



Product Name	GAOTek CO Test Gas Analyzer
Product SKU	GAOTek-CMGD-104
Product URL	https://gaotek.com/product/gaotek-co-test-gas-analyzer/

Contact us: sales@gaotek.com

Based in New York City & Toronto, GAO Tek Inc. is ranked as one of the top 10 global B2B technology suppliers. GAO ships overnight within the U.S. & Canada & provides top-notch support thanks to its 4 decades of experience.



Contents

Precautions.....	1
Product appearance description	5
Instrument front diagram.....	5
Schematic diagram of the back of the instrument	6
Product features.....	7
Product introduction.....	8
Technical principles	8
Performance parameters.....	9
Working conditions	9
Turn on the machine	10
Start preparation	10
Analyzer warm-up and operation.....	10
Preparation before measurement.....	10
Interface description and operation.....	11
Measurement interface	11
Sensor status information description.....	11
Real-time curve	12
Instrument information.....	13
Alarm settings	15
System settings.....	16
Other setting	21
Restore factory settings	21
Common faults.....	22









Instrument care and maintenance 23

GAOTek CO Test Gas Analyzer

Precautions




Please read the "Precautions" carefully before use to ensure correct use. The precautions listed here describe important safety-related contents, so be sure to follow them. Safety precautions are divided into levels: "Danger", "Caution", "Prohibited", and "Electric Shock".

Safety mark	Brief Description	Additional Instruction
	Dangerous	May cause serious human injuries
	Caution	May cause moderate human injuries or may destroy the analyzer
	Electric Shock	May cause human injuries and/or may damage the analyzer.
	Forbidden	Not allowed in normal operation




Precautions when installing and storing the analyzer	
	<ul style="list-style-type: none"> ■ This analyzer is not explosion-proof and cannot be used in potentially explosive environments. Otherwise, explosions and fire accidents may occur, endangering lives and property.
	<ul style="list-style-type: none"> □ Choose an installation location that is as vibration-free as possible and can bear the weight of the analyzer. During operation, it must be ensured that the ambient temperature of the analyzer remains within the allowable ambient temperature range. □ If the analyzer is to be installed in a cabinet or on a desktop rack, it must be placed on support rails. Simply locking the mounting screws on the front of the analyzer is not sufficient because the weight of the analyzer may place excessive load on the chassis. □ During installation and construction, do not let wire ends and other debris.





	enter the analyzer, otherwise it may cause fire or malfunction.
--	---

Precautions when installing gas lines	
	<ul style="list-style-type: none"> <input type="checkbox"/> The air tightness of the pipeline must be ensured to avoid gas leakage due to pipeline rupture. If the leaked gas may contain toxic or explosive gases, it will cause serious accidents. <input type="checkbox"/> The inlet pressure of the analyzer should comply with the specified range of the analyzer to avoid air leakage caused by pipeline detachment due to excessive pressure or too low pressure affecting the measurement results. When exhausting, please handle the gas properly and do not allow it to disperse in the sampling device or indoors.
	<ul style="list-style-type: none"> <input type="checkbox"/> The sample gas must be sufficiently processed to avoid contamination of the components it flows through, otherwise the instrument may not work properly. <input type="checkbox"/> Please do not use pipes with grease on them. Grease may block the air path or cause a fire.
Precautions when installing lines	
	<ul style="list-style-type: none"> <input type="checkbox"/> During the wiring and wiring installation process, it is strictly prohibited to perform live operations, otherwise it may cause electric shock or damage the analyzer. <input type="checkbox"/> The analyzer has a mains plug, which should only be connected to the mains by qualified personnel. The cross-sectional area of the connecting cable must be $\geq 1\text{mm}^2$, and the protective earth conductor used here must have at least a cross-sectional area equal to L and N. <input type="checkbox"/> Check whether the local mains voltage is consistent with the voltage specified on the analyzer label. <input type="checkbox"/> During installation, you should carefully check that the insulation protection of the cable connected to the power supply is not damaged, otherwise it may cause an electric shock accident.

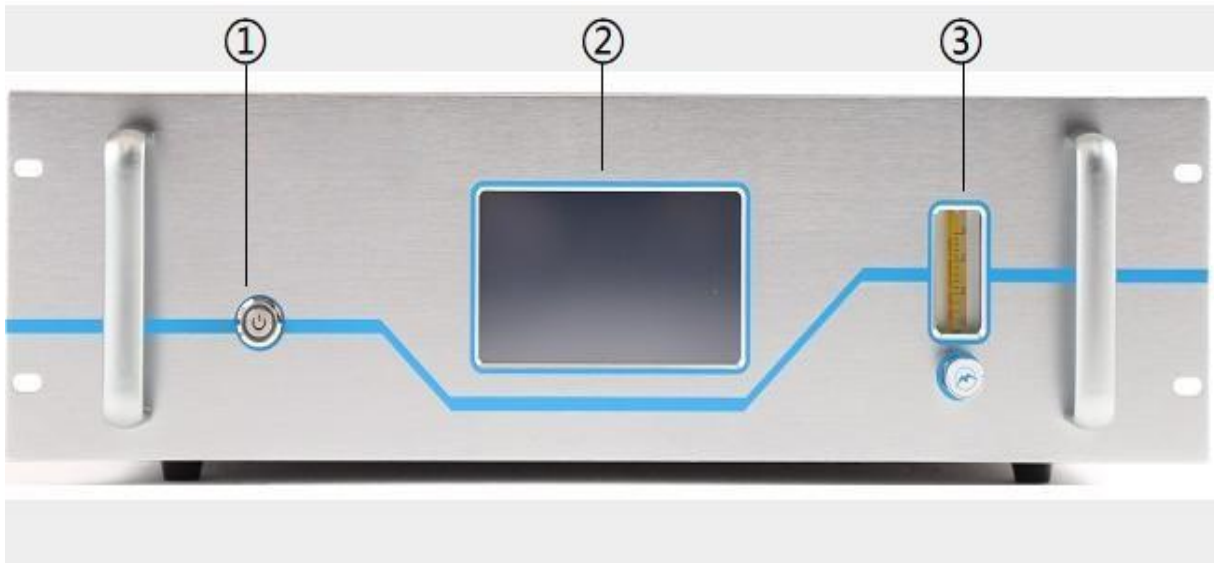


Precautions when using	
	<ul style="list-style-type: none"> ■ When using standard gas, please read the instruction manual of the standard gas thoroughly before using it correctly.
	<ul style="list-style-type: none"> ■ Do not run the analyzer for a long time with the cover open. This will cause dust to accumulate inside the analyzer and cause malfunction.
	<ul style="list-style-type: none"> <input type="checkbox"/> Do not touch the terminals with metal, fingers, etc. Otherwise, there may be a risk of electric shock. <input type="checkbox"/> Do not smoke or use open flames near the analyzer. Otherwise, fire may result. <input type="checkbox"/> Do not allow moisture to enter the analyzer. Otherwise, electric shock or fire inside the analyzer may result.

Precautions during maintenance and inspection	
	<ul style="list-style-type: none"> ■ When maintaining and inspecting the analyzer, it is not only necessary to inspect the inside of the analyzer, but also to fully ventilate the gas pipeline under test with zero-point gas before proceeding. Otherwise, poisoning, fire or explosion may occur due to gas leakage, etc.
	<ul style="list-style-type: none"> <input type="checkbox"/> When working, you should first remove watches, jewelry and other metal objects to avoid the risk of electric shock. <input type="checkbox"/> Do not touch the instrument with wet hands.

Product appearance description

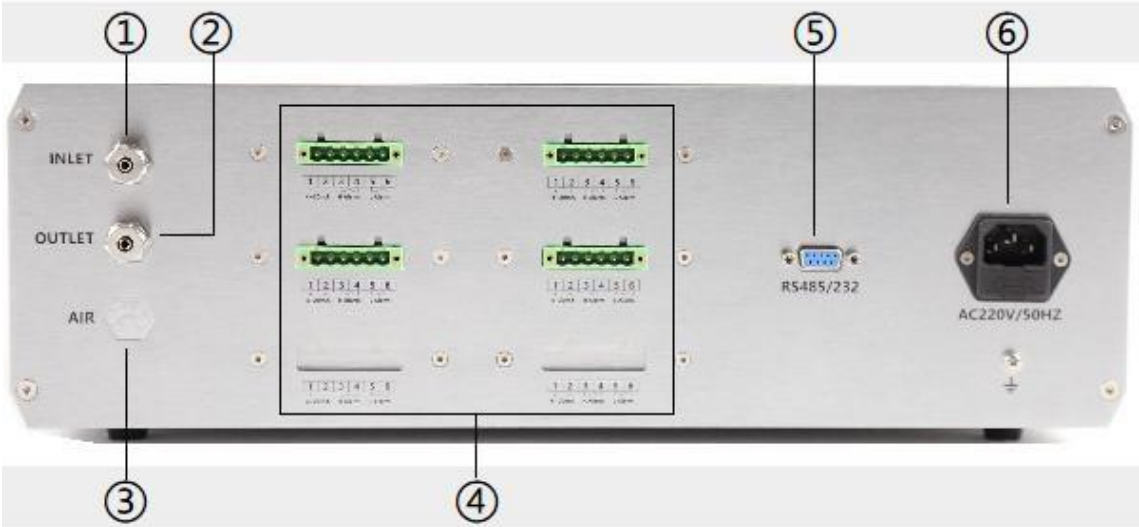
Instrument front diagram.



Items	Descriptions
① Power supply button	Power on or off the gas analyzer
② Touch screen	Display and operation
③ Float flowmeter	Monitor and control the flow of sample gas.



Schematic diagram of the back of the instrument



Items	Descriptions
① Gas inlet	The gas pipeline connection port under test.
② Gas outlet	Exhaust pipe connection port.
③ Zero adjustment port	Clean air line connection port.
④ Output terminal block	For specific functions, see "1.2.1 Output Terminal Function Description".
⑤ Communication Interface	RS485 or RS232.
⑥ Power supply socket	AC 220V



Product features

1. Infrared related filtering technology and long optical path gas cell have the ability to detect ultra-low gas concentrations.
2. Low-temperature cooling infrared detector, low drift, high accuracy, low power consumption and fast response.
3. High-performance infrared light source, long service life, and special structural design to effectively avoid the impact of vibration.
4. The self-tuning PID algorithm is used internally to control the temperature with high precision.
5. The light source, detector, core circuit, etc. adopt modular design, with high reliability, good scalability and easy maintenance.
6. independent gas detection modules for easy integration into any detection system or control system.
7. The dense-flow double detector with high induction and reliability uses an infrared radiation protection block to compensate for the absorption signal of the gas being measured. It is less affected by external environmental factors than the single-channel measurement solution, and the results are more stable and do not require frequent calibration. .
8. Output signal: RS-232/RS-485/4-20mA.
9. The measuring range can be customized according to customer needs, and the gas pool heating function is optional.
10. Long service life.

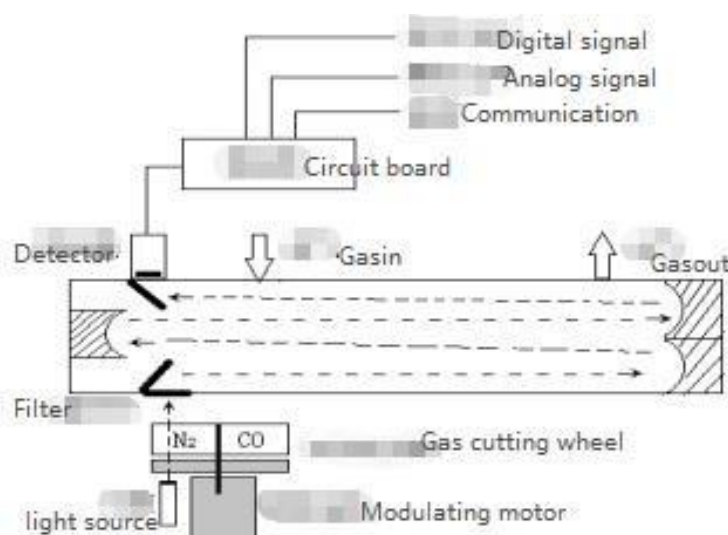


Product introduction

Technical principles

When infrared light passes through the gas cell to be measured, these gas molecules absorb the infrared light of a specific wavelength, and its absorption relationship obeys the Lambert-Beer absorption law. By measuring the light intensity of the absorption window and the unabsorbed window, the concentration of the gas to be measured can be calculated.

The imported infrared light source provides highly stable infrared light, which can meet the gas measurement of infrared gas absorption cells; the highly sensitive detector is matched with two highly customized filters with strong selectivity to select specific wavelengths of light to reach the detector. Thus, a voltage waveform with a concentration signal is output, and the microprocessor is provided for acquisition, calculation, and calibration to obtain the concentration signal.



Performance parameters

Measurement principle	Infrared absorption (NDIR)
Measuring gas	CO、CO ₂ 、CH ₄
Measuring range	(0 ~ 10/50/500/2000) ppm, other ranges can be customized.
Sample gas flow	0.8L/min±10%
T90 time	≤60s
Indication error	≤2%F.S.
Drift	≤±1%F.S./24h
Preheat time	≤60min
Output Interface	RS-232/RS-485/4-20mA

Working conditions

1. Ambient temperature: (0 ~ 40)°C.
2. Environmental humidity: (0~95)%RH, no condensation.
3. Relative pressure: (86~106) kPa.
4. Working power supply and power consumption: (sensor: DC12V/25W; gas pool heating: AC220V/150W).
5. Applicable environment: No significant vibration or impact.

Turn on the machine

Start preparation

- Please first confirm whether the following tasks have been completed:
- The analyzer is installed smoothly as required.
- Check whether the gas pipeline is connected correctly. Whether the sampling device and exhaust pipe are installed in place.
- Whether the power supply is connected correctly and safely.

Analyzer warm-up and operation

- 1) Press the "power switch" of the analyzer, the analyzer will display the startup interface and prompt the startup progress.
- 2) After the analyzer is turned on, it will automatically enter the measurement interface, as shown in the figure below (the displayed content is subject to the actual components).



Preparation before measurement

- The sampling gas needs to be pre-processed to ensure that the sample gas at the inlet is dust-free, oil-free, and dry. The outlet connecting the pipeline is connected to the outdoor atmosphere to ensure a safe discharge and no obstruction. The sampling gas inlet pressure should be 0.1Mpa.
- Control the gas flow rate entering the sampling gas inlet of the analyzer within the range of 0.7~1.2L/min, and it is recommended to choose 1 L/min.

Interface description and operation

Measurement interface



As shown in the figure above, the current interface is the "Measurement Interface", which displays the corresponding component measurement results in real-time. Click on the column identification text below to enter the corresponding column for related operations.

Sensor status information description



: Lower limit alarm mark, that is, the "current concentration" is lower than the set "lower limit alarm value".

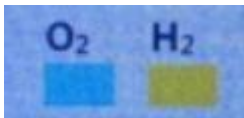
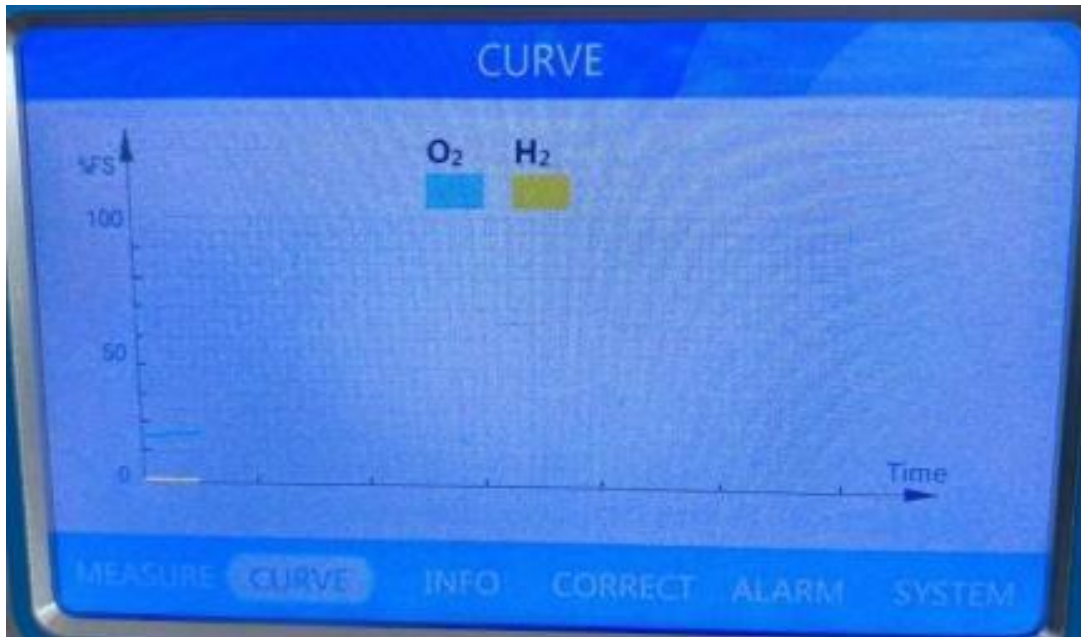


: Upper limit alarm mark, that is, the "current concentration" is higher than the set "upper limit alarm value".

Note: To display the upper and lower limit alarm signs, the alarm function needs to be turned on.



Real-time curve



: The component content currently displayed on the screen. Click the color block under the component name to view or close the concentration change curve of the component.

The current interface is the "real-time curve" interface. The curve color corresponds to the button color under the component name. For example, the "CO" concentration change curve is the "blue" line in the figure, and the "O2" concentration change curve is the "yellow" line in the figure. The abscissa is seconds, the maximum value of the ordinate is the range of each component, and the curve is displayed according to the ratio of (concentration/range).

Click the button under the component name to choose to "turn on" or "turn off" the curve display of each component. By default, each component is in the "on" state.



Instrument information

	Range	Signal	State	Temp	HardNum	SoftNum	No.
O ₂	0-1000 ppm	152	01	0.00	26843	26843	0
H ₂	0-50 %	57	01	50.10	26843	26843	0

LCD Software Version : TY-SCREEN-ZX-0.1.02 Factory number : 630021011101
 Main Software Version : TY-BOARD-ZX-0.1.02 Hardware Version : V2.0

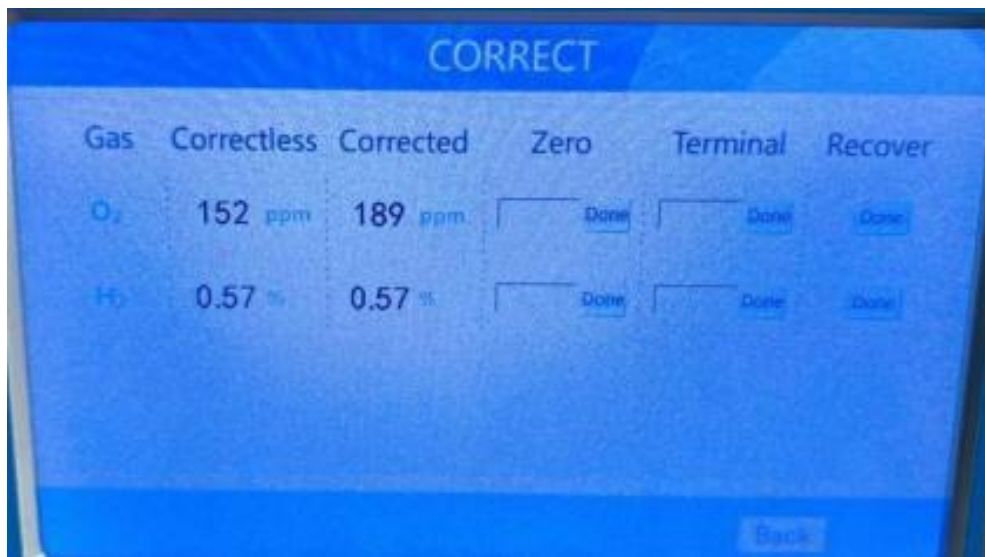
MEASURE CURVE INFO CORRECT ALARM SYSTEM

The current interface is the "Instrument Information" interface. Here you can find information about existing component sensors.

The screen software number and hardware-software number are the default for the program.

The factory number and hardware version number can be set in System Settings - Version Settings.

1. fill in the password on the pop-up keypad and confirm. The default password is "9999".
2. After entering the correct password, you will enter the "Instrument Calibration" interface, as shown below.



- After entering the calibration page, the upper and lower limit alarms are turned off, and 4-20mA retains the value before entering. Press the [Return] button to return to the measurement interface, and the upper and lower limit alarms and 4-20mA output resume work.
- Calibration can only be performed after the "value before calibration" and "value after calibration" is displayed normally;
- When no value is entered in the calibration input box, the "zero point calibration" and "endpoint calibration" input boxes are locked, and the "resume calibration" button can be used normally;
- Calibration can only be performed after the input box has a value;
- When the calibration input value deviates from ([pre-calibration value] ± 10% of the range), it will prompt "Calibration value error", and all parameters will be reset after returning;
- If the calibration input value is correct, it will prompt "Calibrating". After the calibration is completed, it will display "Calibration successful" or "Calibration failed";



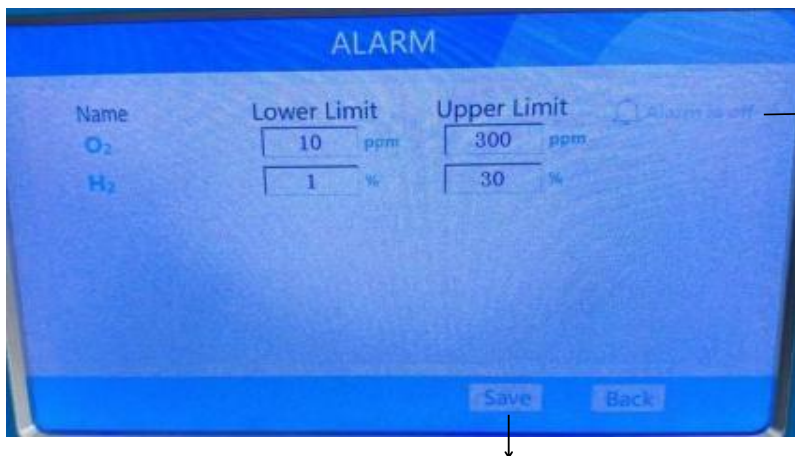
- If the selected component is not connected to the sensor, that is, the component unit is *, the calibration concentration is not displayed, and the calibration input box and calibration button of this component are disabled in this state.

Alarm settings

1. Click "Alarm Settings", and the login interface will appear, click the input box and fill in the password, as shown below.



2. After entering the correct password, you will enter the "Alarm Settings" interface, as shown below.



Click here to turn on or off the alarm function

After filling in the alarm value as needed, click Save to complete the settings.

The upper and lower limit alarm values filled in will change the conditions for the alarm prompt in the "Measurement Interface". Please change it according to actual needs.



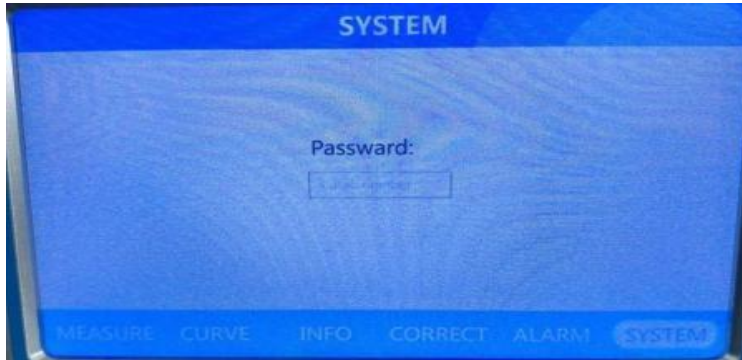
: The alarm function is turned off.



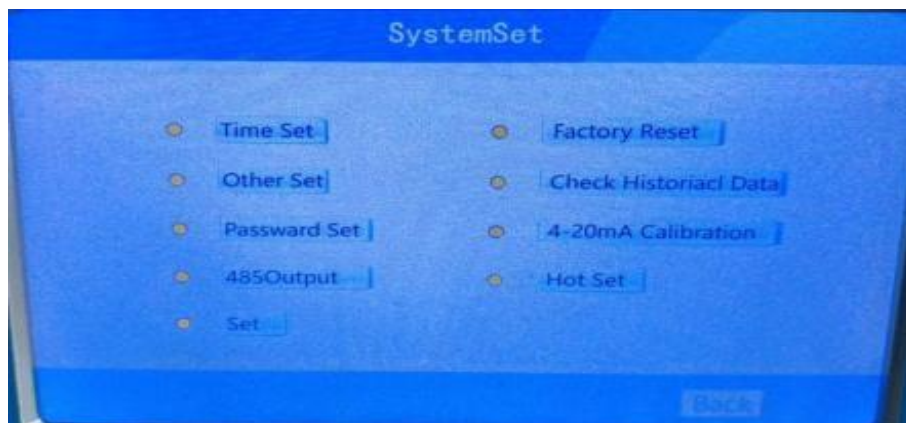
: The alarm function is turned on.

System settings

1. Click "System Settings", and the login interface will appear, click the input box and fill in the password, as shown below.

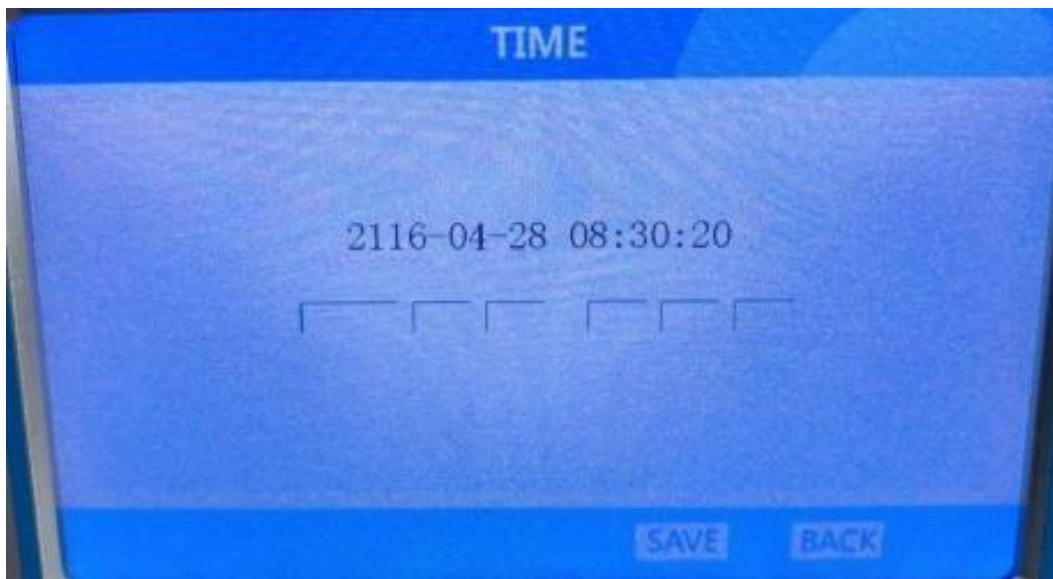


2. After entering the password correctly, you will enter the "System Settings" interface, as shown below.

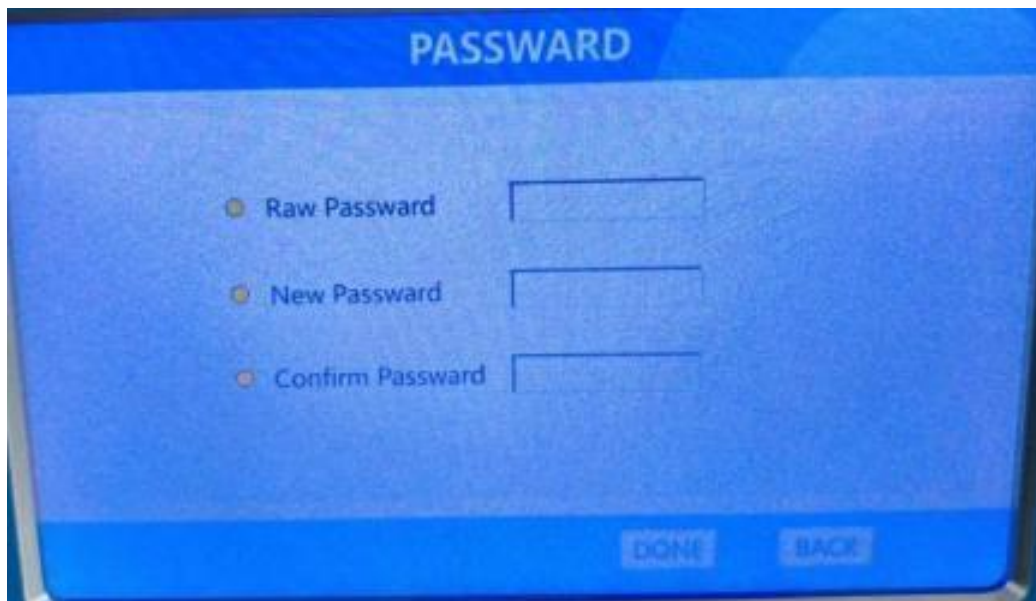


3.1.1 Clock settings

Each time item can be set individually or at the same time. After the setting is completed, click the "Save" button. When the time is modified in the system settings-clock settings, the time displayed in the upper left corner of the [Measurement Interface] changes accordingly.



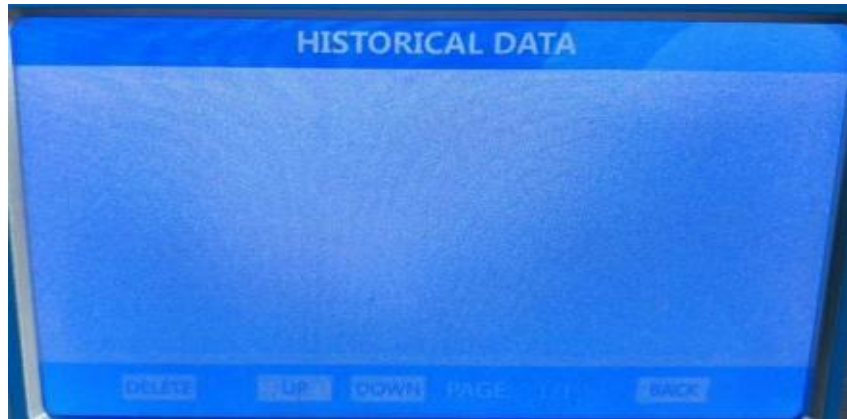
User password modification



Password length is 4 digits.

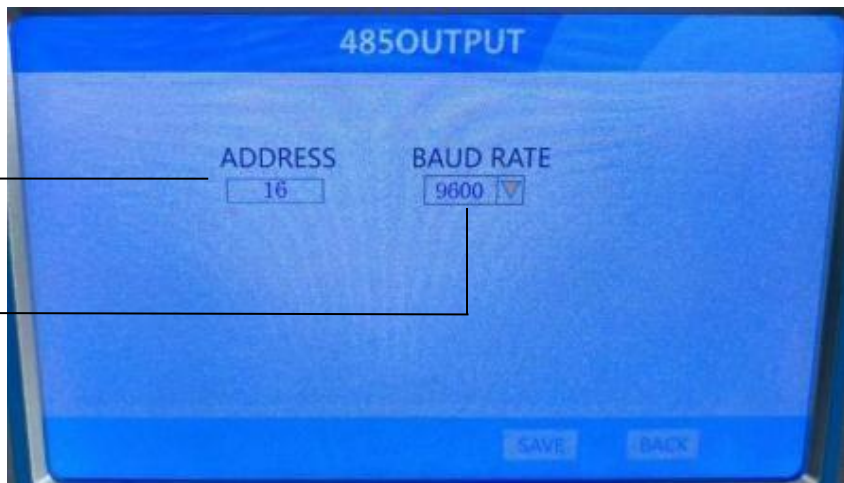
Note: Please remember the modified password. If you accidentally lose your password, you can contact us.

View historical data



0485output settings

The address can be set as required.



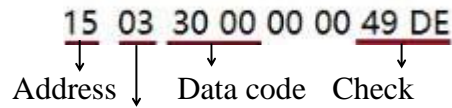
Click the drop-down box to select the appropriate baud rate

The default address is 21, the baud rate is 9600, the address range is 0-255, and the baud rate drop-down menu is optional:

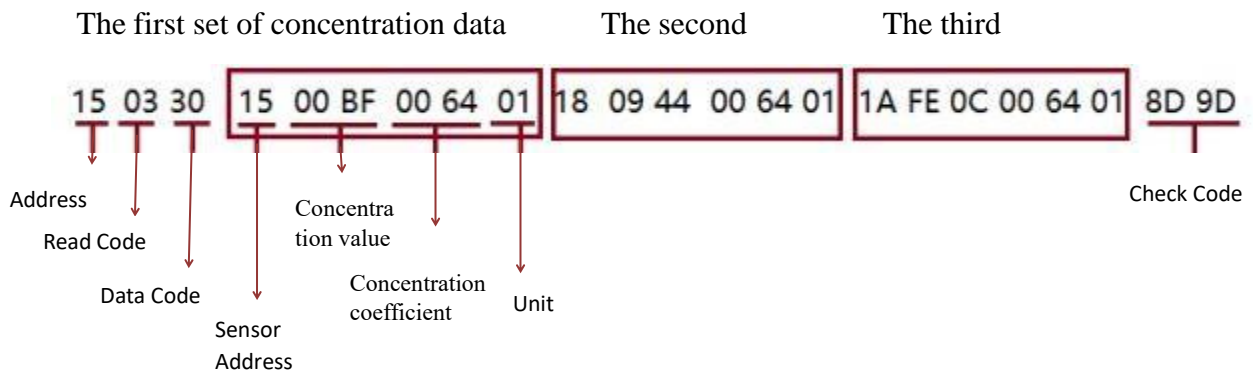
Input Modbus protocol: all in hexadecimal, address setting, 0x03 reading code is fixed, 0x3000 data code is fixed, the last two digits default to 00, the last two digits of check code output protocol;

Output protocol: The first 3 digits correspond to the first 3 digits of the input protocol. Starting from 4 digits, each 6 digits is a set of concentration data. Each group is arranged in sequence. The number of components corresponds to the number of data groups. The last two check digits are True concentration value = concentration value/concentration coefficient.

Modbus protocol example:



Output protocol example (three components):



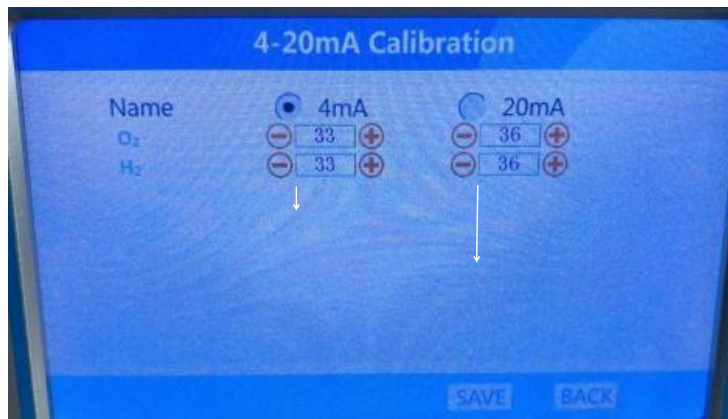
Address ID of each component sensor:

Component	ID
CH4	21 0x15
CO2	22 0x16
H2S	23 0x17
O2	24 0x18
CO	25 0x19
H2	26 0x1A
CnHm	27 0x1B

Gas unit

Gas unit type	Value
%	1
ppm	2
mg/m ³	3

4-20mA output calibration



Enter the interface, the button is a single switch, the default button is [4mA Calibration], and the current output is 4mA, adjust it through the [Add/Subtract] button, the 20mA calibration button is invalid; when switching to [20mA Calibration], the 4mA calibration button is invalid, and the current output is 20mA, adjust through the [Add and Subtract] buttons; [Save] means to save the adjustment value, click the [Return] button to return to the system setting interface.



Other setting



[Over-range limit] is on, the maximum value displayed in [Measurement interface] is the percentage of the measurement range, [Over-range limit] is off, the over-range limit option is hidden, and [Measurement interface] is displayed normally; after over-range, the concentration font in [Measurement interface] turn red;

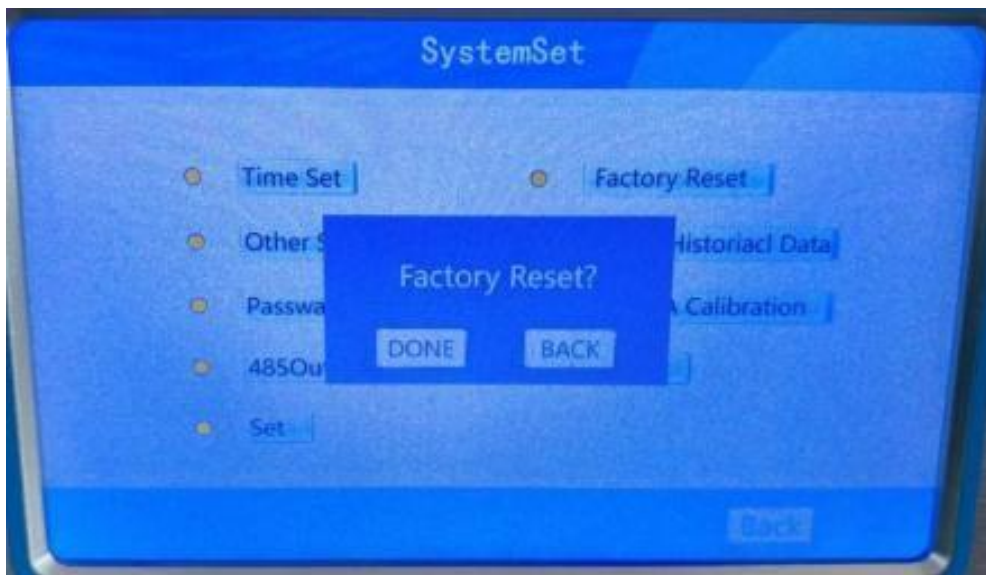
When [Negative Value Display] is on, both [Measurement Interface] and [Instrument Calibration] can display negative values. [Negative Value Display] is off, and the lowest range value is 0.00. When the concentration is <0 , the concentration font in [Measurement Interface] turns red.

When the [Record Data] button is "on", the "Record" button appears on the "Measurement Interface"; when it is off, the button disappears. [Recording interval] The drop-down menu is adjustable.

Indicates that the data is being recorded and saved. The default recording interval is 5 minutes, which can be modified in System Settings - Other Settings. The maximum number of recorded texts is 400, and the maximum number of single text data is 100; when the maximum value is reached, a prompt box is when the number is full pops up and the recording stops.

Restore factory settings


Click "Restore Factory Settings", and a pop-up window will pop up, click the "OK" button, "Restore in progress" will be displayed, and the restoration will be completed after the pop-up window disappears.



Common faults

Fault phenomenon	Reason	Solution
No response after power is on	No power supply; The power cord is damaged;	Power supply, replace the power socket; Replace damaged parts
Low flow or no flow	Sampling system failure; Leakage from the sampling port; Blockage of the airway or trachea	Check the sampling system and eliminate external faults; Tighten the sampling port to connect the airpipe; replace the sampling pipe; Check the airport; check whether the trachea is squeezed; replace the trachea
The response speed of the measured value is slow and the change of the measured value is small or no change.	The sampling gas line is leaking; The dust filter is clogged;	Check the sampling system and refer to the "low flow or no flow" processing method; Replace dust filter paper



The measurement value jumps with a large amplitude and exceeds the allowable error.	The instrument is not warmed up enough; Sampling is unstable	The normal instrument starts and warms up (30seconds); Check sampling system
The value does not return to zero after measurement	There is residual gas in the gas line; Effect of instrument zero drift	Carry out the measurement and pass in nitrogen or clean air to remove the residual gas; Perform zeroing or user calibration
	<ul style="list-style-type: none"> ■ After the above inspection, if the fault still exists, please contact Hubei Fangyuan Environmental Protection Science & Technology Co., Ltd. ■ Non-professionals without permission from the manufacturer are not allowed to disassemble or assemble the instrument by themselves. Otherwise, the manufacturer will not provide warranty or repair services for damage to the instrument. At the same time, there may be electricity inside the instrument, posing a risk of electric shock. 	

Instrument care and maintenance

1. When performing instrument maintenance, the power supply should be cut off to avoid electric shock accidents.
2. After use, wipe the dust and stains on the surface of the instrument clean.
3. The instrument should be stored in a clean, ventilated, and dry environment.
4. Severe vibrations should be prevented during transport.