Hot-Wire Air Velocity Meter

TM-4001 / TM-4002 / TM-4003

User’s Manual

HB2TM4001000

TENMARS ELECTRONICS CO., LTD
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1. PREFACE
Thank you for purchasing our product. Please, read the operating instructions in details before you use this Hot-Wire Velocity meter, so you will operate the meter correctly. This meter can be operated in industry and home.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-compliance warning and/or operating instructions may damage the instrument or its parts or injuring the operator.</td>
</tr>
</tbody>
</table>

2. GENERAL DESCRIPTION
- Fast response probe.
- Air flow volume. (Use platinum-resistors sensor)
- Telescoping probe.
- Instant/ AVG/ 2/3V MAX flow measurement.
- Max/Avg/Min & data hold function.
- Low battery indication “ ”.
- LCD triple display with LED backlight.
- Manual data memory and read function (99 records). (TM-4001/TM-4002)
- Humidity measurement. (TM-4002/TM-4003)
- Calculate dew point temperature, wet bulb temperature. (TM-4002/TM-4003)
- Absolute pressure measurement. (TM-4003)
- Auto power off with disable function.
- USB PC serial interface. (TM-4003)
Data logging capacity (8000 records) (TM-4003)
Sampling interval: Max 24 hours; Min 1S. (TM-4003)

3. SPECIFICATIONS (23°C±5°C)
Air velocity measurement:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>m/s</td>
<td>0.01~40.00</td>
<td>0.01</td>
<td>±3% of reading ±1%FS</td>
</tr>
<tr>
<td>Km/hr(kph)</td>
<td>0.02~144.0</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>mph</td>
<td>0.12~89.5</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Knots(kts)</td>
<td>0.11~77.75</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Ft/min(fpm)</td>
<td>0~7874.0</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Beaufort</td>
<td>1~12</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

Air flow (volume) calculate:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMM</td>
<td>0~9999</td>
<td>0.1</td>
<td>-</td>
</tr>
<tr>
<td>CFM</td>
<td>0~9999</td>
<td>0.1</td>
<td>-</td>
</tr>
</tbody>
</table>

Temperature Measurement:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>-20~50</td>
<td>0.1</td>
<td>±1°C</td>
</tr>
<tr>
<td>°F</td>
<td>-4~122</td>
<td>0.1</td>
<td>±1.8°F</td>
</tr>
</tbody>
</table>

Humidity (TM-4002, TM-4003):

<table>
<thead>
<tr>
<th>Unit</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>%RH</td>
<td>20~80</td>
<td>0.1</td>
<td>±3.5%RH</td>
</tr>
<tr>
<td>%RH</td>
<td>&lt;20,&gt;80</td>
<td>0.1</td>
<td>±5.0%RH</td>
</tr>
</tbody>
</table>
Absolute pressure (TM-4003):

<table>
<thead>
<tr>
<th>Unit</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>hPa</td>
<td>350~1100</td>
<td>0.1</td>
<td>±2hPa</td>
</tr>
<tr>
<td>mmHg</td>
<td>263~825</td>
<td>0.1</td>
<td>±1.5mmHg</td>
</tr>
<tr>
<td>inHg</td>
<td>10.3~32</td>
<td>0.1</td>
<td>±0.1</td>
</tr>
</tbody>
</table>

- **Meter Dimension:** 156x73x35mm (L x W x H).
- **Probe Dimension:**
  - Wire length: 160cm
  - Probe length: 128cm
  - Probe diameter of tip: 1.6cm
  - Probe diameter of base: 3.2cm
- **Meter weight:** 250g. (without batteries)
- **Probe weight:** 240g.
- **Power supply:** UM-4(AAA)1.5V*6PCS or AC100~240V DC9V/0.5A(9mm).
- **Battery life:** 10 hours.
- **Operating temperature & humidity:**
  - -20°C to +50°C, <80 %RH.
- **Storage temperature & humidity:**
  - -10°C to +50°C, <70 %RH.
- **Data output:** USB PC serial interface. (TM-4003)
- **Display:** 60mm(W) x 47mm(L) monochrome LCD and backlight.
- **Standard accessories:**
  - UM-4(AAA)1.5V battery x 6 PCS,
User’s manual, USB cable (TM-4003),
AC100~240V DC9V/0.5A (9mm)×1 (TM-4003),
Install CD disk (TM-4003).

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>To ensure that the accuracy of the meter, we recommend for calibration once a year.</td>
</tr>
</tbody>
</table>

- EMC: This test was designed in accordance with EMC standards in force and its compatibility has been tested in accordance with EN61326-1 (2006).
4. INSTRUMENT DESCRIPTION

1. HOLD Button
2. Power Button
3. MAX/MIN Button
4. Left/read Button
5. Mode Button
6. Display
7. Backlight Button
8. Unit Button
9. Up Button
10. Right/record Button
11. Down Button
12. Enter Button
13. DC power
14. USB
15. Probe Jack
16. Holder
17. Battery holder
18. Battery cover
19. Hot-wire sensor
20. Humidity sensor
21. Temperature sensor
5. LCD DESCRIPTION

First window: Air velocity display
- SET: Setting mode indication.
- REC: Record mode indication.
- HOLD: Data hold indication.
- MAX: Maximum measured display indication.
- MIN: Minimum measured display indication.
- AVG: Average measured display indication.
- [ ]: Low battery indication.
- [ ]: Auto power off indication.
- m/s: Meters per second.
- Knots: knots.
- km/hr: Kilometers per hour.
- mile/hr: Miles per hour.
- ft/min: Feet per minute.
- Beau for: Beaufort.
Second window: Temperature, humidity, air velocity and Absolute pressure display.

- **WET**: Wet bulb temperature indication.
- **DEW**: Dew point temperature indication.
- **%RH**: Humidity indication.
- **°C**: Degree Celsius.
- **°F**: Degree Fahrenheit.
- **hPa**: Hectopascal indication.
- **inHg**: Inch of mercury.
- **mmHg**: Millimeter of mercury.
- **CFM**: Cubic feet per minute.
- **CMM**: Cubic meters per minute.
- **2/3V MAX**: 2/3V Maximum mode is selected indication.
- **×10**: Multiply reading by ten
- **×100**: Multiply reading by hundred.
- **×1000**: Multiply reading by thousand.

Third window: Air flow setting and record display

- **Sample**: Sampling indication.
- **INTV**: Sample interval indication.
- **Area**: Duct area indication.
- **TC**: Average time constant indication.
- **AVG**: Average mode is selected indication.
K: Number of records by one thousand.

[●]: Round duct diameter dimension indication.

[● XY]: Rectangle duct XY dimension indication.

h: Hour indication.

m: Minute indication.

S: Second indication.

in: Inches indication.

cm: Centimeter indication.

ft²: Square feet indication.

m²: Square meters indication.
6. POWER ON/OFF
Press button to turn on or turn off the power.

7. Auto power off
The duration of auto power off time is 15 minutes. If you want disable auto power off, please hold button and press button at the power shutdown mode. When you see the “n-SL” display on the LCD, that means the auto power off function is off. If you want enable auto power off, please restart the meter.

8. BACKLIGHT
Press button to turn on the backlight, press this button again to turn it off. The backlight time is 15 seconds.

9. CHANGE AIR VELOCITY UNIT
Press button to change the air velocity unit.
m/s→knots→km/hr→mile/hr→ft/min→Beaufort

10. CHANGE UNIT
Press button and button to change unit.
°C<=>>°F, m<=>>ft
11. CHANGE FUNCTION
Press \( \text{↓} \) button and \( \text{Mode} \) button to change function.

12. TIME CONSTANT SETTING MODE
Press \( \text{Mode} \) button to select TC and press \( \text{←} \) button to into the time constant setting mode and press \( \text{↓} \) to exit the time constant setting mode. Time constant setting mode operation:
1. Press \( \text{←} \) to into time constant setting mode.
2. In the setting the time constant setting mode that can press \( \text{↑}, \text{↓}, \text{Read}, \text{Mem} \) button to change the digit and press \( \text{←} \) to confirm.

13. AIR FLOW SETTING MODE
Press \( \text{Mode} \) button to select Area and press \( \text{←} \) button to into the air flow setting mode and press \( \text{↓} \) to exit the air flow setting mode.
Air flow setting mode operation:
1. Press \( \text{Read} \) button or \( \text{Mem} \) button to selected Area or the area of a circle, square
area, and press ← button to into setting the size of area.

2. In the setting the size of area that can press ▲,▼,◄Read,◄Mem button to change the digit and press ◄← to confirm.

14. DATA HOLD
Press HOLD button to enable or disable hold function.
※ The HOLD function will be unavailable if calibration function is enabled.

15. SINGLE DATA RECORD
Press◄Mem button to record the current measured result.

16. VIEWING OR CLEARING DATA RECORDS
Press◄Read button to read the data records and press ▼ or wait 15 second to exit.
Press◄Read button for more than 2 seconds to clear the data records.
※The Viewing or cleared Data Records function will be unavailable if calibration,
MAX/MIN, HOLD function is enabled.

17. MAX/MIN/AVG
Press \( \text{Min/Max} \) button simultaneously lockup data maximum and minimum and average value of measuring data.
Press \( \text{Min/Max} \) button for more than 2 seconds to disable this feature.

18. CALIBRATION
Please shut down the meter first, then hold and press \( \text{Read} \), \( \text{Mem} \) button and press \( \text{On} \) button to enter into calibration mode. It will show 0.00 m/s on the upper display.
Press \( \text{▲} \) button to select the project would you want calibration. (Select the order of 0.00m/s→10.00m/s→33.00%RH→75.00%RH→25.00℃)
A. Wind speed calibration (0.00m/s)
   Press \( \text{▲} \) button to select the 0.00m/s and press \( \text{Mem} \) button to start and the 0.00m/s is blinking.
   The duration of calibration time is 5 minutes.
   After end of the 0m/s calibration, you can press \( \text{Off} \) button to shut down or press \( \text{Mem} \).
button to into 10 m/s calibration.

B. Wind speed calibration (10.00m/s)
Put the probe into the standard 10m/s wind tunnel, and press ↑ button to select the 10.00m/s and press Mem button to start calibration 10m/s.
The duration of calibration time is 5 minutes.
After end of the 10m/s calibration, then will be into the normal display.

C. Humidity calibration (33.0%RH)
Put the probe in the 33.0%rh chamber and press ↑ button to select the 33.0%RH and press Mem button to start calibration 33.0%RH.
The duration of calibration time is 10 minutes.
After end of the 33.0%RH calibration, you can press 0 button to shut down or press Mem button to into 75%RH calibration.

D. Humidity calibration (75%RH)
Put the probe in the 75%RH chamber and press ↑ button to select the 75%RH and press Mem button to start 75%RH calibration.
The duration of calibration time is 10 minutes. After end of the 75%RH calibration, then will be into the normal display.

E. Temperature calibration (25.0°C)
1. Press button to select the 25.0°C and press button to start 25.0°C calibration.
2. Confirm with the standard value of the error, press the and button to adjust the temperature and the display will flash.
3. Press to complete the adjustment and into the normal display.

19. PRECAUTIONS
• Keep the meter away from electromagnetic interference (EMI) which may cause erratic readings.
• Please turn off the meter to avoid the sensor burned when you have finished testing the high wind speed (more than 20m/s) and remove the probe.
• To extend the probe, hold the handle in one hand while pulling on the probe tip with the other hand. Do not hold the cable while
extending the probe.

- Remove the sensor protective cover, make sure the sensor window is fully exposed and the orientation is facing upstream.
- To retract the probe, hold the handle in one hand while pushing on the probe tip with the other hand. If the probe antenna binding, please gently straightened probe, and then the rest of the extension of section pressure back and don’t pull the cable.

20. SOFTWARE INSTALLATION(TM-4003)
Please refer to the TM-4003 installation CD execution.

21. COMPUTER GRADE
- CPU : Pentium III 1000MHZ.
- RAM : SDRAM 256MB.
- Hard disk : 200MB.
- OS : Windows 2000, Windows XP.
- Display : 800×600 256 color.
22. EXTERNAL DC POWER
External AC to DC adapter: Voltage $9\text{V}_\text{DC}$.
Socket: Pin positive, Ground casing negative.
External diameter 5.5mm internal diameter 2.1mm

23. SAFETY AND MAINTENANCE STANDARDS
- Do not put this device in direct sunlight or where it is hot and/or damp.
- Operating altitude: below 2,000m.

24. BATTERY REPLACEMENT

WARNING
If the LCD displays " " symbol, please replace the battery immediately.

Turn off the power and unplug all cables, remove the battery and replace into the new battery. Please use the correct specification of the battery and correctly installed in the battery holder.
25. END OF LIFE

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

**WARNING**
If not using the meter, please remove the battery to avoid possible damage.
Professional Electrical and Environment Test & Measurement Instruments:
Battery Capacity / Impedance Tester, TACHO Meter ,LED light meter, Temperature & Humidity meter ,Infrared Thermometer, Sound level meter ,Light meter, EMF meter, UV Light meter, RF meter, Hot wire Anemometer, CO meter Anemometer, Lan cable tester, CO₂ meter, Solar power meter, Radiation meter, Clamp meter, Multimeter, Phase Rotation test, Digital Insulation tester

Our products of high quality are selling well all over the world