Laboratory Equipment Manufacturer
www.mrclab.com

Economical type

AIR QUALITY MONITOR

Model : PM-1051

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, in the indoor environment.
* PM2.5 : 0 to 250 μg/m³.
* 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)
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	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)

3. FRONT PANEL DESCRIPTION

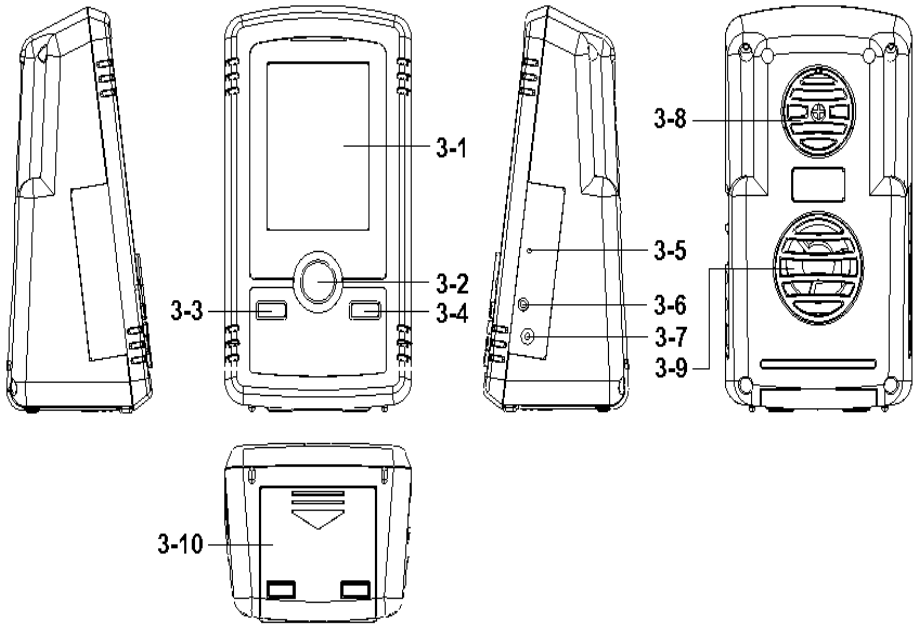


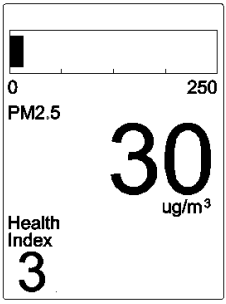
Fig. 1

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

4-2.Into the measurement screen



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

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 SCREEN6).

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

2).Air particle pollution health indicators (Health Index): 0～9, Equivalent measurement value ≧5 or more, the value will blink warning.

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.

2). Press "HOLD" KEY once, off screen lock feature.

6-2.Data Record:

1). Press REC KEY once, the screen will appear REC symbol, at the same time begin PM2.5 maximum and minimum data processing.

2). Press REC KEY once, the screen appears REC MAX symbol, and the reading will display the maximum value.

3). Press REC KEY once, the screen appears REC MIN symbol, and the reading will display the minimum value.

4). Press REC KEY once, then return to the "6-2-1" item.

5). When you press the REC KEY> 2 SEC. When this function is canceled.

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 SCREEN1)
* into SCREEN 1 screen, then press " HOLD " KEY "" REC " KEY once,Back to measurement function screen.

b. In First layer SCREEN 1 screen,Press and holding " power " KEY once, then Into Second layer screen select (as screen 2) and use "HOLD" and "REC"KEY to do project selecting.

c. In Second layer (as SCREEN 2) 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 jump to first layer .

d. In First layer (as SCREEN 1) screen select, press and hold " HOLD " KEY " and " REC " KEY > 3 sec. will ESC User calibration function and back to measurement function .

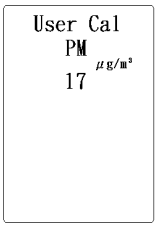
2).PM2.5 calibration:

A.Low level calibration (PML): In SCREEN 1 screen, then press " power " KEY once Into theSCREEN2 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 SCREEN2) as a standard machine, determined to press "POWER" KEY the values are stored, then enter the high-level calibration (PMH) correction (eg SCREEN3).

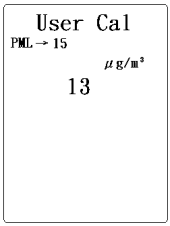
B.High level calibration (PMH): After the measured value must be greater than 60 μg / m³, wait 10 minutes this unit with the standard machine value is stable, press ▲ or ▼ KEY adjust the standard value of the confidential correction (eg SCREEN3) as the standard machine after determining the value press "POWER" KEY store, then will back to nomal measurement screen .

6-5.**Clear user adjustment :**

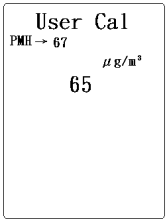
1) During power off , Press and hold the " REC(▼) " key then press "POWER"Key power on the meter , display will show screen (eg SCREEN4), and Count will be Count down from 20 to 14 at this time display will show USER CAL Clear text screen (eg SCREEN5) , please release the "REC(▼) " key display will show screen (eg SCREEN6) , meter will clear up the adjustment and be filled with factory calibration data.



SCREEN1



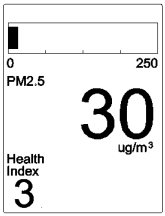
SCREEN2



SCREEN3

SCREEN4

SCREEN5



SCREEN6

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) Take away the " Battery Cover "(3-10, Fig. 1) 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 :

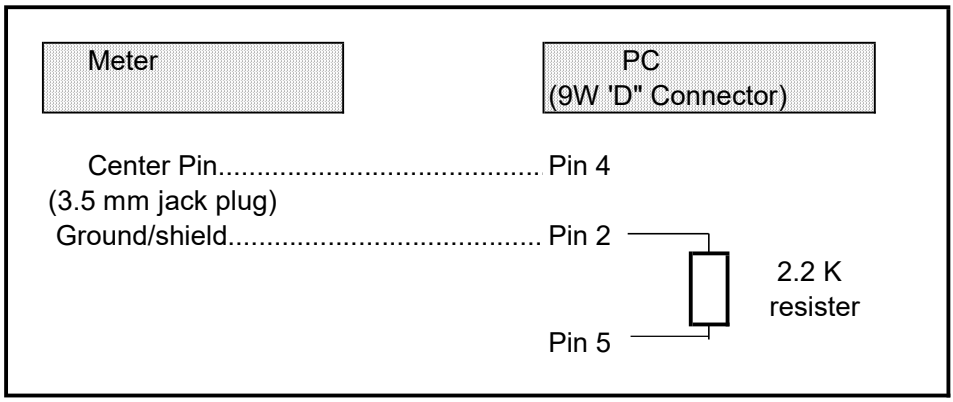
During the power on, use a pin to press the " Reset Button " (3-5, Fig. 1) once a while will reset the circuit system.

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.



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		
D12, D11	Annunciator for Display		
	μg/m^3 = H0		
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		
9	≧ 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.

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