PM2.5, %RH, Temp.

AIR QUALITY MONITOR

Model : PM-1053

Your purchase of this AIR QUALITY MONITOR
marks a step forward for you into the field of precision measurement. Although
this Meter is a complex and delicate instrument, its durable structure developed.
Please read the following instructions carefull yand always keep this manual
within easy reach.

OPERATION MANUAL

TABLE OF CONTENTS

1. FEATURES

* Monitoring air pollutant source from dust, petrochemical industry, steel-making plant, thermal power plant, restaurant, smoke, burning plants, driving automobiles.
* The meter is a real-time air quality monitor instrument used to monitor the concentration of PM2.5, humidity and temperature in the indoor environment.
* PM2.5 : 0 to 250 μg/m³.
* Humidity : 5 to 95 %RH.
* Temperature : 0 to 50 ℃ ,℃/℉.
* PM2.5 time weighted average reading.
* Data hold,Record(Max,Min)
* Health index(0-9) detection and alarm .
* Can replacement air filter .
* Power by UM3/AA(1.5V) X 6 batteries or DC 9V adapter
* RS232/USB PC computer interface

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	LCD Size: 2.18 X 2.87" (55.4 X 72.9 mm)(Dot Matrix) LCD with green backlight (ON/OFF).
Measurement	* PM2.5(Particulate matter) * Humidity * Temperature
Over-range	* LCD display show " OL "
Data Hold	Freeze the display reading.
Memory Recall	Maximum & Minimum value.
Sampling Time of Display	Approx. 1 second.
Data Output	RS 232/USB PC computer interface. * *Connect the optional RS232 cable UPCB-02 will get the RS232 plug.* * *Connect the optional USB cable USB-01 will get the USB plug.*
Power Supply	* *DC 1.5 V (UM3, AA) x 6 PCs, or equivalent.* * AC to DC 9 V power adapter
Power Current	DC 122 mA approximately. Backlight ON approximately DC 142 mA.
Operating Temperature	0 to 50 ℃. (32 to 122 ℉).
Operating Humidity	Less than 80% R.H.
Weight	354 g/0.78 LB.
Dimension	Meter 164 X 93 X 72 mm(6.5 X 3.7 X 2.8 inch)
Accessories Included	Instruction manual...1 PC AC to DC 9 V adapter(AP-9VA)............................ 1 PC
Optional Accessories	Air filter net (AF-01) USB cable, USB-01. RS232 cable, UPCB-02. Data Acquisition software, SW-U801-WIN.

2-2 Electrical Specifications (23±5 ℃)

PM2.5(Particulate matter)

PM2.5	Range	0 to 250 µg/m³
	Resolution	1 µg/m³
	Accuracy	±(10 % reading + 15µg/m³)

Humidity

Humidity	Range	5 % to 95 % R.H.
	Resolution	0.1 % R.H.
	Accuracy	≧70% RH : ±(3% reading + 1% RH). < 70% RH : ±3% RH.

Temperature

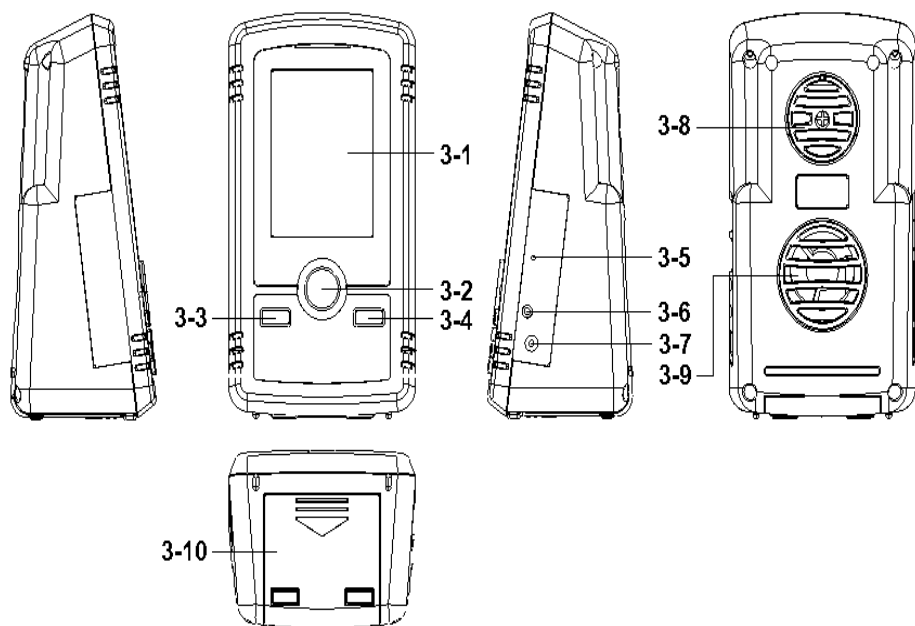| Temperature	Range	0 ℃ to 50 ℃,32 ℉ to 122 ℉.	
	Resolution	0.1 degree	
	Accuracy	℃	±0.8 ℃.
		℉	±1.5 ℉.

3. FRONT PANEL DESCRIPTION
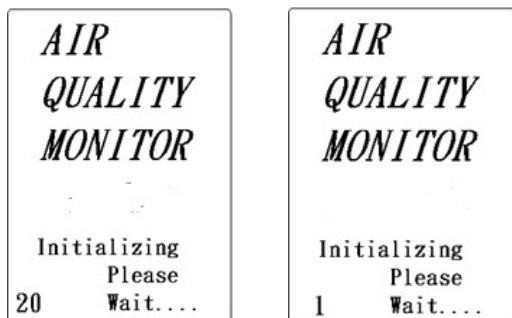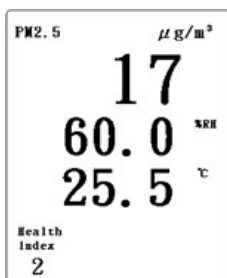

Fig. 1

3-1. Display
3-2. Power/Backlight button
3-3. HOLD key button
3-4. REC key button
3-5. RESET button
3-6. RS232 socket
3-7. DC 9V power adapter socket
3-8. PM2.5 Air sampling inlet(Air filter)
3-9. PM2.5 Air sampling outlet
3-10. Battery Cover/Battery compartment

4. Measurement preparation

4-1.The initial boot screen

AIR
QUALITY
MONITOR

Initializing
Please
20   Wait....

AIR
QUALITY
MONITOR

Initializing
Please
1   Wait....

4-2.Into the measurement screen

PM2.5 $\mu g/m^3$
17
60.0   %RH
25.5   ℃

Health
Index
2

4-3.Key outline

    1).POWER/Backlight KEY(3-2,Fig.1):

        A.Long press this button> 2 SEC. Native ON / OFF function.

        B.In the boot state press the button briefly, for the LCM backlight
          ON / OFF function.

        C.In the user calibration mode, this POWER button is " ENTER "Function

    2).HOLD KEY(3-3,Fig.1):

        A.In measureing:LCD display value lock function.

        B.In the user calibration mode, this HOLD button is " ▲ "Function

        C.In measureing:Press and hold the "HOLD" Key > 6 sec.
          Temp. unit will change.

    3).REC KEY(3-4,Fig.1):

        A.In measureing:The maximum and minimum record.

        B.In the user calibration mode, this REC button is " ▼ "Function

        C.In measureing:The "REC" Function enable, the meter 10 minutes
          autopower off function will disable.

5.Measurement procedure:

5-1.METER POWER ON:
   Press "POWER" KEY> 2 SEC. When you Into the the boot screen, about 20 SEC.
   After you Into the the measurement screen (eg SCREEN1).

5-2.PM2.5 Measurement:
   1).Concentration range display: 0～250 μg/m³, Equivalent measurement
      values> 250 above screen will show the value 250 and OL alternates
      (eg SCREEN2、SCREEN3).
   2).Air particle pollution health indicators (Health Index): 0～9, Equivalent
      measurement value ≧ 5 or more, the value will blink warning(eg SCREEN1).

5-3.Humidity and Temperature measurement:(eg SCREEN1)
   1).Temperature: screen will show t ℃ or ℉ for reading.
   2).Humidity: screen will show % RH for reading.

6.Other Function:

6-1.Data HOLD:
   1). Press "HOLD" KEY once, the screen will appear HOLD symbol will be
      displayed and the data is locked.(eg SCREEN4)
   2). Press "HOLD" KEY once, off screen lock feature.(eg SCREEN1)

6-2.Data Record:
   1). Press REC KEY once, the screen will appear REC symbol, at the same time
      begin PM2.5, %RH and Temp maximum and minimum data processing.
      (eg SCREEN5)
   2). Press REC KEY once, the screen appears REC MAX symbol, and the
      reading will display the maximum value.(eg SCREEN6)
   3). Press REC KEY once, the screen appears REC MIN symbol, and the
      reading will display the minimum value.(eg SCREEN7)
   4). Press REC KEY once, then return to the "6-2-1" item. (eg SCREEN5)
   5). When you press the REC KEY> 2 SEC. When this function is canceled.
      (eg SCREEN1)

6-3 LCD Backlight ON/OFF

After power ON, the " LCD Backlight " will light automatically. During
the measurement, press the " POWER(Backlight)" Key Button (3-2, Fig. 1) once
will turn OFF the " LCD Backlight ".
Press the" POWER(Backlight)" Key Button (3-2, Fig. 1) once again will turn ON the
" LCD Backlight " again.

6-4.User calibration function:
1) operation key
   a. In mesurement screen ,Press and holding " HOLD " KEY "" REC " KEY> 3 SEC
       then Into the first layer user PM2.5 calibration function. (eg SCREEN8)
      * into SCREEN 8 screen, then press " HOLD " KEY "" REC " KEY once,into %RH
         calibration function. (eg SCREEN11)
      * Into SCREEN 11 screen, then press " HOLD " KEY "" REC " KEY once,into Temp.
         calibration function. (eg SCREEN11)
   b. In First layer SCREEN 8 screen,Press and holding " power " KEY once, then
       Into Second layer screen select (as screen 9) and use "HOLD" and "REC"KEY to
       do project selecting.
   c.   In Second layer (as SCREEN 9) screen select, use " HOLD(▲) " KEY "" REC(▼) " KEY
       to adjustment reading value ,Adjust to the same value as the standard value,
       than press "power(Enter) "KEY once to save the adjustment value, and jamp to first laye
   d.   In First layer (as SCREEN 8) screen select, press and hold " HOLD " KEY " and
       " REC " KEY   > 3 sec. will ESC User calibration function.

2).PM2.5 calibration:
   A.Low level calibration (PML): In SCREEN 8 screen, then press " power " KEY
      once Into theSCREEN9 adjust the picture,after this time,the low-level calibration
      should be less than 15μg / m³, wait 10 minutes this unit with the standard
      machine value is stable, press ▲ or ▼ KEY adjust the standard value of the
      machine calibration(eg SCREEN9) as a standard machine, determined to
      press "POWER" KEY the values are stored, then enter the high-level
      calibration (PMH) correction (eg SCREEN10).
   B.High level calibration (PMH): After the measured value must be greater than
      60 μg / m³, wait 10 minutes this unit with the standard machine value is
      stable, press ▲ or ▼ KEY adjust the standard value of the confidential
      correction (eg SCREEN10) as the standard machine after determining the
      value press "POWER" KEY store, then back to the first layer
      PM calibration screen (eg SCREEN8), then press "HOLD" and "REC" KEY
      once ,will into proceeds % RH screen (eg SCREEN11).

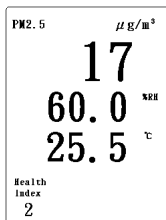3). %RH calibration:

     In SCREEN11 screen, press "POWER" Key proceeds
     SCREEN12 adjust the picture, when the machine with a standard value of a
     given machine steady, press "HOLD(▲)" or "REC(▼)" Key to adjust the value o
     the machine calibration standard as a standard machine after
     determining setting press "POWER(ENTER)" KEY value store, then back to the
     first layer% RH calibration screen(eg SCREEN8), then press "HOLD"and
     "REC" KEY once proceeds Temp screen (eg SCREEN13).
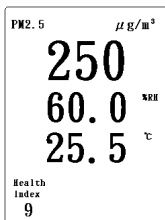
4).Temp calibration:

     In SCREEN13 screen, press "POWER" Key proceeds
     SCREEN14 adjust the picture, when the value of the machine with a
     standard machine is stable, press "HOLD(▲)" or "REC(▼)" Key adjust the
     machine calibration standard value as a standard machine,
     after determining press "POWER(ENTER)" Key to store the value, then back
     to the first layer Temp calibration screen (eg SCREEN13), at this time press
     " HOLD" and "REC" KEY> 3 SEC. Then away from the user calibration screen
     and return to the measurement screen(eg SCREEN1).

6-5.**Clear user adjustment :**
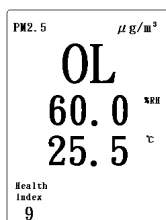
1) During power off , Press and hold the " REC(▼) " key then press "POWER"Key
   power on the meter , display will show screen (eg SCREEN15), and Count
   will be Count down from 20 to 14 at this time display will show USER CAL Clear
   text screen (eg SCREEN16) , please release the "REC(▼) " key display will show
   screen (eg SCREEN1) , meter will clear up the adjustment and be filled with
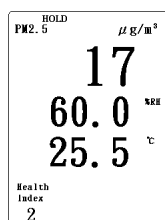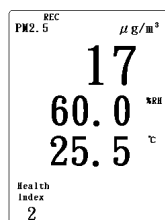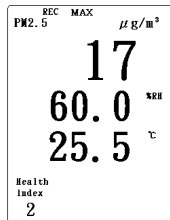   factory calibration data.

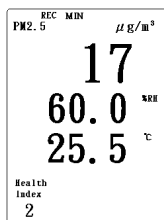| PM2.5 μg/m³ 17 60.0 %RH 25.5 ℃ Health Index 2	PM2.5 μg/m³ 250 60.0 %RH 25.5 ℃ Health Index 9	PM2.5 μg/m³ OL 60.0 %RH 25.5 ℃ Health Index 9	HOLD PM2.5 μg/m³ 17 60.0 %RH 25.5 ℃ Health Index 2	REC PM2.5 μg/m³ 17 60.0 %RH 25.5 ℃ Health Index 2
SCREEN1	SCREEN2	SCREEN3	SCREEN4	SCREEN5
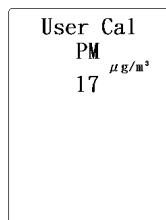
REC MAX PM2.5 μg/m³ 17 60.0 %RH 25.5 ℃ Health Index 2	REC MIN PM2.5 μg/m³ 17 60.0 %RH 25.5 ℃ Health Index 2	User Cal PM μg/m³ 17	User Cal PML→15 μg/m³ 13	User Cal PMH→67 μg/m³ 65
SCREEN6	SCREEN7	SCREEN8	SCREEN9	SCREEN10
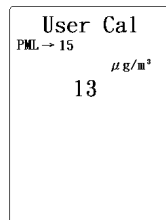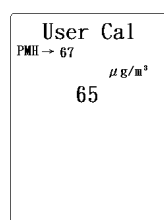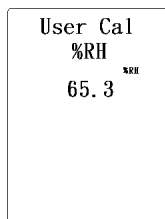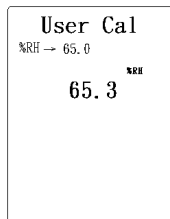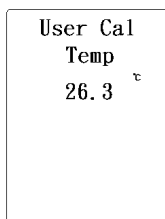
User Cal %RH %RH 65.3	User Cal %RH→65.0 %RH 65.3	User Cal Temp ℃ 26.3	User Cal Temp→25.0 ℃ 26.3	AIR QUALITY MONITOR Initializing Please Wait.... 20
SCREEN11	SCREEN12	SCREEN13	SCREEN14	SCREEN15
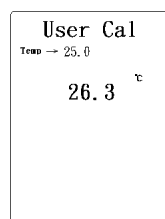
AIR QUALITY MONITOR Initializing Please Wait.... 14 USER CAL Clear
SCREEN16

# 7. Air filter net REPLACEMENT

When the meter show " ⚠ " information ,
This " symbol " meaning is please replace the meter filter,
Please carry out according to the following replacement steps.
1) Loose the screws of the " Air filter net Cover " (3-8, Fig. 1)
   and take away the " Air filter net Cover " from the instrument
   and remove the Air filter net.
2) Replace with Air filter net and reinstate the cover.
3) Make sure the cover is secured after changing Air filter net.
4) please power off the meter ,press and hold the HOLD key & REC key then
   power on the meter, at the same time the meter will be show power on screen
   and one down counter and " Replace Time Clear " text , when the down counter
   decries to zero, the " Replace Filter " Information will be remove.

8. POWER SUPPLY from DC ADAPTER

The meter also can supply the power supply from the DC 9V
 Power Adapter . Insert the plug of Power Adapter into
" DC 9V Power Adapter Input Socket "(3-7, Fig. 1),
Then Press and hold " Power Button"(3-2, Fig. 1) > 2 sec.
The meter will be power ON .

9. BATTERY REPLACEMENT

1) When the left corner of LCD display show " ▱ ", it
   is necessary to replace the battery. However, in-spec.
   measurement may still be made for several hours after
   low battery indicator appears before the instrument
   become inaccurate.
2) Loose the screws of the " Battery Cover " (3-10, Fig. 1)
   and take away the " Battery Cover " from the instrument
   and remove the battery.
3) Replace with DC 1.5 V battery (UM3, AA,
   Alkaline / heavy duty) x 6 PCs, and reinstate the cover.
4) Make sure the battery cover is secured after changing batteries.

10. SYSTEM RESET

If the meter happen the troubles such as :
> *CPU system is hold (for example, the key button can
> not be operated...).*

Then make the system RESET will fix the problem, and meter will be power OFF.
The system RESET procedures will be either following
method :
> *During the power on, use a pin to press the " Reset Button "
> (3-5, Fig. 1) once a while will reset the circuit system.*

11. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5
mm terminal (3-6, Fig. 1).

The data output is a 16 digit stream which can be
utilized for user's specific application.

A RS232 lead with the following connection will be
required to link the instrument with the PC serial port.

Meter	PC (9W 'D" Connector)
Center Pin.. Pin 4	
(3.5 mm jack plug)	
Ground/shield....................................... Pin 2	
	Pin 5 ——— 2.2 K resister
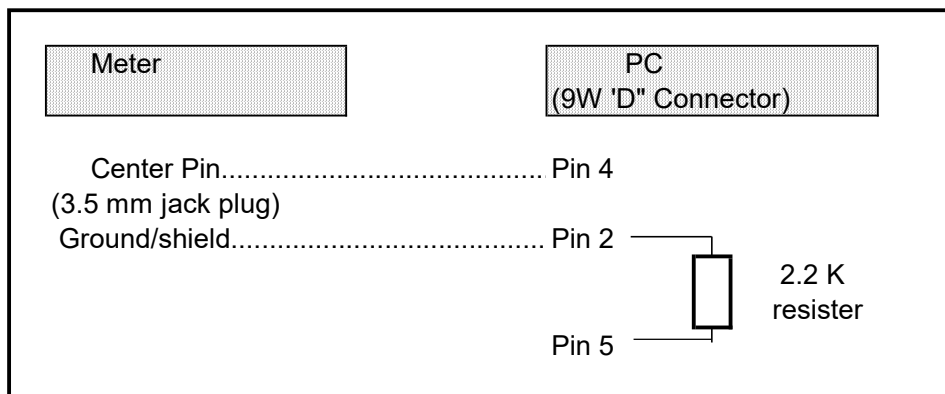
The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D15	Start Word		
D14	4		
D13	When send the PM2.5 data = 1		
	When send the %RH data = 2		
	When send the Temp. data = 3		
D12, D11	Annunciator for Display		
	μg/m^3 = H0	% RH = 04	℃ = 01
	℉ = 02		
D10	Polarity		
	0 = Positive 1 = Negative		
D9	Decimal Point(DP), position from right to the left		
	0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP		
D8 to D1	Display reading, D1 = LSD, D8 = MSD		
	For example :		
	If the display reading is 1234, then D8 to D1 is : 00001234		
D0	End Word		

RS232 FORMAT : 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

12. Micro suspend the particle (PM2.5) Parallel table of the indicator and activity are proposed

Micro suspend the particle (PM2.5) value index

index	μg/m^3	General people The activity is proposed	Sensitiveness ethnicity The activity is proposed
1	0-11	Normal outdoor sports	Normal outdoor sports
2	12-23		
3	24-35		
4	36-41	Normal outdoor sports	The adults and children of heart, respiratory tract and cardiovascular vessel disease experience until symptom, should consider reducing the physical demands, especially reduce the outdoor sports.
5	42-47		
6	48-53		
7	54-58	If no one is uncomfortable, for instance eyes aches, cough or have a sore throat etc., should consider reducing the outdoor sports.	There are the adults and children of heart, respiratory tract and cardiovascular vessel disease,should reduce the physical demands, especially reduce the outdoor sports.
8	59-64		
9	65-70		
10	≧ 71	There are the adults and children of heart, respiratory tract and cardiovascular vessel disease, should reduce the physical demands, especially reduce the outdoor sports.	There are the adults and children of heart, respiratory tract and cardiovascular vessel disease,should reduce the physical demands, especially reduce the outdoor sports.

PSI value and health influence
AIR PSI INDEX

0~50	Good	To that general people are healthy have not been influenced.
51~100	Moderate	Have not influenced the sensitive ethnicity immediately healthily.
101~199	Unhealthful	Will have phenomenon that slight symptom worsens to the sensitive ethnicity, such as the ozone thickness is in this range, the eyes nose will have some the excitement.
200~299	Very Unhealthful	Will have phenomenon obviously worsened to the sensitive ethnicity, reduce its ability of movement; General masses look at the health, may produce all kinds of symptoms.
>300	Hazardous	Except discomfort symptom is apparent worsens and causes some diseases to begin ahead of time to the sensitive ethnicity; Lower normal people's movement ability.