

# OPERATION MANUAL

## RS232 INTEGRAL VANE DIGITAL ANEMOMETER



Model: ■ 8903  
■ 8904  
■ 8906



◆ Congratulations on your purchase of this Integral vane anemometer. The meter features versatile functions, use it to check air velocity FPM (Feet per minute) and CFM (Cubic feet per minute) in residential , light commercial and standard commercial systems.

◆ Thank you for selecting the meter. Please read this operation manual thoroughly before operation. This meter has many user-friendly features, all the features are accessible through the keypads.

◆ Please contact the store or the place you purchased for the rest models you might interested in.

◆ The meter is most ideal for HVAC/R technicians measuring Heat / Ventilation / Air conditioning / Refrigerating wind flow and temperature.

**CAUTION: Objects strike the fan may damage the meter.**

<b>Model:</b>	<b>Knot, MPH, KM/H selectable</b>	<b>Air Flow Volume Measurement</b>
<b>AZ8903</b>	<b>No</b>	<b>No</b>
<b>AZ8904</b>	<b>Yes</b>	<b>No</b>
<b>AZ8906</b>	<b>Yes</b>	<b>Yes</b>

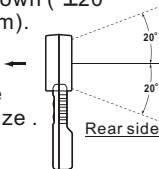
## FEATURES

- A. Measuring Air Velocity (Single point) Feet per Minute (FPM).
- B. Continuous Moving Average.
- C. MIN/MAX/AVG reading on a single point.
- D. Air Velocity average for multiple points ( 8904.8906 model only).
- E. Non Sleep Mode(Bypass auto power off).
- F. Default setting ( Imperial/ Metric)
- G. RS232 interface setting.
- H. Auto power off function.
- I. FTM , MPH , KNOT unit selectable (8904.8906 model only).
- J. Direct measuring of air flow (Single point) CFM ( 8906 only).
- K. Obtain air flow (CFM) average for multi-point ( 8906 only).

### Typical Measurement

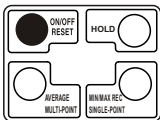
- a) Please place the meter in the airstream. Make sure that the airstream and the sensor are aligned as shown (  $\pm 20$  degrees maximum).

- b) 3 seconds for the reading to stabilize .

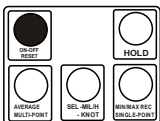


## FRONT PANEL DESCRIPTION

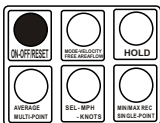
### Model:8903



### Model:8904



### Model:8906

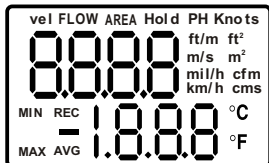


## BUTTON / DISPLAY

- 1.ON/OFF- RESET.** Power ON/OFF.  
Press with HOLD key to set non-sleep mode.
- 2.HOLD.** Freezes the reading.
- 3.AVERAGE MULTI-POINT.**
- 4.MN/MX RECORD SINGLE POINT**
- 5.SEL:MIL/H (MPH) ,KNOT.** unit selectable .  
(Model:8904 & 8906 only)
- 6.MODE VELOCITY, FREE AREA , FLOW.** (Model:8904/8906 only)  
Air volume measurement .

## INDICATORS

- 1.**vel.** Air velocity measurement.
- 2.**FLOW.** Air Flow/Air volume.
- 3.**AREA.** Free area default setting.
- 4.**Hold.** Freezes the reading.
- 5.**ft/m.** Feet per minute.
- 6.**ft<sup>2</sup>.** Feet square.(imperial)
- 7.**m<sup>2</sup>.** meter square.(metric)
- 8.**cfm.** Cubic feet per minute.(imperial)
- 9.**cms.** Cubic meter per second.(metric)
- 10.**C.** Celsius unit.
- 11.**F.** Fahrenheit unit.
- 12.**REC.** Record and saved.
- 13.**AVG.** Average data
- 14.**MIN.** Minimum data
- 15.**MAX.** Maximum data
16. **Primary readout**-Numerical display  
for Air Velocity/ Air Volume/Free  
area digit
17. **Secondary readout** -Temperature  
display or records number.
18. **"-" Polarity** indicator for negative  
temperature.
19. **Knots.** (KN)=1850 meters per hour  
or 1.15 miles per hour
20. **Mil/h.** (Imperial) Miles per hour
21. **Km/h.** (Metric) Km/h Kilometer  
per hour



## A. MEASURING AIR VELOCITY (SINGLE POINT) FEET PER MINUTE (FPM)

1. Press the **ON/OFF** button to turn the meter on. Meter will show full display for initial 5 seconds. (See Fig.1)
2. Unit is ready for use when **LCD** display shows "**vel**" at upper left corner and temperature at lower right corner. (See Fig.2)

**Fig.1**



**Fig.2**



## B. CONTINUOUS MOVING AVERAGE

The meter has the ability to display continuous moving average for up to two(2) hours.

1. Turn the power **ON** .
2. Place sensor in front of air flow source.
3. Press **MIN/MAX** record key once. An "**AVG**" and "**REC**" in the lower left corner of the display to confirm the meter is in continuous moving average measurement mode. The display will update every second. (See Fig.3)

**Fig.3**



## C. MIN/MAX/AVG READING ON A SINGLE POINT

To obtain MIN/MAX/AVG readings on a single point.

1. Power the meter **ON**.
2. Place sensor in front of air flow source.
3. Press **MIN/MAX REC SINGLE POINT** key. The unit will begin to record the readings. The meter displays the average velocity by default. (see Fig.3) Each press of the **MIN/MAX** button cycles the display through:
  - \* Real-time readings.
  - \* MIN velocity.
  - \* MAX velocity.
  - \* Back to AVG velocity.
4. To revert to normal measurement mode or clear the current **MIN/MAX** and average readings, you could turn off the meter first and then turn it on again or press and hold **MIN/MAX** key until meter beeps twice, then release.

**Note:** Feet Per Minute (FPM) readings can be converted to CFM readings by following below instructions:

1. Press the **HOLD** button to store the readings before moving the meter away from an air flow sources.
2. Press **MODE** key to enter area setting (see page 11 for the details of area setting). After setting, press **MODE** key again to convert the FPM into CFM.

## D. AIR VELOCITY AVERAGE FOR MULTIPLE POINTS(8904,8906 only)

1. Turn the meter on and position the vane at the first point to be measured. soon as the first measurement is completed press the **HOLD** key,(you will hear a single beep), and release. The display will show **HOLD** above the reading. (See Fig.4)



Fig.4



Fig.4-A

2. Press the **MIN/MAX** key,(You will hear a single beep), and release,(the display will show a digit 1-8). This number represents the point number which has been recorded.(See Fig.4-A)
3. Repeat above procedure until all desired points have been measured and recorded. A maximum 8 points may be recorded at one time.

4. Once all measurements have been recorded, you could press **AVERAGE** key to view the average air velocity reading and the number of points which are recorded.



Fig.5

5. You could press **HOLD** key to revert to normal measurement mode
6. To clear multi- point average memory, press and hold **next digit/multi point average** key until unit beeps twice, then release.



## E. NON SLEEP MODE (Disable auto power off)

Power unit off; press **ON** and **HOLD** at the same time and then release **ON** only. An "n" appears on the **LCD** then you can release the **HOLD** key. The instrument will remain on until the **OFF** button is pressed.(See Fig.6 )

Fig.6



## F. HOW TO CHANGE THE DEFAULT SETTING/IMPERIAL TO METRIC Vice Versa(METRIC TO IMPERIAL)

— The default measuring units can be changed by following the steps below.  
— The unit should be turned off before commencing.

1. Press and hold the **AVERAGE** key, then press the **ON/OFF** key once to turn the unit on. When the **LCD** displays " ft/m,ms " and "°C,°F" release the **AVERAGE** key.(Fig.7)
2. To choose the metric units, pressing the **HOLD** key. The **LCD** should display " m/s,°C". (See Fig.8)

Fig.7

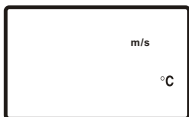
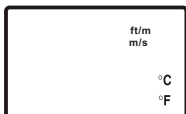


Fig.8

To choose the imperial units, pressing the **AVERAGE** key. The **LCD** should display "ft/m, °F" (See Fig.9).

Fig.9



3. Press the **MIN/MAX REC** key, the **LCD** should display "S" (See Fig.10) . Then press the **HOLD** key. The LCD display **2400** or **1200** (pre-setting). (If Baud rate change is needed, please refer to step G.1) (See Fig.11)

Fig.10



Fig.11



4. Press the **MIN/MAX REC** key again, the **LCD** should display "S" again. (See Fig.10) .Then press the **HOLD** key, the **LCD** will revert to a normal measurement display. The default setting is now completed.(See Fig.12)

Fig.12



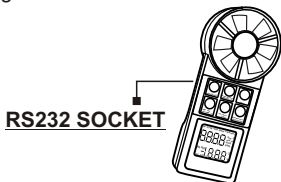
## G.SETTING THE RS232 OUTPUT (Optional accessory)

1. Following Step F.2, you will see a "2400" (default) number on the screen. The 2400 is the default setting of Baud Rate for RS232 output. You can change the setting to "1200" by pressing **HOLD** Key and change the setting back to "2400" by pressing the **AVERAGE** key. (See Fig.13)

Fig.13



2. Please remember to save your changes by pressing the **MIN/MAX REC** key. An "S" displays on the **LCD**. (See Fig.10). Press the **HOLD** key to confirm and save the changed value. The meter will return to air velocity mode automatically.
3. Plug the earphone jack of the cable VZRS232M into RS232 socket on the meter and connect 9-pin D-sub to the computer's COM1 or COM2. Press **ON** key to start measurement. The length of the cable VZRS232M is 2M.



## H. AUTO POWER OFF

The unit will turn off automatically after 20 minutes to save the battery. This will be preceded by 3 beeps.

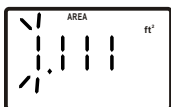
## I. MEASURING ft/m , MPH, Knot (Km/ Hour) (model 8904,8906 only)

In imperial , press **SEL** :.MPH . KNOT Key, the reading will change from ft/m, mil/h, knot in turns. In metric, press **SEL** :.MPH. KNOT key, the reading will change from m/s , km/h, knot in turn .

## J. DIRECT MEASURING OF AIR FLOW (SINGLE POINT) CFM (model 8906 only)

Air Velocity measurement is calculated by multiplying the air velocity readings by the free area dimensions. Free area is published by the grill and register manufacturer you are servicing. You must first determine the free area of the air source before entering it into the meter.

Fig.14



1. Power unit on
2. Press **MODE** once. LCD will display "AREA" and "1.111" will appear (See Fig.14). The first digit will flash.
3. Press the **HOLD** key to increase the number.
4. Press the **AVERAGE** key to advance to next number. Follow Step 3 and repeat to input the free area size.
5. Press the **MODE** key once all digits have been entered. The word "flow" will appear.

The meter is now ready to measure air flow(CFM).

**K. TO OBTAIN AIR FLOW (CFM)  
AVERAGE FOR MULTIPPOINTS  
(model 8906 only)**

Simply complete steps 1~4 in D. Once all the multi-point average is determined:

1. Press **MODE** button once and confirm correct free area setting is locked into instrument. (if free area setting must be adjusted make necessary changes now.)
2. If free area setting is correct press **MODE** button again to enter air flow mode.
3. Unit will now display average air flow reading and number of points measured.

**L. MIN/MAX/AVG AIR VOL. READING  
ON A SINGLE POINT (8906 only)**

To obtain min/max/avg air volume readings on a single point, power the meter on, select the mode as FLOW and the place the sensor in front of the air flow source.

Press **MIN/MAX/REC SINGLE POINT** key, the unit will begin to record the reading. Press **MIN/MAX** key to read the real time value/MIN/MAX/AVG in turns. Long press **MIN/MAX** key to clear the average readings.

The meter's free area dimension has been set to **1.111** square feet, a most commonly used free area dimension in the U.S.A. If you want to measure the air flow for a single point without changing the area dimension, please power on the

meter, position the fan and then press the **MODE** key twice, you will be into the air flow(CFM) mode and the air flow(CFM) displayed is equal to the current air velocity reading (**FPM x FREE AREA = CFM**) times the 1.111 square feet.

We would suggest to set the free area dimension before you start measuring the air velocity so after you measure the air velocity, you can jump to the air flow mode to view the cubic feet per minute without further changing the free area dimension.

### Cubic equations:

**CFM (ft<sup>3</sup>/min)**  
**= Air Velocity (ft/min)xArea (ft<sup>2</sup>)**

**CMS (m<sup>3</sup>/second)**  
**= Air Velocity (m/sec)xArea (m<sup>2</sup>)**

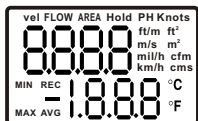
### Units Conversion Table:

	<u>m/s</u>	<u>ft/min</u>	<u>knots</u>
1 m/s=	1	196.87	1.944
1 ft/min=	0.00508	1	0.00987
1 knots=	0.5144	101.27	1
1 km/hr=	0.2778	54.69	0.54
1 mph=	0.4464	87.89	0.8679

	<u>km/hr</u>	<u>mph</u>
1 m/s=	3.6	2.24
1 ft/min=	0.01829	0.01138
1 knots=	1.8519	1.1523
1 km/hr=	1	0.6222
1 mph=	1.6071	1

### Note:

On initial start up, the unit will show full display as fig.15 although these features are only available on models 8901, 04 and 06.



## **TROUBLE SHOOTING**

### **? LOW BATTERY**

When the reading of display is flashing, or no display , please change the 9 volt battery in the meter .

Replace battery procedure:

Remove the screw from the lower back of the meter. Lift the cover out and remove the battery .Reverse the process to install a new battery and replace the cover .

### **? E6**

Indicates the related circuits or parts of thermistor are failed. Send them back to the store you have bought for repairing.

### **? SENSOR'S FAN WILL NOT TURN**

Indicates the sensor fan is damaged , purchase new sensor probe .

## **MATERIAL SUPPLIED**

This standard package contains:

- 1.The meter x 1
- 2.Battery x 1 (9.0 volt)
- 3.Operation manual x 1
- 4.Hard carry case x 1

Optional accessory:

- a) RS232 software CD-R.
- b) D-sub connector.

## GENERAL SPECIFICATION

SPECIFICATIONS		Resolu- tion	Accuracy
<b>Airflow Range</b>	80-5900 ft/min	1	$\pm(2\%$ of reading $+0.2$ m/s)
	0.4-30 m/sec	0.01	
<b>Temperature</b>	-10°C to 50°C	0.1	$\pm 1.0^{\circ}\text{C}$
	+14°F to 122°F	0.1	$\pm 2.0^{\circ}\text{F}$
<b>Battery Life</b>	100 Hours		
<b>Display Type</b>	LCD		
<b>Display Size</b>	37mm x 42mm(1-1/4" x 1- 5/8")		
<b>Max Reading</b>	9999		
<b>Dimensions</b>	183mm(L)x76mm(W)x45mm(D)		
<b>Fan Diameter</b>	70mm(2-7/8")		
<b>RS232 OUTPUT FORMAT</b> TXXX.XF, VXXXXFTM TXXX.XC, VXXXXMPS			
<b>AUTO POWER OFF</b> Approx. 20 minutes			
<b>DATA HOLD</b>			

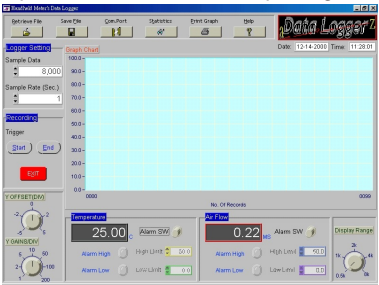
## RS232 OUTPUT:

The meter can link with personal computer to capture on-line datas ,display air velocity records with real-time output, you can retrieve file , save the datas for operating data analysis, records statistic ,multi-files display in the screen, ....versatile functions for your choice.



**Connection procedures:**

- 1.Plug the optional accessory RS232 cable onto the DC jack port ( at the right side of the meter)
- 2.Instert the D-sub 9P type connector onto computer's Com.1 or 2 port or....
- 3.Start to set up RS232 software by inserting the CD-ROM or Floppy diskette.
- 4.When installing the RS232 software ,please follow the operation manual procedure in the software package.



**WARRANTY**

The meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover battery , misuse , abuse , alteration , tampering , neglect , improper maintenance , or damage resulting from leaking batteries . Proof of purchase is required for warranty repairs . Warranty is void if the meter has been opened .

## **RETURN AUTHORIZATION**

Authorization must be obtained from the supplier before returning items for any reason . When requiring a RA (Return Authorization) , please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in shipment and insured against possible damage or loss .

## **CE CERTIFICATION**

The meter conforms to the following standards:

- \* EN 50081-1/1992: EN 55022
- \* EN 50082-1/1997: (EN 61000-4-2/-3/-8 ,ENV 50204)

, the meter complies with the essential protection requirements of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

**Accuracy, the Zenith of  
Measuring / Testing Instruments !**

Hygrometer/Psychrometer

Thermometer

Anemometer

Sound Level Meter

Air Flow meter

Infrared Thermometer

K type Thermometer

K.J.T. type Thermometer

K.J.T.R.S.E. type Thermometer

pH Meter

Conductivity Meter

T.D.S. Meter

D.O. Meter

Saccharimeter

Manometer

Tacho Meter

Lux / Light Meter

Moisture Meter

Data logger

Temp./RH transmitter

Wireless Transmitter .....

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