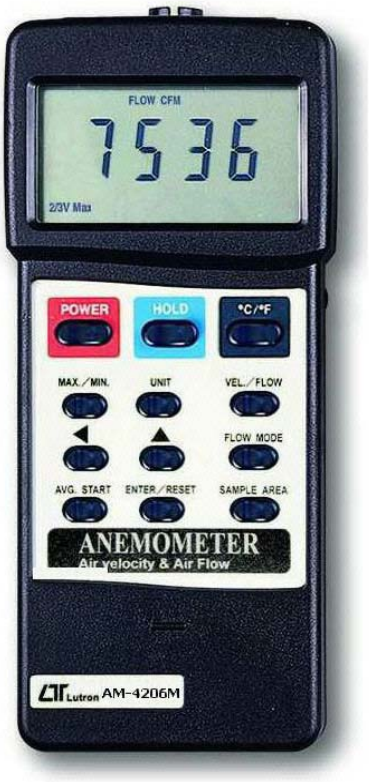
metal vane + air flow

ANEMOMETER

Model : AM-4206M



Your purchase of this ANEMOMETER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

TABLE OF CONTENTS

1. FEATURES

* Metal vane pobe, heavy duty, wide range measurement.
* Air flow : CMM (m^3/min.) and CFM (ft^3/min.).
  Air velocity : m/s, ft/min, km/h, knots, mile/h.
  Air temperature:
* 3 air flow mode: instant, 2/3 V.max, Average.
* Low-friction ball vane wheels make sure high accuracy in high & low velocities.
* Large LCD with dual display.
* Record maximum and minimum reading with recall.
* Data hold.
* Microcomputer circuit provides special function & offer high accuracy.
* Auto shut off saves battery life.
* Thermistor sensor for Temp. measurement, fast response time.
* Build-in low battery indicator.
* Operates with 006P DC 9V battery.
* RS232 PC serial interface.
* Separate probe, easy for operation of different measurement environment.
* Used the durable, long-lasting components, including a strong, light weight ABS-plastic housing case.
* Wide applications: use this anemometer to check air conditioning & heating systems, measure air velocities, wind temperature...etc.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Exclusive one-chip of microcomputer LSI circuit.	
Display	* 13 mm (0.5") Super large LCD display. * Dual functions display.	
Measurement	Air velocity: m/s (meters per second) km/h (kilometers per hour), ft/min (feet per minute), knots (nautical miles per hour), mile/h (miles per hour),	
	Air flow: CMM (m^3/min.) CFM (ft^3/min.).	
	Air temperature: ℃/℉	
	Data hold.	
Sensor Structure	*Air velocity & Air flow* Metal structure, Conventional twisted van arm and low friction ball bearing design.	
	Temperature : Thermistor.	
Memory Recall	Record maximum & minimum reading value with recall.	
Power off	Auto shut off saves battery life or manual off by push button.	
Sampling Time	Approx. 1 sec.	
Operating Humidity	Less than 80% RH.	
Operating Temperature	*Meter*	0 ℃ to 50 ℃ (32 ℉ to 122 ℉)
	Probe	0 ℃ to 80 ℃/32 ℉ to 176 ℉

Data Output	RS 232 PC serial interface.
Power Supply	Alkaline or heavy duty type DC 9V battery, 006P, MN1604 (PP3) or equivalent.
Power Current	Approx. DC 8.3 mA.
Weight	381 g/0.84 LB, main instrument
Dimension	Main instrument : 180 x 72 x 32 mm
	Sensor head: Round, 72mm Dia.
Accessories Included	Instruction manual.....1 PC. Sensor probe.....1 PC. Carrying case..... 1 PC.
Optional Accessories	Data acquisition software.....SW-U801-WIN USB cable.....USB-01 RS232 cable.....UPCB-01

2-2 Electrical Specifications

A. Air velocity

Measurement	Range	Resolution	Accuracy
m/s	0.4 - 35.0 m/s	0.1 m/s 0.01m/s,<10m/s	± (2%+0.2m/s)
km/h	1.4 - 126.0 km/h	0.1 km/h	± (2%+0.8km/h)
mile/h	0.9 - 78.3 mph	0.1 mile/h	± (2%+0.4mile/h)
knots	0.8 - 68.0 knots	0.1 knots	± (2%+0.4knots)
ft/min	79 - 6890 ft/min	1 ft/min	± (2%+40 ft/min)
Remark : For prolonged life and safe operation, if measuring range > 30 m/s please do not make the operation over 5 minutes continuously.			

B. Air flow

Measurement	Range	Resolution	Area
CMM (m^3/min.)	0-999,900 m^3/min.	0.001-100	0.001-9,999 m^2/min.
CFM (ft^3/min.)	0-999,900 ft^3/min.	0.001-100	0.001-9,999 ft^2/min.

C. Air temperature

Measuring Range	0 ℃ to 80 ℃/32 ℉ to 176 ℉
Resolution	0.1 ℃/0.1 ℉
Accuracy	0.8 ℃/1.5 ℉ (< 60 ℃)

3. FRONT PANEL DESCRIPTION

Fig. 1

3-1 Display
3-2 Power Off/On Button
3-3 Data Hold Button
3-4 ℃/ ℉ conversion Button
3-5 MAX/MIN/. Record Button
3-6 UNIT/ conversion Button
3-7 VEL./FLOW Button
3-8 Button
3-9 Button
3-10 FLOW MODE Button
3-11 AVG.START Button
3-12 ENTER/RESET Button
3-13 SAMPLE AREA Button
3-14 Probe Input Socket
3-15 RS232 Output Terminal
3-16 Battery/Compartment/ Cover
3-17 Vane Probe Head
3-18 Vane Probe Handle

4. MEASURING PROCEDURE

4-1 Air Velocity Measurement

1) Install the " Probe Plug " into the " Probe Input Terminal " (3-14, Fig. 1).
2) Power on the meter by pressing the " Power OFF/ON Button " (3-2, Fig. 1).
3) Select VELOCITY measuring mode by pressing " VEL./FLOW Button " (3-7, Fig. 1) to get into velocity measuring mode.
4) Select the desired temperature units, by pressing the " ℃/℉ Conversion Button " (3-4, Fig. 1).
5) Select the desired air velocity measurement units, (mph, ft/min, knot, Km/h, m/s) by pressing the " Unit/ Button " (3-6, Fig. 1).

It is ready to measure air velocity when you finish above setting. Regarding other functions relative to Velocity Mode please refer to following description.

6) *Data Hold Function:*
During the measuring procedure, pressing the " Data Hold Button " (3-3, Fig. 1) will hold the measured value and the LCD will indicate " HOLD " symbol on the left.
** Press the "Data Hold Button" again to release the data hold function.*
7) *Data Record(Max., Min.)*
* Press the " MAX/MIN/. Button " (3-5, Fig. 1) once a while to get into Data Record mode. A "REC" symbol appears on the LCD display. At the same time meter records value received by probe.
* Press again, " Max " symbol appears on the left down corner of the LCD and the Maximum value during recording procedure will displayed on the LCD at the same time.

* Press again, " Min " symbol appears on the left down corner of the LCD and the Minimum value during recording procedure will displayed on the LCD at the same time.
* ***Press the MAX/MIN/. Button for around 3 seconds to exit Data Record mode.***

4-2 Air Flow Measurement

1) Install the "Probe Plug" into the " Probe Input Terminal " (3-14, Fig. 1).
2) Power ON the meter by pressing the " Power OFF/ON Button " (3-2, Fig. 1).
3) Select FLOW measuring mode by pressing " VEL./FLOW Button " (3-7, Fig. 1) to get into flow measuring mode.
4) Select the desired air velocity measurement units, (CMM or CFM) by pressing the " Unit/ Button " (3-6, Fig. 1).

   Note :
   Under Air Flow Mode, meter is without Temp. function.

5) Press " SAMPLE AREA Button " (3-13, Fig. 1) to set the measuring area (m 2 ft 2) The more accurate area setting is the more accurate air flow value measured. When you press the button you may see a " " symbol appears and the fist digit sparkling. Now you can continue the area setting procedure.
6) Area setting producre uses four buttons " ", "UNIT/ ", " " and " MAX/MIN/. ". (please refer to Fig. 1 page 4)

Note :

* " " *button*
  Press one time to add one of the sparkled digit.

* *" UNIT/ " button*
  Press one time to decrease one from the sparkled digit.

* " " button
  Press one time to select next digit.

* "MAX/MIN/. " button
  Setting the decimal point.

After you set the number you need, please press "ENTER/RESET" button to finish the setting procedure.

For instance, if you want to set the sample area 120.3 square feet, please press " UNIT/ " button to make sure " ft 2" appears on the display. Then press " SAMPLE AREA " button to get into the measuring area setting procedure. Press " " button one time to set 1 and press " " button to select the next digit. Press " " button two times to set 2 then press " " button and press " MAX/MIN/. " button to set the decimal point. Press " " button three times to set 3 and press "ENTER/RESET" button to finish the sample area setting procedure.

7) Under air flow measuring, we provide 3 kinds of flow mode for you to apply by pressing the "FLOW MODE" button.

A. 2/3V Max mode :
Selecting this mode you can get the 2/3 of the Max. measured value. For instance Max. value is 300 CFM but under 2/3V Max mode you can see 200 CFM only.

B. AVG mode :

Under this mode you can average maximum 20 records by pressing the " AVG.START " button manually. You can see the average number from the right-bottom of LCD. The AVG formula listed as below:

$$\frac{\text{1st Records} + \ldots\ldots\ldots + \text{Nth Records}}{N}$$

C. INSTANT mode :

LCD display shows measured number directly.

8) Under " 2/3V Max " and " AVG " mode, press " ENTER/RESET " button to reset the previous setting and restart measuring again.

9) *Data Hold Function :*

During the measuring procedure, pressing the " Data Hold Button " (3-3, Fig. 1) will hold the measured value and the LCD will indicate " HOLD " symbol on the left.

* *Press the "Data Hold Button" again to release the data hold function.*

10) Data Record(Max., Min.)

* Press the MAX/MIN/. Button to get into Data Record mode. A "REC" symbol appears on the LCD display. At the same time meter records value received by probe.
* Press again, " Max " symbol appears on the left down corner of the LCD and the Maximum value during recording procedure will displayed on the LCD at the same time.

Measuring Consideration:

The " " mark on the sensor head indicates the mark need to face against the direction of air flow.

* Press again, " Min " symbol appears on the left down corner of the LCD and the Minimum value during recording procedure will displayed on the LCD at the same time.
* Press the MAX/MIN/. Button for around 3 seconds to exit Data Record mode.

5. RS232 PC SERIAL INTERFACE

The instrument features an RS232 output via 3.5 mm Terminal (3-15, Fig. 1).

The connector output is a 16 digit data stream which can be utilized by user's specific application.

An RS232 lead with the following connection will be required to link the instrument with the PC serial input.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)
Center Pin.....	Pin 2
Ground/shield.....	Pin 5

The 16 digit data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicate the following status :

D0	End Word		
D1 to D8	Display reading, D1=LSD, D8=MSD For example: *If the display reading is 1234, then D8 to D1 is* 00001234		
D9	Decimal Point(DP) for display. 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D10	Polarity 0 = Positive 1 = Negative		
D11 & D12	Annunciator for Display		
	01 =C	09 = Knot	12 = mile/h
	02 =F	10 = Km/h	84 = CMM
	08 = m/s	11 = ft/min	85 = CFM
D13	When send the upper display data = 1 When send the lower display data = 2		
D14	4		
D15	Start Word		

6. BATTERY REPLACEMENT

1) When the left corner of LCD display show " LBT ", it is necessary to replace the battery. However in-spec measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Slide the Battery Cover (3-16, Fig. 1) away from the instrument and remove the battery.
3) Install a 9 V battery (PP3 type) and replace the cover.