

OPERATION MANUAL

ANEMO-PSYCHROMETER & BTU-PSYCHROMETER



Model: ■ 8902
■ 8911
■ 8912



www.calcert.com

sales

INTRODUCTION

Thank you very much for purchasing this Anemo-Psychrometer.

This unique meter design with 7 H.V.A.C &R must parameters in 1. The meter designed as battery operated for Humidity, Air temp., Dew Point, Wet Bulb, Air Velocity, Air Volume & BTU (8912).

The sensor is built in the remote fan and is specially protected by tunable cap. While in operation, please turn on the cap to get accurate temperature and humidity reading.

The psychrometer is a micro processor-based design. A must device for HVAC engineers use. No need to whirl the meter or refer to the chart. Easy to get wet bulb, dew point and BTU(8912) quickly!

Features :

- **Tunable cap** to protect sensor
- **Up to 8 velocity memory** (only 8911)
- **Big LCD** digit display
- Professional **remote vane**
- **Metric & Imperial** selectable
- **Handheld size**, easy to carry
- **Low** battery indication
- **Fast** response & **Accurate** reading
- **Tripod mountable** for long time use
- **Dew Point** calculated in seconds
- **Wet Bulb** calculated in seconds
- **Microprocessor** circuitry for reliability
- **Sleep and non-sleep** selectable
- Powered by **4 AAA** batteries or 9VDC adaptor
- **Back light** for dark places

MATERIAL SUPPLIED

This package contains:

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

Optional accessory:

- ✓ AC to DC 9V adaptor
- ✓ RS232 cable & CD

REMINDER



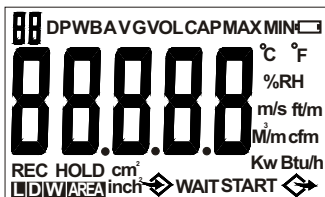
Important:

1. Rotate the cover before measurement to ensure the measured data is correct.
2. The fan and meter are sold as a kit and are well calibrated.

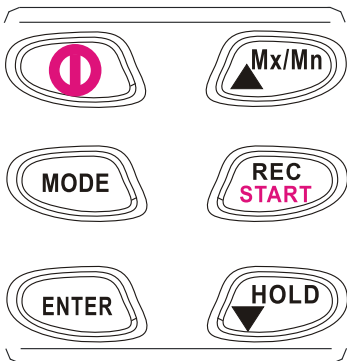
When you need to replace the fan, please see page 16 for the details of fan replacement.

CONTROLS AND INDICATORS


LCD DISPLAY



KEY PAD



1. Power :

- Turn on the meter with auto-sleep mode.
- Turn off the meter at any mode.
- When the meter is off, pressing  more than two sec. to enter units selection.

2. MODE:

- Pressing to select different modes.
Temp. → DP → WB → RH → Velocity.
- Pressing longer to select VOL and CAP.

3. ENTER:

- To confirm the setting & calibration.

4. Mx/Mn/Up ^{Mx/Mn} :

- Pressing to view MAX/MIN/AVG value.
- Press to select the value of each digit in cycle.

5. REC/START:

- In velocity mode, pressing this key to store the current velocity reading into memory (8911 only)
- To start measuring volume or capacity (8912 only) without waiting.

6. **HOLD/Down** **HOLD** :

- In basic modes pressing this key to hold the current reading, then pressing this key again to unlock the holding.
- Pressing to select the setting digit.

7. **Power** + **Mx/Mn** :

- When the meter is off, pressing more than two sec. to enter non-sleep mode.


8. **Power** + **Mx/Mn** + **HOLD** :


- Pressing more than two seconds to enter RH calibration mode.

9. **ENTER** + **HOLD** :



- Pressing to turn on/off the backlight.

POWER ON/OFF & UNIT SELECT

Press  to turn on the meter with auto-sleep mode. Press again to turn off the meter at any mode.

When the meter is off, pressing  more than two seconds to enter units selection mode.

<p>cm</p> <p>°C %RH m/s M/m Kw</p>	Or	<p>inch</p> <p>°F %RH Ft/m cfm Btu/h</p>
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When in unit selection mode, press  **Mx/Mn** or  **HOLD** to select the unit, then, press **ENTER** to save and meter will be powered on automatically.

BASIC MEASUREMENT

Please refer to below table of the basic measured parameters of each model

Basic Measure

	8902	8911	8912
Air temp.	●	●	●
Humidity	●	●	●
Dew Point	●	●	●
Wet Bulb	●	●	●
Air Velocity	●	●	●
Vel with average		●	

Extend Measure

	8902	8911	8912
Air Volume	●	●	●
Sum of Volume	●	●	●
Capacity			●
Sum of Capacity			●

When power on, the air temperature is the default value to show on the LCD. To review the other basic parameters, just press **MODE** key then each parameter will be display in turn.

While in basic mode, press **MODE** for over 2 seconds to enter extend measurement mode. For 8912, also press **MODE** key to switch between volume and capacity.

Velocity with memory (8911 only)

In velocity mode, press **REC START** to store value into memory. A record number will be displayed on the top-left of the LCD. The max. record is 8 points.(Fig.A)



(Fig.A)

MAX, MIN & AVG.

From the meter is powered on, air temp., dew-point, WBT, humidity & velocity will be temporarily saved in meter, so, to press $\blacktriangle^{Mx/Mn}$ could view the average value minimum value and maximum value in turns. Press $\blacktriangle^{Mx/Mn}$ again to back to normal mode. The data will be re-counted once the meter is powered off and turn on again.

When in Max./Min./Avg. mode, pressing MODE key to display the parameters you need. (Fig. B, Fig. C)



(Fig. B)



(Fig. C)

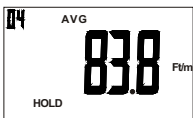
Checking velocity memory(8911 only)

While the 8911 is in velocity mode and with record in memory (up to 8 points), pressing ENTER key to review average value (at moment, the meter is in hold mode).

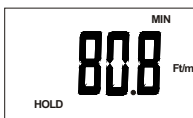
Pressing $\blacktriangle^{Mx/Mn}$ key to view the minimum /maximum value of memorised velocity in turns.(Fig.D & Fig. E)

Pressing ENTER key again to exit above average/ min. /max. review and back to normal.

The memorized record will be deleted after the meter is powered off and turn on again.



(Fig.D)



(Fig.E)

AIR VOLUME: OUTLET SIZE

While in normal mode, long pressing **MODE** key to enter air volume mode. To measure the volume, the outlet size need to be input first. There are three choice to enter the size:

- Length & Width:

This is the default choice. Press ∇^{HOLD} key to select the setting digit first, then press $\blacktriangle^{\text{Mx/Mn}}$ key to select the appropriate value (0~9). When select the value, the value will show from 0 to 9 in cycle. After entering length, short press **ENTER** to enter width setting. Repeat the procedure of length setting, then short press **ENTER** again to finish the size setting and enter next step. (Fig.F)

- Diameter:

While in default outlet setting mode (length), pressing **ENTER** key for over two seconds to choose diameter setting. Press ∇^{HOLD} key to select the setting digit first, then press $\blacktriangle^{\text{Mx/Mn}}$ key to select the appropriate value (0~9)

After selection, short press **ENTER** again to finish the size setting and enter next step. (Fig. G)

- Area:

While in diameter setting mode, pressing **ENTER** key for over two seconds to enter area setting.

Press \blacktriangledown ^{HOLD} key to select the setting digit first, then press \blacktriangle ^{Mx/Mn} key to select the appropriate value (0~9)

. After selection, short press ENTER again to finish the size setting and enter next step. (Fig. H)



(Fig. F)



(Fig. G)

(Fig. H)

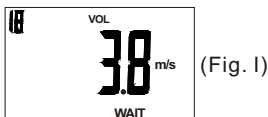
Note: Refer to page 13 for the range of each size input mode.

AIR VOLUME: MEASUREMENT

After short pressing ENTER to finish and leave size setting, there are 20 second waiting time for you to put the vane to the grill.

During the 20 second waiting time, the count down number displayed on top-left corner and meter also beeps when time is up. (Fig. I)

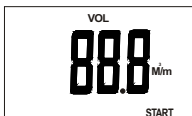
If no need to wait for 20 seconds, just pressing **REC** **START** key to start measuring the volume right away.



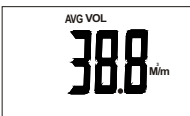
(Fig. I)

After starting measuring the volume, the meter will automatically count the volume for 60 seconds to give a average value. (Fig. J) During this 60 second time, the vane should move along the whole outlet to cover each area so the measured data could be more accuracy. The count down number displayed on the top- left corner as a reminder and meter also beeps when 60 sec is up.

After time is up, 60 seconds average volume will display on the LCD as Fig K.



(Fig. J)



(Fig. K)

If there are more than one outlet, you could press ENTER key again to repeat the procedure from outlet size input. You could measure outlet as many as you need.

After measuring more than one outlet volume, you could press $\blacktriangle^{Mx/Mn}$ key to review the sum of all outlets. Pressing $\blacktriangledown^{HOLD}$ key to review the last outlet volume.

CAPACITY: OUTLET SIZE

While in normal mode, long pressing MODE to enter air volume, then short press MODE to enter capacity mode. To measure the capacity, put the vane on the Inlet, then press ENTER to count the 60 second average Temp. & RH% (Fig. L)count down will show on left-top corner of LCD and meter beeps after 60 second is up. Then, the meter enter outlet size setting automatically. (Note 1)

There are three choice to enter the size:

- Length & Width:

This is the default choice. Press ∇^{HOLD} key to select the setting digit first, then press $\blacktriangle^{\text{Mx/Mn}}$ key to select the appropriate value (0~9). When select the value, the value will show from 0 to 9 in cycle. After entering length, short press ENTER to enter width setting. Repeat the procedure of length setting, then short press ENTER again to finish the size setting and enter next step. (Fig.M)

- Diameter:

While in default outlet setting mode (length), pressing ENTER key for over two seconds to choose diameter setting. Press ∇^{HOLD} key to select the setting digit first, then press $\blacktriangle^{\text{Mx/Mn}}$ key to select the appropriate value (0~9) After selection, short press ENTER again to finish the size setting and enter next step. (Fig. N)



(Fig. L)



(Fig. M)

- Area:

While in diameter setting mode, pressing ENTER key for over two seconds to enter area setting.

Press ∇^{HOLD} key to select the setting digit first, then press $\blacktriangle^{\text{Mx/Mn}}$ key to select the appropriate value (0~9)

. After selection, short press ENTER again to finish the size setting and enter next step. (Fig. O)



(Fig. N)



(Fig. O)

CAPACITY: MEASUREMENT

After short pressing **ENTER** to finish and leave size setting, there are 90 or 20 second (note 1) waiting time for you to put the vane to the grill.

During above waiting time, the count down number displayed on top-left corner and meter also beeps when time is up. (Fig. P)

If no need to wait for 90 or 20 seconds, just pressing **REC START** key to start measuring the capacity right away.



(Fig. P)

Note 1:

If you have many outlet to measure, while you start to measure the second one, the waiting time will adjust to 20 sec automatically. 90 sec. is the buffer for sensor to stable. No matter in inlet or outlet, suggest to move the vane along the grill to get accuracy value.

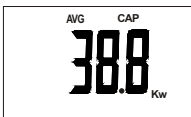
After starting measuring the capacity, the meter will automatically count the capacity for 60 seconds to give an average value. (Fig. Q)

During this 60 second time, the vane should move along the whole outlet to cover each area so the measured data could be more accuracy. The count down number displayed on the top-left corner as a reminder and meter also beeps when 60 sec is up.

After time is up, 60 seconds average volume will display on the LCD as Fig R.



(Fig. Q)



(Fig. R)

If there are more than one outlet, you could press ENTER key again to repeat the procedure from outlet size input. You could measure outlet as many as you need.

After measuring more than one outlet volume, you could press ▲^{Mx/Mn} key to review the sum of all outlets. Pressing ▼^{HOLD} key to review the last outlet capacity.

If you would like to measure more than 1 inlet, please wait for 10 minute and allow the humidity sensor to return to the humidity room or help it by home ventilation.

LOW-BATTERY

Two level low battery indication:

-Level 1: Battery indicator will flash when meet level 1. In this situation, the meter will work normal however users should prepare new batteries.

-Level 2: Battery indicator will always display on the LCD while meet lever 2. In this situation, users need to change batteries immediately.

1. Open the battery cover on the rear side.
2. Remove the expired batteries.
3. Insert new 4pcs AAA batteries and make sure the batteries are inserted with correct polarity, put on the cover.

AC TO DC ADAPTOR

The compatible AC to DC adaptor is 9V at least 200mA.

AVAILABLE SIZE RANGE

Please refer to below input size range. Please be reminded that in metric L/W/D, the value after decal is not selectable.

	L/W/D	AREA
cm	000.0~999.0	00000~99999
inch	000.0~999.9	00000~99999

RS232 SOFTWARE

Software

We have compatible software and cable which is design for the meter, please contact with your supplier for the details.

Interface of RS232

A. 9600 bps, 8 data bits, no parity.

B. Format: Tx. ASCII code by every sec. while meter is on

VXXX.XMPS(FTM):TXXX.XC(F):HXX.X%:

dXXX.XC(F):wXXX.XC(F):

vXXXXX.XCMM(CFM):

UXXXXX.XKW(BTU)

NOTE: Last parameter (capacity) is for 8912 only.

Where: The 1st value is velocity, the 2nd value is Air temp., the 3rd value is Humidity, the 4th value is Dew Point, the 5th value is Wet bulb, the 6th value is AIR Volume, the 7th value is Capacity. The x here means one of {0|1|2| |9|-}

C. Format for error value:

E01 Probe didn't connected;

E02 Under flow;

E03 Over flow. See more in page

The unit for error code is Nul.

EX:

V010.5MPS:TE02Nul:H66.7%:

dE04Nu:wE04Nul:v00020.5CMM.

TROUBLESHOOTING

1. Power on but no display

a) Make sure the time of pressing key is more than 0.1 second.



b) Check the batteries are in place and in good contact with correct polarity.

c) Replace a new battery and try again.

d) Move away the battery for one minute and put back again.

2. Display disappear

a) Check whether the low battery indicator displayed before Display disappear, if yes, replace a new battery.

b) Turn on the meter by pressing  +  key to disable auto power off function for long time using.

3. E1

a) The probe is disconnected or damaged.

4. E 2

a) The value is underflow.

5.E 3

a)The value is overflow.

4.E4

a)The original data that is relative to this value error.

5.E5

a)Out of meter display range.

6.E6

a)the value is not calculated completely.

7.E 11

a)Humidity Calibration error.

SPECIFICATION

TEMPERATURE : -20°C to 60°C (-4 to 140°F)

Accuracy. : $\pm 0.6^{\circ}\text{C}(\pm 1^{\circ}\text{F})$,

Resolution : $0.1^{\circ}\text{C} (0.1^{\circ}\text{F})$

RELATIVE HUMIDITY : 0 to 100% RH

Accuracy : $\pm 3\%$ at 10 to 90%RH (cal. temp.)

$\pm 5\%$ at other range

Resolution : 0.1%

DEW POINT : -68 to 70°C (-90 to 158°F)

Resolution : 0.1°C

WET BULB TEMPERATURE :

-22 to 70°C (-7.6 to 158°F)

Resolution : 0.1°C

AIR VELOCITY : 0.6 to 32 m/s (118 to 6299 ft/m)

Accuracy : $\pm 2\%$ of full scale

Resolution : 0.1

AIR VOLUME : 0 to 99999 m³/s (0 to 99999 cfm)

Accuracy : $\pm 2\%$ of full scale

Resolution : 0.1 (0 - 9999.9) or 1 (10000 - 99999)

ADDITIONAL FEATURE :

BTU CAPACITY : 0 to 99999 BTU/H (KW) (8912)

Resolution : 0.1 (0 - 9999.9) or 1 (10000 - 99999)

Dimension : (HxWxD)

Vane : 170 x 77 x 40 mm³; Meter : 175 x 70 x 33 mm

Power: 4 x 1.5V AAA battery or





9V >200mA adaptor.

FAN REPLACEMENT

If users have more than one set anemometers or users change a new fan for his old meter, user should input the RH% calibration data which enclosed with each fan. The data will be recorded in a slip of paper and ship with fan, please keep the paper well for future use.

There are two calibration data need to be inputted. First value is "Slope, S" and the second value is "Intercept, Z"

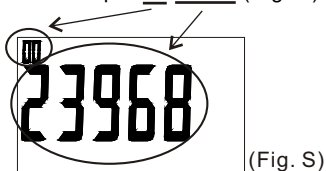
Slope(value S)

1. While the meter is off, press  +  + **REC** **START** at the same time for 2 seconds to enter humidity slope calibration mode. LCD will display current saved S value and the last digit will flash to indicate the value is ready for edit.
2. If the saved S value is different from your paper, press  key to move to the digit which you want to edit and then use  key to change the value.
3. Press **ENTER** key to save new input S value and then meter will enter second value input automatically.

Important Note: While setting the slope, only input 5 digits after decimal point, so user need to round off the 6th digit. User should also input two digits before decimal.

Example:

- If the S value is 8.239678, user should input 08 23968
- If the S value is 11.23968, user should input 11 23968
- If the S value is 0.2396838, user should input 00 23968 (Fig. S)



Intercept (value Z)

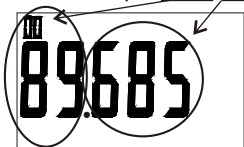
- While press **ENTER** key save the S setting, the meter will enter intercept input automatically. The last digit will flash to indicate the Z value is now ready for edit.
- If the last saved Z value is different from your paper, press **▼^{HOLD}** key to move to the digit which you want to edit and then use **▲^{Mx/Mn}** key to change the value.
- Press **ENTER** key to save new input Z value and then meter will be back to normal RH value mode.

Important Note: While setting Z value, only input 3 digits after decimal point, so user need to round off the 4th digit.

User should also input four digits before decimal. All the Z is a negative value but LCD will not appear the negative icon.

Example:

- If the Z value is -928.8683, user should input 09 28868
- If the Z value is -1928.868, user should input 19 28868
- If the Z value is -89.68482, user should input 00 89685 (Fig. T)



(Fig. T)

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.

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 .