

# Operation Manual

## 10cm Vane Wireless Air Flow Meter



Model: ■ 89161

■ 89171

■ 89191



## INTRODUCTION

Thank you for purchasing AZ wireless air flow meter. This meter is specially designed for HVAC&R application that combines those required measurements, includes Air Velocity, Air volume, Temp., RH, WBT, DP, and CO2 in a handy meter. Optional airflow cone helps in quick volume measurement, just install the compatible airflow cone, meter will recognize the area for air volume calculations automatically.

Optional extension set provides user another way to take measurement in an efficient way without using ladder.

### Features :

- **Available** for air velocity, air volume, temp., RH, WBT, DP, and CO2.
- **Big LCD** digital display.
- **Multi-points** and **Timed** average calculation automatically.
- **Metric & Imperial** units selectable.
- **Fast** response & **Accurate** reading.
- **Low** battery indication.
- **Blue back light** for dark places use.
- **Handheld size**, easy to carry.
- **Wireless** transfer with free App available.
- **Advance BLE 4.0** technology.
- Free App is available for both **iOS & Android system**.
- **View history data** from your smart devices by one touch.
- **History data** contains summary with detail information can be **send to your PC/Laptop in CSV** format.
- Optional Round & Square **airflow cone**.
- Optional **Extension set**

## Function Table

	89161	89171	89191
Wireless	●	●	●
Air Velocity	●	●	●
Air volume	●	●	●
Air temp.	●	●	●
Humidity		●	●
Dew Point		●	●
Wet Bulb		●	●
CO2			●

## MATERIAL SUPPLIED

This package contains:

- ✓ The meter x 1
- ✓ Battery x 4 (AAA size )
- ✓ Operation manual x1
- ✓ Hard carry case x1

Optional accessory:

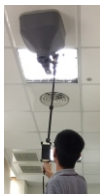
### Air Flow Cones

■ Square  
346x346mm

■ Round  
dia. 210mm

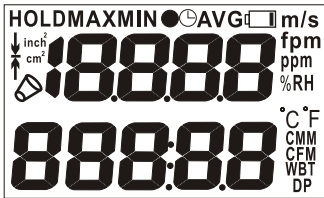


**Extension set:**



# CONTROLS AND INDICATORS

## LCD DISPLAY



**Upper display:** air velocity, RH, CO2

(Depends on model) value.

Duration time in average.

**Lower display:** air volume, temp., WBT,

(Depends on model) DP value.

**HOLD** : freezes the current reading.

**MAXMIN**: maximum & minimum reading

●🕒 **AVG**: multi-points & timed average

🔋 : battery low voltage indicator

ppm : CO2 unit

m/s, fpm: air velocity unit

%RH : relative humidity unit

°C °F : temperature unit

CMM, CFM: air volume unit

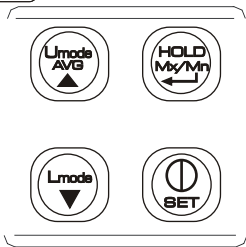
WBT, DP : wet bulb, dew point temp.







inch<sup>2</sup> cm<sup>2</sup> : area dimension unit

📏 : air flow cone indicator

↕ : vain icon in this meter


## KEY PAD




-  -Power button  
-Long press to enter or exit setup mode.
-  -Freeze current reading on LCD  
-Long press to review MIN and MAX  
-In average mode, press to record data or start timed recording.  
-In setup mode, press to enter data settings.
-  -Switch for upper display.  
-Long press to enter average mode.  
-In average mode, press to select option of average mode, press again to return to normal mode.  
-In setup mode, press to select category or increase value.
-  -Switch for lower display.  
-In average mode, press to view recorded and average reading of all parameters.  
-In setup mode, press to select category or decrease value.
-  +  -Disable auto power off.

## MEASUREMENT

### POWER ON/OFF

Press  to turn on the meter. The screen shows full display with blue backlight on and enter normal mode. (Model 89161/89171).

For model 89191, it proceeds 30 seconds warm up after turned on the meter, then it enter normal mode.

Press  again in any mode to turn off the meter.




The meter is preset auto sleep in 20 minutes of inactivity. To disable this function, hold down  and  for 2 seconds to turn on the meter while it is off. It shows "n" on the LCD (see Fig.A) and goes into normal mode (or 30 sec. warm up for model 89191) and won't turn off itself until  is pressed or out of voltage.



Fig.A

### SWITCH DISPLAY





When the meter is turned on, it shows the current readings of **air velocity** on the upper display and **air temp.** on the lower (see Fig.B). To switch display of other measurements, press  or .



Fig.B

Short press , the upper display will cycle among **air velocity, RH, and CO2** (89191 only).

And short press , the lower display cycles among **air temp. → air volume → WBT(wet bulb temp) → DP(dew point temp)**(Fig.C).

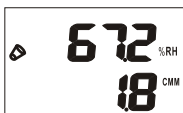




Fig.C

### **AIR VOLUME**

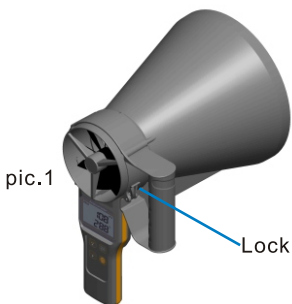
To measure air volume, it is necessary to get the outlet dimensions. Go to Setup mode and input the AREA value first before taking measurement. (See page 9 , P2.0)

After AREA setting is completed, press  to switch the display to air volume and the measured air volume will be displayed on the lower LCD.

To measure air volume with use of an airflow cone. Just plug on the cone and the meter will automatically recognize it and shows a  on the display(Fig.C). Then the meter will calculate the air volume by the default dimensions despite of any AREA value is input.


**Note:**

Be sure the airflow cone is well mounted and locked tight. (See pic.1)




**RH** (89171/89191 only)

The capacitive humidity sensor is built in the center of the vane to measure air flow relative humidity and is used for calculating dew point and wet bulb temperatures.



Press  to switch to RH display. It shows measured RH readings on the upper display. And it is also possible to display with RH offset. Go to Setup mode (see page 11, P3.0) and input offset value, then the displayed readings will be the measured data with offset.

## CO2 (89191 only)


Model 89191 features additional CO2 measurement for HVAC application. The NDIR CO2 sensor is built in the rear side of the meter. Press  to switch to CO2 display and the current reading will show on the upper LCD.

For places in high altitude, the pressure compensation needs to be considered in order to get accurate CO2 readings. Go to Setup mode P4.0 and input the pressure value according to your location before taking measurements.

## DATA HOLD

In normal mode, press  and the current readings are fixed on the LCD with **HOLD** icon on the top and won't change until a second press on .

## MIN/MAX

In normal mode, long press  for 3 seconds and it displays the minimum readings of all parameters since power on with **MIN** icon on the top. Long press this button again, it shows the maximum readings with **MAX** on the top. (Fig.D) Long press again and it returns to the normal mode.

While reviewing the minimum and maximum data, press  and  and it switches to display MIN and MAX readings of other parameters.

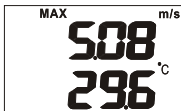






Fig.D

## AVERAGE

This meter calculates multi-points average and timed average of all parameters.

### Multi-points average

In normal mode, press  for 2 seconds to enter multi-point average mode. (See Fig.E, the upper display shows the record number and the lower is the measured reading)

- Press  to record readings.
- Press  to see the multi-point average once all data is recorded. It shows the average readings with flashing "● AVG".
- Press  to view the average reading of each parameter.

(See Fig.F, the upper display means total 20 recorded data; and the lower display is the average reading of RH.)

- Press  to return to normal mode.




Fig.E



Fig.F

### Timed average

In normal mode, press  for 2 seconds and it goes into multi-point average.

Press it again to enter timed average mode. (See Fig.G, the upper display shows the duration time in **second**, the maximum time is 19999 seconds, and the lower is the measured reading)



- Press  to start recording, the upper display starts the counting clock.
- Press  to stop and calculate the timed average. It shows the duration seconds on the upper display and the average readings at the lower display with flashing "●AVG". (See Fig.H)



Fig.G



Fig.H

- Press to view average reading of other parameters.
- Press to return to normal mode.

## SETUP

The setup mode is for those related parameters setting that can ensure more accurate measurements.

It includes:

P1.0: Unit selection

P2.0: AREA size

P3.0: RH offset

P4.0: Pressure input (*model 89191 only*)

In normal mode, press for 2 seconds to enter SETUP mode. It starts with P1.0 unit selection. Press or to select among P1.0 to P4.0. Long press again to return to normal mode.

### P1.0: Unit selection

In P1.0 (Fig.I), press to enter units selection (Fig.J). Then press or to switch from Metric to Imperial unit. The units include air velocity(m/s, fpm), temp.(C, F), air volume(cmm,cfm), and area size(cm<sup>2</sup>,inch<sup>2</sup>). After finishing the setting, press to return to P1.0.



Fig.I



Fig.J

## **P2.0: AREA Size**





In P2.0(Fig.K), press  to enter AREA size setting. It shows "99999" on the lower display with the first digit flashing. (Fig.L) The flashing digit means it is ready to adjust. Press  to change the number and it will cycle from 0 to 9. Press  to move to next digit. After completed, press  again to return to P2.0.



Fig.K



Fig.L

## **P3.0: RH offset (89171/89191 only)**





In P3.0(Fig.M), press  to enter RH offset setting. It shows blinking 0.0 RH reading on the upper display(Fig.N). Press  to increase the offset value and  to decrease it. When finished the setting, press  again to return to P3.0.



Fig.M



Fig.N

## **P4.0:Pressure input (89191 only)**





In P4.0 (Fig.O), press  to enter pressure input. It shows default 1013 hpa on the display with blinking value at the upper (Fig.P). Press  to increase the pressure value and  to decrease it. Once finished, press  again to return to P3.0.



Fig.O



Fig.P

## CALIBRATION

### **RH CALIBRATION** (89171 / 89191 only)

The humidity calibration of this meter requires specific fixture and cannot be done by end users. Please contact the dealer for calibration service.

### **CO<sub>2</sub> CALIBRATION** (89191 only)

The meter is calibrated at standard 400ppm CO<sub>2</sub> concentration in factory. It's suggested to do manual calibration regularly to maintain good accuracy.

#### **Note:**

When the accuracy becomes a concern after a long time use, return to dealers for standard calibration.

#### **400ppm calibration**

400ppm calibration is suggested to be done in outdoor fresh air that is well ventilated and in sunny weather.

#### **CAUTION:**

Do not calibrate the meter in the air with unknown CO<sub>2</sub> concentration. Otherwise, it will be calibrated as default 400ppm and leads to inaccurate measurements.

Place the meter in the **calibration site** and follow the below procedure to complete the 400ppm calibration.




1. While the meter is turned off, hold down , , and  simultaneously to enter CO2 calibration mode. It runs 30 seconds countdown with CAL at lower display (Fig.T), and then starts 400ppm calibration.
2. During calibration, a CO2 reading in the range of 380 to 420ppm will be flashing on the upper display. (Fig.U)
3. Wait for 10 minutes until the reading stops flashing, the 400ppm calibration is completed and it returns to normal mode automatically. .  
To abort the calibration, turn off the meter at any time.



Fig.T




Fig.U

**NOTE:**

Be sure the batteries are with full voltage during the calibration to prevent from interruption and fail in the calibration.

**LOW-BATTERY**

When the battery voltage falls below the measurement required range,  shows on the LCD. Replace with fresh batteries to ensure accurate measurements.

## Nice Flow App download

### Smart device system requirement

- ✓ Bluetooth function
- ✓ iOS system above iOS 10.4
- ✓ Android system above 6.0

Please always remember to enable the Bluetooth function on your smart devices before using this App.

Free APP can be download from App Store (iOS) or Play Store (Android). Search for "Nice Flow".



## App function

### Main Page



### 1. Device information

- Display serial number, device name (editable), low battery indicator, airflow cone indicator and realtime measurements.
- Maximum 5 devices' data can be viewed at the same time.
- Press each column to view the detail, do the setting, or calculate Time Average / Multi-point Average of specific device.

## 2. Preference display setting

- User can choose the parameters you want to view on main page for easy comparison of specific value between different devices.

Default setting is to display all, press “★” to remove the parameter, and press again to add it back.

## 3. Air Flow

- Press to return to the main page or update current measurement.

## 4. File

- Press to check the recorded history data of Average calculation.

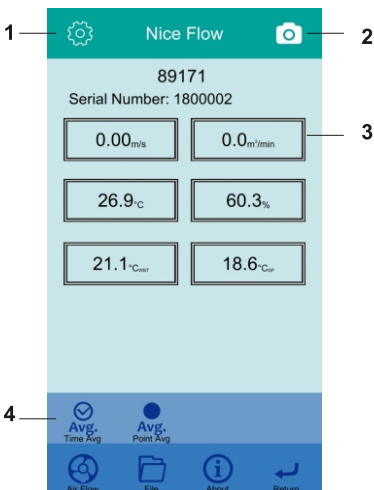
## 5. About

- Information of privacy and version number.

## 6. Return

- Return to previous page.

### Main Operation



## 1. General Setting

### - **Device Name Setting**

Maximum 6 characters.

### - **Unit**

Select "**Metric**" or "**Imperial**".

### - **RH Offset(for 89171 & 89191)**

Range from -12~12 RH%

### - **Absolute pressure (89191 only)**

Range from 700~1990hPa

### **Note:**

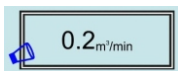
Current setting of anemometer will be displayed on upper area.

## 2. Camera Function

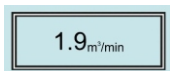
- Allow App to access camera / album on your smart device.
- Current measuring value with date and time stamped can be viewed.

## 3. Area Input Setting

User can input the area of air outlet by App when the **airflow cone** is **uninstalled**.



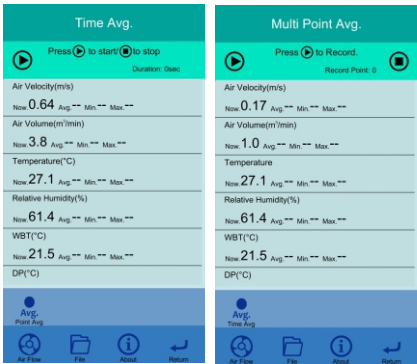
**Air flow cone installed**  
(CANNOT input area)







**Air flow cone uninstalled**  
(Can input area)

- Press the column of volume flow for outlet area input, 3 options available:
  - \***Area:** Enter the calculated area
  - \***Diameter:** Enter the diameter for round shape air outlet.
  - \***LxW:** Enter the Length and Width of the air outlet.
- Press "OK" to confirm, the setting on anemometer will be synchronized immediately.

## 4. Average Calculation



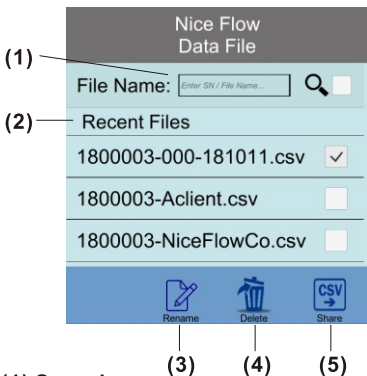
- Press “ Avg.” to enter Time Avg. Mode.
- Press “ Avg.” to enter Point Avg Mode.
- Press “” to record.
- Press “” to stop & view result.

**The calculation with summary and detail data will be saved automatically.**

### File - History Data

App records the summary and detail of average calculation automatically. User is able to:

- \***View** the **Avg.**, **Min.**, **Max.** and **detail** of each record point.
- \***Rename** the file.
- \***Send** the recorded **data in “CSV”** format by email.
- \***Delete** multiple files for data management.



**(1) Search**

Enter key word (serail number or edited file name), press “ 🔍 ” to search.

**(2) View History Data**

Press each column to view summary with detail data of each average calculation.

**(3) Rename**

Pre-set file name composed by **Serial Number** (non-editable) with **Sequence Number** and **Record Date**.

Select one file at one time, press “**Rename**” to edit the file name.

**(4) Share CSV file**

Select the file and click “**Share**” to send the CSV file via Email.


**(5) Delete**

Select the file and click “Delete”.

**Note: The delete file cannot be resumed, please make sure before press delete.**

## TROUBLESHOOTING

### 1. Power on but no display

- 1) Make sure the time of pressing  key is more than 200mS.
- 2) Check the batteries are in good contact with correct polarity.
- 3) Replace new batteries and try again.

### 2. Display disappeared

Check whether the low battery indicator shows before display disappears, if yes, replace with new batteries.

### 3. Error code and solution

#### 1) **Air Temp.**

E02: Temp. is under low range limit. Put the meter in room temp for 30 minutes. If E02 still shows, send to the dealer for repair.

E03: Temp. is over high range limit. Put the meter in room temp for 30 minutes. If E03 still shows, send to the dealer for repair.

E31: temperature measuring AD damaged. Send to the dealer for repair.

#### 2) **RH**

E04: temperature error caused the RH error. Check the temp. error solution.

E11: RH calibration error. Try recalibration or send for repair if it still can't work.

E33: RH measurement circuit error. Send to the dealer for repair.

### **3) DP and WBT**

E04: Temp. or RH error.

Check temp. or RH error solution.

### **4) Air velocity**

E03: Velocity is over high range limit.

Try in range measurement. If it still shows in range velocity, recalibrate it send for repair.

### **5) Air volume**

E03: Reading exceeds display limit.

Check if the outlet area setting is correct.

E04: Air velocity error.

Try recalibration or send for repair if it still can't work.

### **6)CO2**

E03: Temp. is over high range limit.

Put the meter in room temp. for 10 minutes and if E03 still shows, recalibrate it or send for repair.

E01/E33: Voltage too low or CO2 module error.

Check if battery low icon showed on the LCD, if yes, replace with new batteries.

Try recalibration, or send for repair if it still can't work.

### **7) Others**

E32: Memory IC error.

Turn off the meter and turn it on again. If E32 still shows, send to the dealer for repair.

## COMMON QUESTION OF APP

### How do I get the App?

- 1) Search "Nice Flow" on Google Play Store or Apple Store.

### Why can't I install the App?

- 1) Ensure if your smart device have enough space.
- 2) Ensure the system of your smart device is above the requirement:
  - \*iOS version above iOS 10.4
  - \*Android version above 6.0

### Why the App didn't work?

- 1) Ensure the Bluetooth function on your smart device had been activated.
- 2) Ensure the anemometer is powered on.
- 3) Ensure the distance between your smart device and anemometer is within 10M.  
**Note: Bluetooth transfer is available to operate at a range of 10 meters, however, performance can be diminished by obstacles such as walls or metal, and may also be affected by other BlueTooth devices.**
- 4) Move the Anemometer closer to your smart device.
- 5) Restart both Anemometer and your smart device and try again.

### Why can't I search the history data?

- 1) Ensure you enter the correct serial number or file name as key word.
- 2) Restart the App and try again.

### Why can't I rename the file name?

- 1) Ensure the letter you enter is within 10 Characters.
- 2) Restart the App and try again.

## SPECIFICATION

	89161	89171	89191
<b>Measuring range</b>			
Air velocity		0.20~30.00m/s	
Air volume		0 to 99,999 m <sup>3</sup> /m	
Temperature		-20.0~60.0°C (-5~140°F)	
Relative Humidity	N/A	0.1%~99.9%RH	
DP(Dew point temp.)	N/A	-5.0~59.9°C	
WBT(Wet bulb temp.)	N/A	-20.0~59.9°C	
CO2	N/A	N/A	0~9999 ppm, <small>(5001~9999 ppm out of scale range)</small>
<b>Resolution</b>	0.1m/s, 0.1(0~9999.9) or 1(10000~99999), 0.1°C/°F, 0.1%RH		
<b>Accuracy</b>			
Air velocity	+/- (1.5% of reading +0.3m/s) for under 20m/s +/- (3% of reading +0.3m/s) for above 20m/s		
Temperature	±0.6°C		
Relative Humidity	N/A	±3%RH <sub>(at 25°C, 10~90%RH)</sub> ; ±5%RH <sub>(others)</sub>	
CO2	N/A	N/A	±30ppm±5% of rdg.(0~5000ppm)
CO2 Warm-up time	N/A	N/A	30 seconds
Vane / Meter size (mm)	Dia. 100, 269(L)x106(W)x51(H)		
Air flow cone size(mm)			
Round	Dia. 210		
Square	346x346		
Operating condition (avoid condensation)	0 to 50 °C, <80%RH		
Storage condition	-10~ 50°C, <90%RH(avoid condensation)		
Power supply	AAA x 4pcs		
Standard package	Meter, manual ,AAA bat. , Hard carry case		
Optional accessory	Air flow cone set ( w/soft carry case ), Extension set		

## Certification

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

## **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 returned along with good packing to prevent any damage in shipment and insured against possible damage or loss.

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

Anemometer

Data logger

Datalogging printer

Gas Leak Detector

CO meter

CO2 meter

Hygrometer/Psychrometer

RTD probe Thermometer

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

Heat Index Meter / WBGT Meter

Infrared Thermometer

Manometer

Tachometer

Sound Level Meter

pH Meter

Conductivity Meter

T.D.S. Meter

D.O. Meter

ORP Meter

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