TENMARS

TM-185A Temperature
/ Humidity Monitor
TM-187A CO_2 Monitor
User's Manual

CE

HB2TM185A00

CONTENTS

1 Introduction

The meters are wall-mounted monitors, suitable for monitoring and recording environmental temperature, humidity and carbon dioxide. It also has 4~20mA/RS-485/dry contact industrial output, and is an indispensable instrument for improving air quality.

2 Accessories

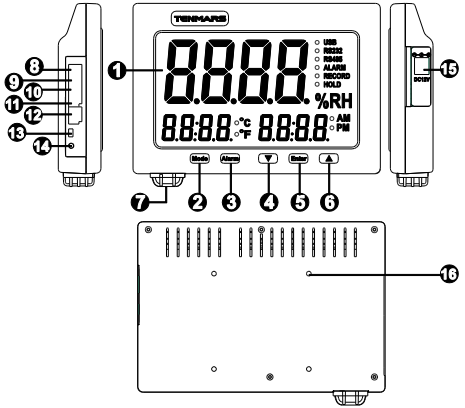
1 Meter
1 User's Manual
1 AC to DC adaptor
1 Wall Mount
1 USB cable and Installation disk

3 Safety

	Note! Please refer to this manual. Improper use may damage the meter and its components.
CE	Complies with European Directive.

- Do not operate in environments with flammable gas or humid environments.
- Do not place the meter in locations with high temperature, humid, or exposed to direct sunlight.
- Operating altitude: 2000 meters below sea level.
- Operation environment: Indoor use; contamination level class 2.
- EMC: EN61326-1:CISPR 11:Group 1, Class B
  - ✧ **Class B** – Equipment is suitable for use in domestic establishments and outside facilities.
  - ✧ **Group 1** – RF energy generated is needed for internal functioning.

4 Meter description

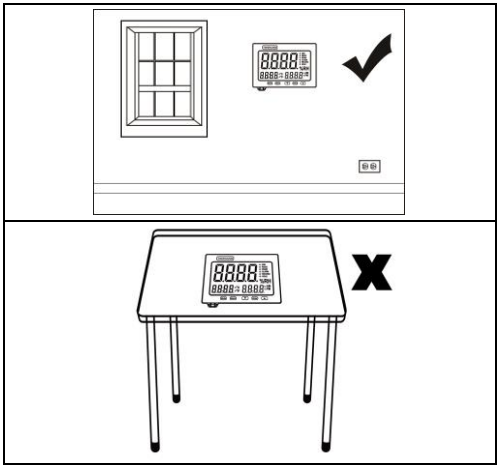


1.LED display screen	9. Dry contact
2.Device setting button **Mode**	10.4-20mA output
3.Alarm setting button **Alarm**	11.RS-485 interface
4.Temperature unit switching button ▼	12. RS-232 interface
5. Switch display button **Enter**	13. USB interface
6. Data lock button ▲	14. Alarm signal output (2KHZ)
7. Temperature / humidity sensor	15. DC power input
8. AC power input	16. Standard VESA wall mount hole (100x100mm)

5 Operation

1. The device can be used once the correct power is connected.
2. Place it at a fixed location for approximately 30 minutes and wait for the test data to become stable.
3. Press the **Mode** button to enter Device setting.(see 5.1)
4. Press the **Alarm** button to enter Alarm setting.(see 5.2)
5. Press the ▼ button to select Celsius ºC or Fahrenheit ºF.
6. Press the **Enter** button to select 12-hour mode, 24-hour mode or humidity display.
7. Press the ▲ button to freeze the window and stop updating.

⚠	Install the meter as shown below to obtain the correct reading



5.1 Device setting

Press the Mode button to enter Device setting; the setting contents are as follows:
RTC time → Temperature ADJ(A ℃) → Humidity ADJ(A rH) → Carbon dioxide ADJ (A CO2)→Current output (4-20/℃/ Rh/ CO2)→ Computer interface (485/232)→ Automatic recording → Carbon dioxide self-calibration (AbC)→ Return to testing mode.

Mode Select Device setting

Alarm Select digit to set

▲ & ▼ Increases and decreases the setting value

Enter Confirm & exits setting

- Temperature ADJ range: ±10ºC/±18ºF
- Humidity ADJ range: ±10%RH
- Carbon dioxide ADJ range: ±200 PPM
- Automatic recording time: 1 second ~ 24 hours
- Current output: Temperature; humidity; carbon dioxide, select one to output.
- Computer interface: USB; RS-232; RS-485, select one to output

5.2 Alarm setting:

Press the Alarm button to enter Alarm setting; setting contents are as follows:
Temperature alarm(℃) → Humidity alarm(rH) → Carbon dioxide alarm(CO2) → Temperature threshold(9 ℃) → Humidity threshold(9 rH) → Carbon dioxide threshold(9 CO2) → Buzzer switch(bEE) → Dry contact switch(dry) → Return to test mode

Alarm Select Alarm setting

Mode Select digit to set

▲ & ▼ Increases and decreases the setting value

Enter Confirm & exits setting

- Temperature alarm range:-20ºC~70ºC/-4ºF~158ºF
- Humidity temperature range:5~95%RH
- Carbon dioxide range:1~9999 PPM
- Temperature threshold range: -10~0ºC/-18~0ºF
- Humidity threshold range: -10~0%RH
- Carbon dioxide threshold: -999~0 PPM

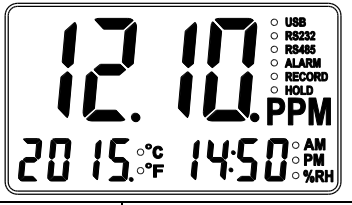
5.3 Hide/display testing screen

Enter + Alarm Hide/display humidity test value

Enter + ▼ Hide/display temperature test value

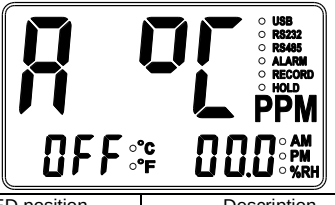
Enter + ▲ Hide/display carbon dioxide test value

5.4 Clock setting



LED position	Description
Top row	Month-Day
Bottom-left row	Year
Bottom-right row	Hour:Minute

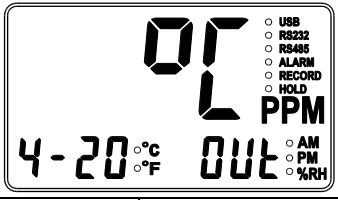
5.5 Calibration of Adjustment



LED position	Description
Top row	Adjustment stalls
Bottom-left row	Start/Stop (Default Stop)
Bottom-right row	Deviation value (Default 0)

Deviation correction formula
(Default test value + deviation value)= displayed test value

5.6 Current output

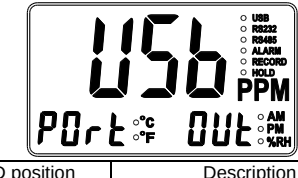


LED position	Description
Top row	Output selection (default temperature)

Current output formula
{[Displayed test value-lower test limit] ÷ (upper test limit-lower test limit)] x 16} +4

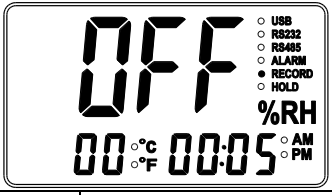
Example 1: Displayed temperature test value is 25℃, upper temperature test limit is 70℃, lower temperature test limit-20℃, the result when set into the formula is 12mA.
Example 2: Displayed humidity test value is 33%RH, upper temperature test limit is 100%RH, lower temperature test limit is 0%RH, the result when set into the formula is 9.28mA

5.7 Computer interface



LED position	Description
Top row	Interface selection (Default USB)

5.8 Automatic recording

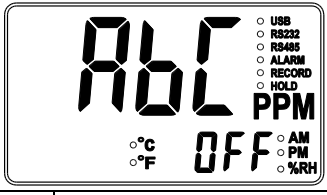


LED position	Description
Top row	Start/Stop (Default Stop)
Bottom-left row	Hour
Bottom-right row	Minute:Second (Default 5 seconds)

LED action	Device status
Constantly off	Stop Automatic recording
Constantly On	Start Automatic recording
Quick flash	Writing record data
Continuous flash	Memory full; please download data as soon as possible

- ✧ Suggested Automatic recording interval is greater than 5 seconds; if set lower than 5 seconds the continuity of the data cannot be guaranteed.
- ✧ Setting the record interval to less than 5 seconds may cause continuous flashing; please be aware.

5.9 CO2 self-calibration (ABC)

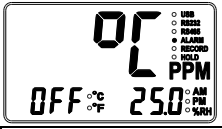


LED position	Description
Bottom-right row	Start/Stop (Default Stop)

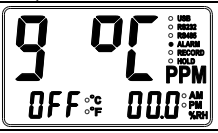
Before starting the carbon dioxide self-calibration function, please first place the device in a well-ventilated environment and provide sufficient power. The self-calibration function takes 180 hours (approximately 7.5 days); during this period the power of the device cannot be turned off. Suggested optimal carbon dioxide concentration is between 400~500 PPM.

Do not start the carbon dioxide self-calibration function (ABC) in places with poor ventilation or where the stability of the power system cannot be guaranteed for extended periods of time in order to prevent unnecessary damage to the sensor.

5.10 Alarm mode



LED position	Description
Top row	Alarm stalls
Bottom-left row	Start/Stop (Default Stop)
Bottom-right row	Alarm value (Default 25℃; 50%RH; 1500 PPM)



LED position	Description
Top row	Alarm OFF difference range
Bottom-left row	Start/Stop (Default Stop)
Bottom-right row	Threshold value (Default 0)

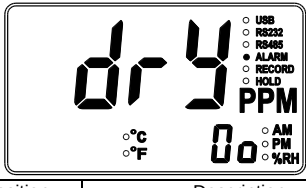
When Alarm mode is started, the indicator will automatically light up when "displayed test value" ≧ "*alarm value*"; the buzzer or dry contact setting will also start if set as enabled.

If a threshold value is set, it will automatically stop when "alarm value + threshold value" ＞ "displayed test value". When the "displayed test value" is once again ≧ "*alarm value*", it will automatically start again without the need to reset it.

If no threshold value is set, press any button to reset the alarm; if alarm is disabled, Alarm setting must be restarted.

5.11 Buzzer and dry contact

LED position	Description
Top row	Buzzer
Bottom-right row	Start/Stop (Default Stop)



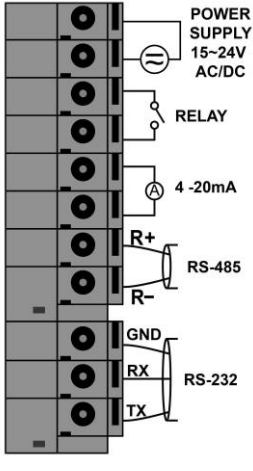
LED position	Description
Top row	Dry contact
Bottom-right row	Start/Stop (Default Start)

5.12 Changing humidity / temperature sensor

Before changing the humidity / temperature sensor, please disconnect all power, follow the instructions in the user's manual and operate in a safe environment.

- Remove the screws and protection cap
- Remove the old sensor
- Take out the new sensor and install it according to the direction illustrated in the figure
- Install the protection cap and screws
- Restart and set the ADJ settings to disabled or reset.

5.13 Installation figure (Electrical connections)



6 Software Installation

The desktop software supports the Windows XP/ 7 / 8 / 10 operating systems

- Place the included CD into the CD/DVD-ROM of the PC and complete the installation sequence: Click execute program.

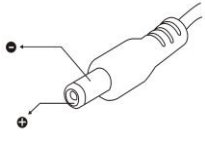
- When the desktop program installation is complete; remove the CD from the CD/DVD-ROM drive.
- Connect the PC with this monitor and first confirm the interface settings, then connect the cable according to the following description.

Interface	Monitor	PC terminal
RS-232	RX	TX
	TX	RX
	GND	GND
RS-485	R+	R-
	R-	R+
USB		USB

- Execute PC desktop software program: Double-click on the desktop program (CO2 Monitor) or (Temperature-Humidity Monitor) with the left mouse button to execute the desktop program.

7 General Specifications

- Read value display: Double LED display
- Temperature display unit: ℃; ºF
- Clock function
- Data lock function (HOLD)
- Alarm function
- Overload display: “OL” or “-OL”
- Memory can store a maximum of 60,000 data entries
- Operation power consumption: ≦ 7W
- Operation temperature and humidity: 0℃~50℃, relative humidity under 80%
- Storage temperature and humidity: -10℃~60℃, relative humidity under 80%
- Weight: Approximately 1000 grams
- Dimensions: 260 (length)×178 (width) ×47 (height) mm
- Transformer specifications
  External AC to DC 9~15V power supply (Note the polarity).
  Specifications: Voltage DC 12V (9.0~15.0 VDC MAX)
  Current: ≧ 1000mA.
  Plug: The pin in the center connects to the positive electrode and the outer case is negative electrode
  Diameter: 5.5mm; internal diameter: 2.1mm



8 Electrical Specifications

Measurement range	Temperature	-20℃~70℃ -4~158℉
	Humidity	1~99%RH
	Carbon dioxide	1~9999 PPM
Resolution	Temperature / humidity	0.1
	Carbon dioxide	1
Accuracy	Temperature	±1℃(5℃~60℃) ±2℉(41℉~140℉) Other ranges ±2℃/±4℉
	Humidity	±5%RH (20~80%RH@25℃) Other ranges ±8%RH
	Carbon dioxide	±70PPM or ±5% (≦2000PPM) Other ranges ±7%
	Analog output	±0.3mA or ±2% (load≦250Ω)
Power	AC input	24Vac/Vdc±20% (50~60Hz)
	DC input	9~15V
Update rate	Once per second	
Computer interface	USB; RS-232; RS-485	
Dry contact specification	Maximum 1A @30Vdc (Normal open)	
Transmission format	115200bps 8:N:1	

9 Maintenance

1. Please read the user's manual carefully to check whether there are any operating errors.
2. Do not place the meter in locations that have high temperature, humidity or that are exposed to direct sunlight.

10 Cleaning

Please use soft dry cloth to wipe it clean when cleaning; do not wipe it with wet cloth, liquids or water etc.

11 Disposal

Note: This symbol indicates that this product and its peripheral accessories must be recycled and processed; do not discard directly with trash in order to prevent environmental pollution.

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