Operation Manual

10cm Vane Air Flow Meter with Airflow cone

Model: ■ 8916
　　　　 ■ 8917
　　　　 ■ 8919

$C\!\epsilon$

INTRODUCTION

Thank you for purchasing this 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.

The Air flow cone compatibility also helps in quick volume measurement. Users can be freed from the hassle of calculating dimensions.

Features :

- **Measures** air velocity, air volume, temp., RH, WBT, DP, and CO2.
- **Big LCD** digital display
- **Multi-points** and **Timed** average
- **Metric& Imperial** units selectable
- Round & Square **airflow cone** compatible
- **Fast** response & **Accurate** reading
- **Dew Point** calculated in seconds
- **Wet Bulb** calculated in seconds
- **Low** battery indication
- Blue **back light** for dark places use
- **Handheld size**, easy to carry

Function Table

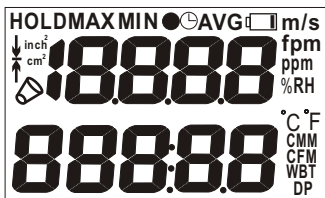|	8916	8917	8919
Air Velocity	●	●	●
Air volume	●	●	●
Air temp.	●	●	●
Humidity		●	●
Dew Point		●	●
Wet Bulb		●	●
CO2			●

MATERIAL SUPPLIED

This package contains:

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

Optional accessory:

✓ Airflow cone set:
  Round cone x1 (dia.210mm)
  Square cone x1 (346x346mm)

CONTROLS AND INDICATORS

LCD DISPLAY

Upper display: air velocity, RH, CO2 value
    duration time in average.
Lower display: temp., air volume readings.
HOLD : freezes the current reading.
MAXMIN: maximum and minimum reading
●🕒AVG: multi-points mean & timed average
▯ : battery low voltage indicator
ppm : CO2 unit
m/s,fpm: air velocity unit
%RH : relative humidity
°C °F : temperature units
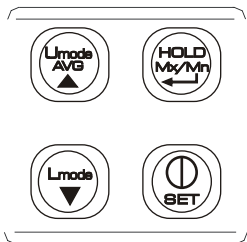**CMM,CFM**: air volume units
WBT, DP : wet bulb, dew point temp.
inch² cm² : area dimension units
◇ : air flow cone indicator
✳ : vain icon in this meter

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$\boxed{\underset{SET}{\textcircled{\tiny O}}}$ -Turns the meter on and off.
  -Long press to go in and out setup
   mode.

$\boxed{\underset{Mx/Mn}{HOLD}}$ -Freezes 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.

$\boxed{\underset{AVG}{Umode}}$ -Switches upper display.
  -Long press to go into average mode.
  -In average mode, press to average
   and return to normal mode.
  -In setup mode, press to select
   category or increase value.

$\boxed{\underset{\blacktriangledown}{Lmode}}$ -Switches 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.

$\boxed{\underset{SET}{\textcircled{\tiny O}}}$ + $\boxed{\underset{AVG}{Umode}}$ -Disables auto power off.

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MEASUREMENT

POWER ON/OFF

Press $\textcircled{\Phi}$ to turn on the meter. The screen shows full display with blue backlight on and enter normal mode. (Model 8916/8917). For model 8919, it proceeds 30 seconds warm up when turned on, then goes into normal mode. Press $\textcircled{\Phi}$ 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 $\textcircled{\Phi}$ and $\textcircled{\text{AVG}}$ 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 8919) and won't turn off itself until $\textcircled{\Phi}$ 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 $\textcircled{\text{AVG}}$ or $\textcircled{\text{mode}}$.

Fig.B

Short press [Umode AVG], the upper display will cycle among **air velocity, RH,** and **CO2** (8919 only).
And short press [Lmode], the lower display cycles among **air temp.** → **air volume** → **WBT**(wet bulb temp) → **DP**(dew point temp)(Fig.C).

$$67\ 2\ \%RH$$
$$18\ ^{CMM}$$
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 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 ◈ 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
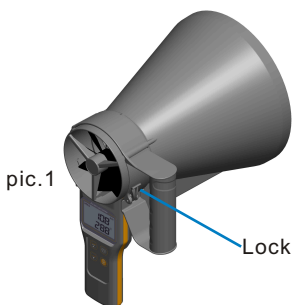
RH *(8917/8919 only)*

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 ⟨Umd⟩ 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.

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CO2 *(8919 only)*

Model 8919 features additional CO2 measurement for HVAC application. The NDIR <u>CO2 sensor</u> 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.
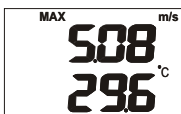

MAX	m/s
5.08	
29.6 °c	

Fig.D

(AVERAGE)

This meter calculates multi-points mean 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 mean 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)
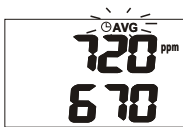
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Fig.G   Fig.H

- Press ⬇Lmode to view average reading of other parameters.
- Press ▲AVG 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 8919 only)*

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

P1.0: Unit selection

In P1.0 (Fig.I), press ⬒HOLD to enter units selection (Fig.J). Then press ▲AVG or ⬇Lmode 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 ⬒HOLD to return to P1.0.

Fig.I   Fig.J

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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 P2.0	cm² ArEA 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 P3.0	0.0 %RH oFSt
Fig.M	Fig.N

P4.0:Pressure input *(8919 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

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.

1. While the meter is turned off, hold down ($\textcircled{\textbf{①}}$), (HOLD) and (Lmode) 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.

30	**402** ppm
CAL	**CAL**
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.

TROUBLESHOOTING

1. <u>Power on but no display</u>
   1) Make sure the time of pressing ⓂSET 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.

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SPECIFICATION

	8916	8917	8919
Measuring range			
Air velocity		0.2~30m/s	
Air volume		0 to 99999 m³/s	
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 Square	Dia. 210 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)		

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 !**

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
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Manometer
Tacho Meter
Lux / Light Meter
Moisture Meter
Data logger
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