Operation Manual

10cm Vane Wireless Air Flow Meter with Airflow cone

Model: ■ 89161 ■ 89171 ■ 89191 $C\!E$

INTRODUCTION

Thank you for purchasing this wireless air flow meter. This meter is specially designed for HVAC&R application that combines those required measurements, like Air Velocity, Air volume, Temp., RH, WBT, DP, and CO2 in one 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.
A hassle free way to take the value of air volume .

Features :
- **Wireless** transfer with free App available for both iOS & Android.
- **Available** for air velocity, air volume, temp., RH, WBT, DP, and CO2.
- **Big LCD** digital display
- **Multi-points** and **Timed** average
- **Metric& Imperial** units selectable
- Optional Round & Square **airflow cone**
- **Fast** response & **Accurate** reading
- **Low** battery indication
- Blue **back light** for dark places use
- **Handheld size**, easy to carry

Function Table

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

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MATERIAL SUPPLIED
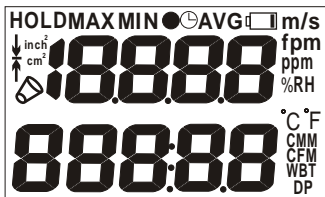
This package contains:
- ✓ The meter x 1
- ✓ Battery x 4 (AAA size)
- ✓ Operation manual x1
- ✓ Hard carry case x1

Optional accessory:
- ✓ Airflow cone set:
  Round conex1 (dia.210mm)
  Square conex1 (346x346mm)

CONTROLS AND INDICATORS

LCD DISPLAY

Upper display: air velocity, RH, CO2 value.
(Depends on model) duration time in average.
Lower display: air volume, temp., WBT, DP
(Depends on model) 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.
inch² cm² : area dimension unit
◇ : air flow cone indicator
↕ : vain icon in this meter

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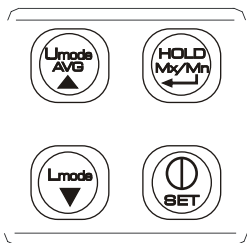
⏻/SET -Power button
  -Long press to enter or exit setup mode.

HOLD/Mx/Mn -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.

Umode/AVG -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.

Lmode/▼ -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.

⏻/SET + **Umode/AVG** -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.


```
        n

                    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 ⓥ.


```
              m/s
      0.00
      27.2  °C     Fig.B
```

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Short press (Lmode/AVG), the upper display will cycle among **air velocity, RH,** and **CO2** (89191 only).
And short press (Lmode▼), the lower display cycles among **air temp.** → **air volume** → **WBT**(wet bulb temp) → **DP**(dew point temp)(Fig.C).


```
◇   6 7 2 %RH

      1 8 CMM    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 (Lmode▼) to switch the display to air volume and the measured air volume will be displayed on the lower LCD.

Measure with airflow cones

Two optional airflow cones are available for using with this anemometer and are sold as a set.

■ Square
346x346mm

■ Round
dia. 210mm

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 $\diamondsuit$ 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)

pic.1

Lock
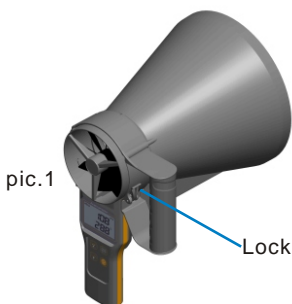
RH(89171/89191 only)

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 $\overset{\text{Umol}}{\underset{\text{AVG}}{\blacktriangle}}$ 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 9, 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 (mode/AVG) 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 (HOLD/MAX/MIN) and the current readings are fixed on the LCD with **HOLD** icon on the top and won't change until a second press on (HOLD/MAX/MIN).

MIN/MAX

In normal mode, long press (HOLD/MAX/MIN) 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 (mode/AVG) and (Lmode) and it switches to display MIN and MAX readings of other parameters.

MAX   m/s

5.08
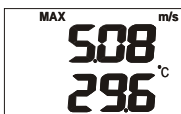
29.6 °c   Fig.D

(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.

● AVG m/s **000** **2.08**	● AVG **020** %RH **600**
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(cm², inch²). 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.

ArEA	cm² ArEA
P2.0	99999
Fig.K	Fig.L

P3.0: RH offset

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.

oFSt	0.0 %RH
P3.0	oFSt
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.

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| Fig.O | Fig.P |

CALIBRATION

RH CALIBRATION

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

CO2 CALIBRATION *(89191 only)*

The meter is calibrated at standard 400ppm CO_2 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_2 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.

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1. While the meter is turned off, hold down $\textcircled{\small ①}$, (HOLD M/M) and (Lmode) simultaneously to enter CO_2 calibration mode. It runs 30 seconds countdown with CAL at lower display(Fig.T), and then starts 400ppm calibration.

2. During calibration, a CO_2 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 installation

Smart device system requirement
✓ iOS version above iOS
✓ Android version above 5.0

Please always remember to enable the wireless function on smart device before using this App.

App function

(Main Page)

Preference display
User can choose which parameters to be displayed at the main page.
Default setting is to display all parameters, press " *star* " button next to the parameter to remove the one you don't want to see at the main page, and press again to add it back.

Main Page
Press to return to the main page and view the current measuring values of different meters.
(Maximum display 5 meters at one time)

Files
Press to check the history data of Avg-Min-Max data.

About
Information of privacy and version.

Return
Return to previous page.

Avg-Min-Max by App

This App is able to calculates multi-points average / timed average, and display together with Minimum / Maximum values of all parameters after starts the recording process.

User can determine when to start and when to stop the calculation, or when to take the measurements under Point Avg. Mode by App.

The data will be saved automatically after stop recording, it can be output in csv format for further analyze.

Timed average

- Select one device at one time on main page, you will see the detail of current measurements of the specific meter.
- Press "*Time Avg.*" to enter the Timed-average mode.
- Press "*Start*" to start recording, the upper right corner display the time duration of recording.
- Press "*Stop*" to stop recording, the data will be saved automatically.
- Check the recording detail at "Files"

Multi-points average

- Select one device at one time on main page, you will see the detail of current measurements of the specific meter.
- Press "*Point Avg.*" to enter the Point Average mode.
- Press "*Start*" to record, the upper right corner display the total record point
- Press "*Stop*" to stop recording, the data will be saved automatically.
- Check the recording detail at "Files"

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Data Review & Output by App

Search Recorded Data
- Press "File" to enter the search page
- Enter serial number or file name at the upper blank area, press "*icon*" to search.
- The search result will be listed, click "File Name" to see the detail.

Edit File Name
- Select the file and you will see the "Rename" option appear.
- Click "Rename", click edit, enter file name.
- Press Save to save the file name.

Send in CSV format
- Select the file and you will see the "CSV" option appear
- You can select multiple files to send them in CSV format for further analyze.

Delete File
- Select the file and you will see the "delete" option appear.
- Click "delete" to delete the file, the delete file will not be able to resume, please be sure before press click.

Setting by App

User is able to do the setting by App.
- Select one meter on main page
- Press " *SET* " on upper left corner for general setting list as below:

Device Name
- Press **Device Name** to start.
- Enter maximum 6 characters for device name setting.
- Press ok to confirm.

Unit Selection
- Press **Unit** to start.
- Select Metric or Imperial.
- Press ok to confirm.

RH off set(89171/89191 only)
- Press **RH off set** to start.
- Enter the number between 0~12 for RH off set setting.
- Press ok to confirm.

Pressure input (89191 only)
- Press **Absolute pressure** to start.
- Enter number between 700~1990 for pressure compensation.
- Press ok to confirm.

Outlet Area input

User can also input the outlet area via App, please follow below steps:
- Ensure airflow cone is not installed
- Press the meter you would like to input outlet area on main page
- Press "**Volume Flow**" for outlet area input, 3 options available:

*Area: Enter the calculated outlet area
*Diameter: If the outlet is in round shape, enter the diameter
*LxW: Enter the Length and Width of the outlet area

TROUBLESHOOTING

1. <u>Power on but no display</u>
  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. <u>Display disappeared</u>
   Check whether the low battery
   indicator shows before display
   disappears, if yes, replace with new
   batteries.

3. <u>Error code and solution</u>
  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.

TROUBLESHOOTING FOR APP

1. <u>App no display</u>
   1) Make sure meter is power on with display.
   2) Turn off other BLE device.
   3) Close the app and switch it on again.

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 0.5 centimeters between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The antennas used for this transmitter must be installed to provide a separation distance of at least 0.5 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

SPECIFICATION

	89161	89171	89191
Measuring range			
Air velocity		0.20~30.00m/s	
Air volume		0 to 99,999 m³/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, (5001~9999 ppm out of scale range)
Resolution	0.1m/s, 0.1(0~9999.9) or 1(10000~99999), 0.1°C/°F, 0.1%RH		
Accuracy			
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(at 25°C, 10~90%RH) ; ±5%RH(others)	
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

More products available !

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