Temtop

M2000 2nd Generation
Multi-functional Air Quality Detector
User Manual

Factors Affecting Air Quality

PM2.5 (Particulate Matter 2.5) refers to fine particles with diameter of 2.5 micrometers or less. Due to its tiny size, PM2.5 can be absorbed into bloodstream and the lungs, so that long-term exposure to high concentration of PM2.5 environment may cause eye and nose irritation, cough, asthma, emphysema, lung disease, heart attacks, cancer and etc.

PM10 (Particulate Matter 10) refers to particulates with a diameter of 10 micrometers or less. Due to the larger size, it's inhalable but penetrates no further than bronchi as larger particles can be filtered out by cilia and mucus of nose and throat. It normally considered as less harmful to health than PM2.5.

Formaldehyde (HCHO) is a colorless and strong-smelling gas with formula CH_2O, which has been classified by IARC as Group 1 carcinogen. Long-term exposure to just low doses could cause chronic respiratory diseases, nasopharyngeal carcinoma, colon cancer, brain tumors, nuclear gene mutation and etc.

TVOC (Total Volatile Organic Compounds) refers to various common VOCs including benzene, toluene, styrene, formaldehyde and etc. Due to their volatility as well as toxicity, irritability and carcinogenicity, long-term exposure to TVOCs can cause damage to the skin, liver, kidneys, central nervous system and etc.

CO_2 (Carbon Dioxide) refers to a colorless and odorless gas that is usually derived from the breath of humans and animals. High CO_2 concentration means that fresh air or ventilation is required, otherwise it may cause problems such as drowsiness, dizziness, loss of attention, and cognitive impairment.

Important!

★ Do not place detector in heavily polluted environments (concentration of HCHO > 1.0mg/m³ or particle > 500μg/m³) for a long time; or it may cause damages to the sensor.
★ Do not cover the air inlet/outlet during detection; or let fluff or hair enter the detector.
★ Do not make contact with organic solvents, such as glue/adhesives/paint/alcohol etc.
★ Do not use detector in humid places or environments with strong odor to maintain accuracy.
★ Do not use in environments contain gases listed in FAQ 6 to avoid influences on HCHO sensor.
★ If battery level shows ▯, please charge the detector promptly to avoid effects during use (also chargeable when turned off).

Overview:

① Buzzer Status   ② Measuring Status   ③ Display   ④ Menu Button

⑤ Increase/Up   ⑥ USB Port   ⑦ Date & Time   ⑧ Battery Level

⑨ Back Button   ⑩ Power/OK Button   ⑪ Decrease/Down/Switch (Start/Pause) Button
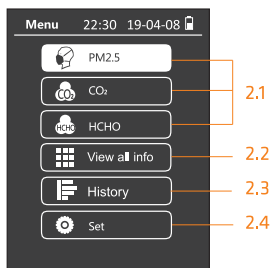
Operation

> ⚠ **Warning!**
>
> · First use or unused for a long time: please put it outside over 6 hours for calibration.
> · Indoor use: keep the room/area airtight for 10 minutes to obtain more accurate results.
> · When calibrating the CO_2 and formaldehyde sensors, please adjust the detector to the calibration interface and place it outdoors in a cool and ventilated environment for 5 minutes. Detection results will be much more accurate.

① ON

    Press and hold the power button $\frac{OK}{\circlearrowleft}$ for 2 seconds to turn on the detector.

② Detection

Press ☰ to enter the main menu interface (see the figure below), then press ▲ or ↙ to locate the option to view or set and press $\frac{OK}{\mathrm{U}}$ to confirm.

```
Menu    22:30  19-04-08 🔋
   🎭  PM2.5
   🫧  CO₂              ⟩ 2.1
   HCHO HCHO
   ▦  View all info     — 2.2
   ▤  History           — 2.3
   ⚙  Set               — 2.4
```

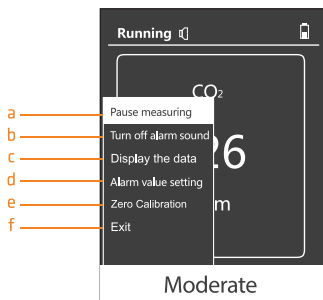2.1 View or set particles/CO$_2$/HCHO

2.2 View all the information

2.3 Check data records

2.4 Set date, time, alarm value, help document, reset to default, and language.

Note: It takes about 3 minutes for the CO$_2$ sensor to warm up and then enter detection status.

2.1 View or Set PM2.5/CO$_2$/HCHO

In each interface, press ☰ to display more functions. Take CO$_2$ interface for example, press ☰ button, you may see the following function options:

```
Running ◁                    🔋
              CO₂
a —  Pause measuring
b —  Turn off alarm sound
c —  Display the data         6
d —  Alarm value setting
e —  Zero Calibration        m
f —  Exit
              Moderate
```

a. Pause measuring: Pause or restart detecting PM2.5.

b. Turn on / off alarm sound: Mute / Unmute the buzzer.

c. Display the curve: Display (or not) PM2.5 concentration curve.

d. Alarm value setting: Set high alarm limit.

Operation: Press ▲ or ↙ button to adjust the value and press ≣ to switch digits. Then press **Save** and $\frac{OK}{\cup}$ to save the setting and exit the interface, or press **Exit** and ≣ to exit without saving the setting (See the figure below).

e. Zero calibration : Calibrate the sensor to zero (not available for PM2.5). Take CO_2 interface below for example:
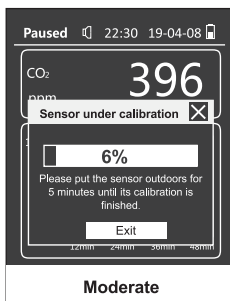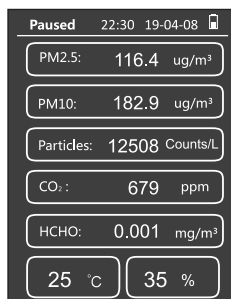

f. Exit: Exit current interface.

2.2 View all info

The **View all info** interface displays all the detected data including the concentration of PM2.5, PM10, CO_2, HCHO, number of particles, temperature and humidity.
Operation: Press ≣ to switch between °C and °F (See the figures below).
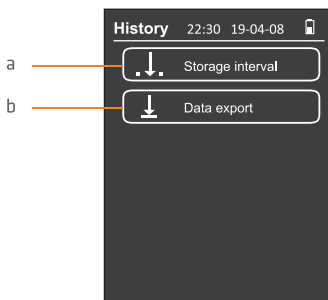Press ↙ to pause or detect; press ⌐ to back to the main menu interface.
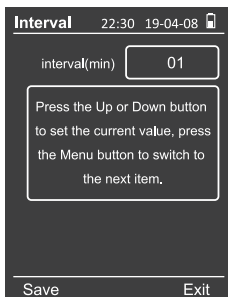

2.3 History

The **History** interface includes **Storage interval** and **Data export** functions (See the figure below).
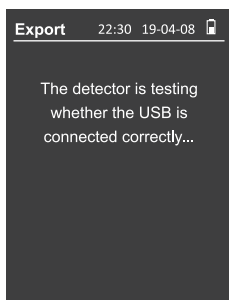**Operation:** Press ▲ or ↙ to switch between **Storage interval** and **Data export**, then press $\frac{OK}{\cup}$ to enter the corresponding interface.

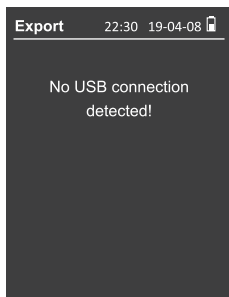**a. Storage interval:** Press ≡ to switch between digits, **Save** and **Exit**. When you select a digit, press ▲ or ↙ to adjust the value to your desired storage interval among 1, 5, 10, 30 and 60 minutes, then locate the option to **Save** and press $\frac{OK}{\cup}$ to save the setting and exit the interface; or locate the option to **Exit** and press $\frac{OK}{\cup}$ to exit the interface without saving the setting.

Interval	22:30 19-04-08 🔋
interval(min)	**01**
Press the Up or Down button to set the current value, press the Menu button to switch to the next item.	
Save	Exit

b. Data export: In this interface, you will see the following tips.

Export	22:30 19-04-08 🔋
The detector is testing whether the USB is connected correctly...	

If connected to the computer successfully by the USB cable, the detector will pop up a tip **USB connection successful**; If not, it will remind you of the failure (See the figures below).

Export	22:30 19-04-08 🔋
USB connection successful! Please do not disconnect the USB during the connection. If you want to exit the USB connection mode, press the Back button!	

Export	22:30 19-04-08 🔋
No USB connection detected!	

After connected successfully, the detector will generate **in the computer** a removable storage device **Temtop**, which contains a folder named **History**. The history folder includes a CSV format file listing the date and time PM2.5, PM10, CO_2, and HCHO concentration (see the figure). Please save it to your computer for viewing.

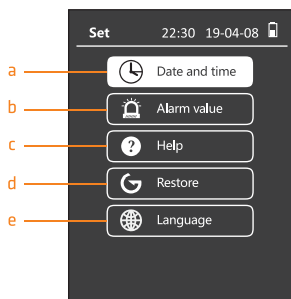| Date	PM2.5	PM10	CO_2	HCHO
2019/10/28 15:09	6	10	2038	0.081
2019/10/28 15:13	7	11	1795	0.071
2019/10/28 15:21	8	14	1914	0.059

After the data is copied and viewed, please press ⏻ to exit and restart the detector (See the figure below).
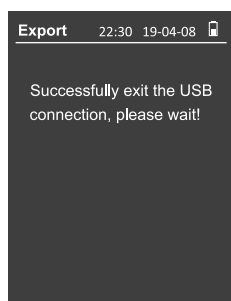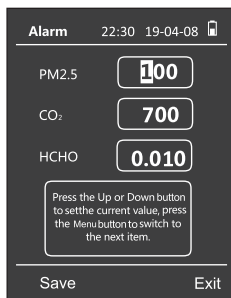

2.4 Set

The Set interface displays 5 options below.

Operation: Press ▲ or ⬦ to select the desired option; press $\frac{OK}{⏻}$ to enter the interface.

a. Date and time: Allows customized setting of year, month, date and time (See the figure below).

Operation: Press ▲ or ⚡ to adjust time and press ☰ to switch to next digit. Then press ☰ to switch to **Save** or **Exit**. Press $\frac{OK}{\text{\textcircled{U}}}$ to finish the settings and exit the interface.

Time	22:30 19-04-08
2019 - 04 - 08	
22 : 30 : 29	
Press the Up or Down button to set the current value, press the Menu button to switch to the next item.	
Save	Exit

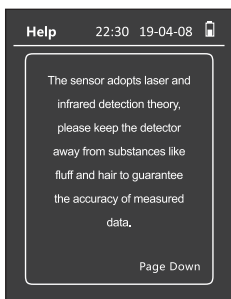| Alarm	22:30 19-04-08
PM2.5	**1**00
CO_2	700
HCHO	0.010
Press the Up or Down button to set the current value, press the Menu button to switch to the next item.	
Save	Exit

b. Alarm value: Set high alarm limit for PM2.5, CO_2 or HCHO concentration (See the figure below).

Operation: Press ▲ or ⚡ to set high alarm limit for PM2.5, CO_2 or HCHO concentration and press ☰ to switch to next digit. Then press ☰ to switch to **Save** or **Exit**. Press $\frac{OK}{\text{\textcircled{U}}}$ to finish the settings and exit the interface.

c. Help: View the help information for using the detector (See the figure below).

Operation: Press ▲ or ⚡ to view the information that help you use the detector; press ↰ to back to Set interface.

Help	22:30 19-04-08
The sensor adopts laser and infrared detection theory, please keep the detector away from substances like fluff and hair to guarantee the accuracy of measured data.	
	Page Down

| Set	22:30 19-04-08
⏰ Date and time	
Restore factory settings as default ✕	
Switch on the Menu button and press OK button to make a confirmation.	
Restore	Exit

d. Restore: Reset to the default parameters (See the figure below).
    Operation: Press ☰ to switch to **Restore** or **Exit**. Press $\frac{OK}{\cup}$ to confirm the settings and exit the interface. If reset, all the customized settings will automatically turn to the default.

e. Language: Set Chinese or English as displayed language (See the figure below).
    Operation: Press ☰ to switch between Chinese and English, press $\frac{OK}{\cup}$ to confirm; then press ☰ again to switch to **Save** or **Exit**; press $\frac{OK}{\cup}$ to finish the settings and exit.
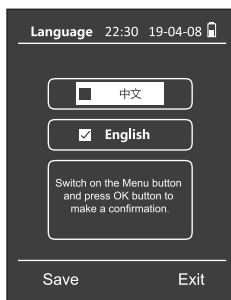
③ Multipoint Detection
Repeat ② Detection at multiple points in the targeted area to get a more comprehensive understanding of your air quality.

④ OFF
The device will turn off automatically after 1 hour without any activity, you can also press and hold $\frac{OK}{\cup}$ for 2 seconds to turn off it manually.
Note: Auto off function is invalid in Histogram interface.

Specifications

Model	M2000 2nd Generation
Dimensions	223.5x73.5x37.5mm / 8.8x2.8x1.4in.
Battery capacity	3000mAh
Battery life	6-8h
Input	DC5V; 1A
Display	TFT color screen
Operation environment	Temperature range: 0-50°C (32-122°F) Humidity range: 0-90% RH Atmospheric pressure condition: 1atm
PM2.5	Sensor: Laser PM sensor Measuring range: 0-999 $\mu g/m^3$ Resolution: 0.1 $\mu g/m^3$ Accuracy: $\pm 10\ \mu g/m^3$(0-100 $\mu g/m^3$) $\pm 10\%$(100-500 $\mu g/m^3$)
PM10	Sensor: Laser PM sensor Measuring range: 0-999 $\mu g/m^3$ Resolution: 0.1 $\mu g/m^3$ Accuracy: $\pm 15\ \mu g/m^3$(0-100 $\mu g/m^3$) $\pm 15\%$(100-500 $\mu g/m^3$)
Carbon dioxide (CO_2)	Sensor: Non-Dispersive Infrared (NDIR) CO_2 sensor Measuring range: 0-5000 ppm Resolution: 1 ppm Accuracy: $\pm$(50 ppm + 5% reading)
HCHO	Optimum measurement range: 0-2 mg/m^3 Measurement limits: 5 mg/m^3 Resolution: 0.001 mg/m^3 Accuracy: $\pm 0.03\ mg/m^3$(0-0.3 mg/m^3) $\pm 10\%$(0.3-1 mg/m^3)

FAQ:

Q: Why is the data reading very high/over-range after the detector is turned on?

A: As being packed in ink printed package box over time may interfere with the sensor due to the remaining organic volatile residue inside the package. Therefore, after unpacking, please put the detector in a ventilated place to help accelerate its data recovery.

Q: Why is data reading unstable?

A: As airflow in the environment is changing, the distribution of organic matter concentration may be uneven. Temtop recommends trying again in low airflow areas.

Q: Why is the test result abnormal or below normal?

A: ① Please check whether the air inlet or outlet has been covered or fluid is in.
   ② Gently shake the detector during detection to increase the interaction with surrounding air.
   ③ The sensor may be not recovered. Please place the detector outdoors for ventilation.

Q: Can the calibration be accelerated if the detector is facing the outlet of air conditioner / fan?

A: No. The temperature difference or air flow speed at the air conditioner/fan outlet is relatively high, which may cause condensation or temperature changes on the sensor, affecting its detection performance. Please put the detector outdoors in a cool ventilated place.

Q: Why is the PM2.5 reading constantly changing?

A: As PM2.5 concentration in the environment is changing all the time not only due to environment factors like changes in airflow, humidity, wind direction and etc. but also due to common pollutant sources like smoking, cooking; exhaust emissions from vehicles, smoke from burning coal/chimneys/furnaces and etc. All these may influence the PM2.5 concentrations and give differences in the readings.

Q: Why is the HCHO reading inaccurate or overestimated at some points?

A: As Temtop uses a high-precision electrochemical HCHO sensor, its electrochemical reaction characteristics could also respond to other gases besides formaldehyde. This table lists the most common gases that interfere with relative sensitivities of HCHO sensor:

Interference Gas	Relative Sensitivity (%)
Carbon monoxide (CO)	1
Hydrogen (H_2)	0.1
Ethyl alcohol	50
Phenols	7
Sulphur dioxide(SO_2)	12
Ammonia (NH_3)	0

Q: Which reference standards have been used to indicate the pollution levels?

A: Reference Standards for Particles and CO_2 are showing below.

Status / Pollutant	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Hazardous
PM2.5 ($\mu g/m^3$)	≤12	12.1~35.4	35.5~55.4	55.5~150.4	150.5~250.4	≥250.5
PM10 ($\mu g/m^3$)	≤54	54.1~154	154.1~255	255.1~354	354.1~424	≥425
CO_2 (ppm)	≤700	701~1000	1001~1500	1501~2500	2501~5000	≥5001

Reference Standard for HCHO is showing below.

Status / Pollutant	Healthy	UnHealthy
HCHO (mg/m^3)	≤0.1	>0.1

What's Included

Detector	x 1
USB Cable	x 1
User Manual	x 1

Warranty

Temtop warrants the included item for 1 year from the date of original purchase. The item can be exchanged or returned within 30 days if the defect is not caused by artificial damage.

Item	Warranty Period
Detector	1 year
Accessories	N/A

Before returning or sending for repair, please check if the following items are ready:

	Detector & Accessories	Complete Package	Proof of Purchase*	Gift (if any)
Return	√	√	√	√
Exchange	√	√	√	
Repair	√		√	

* Including invoice, order number etc.

Temtop warranty does NOT include:
·Malfunction or damages caused by artificial damage or modification
·Other deliberate damages.
·Damages caused by force majeure events.