



ET-1000 MULTIFUNCTIONAL GAS AND DUST DETECTOR

USER MANUAL



WARNING

Read and understand this instruction manual before operating instrument. Improper use of the gas monitor could result in bodily harm or death.

Periodic calibration and maintenance of the gas monitor is essential for proper operation and correct readings. Please calibrate and maintain this

Instrument regularly! Frequency of calibration depends upon the type of use you have and the sensor types. Typical calibration frequencies for most applications are between 1 and 3 months, but can be required more than or less often based on your usage.

Catalog

Notice	4
1.Product Brief Introduction	7
2.Key Feature	7
3.Technical Parameters	9
4.Product Structure	11
5.Operation Instruction	12
5.1Button Description	12
5.2Power On	13
5.3Power Off	14
6.Operation Interface	14
6.1 Gas Detection Interface	14
6.2 Function Menu Instruction	16
6.2.1 Basic Setting	16
6.2.2 History Data	17
6.2.3 Data Analysis	18
6.2.4 Zero Calibration	18
6.2.5 Target Calibration(Do Not Calibrate Unless You Are Professional)	19
6.2.6 Alarm Settings	20
6.2.7 Data Storage and Printing	21
6.2.8 Time Setting	22
6.2.9 Factory Reset	22
7.Other Notice	23
8. Common Faults and Exclusions	23
9.Concentration Datalog Output Instruction	25

Notice

① Button description

There are seven buttons beneath the display screen: Up,Down,Back,Ok,run/stop,⏻Power,Print

Three operation interfaces: Detector interface,menu,parameter setting.

The following form is description for the seven buttons. [The table below illustrates the function of seven buttons.](#)

	Detector interface	Menu	parameter setting
Up	Save instant data(press and hold for 5 seconds) (manually saving mode)	Up	Move up/ Value+
Down	Save instant data(press and hold for 5 seconds) (manually saving mode)	Down	Move down/ Value-
Back	Switch gas detection mode and dust detection mode(When dust detection is necessary)	Return to previous menu	Return to previous menu
Ok	Enter menu(press and hold for 5 seconds)	Confirm to enter menu	Enter/Select/Save

Run/stop	Pump switch/ Timing detection switch	Invalid	Invalid
Power	On/Off(press and hold for 5 seconds)	On/Off(press and hold for 5 secondseconds)	On/Off(press and hold for 5 seconds)
Print	Print instant gas concentration data	Invalid	Invalid

CAUTION:

1. All operations are operate by a short press of the button unless it is special noticed
2. ET-1000 mult-ifunctional gas detector could be work normally only in condition of the pump was switched on

②Gas Detector Processing Operation under Out-range Status

Users should avoid to have sensor impacted by the gas with a pressure value greater than the maximum of the detector, which might affect the service life and precision of the detector, or even directly damage detector.

When a user accidentally makes out-range operation, he should evacuate the instrument out of the detecting site and place it in the clean air for more than half of an hour. During the time, user should observe whether the density value of the instrument is keeping decreasing or not. If it can straightly go down to normal value, then he can continue to use it after the zero calibration of instrument. While the instrument after the out-range operation and user has placed it in clean air for hours, the density value remains high, then

it should be sent back to the manufacturer or agent for maintenance, be ready to replace the sensor.

Special Note: Detector damage resulted from out-range operation is not within the warranty.

③**Detector Calibration and Warranty**

We guarantee all detector were precise calibrated with certain density standard gas. It's not necessary for customer to re-calibrate the detector after purchase unless encounter special situation. Also the calibration need to be operate under the guidance of the professional.

All ET-1000series products we provide 12-Mounths warranty for the detector and 3-Mounth warranty for the accessories. Beside , we have free calibration once a year during the entire products service life.

④**Instruction of detector display dimmed**

Power capacity protection program had been preset for all TYD-1000-TH multifuncional gas detector, when no operation were made within 30 seconds the protection program will activate and the display of the detector will dim out,user can light up the display by press any button.

⑤**ET-1000 series Hot Key Instruction**

Mute: When detector is in the state of alarming user can mute the detector by pressing the “Up”or “Down”button.

Save manually:When storage mode was preset as manually, user can save the gas concentration value of each channel by long press the “Up” button in detection interface

Function menu: When detector is in the detection menu user can enter system menu by pressing “Ok” button for 5 seconds

When gas concentration reach the alarming value and triggered the alarm,user can mute the detector by pressing Up or Down button(Press to mute and press another time to restart the alarm)

⑥Parameter modification instruction

User can modify all parameters by “Back”,“Up”,“Down”,“Ok”buttons.

1.Product Brief Introduction

ET-1000 series multifunctional gas detector are portable gas and dust detector which can be configure flexibly up to 5 gas sensors or 3 gas sensors plus 1 dust sensor.With import gas sensor and most advance nanometer semiconductor technology ET-1000 series multifunctional gas detector can detect corresponding gas and dust concentration at the same time rapidly and precisely,we maintain a leading position in domestic level and our products are famous of high stability and repeatability .User can custom setting all parameters to ensure the operations are user-friendly,4000mA built-in high capacity polymer rechargeable battery,technical indicators、gas concentrations and history data can be display in the 3.5 inches IPS technical grade screen,User can save concentration data.output data,print and output data,detect temperature and humidity level.

2.Key Feature

- ◆ With the most advance nanometer semiconductor technology ,ultra low power 32bit microprocessor,24bit ADC data acquisition chip,outstanding accuracy.
- ◆ 3.5 inches IPS technical grade display with a pixel up to 320*480,display technical indicators and gas concentration value perfectly.
- ◆ Three concentration units are available PPM,%VOL,mg/m3.
- ◆ User can combine different sensor,1-5 kinds of gas can be detect at the same time,PM 2.5 dust sensor, temperature and

humidity sensor and other kind of sensors are available.

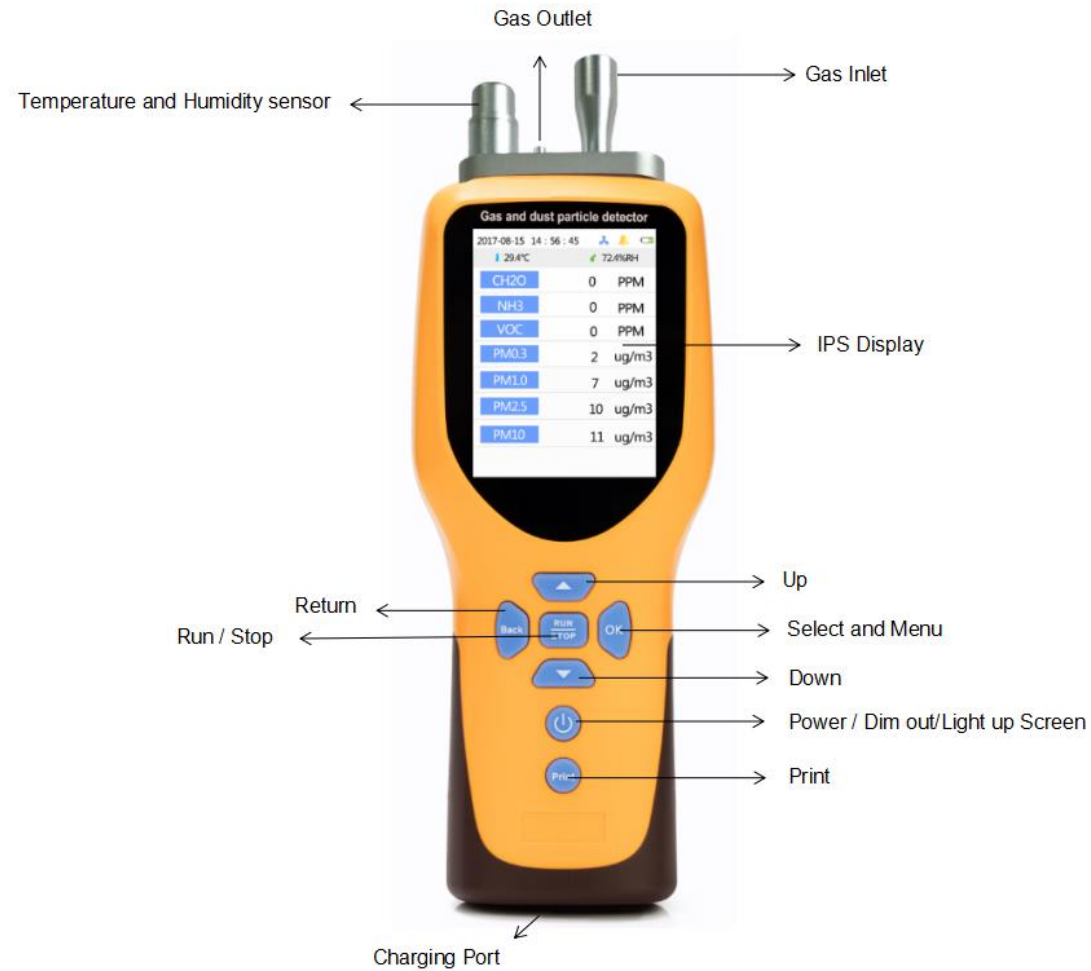
- ◆ Up to 100,000 group data can be storage,user can view history data on the display and data output is available.
- ◆ ET-1000 allow user to connect to potable printer to print data
- ◆ With temperature and humidity detection,user can detect temperature and humidity value on the scene or the temperature and humidity value inside the pipe.
- ◆ Five operation modes are optional:Detection mode,Storage mode,Printing mode,Display mode,Pumping mode.
- ◆ With high-power pump allow device working under tiny negative pressure condition,the reasonable gas chamber design ensures that the sensor is not affected by the pressure.
- ◆ With over-voltage protection,overcharge protection,electrostatic prevention,magnetic-field interference prevention
- ◆ All software automatic calibration, sensor up to 6 levels target calibration,ensure the accuracy and linearity of the entire measurement,also with data recovery function.
- ◆ Chinese and English operation model are available,user-friendly.
- ◆ With temperature and humidity compensating function.With dust filter and dust-proof design allow device applies in all sort of harsh conditions.

3. Technical Parameters

Product type:	Multifunctional Air Laser Dust Particle Detector		
Detection Object:	0.3um、 0.5um、 1.0um、 2.5um、 5.0um、 10um		
Detection range	0-999ug/m3		
Detection principle	Semiconductor Laser Diode		
Scalable gas sensor:	User can customize 1-6 gas sensors in any combination, please refer to the sensor parameters		
Temperature and humidity:	Temperature detection range: -40 ~ 120℃ Humidity detection range: 0-100%RH		
Detection pattern:	Pumping, with built-in high-power pump allow device working under tiny negative pressure condition, the flow rate is adjustable.		
Detection accuracy:	≤±3%F.S	Linearity error:	≤±1%F.S
Reaction Time:	≤20 S (T90)	Zero drift:	≤±1% (F.S/Year)
Recovery Time:	≤20 S	Repeatability:	≤±1%F.S
Detection pattern:	Real-time detection mode and timing detection mode can be switch freely		
Storage pattern:	Automatically saving and manually saving is available, Up to 100,000 group data, user can view history data on the display.		
Printing pattern:	Micro printer is optional, user can set		

Explosion proof sign:	ExdII CT4 (IA)	Shell material:	ABS+PC ABS+PC
IP rating:	IP6	Working temperature:	-30 ~ 60℃
Power:	4000mA high capacity polymer rechargeable battery	Humidity:	≤95%RH, Non-condensing
Dimensions:	220*88*55 mm (LxWxH) 0.5 Kg (net weight)	Working pressure:	-30Kpa ~ 100Kpa
Accessories:	Case、User manual、Certification、USB charger+Data cable、Calibration cover		

4.Product Structure



5.Operation Instruction

5.1Button Description

There are seven buttons beneath the display screen: Up,Down,Back,Ok,Run/stop,Power,Print

Three operation interface: Detector interface、Menu、Parameter setting.


The following form is description of the seven buttons.

	Detector interface	Menu	parameter setting
Up	Save instant data(press and hold for 5 seconds) (manually saving mode)	Up	Move up/ Value+
Down	Save instant data(press and hold for 5 seconds) (manually saving mode)	Down	Move down/ Value-
Back	Switch gas detection mode and dust detection mode(When dust detection is necessary)	Return to previous menu	Return to previous menu
Ok	Enter menu(press and hold for 5 seconds)	Confirm to enter menu	Enter/Select/Save
Run/stop	Pump switch/ Timing detection switch	Invalid	Invalid

Power	On/Off(press and hold for 5 seconds)	On/Off(press and hold for 5 secondseconds)	On/Off(press and hold for 5 seconds)
Print	Print instant gas concentration data	Invalid	Invalid

CAUTION: TYD-1000-TH series multifunctional gas detector will perform normally Only in condition of the pump was switched on

5.2Power On

Long press  power button for five seconds until you hear a beep the “DI” sound then the display and red signal light turn on,The screen appears:Sensor checking (3 seconds),Sensor information(1 second) ,Sensor preheating and automatically start the pump(60 seconds count down)in sequence as it show in figure 1-3,detector will start after the count down and enter detection interface as it show in figure 4

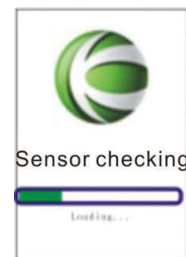


Figure 1

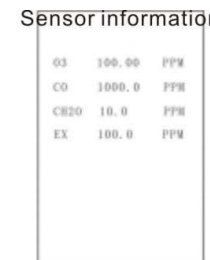


Figure 2

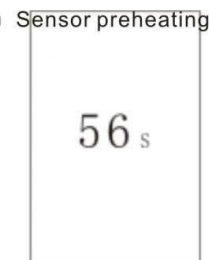


Figure 3




Figure 4

When the ET-1000-TH completes its startup sequence,it is in Measuring Mode.

The fan symbol in the upper right corner will appear

5.3Power Off

In normal detection mode long press  power button for five seconds until the “DI” sound ,display shows shutting down as it show in figure 5,device will be shutoff within 1 minute .

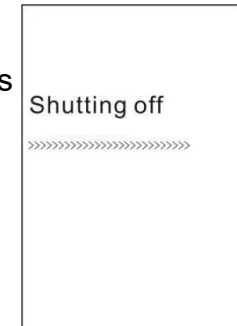


Figure 5

6.Operation Interface

6.1 Gas Detection Interface

Under normal-detection mode, according to the number and types of sensors in the device, there are different interfaces: single gas detection mode as shown in figure 6 (O₃ for example), two kinds of gas detection mode as shown in figure 7 (O₃、CO for example), three kinds of gas detection mode as

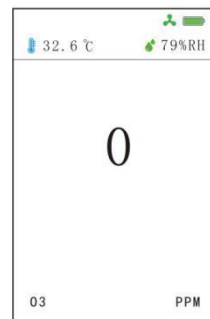


Figure 6

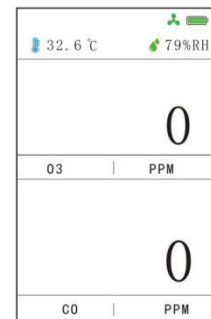


Figure 7

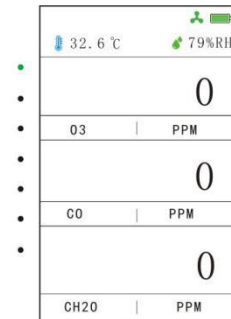


Figure 8

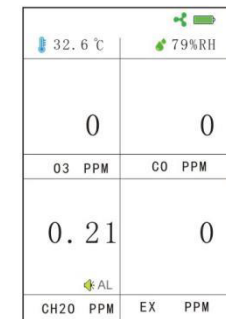


Figure 9

shown in figure 8(O₃、CO、CH₂O for example),four kinds of gas detection mode as shown in figure 9(O₃、CO、CH₂O,Combustible gas for example).

Icons at the left top of the the display (refer to figures above) are time and temperature, at the right top of the display shows the “pump status”, “battery capacity”, “humidity”,take figure 9 for example,there are four channels ,channel 1 at the left top(O₃),channel 2 at the right top(CO),channel 3 at the lower left(CH₂O₂),channel 4 at the lower right(EX);figure indicate corresponding gas concentration in each channel,lower left“O₃” is the gas’s molecular formula,lower right“PPM” is the concentration unit;when one or several gas channel reach the alarm value,there will be a alarm sign under corresponding concentration figure,as shown in figure 9 the CH₂O channel is alarming.

6.2 Function Menu Instruction

Long press "OK" button for 5 seconds to enter function menu as shown in figure 10. Nine sub-menus are including in function menu: Basic setting、History data、Data analysis、Zero calibration、Target calibration、Alarm setting、Detection and storage、Time setting、Factory reset. In main menu move the cursor to different sub-menu by press "Up" and "Down" button, press "Ok" to enter corresponding sub-menu, press "Back" to return to normal detection interface or previous menu.

6.2.1 Basic Setting

In Basic setting menu user can see various setting as shown in figure 11, press "Up" and "Down" button to move the cursor, press "Ok" to enter sub-menu and modify parameters.

1. Range/Unit setting: (as shown in figure 12) User set detection range and units (ppm、mg/m³、mg/L、%VOL) of different gas
2. Channel setting: In this menu user can set to

Main Function Menu
Basic Settings
Historical Data
Data Analysis
Zero Calibration
Target Point Calibration
Alarm Settings
Detection, Storage, Printing
Date and Time
Restore Factory Settings

Figure 10

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 005
Pump flow rate setting 30
Temp Modify 0.0
Hum Modify 0
Language Setting 中文

Figure 11

Detection range/unit setting
03 100.00 mg/L
C0 100.0 %VOL
CH20 10.0 mg/m ³
EX 100.0 PPM

Figure 12

Channel setting
03 On
C0 Off
CH20 On
EX Off

Figure 13

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 005
Pump flow rate setting 30
Temp Modify 0.0
Hum Modify 0
Language Setting 中文

Figure 14

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 000
Pump flow rate setting 25
Temp Modify 0.0
Hum Modify 0
Language Setting 中文

Figure 15

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 000
Pump flow rate setting 25
Temp Modify 32.6 °C 00.0
Hum Modify 75%RH 0
Language Setting 中文

Figure 16

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 000
Pump flow rate setting 25
Temp Modify 34.7 °C 0.0
Hum Modify 75%RH 000
Language Setting 中文

Figure 17

Basic setting
Range/Unit Settings
Channel Settings
Address Settings 000
Pump flow rate setting 25
Temp Modify 0.0
Hum Modify 0
Language Setting English

Figure 18

activate/shield one or various gas channels as shown in figure 13, and also allow user to check channel address.

3. Address setting: (as shown in figure 14) User can set detector address in this menu.
4. Pump flow rates: In this menu user can adjust the intake air flow rate of the pump as shown in figure 15 (Normally require preset under condition of negative pressure, defaulted value is 25).
5. Temperature modify: In this menu user were allow to modify the temperature parameter manually as shown in figure 16.
6. Humidity modify: In this menu user were allow to modify the humidity parameter manually as shown in figure 17.
7. Language setting: User can change system language to Chinese or English in this menu.

6.2.2 History Data

User can view previous gas concentration data or delete history data in “history data” menu as shown in figure 19.

Enter “View history data” interface remain the cursor at “View” and press “Ok” then press “Up” or “Down” to switch between View, Print, Output as shown in figure 20-22. For example in View menu press “Ok” user can view all previous concentration datalogs as it shown in figures 23-24.

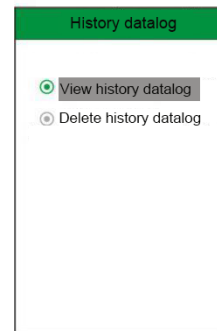


Figure 19

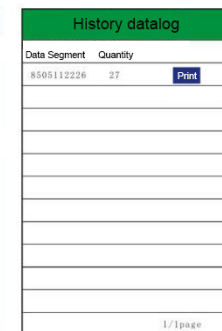


Figure 20

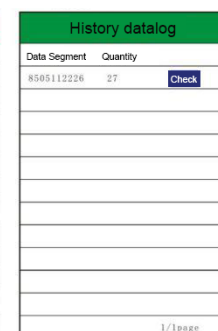


Figure 21

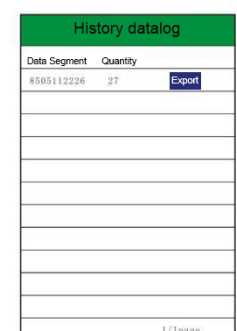


Figure 22

6.2.3 Data Analysis

Detector can automatically storage and analyze average concentration and highest concentration of various gases being detected during whole working period and shown in “data analysis” menu. TWA stand for average concentration, STEL stand for highest concentration as it shown in figure 25.

6.2.4 Zero Calibration

If zero drift of the sensor is over range, user can proceed zero calibration, the gas concentration are defaulted set to zero after zero calibration as shown in figures 26-27.

Special Note: Zero calibration must be proceed in fresh air or high-purity inert gas(for example 99.999%VOL N2 etc)

History datalog		
Sensor	Quantity	Check
03	9	Check
C0	9	Check
CH20	9	Check
EX	9	Check

Figure 23

History datalog		
Sensor C0		
Time	Value	Unit
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
22: 26: 25	0.0	PPM
1/Image		


Figure 24

Data log analysis			
Sensor	TWA	STEL	Unit
O3	0.00	0.00	mg/L
CO	0.0	0.0	%VOL
CH2O	0.00	0.00	mg/m³
EX	0.0	0.0	PPM

Figure 25

Sensor	Concentration	Calibration
O3	0.00 mg/L	Enter
CO	0.0 %VOL	Enter
CH2O	0.01 mg/m ³	Enter
EX	0.0 PPM	Enter

Figure 26



Zero calibration

Sensor 03

Calibration value : 0.00 PPM

Real-time concentration : 0.07 PPM

Confirm to start zero calibration

Quit **Calibrate**

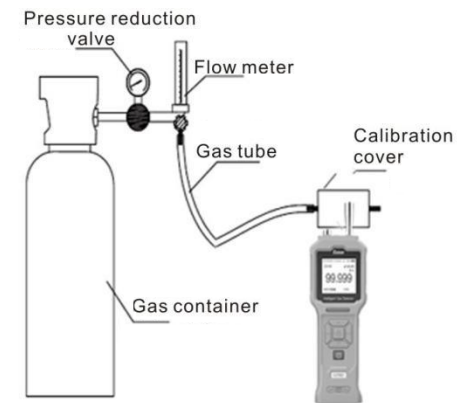
Figure 27

6.2.5 Target Calibration(Do Not Calibrate Unless You Are Professional)

Find a fresh-air environment.This is an environment free of toxic or combustible gases and a normal oxygen content(20.9%)

ET-1000-TH series gas detector provide 6 levels target gas concentration calibration,as shown in figure 28,this calibration should be operate under conditions of certain standard concentration gas, Pressure reduction valve ,Flow meter, Calibration cover and make sure all instruments are well connected, otherwise this function is forbidden.

Procedures: Connect all instruments as shown in figure 11,enter target gas calibration interface,release standard gas slowly and control gas flow within 500ml/min,observe the real-time concentration value(concentration value should be increasing),wait until real-time concentration value rise to the peak reading and stay still, user can chose a un-calibrate option to operate(√ stand for this level has been calibrated and × stand for this level still need to be calibrate);first of all input a concentration value of standard gas then calibrate. Target gas concentration value will set up to be the standard gas concentration value after calibration.



6.2.6 Alarm Settings

And the gas readings flashing.

User can set the alarm limit and alarm mode in this menu, as shown in figures 29-30, there are two alarm value setting, which are high alarm and low alarm. When user set as the low alarm mode, it will trigger alarm when real-time concentration is lower than preset value, when user switch to high alarm mode, it will trigger alarm when real-time concentration is higher than preset value.

Procedures: Enter alarm settings sub-menu, Move the cursor to “alarm mode”, press “Ok” to select and press “Up” and “Down” to switch alarm mode, then press “Ok” to save your modification.

Figure 29 shows the 'Alarm setting' menu. It has a green header with the text 'Alarm setting'. Below the header, there are four rows, each with a sensor type and a 'Set' button. The first row is '03' with a green dot and a 'Set' button. The second row is 'CO' with a black dot and a 'Set' button. The third row is 'CH2O' with a black dot and a 'Set' button. The fourth row is 'EX' with a black dot and a 'Set' button. The 'Set' buttons are blue with white text.

Figure 29

Figure 30 shows the 'Alarm setting' menu. It has a green header with the text 'Alarm setting'. Below the header, there are four rows. The first row is 'Sensor' with '03' and a 'Set' button. The second row is 'alarm value 1:' with '10.00' and 'mg/L'. The third row is 'alarm mode:' with 'Low alarm' and a dropdown arrow. The fourth row is 'alarm value 2:' with '20.00' and 'mg/L'. The fifth row is 'alarm mode:' with 'High alarm' and a dropdown arrow. The 'Set' buttons are blue with white text. The 'alarm mode' dropdowns are grey with white text.

Figure 30

6.2.7 Data Storage and Printing

User can set detection mode and storage mode in this menu. real-time detection and timing detection are optional in detection mode. manually save, automatically save and close(not save) are optional in storage mode.

When detector is preset as “real-time detection mode”, it provides continuous monitoring and will show real-time concentration of each channel in the display, the instrument offers three options for

data storage (Manually, Automatically, Not save), it also allows user to set storage cycle under automatically storage mode.

As it shown in figures 31-32, the device will detect the average concentration value of a certain time period when preset as “timing detection mode”, it allows user to set timing cycle and cycle interval (interval of two timing detection), as shown in figure 33, instrument will store the average concentration value of each periodic detection.

User needs to return to detection interface and press “Run/Stop” button to activate the countdown after finishing the setting of timing detection, as shown in figure 34, if the periodic detection mode is not activated, gas pump and detection process will automatically stop.

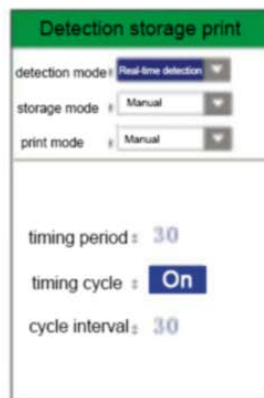


Figure 31

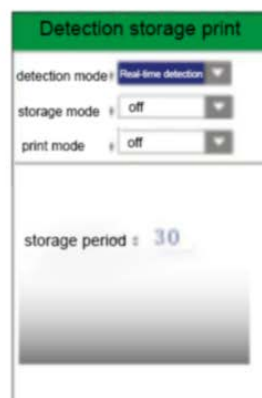


Figure 32

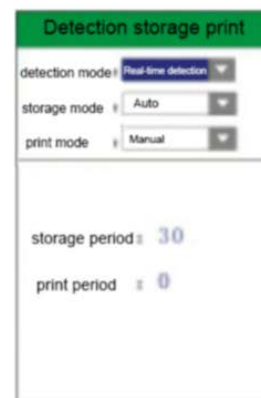


Figure 33

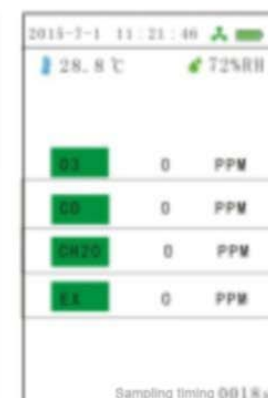


Figure 34

The time can be set in 1day increments. The minimum setting is 1 day and the maximum setting is 365 days. The factory setting is 90 days.

6.2.8 Time Setting

Time setting menu allow user to set date and time,this time is related to the time of the concentration values are being recorded.

6.2.9 Factory Reset

If user proceeded an wrong operation by accidentally or need to reset all parameters to factory setting,you can reset all parameter to factory setting.

7. Other Notice

- ◆ Please read User Manual carefully before use the detector.
- ◆ It is strictly forbidden user to disassemble the detector or replacement parts.
- ◆ Installation, adjustment, calibration and parameters setting must be progress by professionals.
- ◆ Regular inspection of calibration is necessary, expired or broken sensor should be replace immediately.
- ◆ It is strictly forbidden to impact sensor with gas which is over detection value.
- ◆ User should prevent drop or impact the detector.
- ◆ It is strictly forbidden to use detector in high temperature, high humidity or high pressure environment ,if workingenvironment is high humidity, detector need to equip with vapor filter.
- ◆ Man-made damage is not within warranty.
- ◆ To reduce the risk of ignition of hazardous atmospheres, recharge, remove or replace the batteryonly in an area known to be non-hazardous.Do not mix old and new batteries or batteries from different manufacturers.
- ◆ Electrostatic discharge should be proceed before the detection in hazardous area
- ◆ ET-1000-TH series products shall only be charged outside hazardous areas,it is strongly recommend use the original charger.

8. Common Faults and Exclusions

Problem: Concentration value is not stably when detector place in air, reading is unstable

Possible reasons: Electrochemical sensor might interfered with unrelated colorless and odorless gas

Solutions: Place detector at pure gas environment to see whether the concentration value decreasing or not, if it is that the environment is clear but the concentration value remains high, you need to proceed zero calibration

Problem: No response or weak response when detecting

Possible reasons:

- 1) Oxygen content value of gas is too low: <5%VOL.
- 2) Gas pressure is too high, the pump can't not afford it.
- 3) Expired sensor might cause the problem too .

Solutions: Make sure the oxygen content value of the gas is higher than 5%VOL when equip with Electrochemistry sensor, Catalytic combustion sensor or Semiconductor sensor. Detector working pressure is -30Kpa~100Kpa, User can proceed zero calibration if has standard gas. If oxygen content value, working pressure are eligible for detection but problems still remain, user should return detector to factory for maintenance.

Problem: Concentration value is unstable when start detecting.

Possible reasons: Normally due to gas oxygen content is too low or changing of gas concentration value.

Solutions: Increase gas oxygen content value and make sure the gas flow speed is stable.

Problem:Weak pumping,or device make a unusual sound while pumping.

Possible reasons:Gas inlet blocked due to too many dust and vapor inhaled.

Solutions: Return to manufacturer to replace the pump,install a dust and vapor filter at the gas inlet.

Problem:Unable to boot up instrument.

Possible reasons:Battery low or empty

Solutions: Try to start the instrument after fully charged the battery,if the problem still remain,user need to return the device to manufacturer.

Problem:Unable to charge the instrument

Possible reasons:Adapter failure or wrong adapter(5-5.5VDC,1-2A)

Solutions: Make sure output voltage of adapter is 5V,user need to change a adapter if the output voltage is not 5V,if the problem still remain after change a adapter,user need to return the instrument to manufacturer.

9.Concentration Datalog Output Instruction

ET-1000-TH series gas detector allow user output history datalog via the charge port,there are several steps to output datalog.

- 1) Install concentration datalog output software in host computer
- 2) Boot up the detector and wait for 60s to preheat the instrument and connect to the computer

- 3) Run the concentration datalog output software in the host computer,make sure the detector is connected to the host computer,meanwhile at the lower left interface of the software will show connection port standby(defaulted baud rate is 115200,do not change)
- 4) Enter the history data interface to output datalog,there will be menu prompts at the both software and detector interface.
- 5) User can preset detector's address in concentration datalog output software(this address need to corresponded to the parameter in "address setting"of the detector)、Channel(Corresponded to the gas channel of the detector)、start time and finish time(datalog storage period should be within the start and finish time)
- 6) Detector allows user to search concentration of certain channel of datalog storage period,datalog can be output as EXCEL format by "datalog output" function.

NOTICE:Connection cable is the USB cable connected to the adapter