows 12 hour time originally, if you want to change 24 hours, push"Enter".

## 11. Buzzer ON/OFF Setup



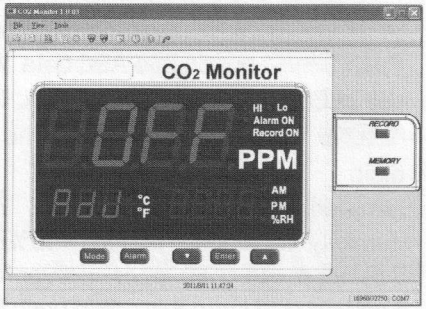

- Push "Mode" button into Buzzer ON/OFF setup.





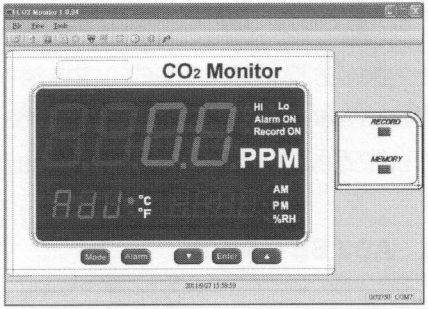
- Push "▼"or "▲" button to change setup ON or OFF.
- Push "Enter" button to store the setup then exit the mode, If not push "Mode" button then exit clock and data setup.

## 12. ADJ SET Setup




- Push "Mode" button into ADJ setup LED will display ADJ OFF。If you just reading alarm setup please push "Mode" button again to viewing set data. push "Alarm"

button enable ADJ.




- Push "Mode" button into ADJ data set , LED display show ADJ data, "▼"or "▲" button to change the digit.
- ✧ Temp adj range : -10℃~+10℃
- ✧ Humidity adj range : 10%RH~+10%RH
- ✧ $CO_2$ adj range : -200ppm~+200ppm
- If you want to store this setup push the "Enter" button, If not push "Mode" button then exit alarm setup





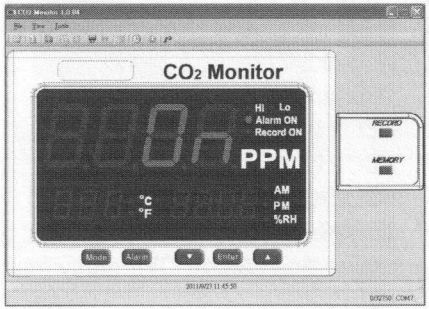
## 13. Alarm Set Mode

- Alarm ON/OFF setting.
- Alarm Gap/Trigger setting.
- Temp Lo Alarm setting
- Temp HI Alarm setting
- Temp Gap setting
- Humidity Lo Alarm setting.
- Humidity HI Alarm setting.
- Humidity Gap setting.
- CO2 Lo Alarm setting.
- CO2 HI Alarm setting
- CO2 Gap setting.

- ✧ Trigger : Alarm ON if value <= L or value >= H Alarm OFF : only manual OFF.
- ✧ Gap : Alarm ON if value <= L or value >= H.
- ✧ Alarm OFF : value > (L+G) or value < (H-G).

## 14. Alarm Setup

- Push "Alarm" button into alarm setup LED will display ALARM ON. Push "Alarm" button again LED will display ALARM OFF.

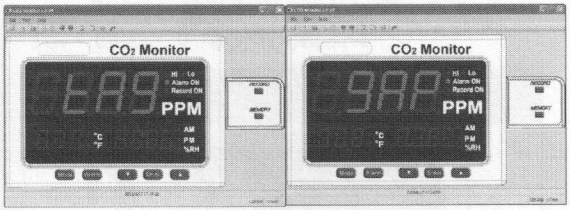



- Push "Mode" button into Regular Alarm Setting (The user has to manually switch on/off the alarm even though the current reading value has dropped below your alarm settings) which "tAg" will be shown on the LED display or Alarm Gap Value settings (The meter will automatically switch on/off the alarm when the current reading value

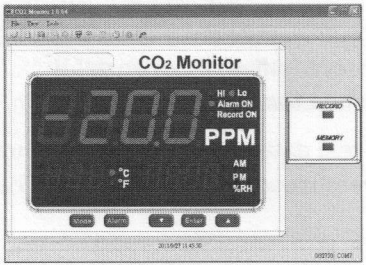




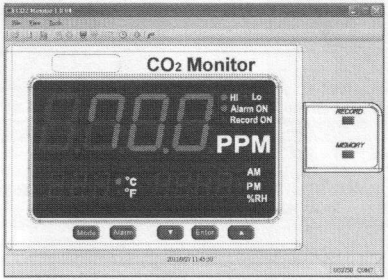
has dropped below your alarm settings) which "gAP" will be shown on the LED display.




- Push "Alarm" button to change Regular Alarm Setting to Alarm Gap Value settings.
- Push "Mode" button into alarm range setup , LED display show " LO ALARM ON " set LOW Alarm, Push "▼"or "▲" ,button to change the digit.



- Push "Mode" button into alarm range setup" ,LED display show " HI ALARM ON ", set HI Alarm, Push "▼"or "▲" button to change the digit.




- Push "Mode" button into alarm Gap value settings, Push "▼"or "▲" button to change the digit.
- If you want to store this setup push the "Enter" button, If not push "Mode" button then exit alarm setup.
- If test data exceed set range, buzzer were bleep, at this time socket output





sin wave signal at 2000Hz, terminal blocks were short.

## 15. Battery replacement

**WARNING**

If the LO Battery LED were turn on, please replace the battery immediately.

- Turn off the instrument.
- Open the battery cover and remove the battery.
- Replace with four-9V NEDA 1604, IEC 6F22 or JIS 006P size battery.
- Install the battery cover.

## 16. Single data memory

Push Record button each time to store the display reading and memory location in memory.

## 17. Viewing logged Data

Push Memory button into view logged data mode，push Memory button again exit view logged data mode In view logged data mode push"Mode" button reading stores time，push "▼" button to change the temp unit，Push "Enter"or "▲" button to change view logged data

## 18. Auto Stores Data

- Push "Mode" button into time clock and date setup.
- Push "Mode" button again into auto stores time clock setup.
- This time LED display shows auto stores data time，you can push"Alarm" to change time unit. (Max auto stores data time :23hour 59min 59sec)

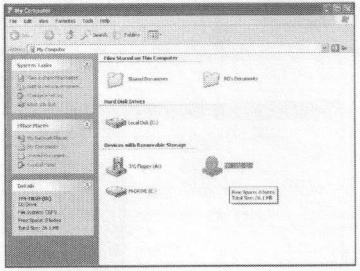




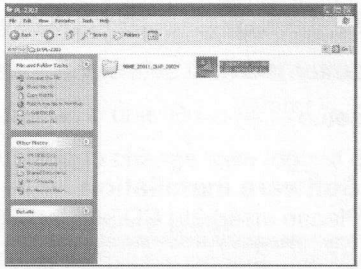
- Push "▼"or "▲" button to change the digit.
- Push "▼"or "▲" button to change the digit.
- If you want to store this setup push "Enter" button, If not push "Mode" button then exit auto stores data time setup.

## 19. Software installation

- Please insert the CD into the PC.



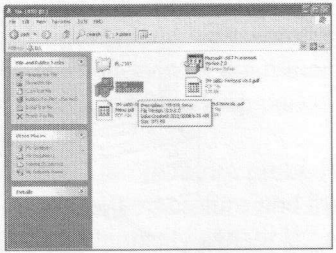
- Please select the USB driver that will be installed, such as E:\ PL-2303 Driver Installer.exe (windows 2000 SP4/windows XP SP2), or go to" http://www.prolific.com.tw/eng/downloads.asp?id=31 "download new drivel.





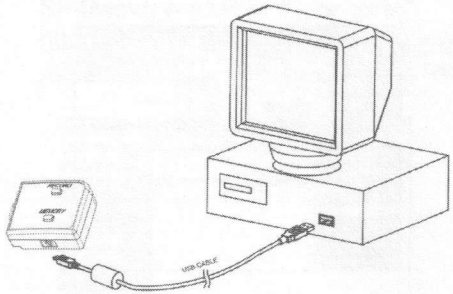


- Select the SETUP.EXE i.e., E:\CO2 Monitor\SETUP.EXE and installs the desktop icon

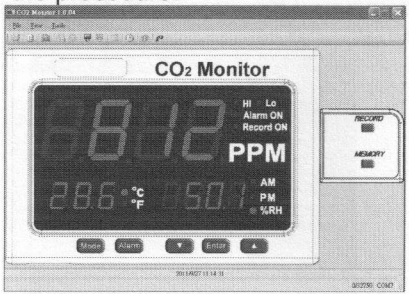


- Tack out the CD from the PC after completed the installation of the desktop icon.

- Use the USB cable to connect the meter and computer according to the drawing.




- Select the desktop icon and click twice on left key of the mouse to run the procedure.








## 20. Maintenance

- Do not use the meter in an environment with severe change; do not store the unit in an environment with high temperature, high humidity, and high vibration.
- Take the battery off if the meter has not been used for a long period of time.
- The Diode temperature probe is used to measure temperature and the capacitive humidity sensor is used to measure take humidity.
- The thermocouple and humidity sensor will start aging under the influence of oxidation, reduction, corrosion, pollution, vaporization, diffusion or other metallurgy. The aging process will affect its precision seriously.
- Cleaning and inspection of temperature probe:
  The smoke, coal, dust, grease attached on the protective tube of

temperature probe will slow down the heat conduction of the thermocouple and cause measuring error. Therefore, it should be cleaned periodically. The metal coating of thin thermocouple should be replaced properly upon the occurrence of corrosion.

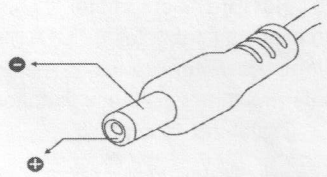
- Cleaning and inspection of humidity sensor:
  The smoke and dust attached on the humidity sensor will slow down the function of humidity sensor and cause measuring error. Therefore, it should be cleaned periodically. Blow off the dust with mild compressed air instead of water or alcohol. The aluminum plate inside the humidity sensor should be replaced upon the occurrence of corrosion.





## 21. External DC Power

- External AC to DC adapter: Voltage $9V_{DC}$.($8\sim14V_{DC}$Max)
- Socket : pin Positive, Ground Casing External.
- Diameter 5.5mm internal Diameter 2.0 mm.



## 22. End of life

**Caution:** this symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal.