

KC TECHNOLOGY CO., LTD.

TC30 User Manual Terminal Conductivity Analyzer



0~50.00%/50~99.99% H2

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User information

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Tips

Only by reading and understanding this manual can ensure the analyzer TC30 was used correctly and reasonable. So before the installation and use of this instrument , please read this all this manual carefully .

All the value data show in this manual are all examples, which are pre-set by manufacturer , the actual value during operation must be self-determined by the user .



Safety tips

1. The analyzer can't be used in explosion hazardous situations;
2. Commissioning, operation and maintenance shall be responsible by people specifically ;
3. Before open the tank cover of the analyzer , please turn off the analyzer and disconnect the power supply.



Special attention

- During the work process of the instrument, please stat away from power cable , power relays , electromagnetic interference source;
- Please disconnect all the cable before move the analyzer;
- Analyzer cannot be immersed in any liquid, also avoid liquids or solids fall into the analyzer.

Content

1	Overview	1
2	Typical application	1
3	TC30 analyzer's main characteristic	1
4	TC30 technical specification.....	2
4.1	Technical specification.....	2
4.2	Main application	2
4.3	Function input/output.....	2
4.4	Basic parameter	3
5	TC30 analyzer structure	7
5.1	Front panel.....	7
5.2	Rear panel.....	9
6	TC30 analyzer installation	12
6.1	Installation condition	12
6.2	Analyzer installation	12
6.2.1	Analyzer fixating.....	12
6.2.2	Inlet port connection.....	13
6.2.3	Outport connection.....	14
6.2.4	Line connection.....	14
7	Analyzer boot.....	15
7.1	Cold boot.....	15
7.2	Warm boot.....	17
8	Operation and parameter setting.....	18
8.1	Standard detection mode	18
8.2	Menu description	19
9	Menu function and setting.....	22
9.1	Enter into menu	22
9.2	Exit menu	24
9.3	Range setting	25

9.3.1	Auto range	26
9.3.2	Fix range	31
9.4	Alarm setting	34
9.5	Advanced menu (calibration)	36
9.6	Advanced menu (Function setting)	39
9.6.1	Exit	41
9.6.2	Analog output calibration	41
9.6.3	Analog output mode	44
9.6.4	Time setting.....	46
9.6.5	Date setting	47
9.6.6	Key tone.....	48
9.6.7	Language.....	49
9.6.8	Communication address	50
9.6.9	Interfering gas	51
9.6.10	Boot mode.....	55
9.6.11	Range selection	56
9.7	Storage period.....	57
9.8	History data	58
9.9	Instrument information	59
9.10	Restore factory setting	60
9.11	Menu lock switch.....	61
10	Defect and trouble shooting.....	62
11	Warranty,maintenance and storage	63
11.1	Warranty	63
11.2	Maintenance.....	64
11.3	Storage.....	65
12	Accessory.....	65

1. Overview

The TC30 which developed by the KC Technology co., ltd are based on microprocessor, Considering microprocessor thermal conductivity sensor as measuring unit. it has high accuracy; good stability; comprehensive function and long service life. applied to test the H₂ or He in binary gas or binary mixture gas .

1 Application

- Air separation;
- Chemical engineering application;
- Wood gasification;
- Gas manufacturing ;
- Protection gas detection;
- Blast furnace gas detection;
- Synthetic gas detection;
- H₂ cooling generator 's detection.

2 Main characteristics of TC30 analyzer

- Based on microprocessor, have high intelligence, stability, reliability and so on ;
- Considering microprocessor thermal conductivity sensor as measuring unit. high accuracy, long calibration period;
- With 128×64 LCD screen to show the hydrogen value, menu, setting data and machine status and so on , the surface is covered by tempered glass windows, has a good protective effect (see chapter 5.1, page 6);
- Auto detection range(refer to 9.3.1,page 22), It will switching the output range automatically according to the gas concentration. improve the output accuracy ;
- Interference gas compensation function (Refer to 9.6.9, Page 51) , to

eliminate the influence of the interference gas, and improve the detection accuracy;

- Menu lock switch (refer to 9.11, page 61) , In case the misuse of the operation;
- Use the newest touch button technology, Extend the life of the key;
- Two single-pole single-throw gas concentration alarm output function;
- RS485/RS232(Optional)two way communication function, can connect with computer and other digital instrument directly;
- Isolated analog signal output, can free setting via the menu as 4-20mA、0-20mA、0-1V、0-5V、0-10V analog output mode (Refer to 9.6.3, Page 44) ;
- Simple structure, Easy to operation and maintain.

3 TC30 Technical Specifications

4.1 Technical data

- Range: 0~50.00%/50~99.99% H₂
- Accuracy: ±1%FS
- Repeatability: ±1%FS
- Stability: ±2% FS/7d
- Respond time: T₉₀<30s

4.2 Application condition

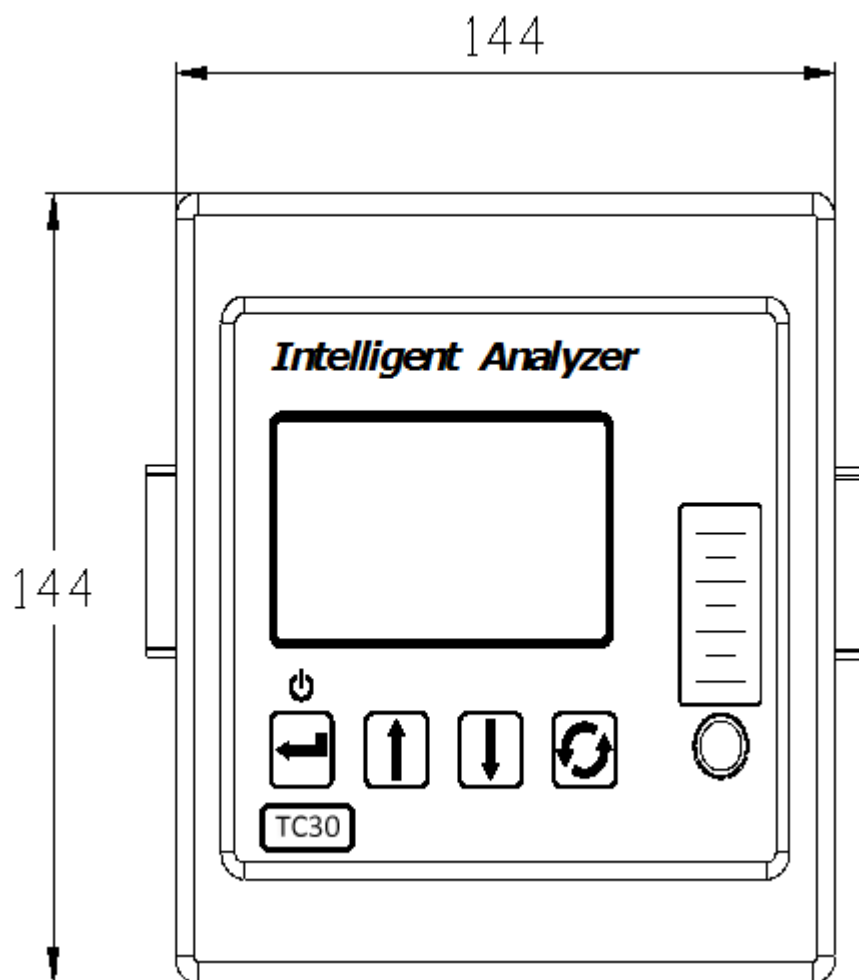
- Power supply: 85~264VAC, 50/60Hz
- Ambient temp: 5°C~45°C
- Ambient Humidity: <90%RH
- Sampling gas pressure: 80kPa~110kPa (**Absolute pressure**)
- Sampling gas flow: 200~400ml/min
- Gas temp: 0°C~50°C

4.3 Function input/output

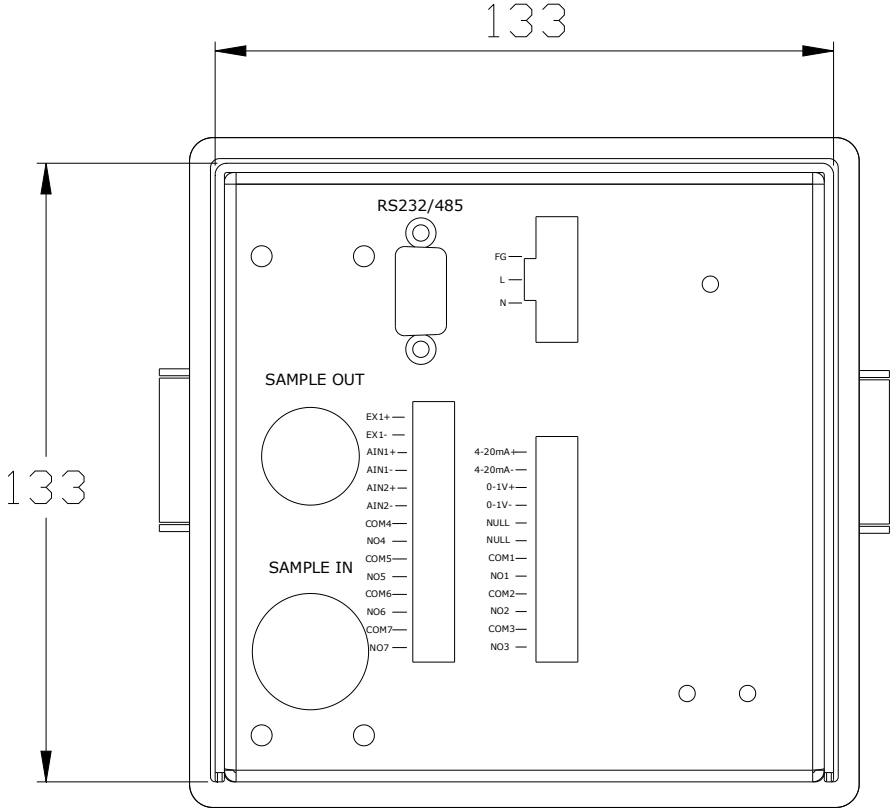
- External controlling signal: Can input 1 group 9~28VDC signal controlling gas pump(optional)
- Interfacing gas compensation signal:can input two group 4-20mA interfacing compensation signal(default interfering gases CO, CO₂, if they contain other interfering signals, please specify when Place the order)
- Analog output: Standard configure two group 4-20mA analog output,can been free set as 4-20mA、0-20mA、0-1V、0-5V、0-10V output mode.
- Communication: RS485/RS232 (Optional)
- Alarm output: Two group gas concentration alarm switch output, two group range mark switch output (auto detection range)
- Alarm contact capacity : 240VAC, 0.2A

4.4 Basic parameters

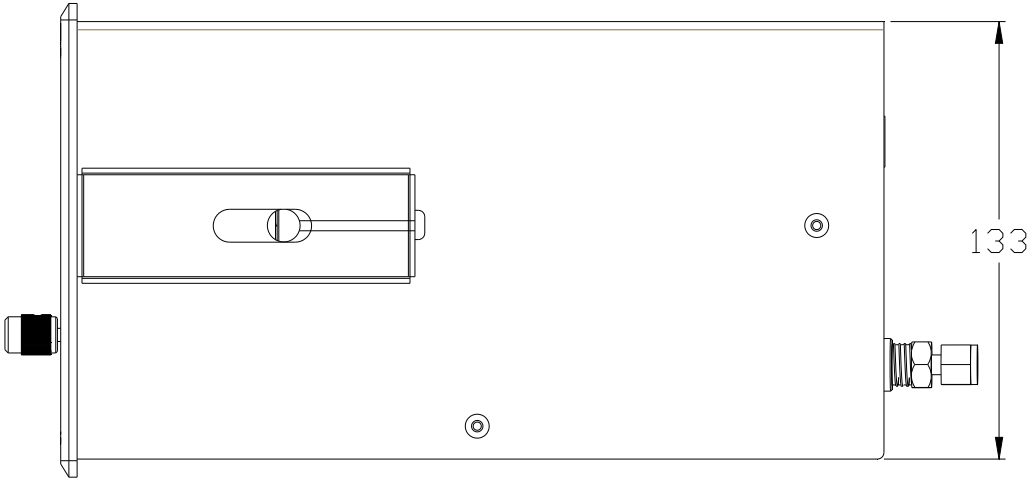
- Sensor life: Longer than 3 years (Normal use)
- Instrument life: Longer than 5 years (Normal use)
- Instrument size: 144mm(W)×144mm(H) ×295mm(D), As picture 1a~1d
- Instrument installation hole size: 136mm×136mm



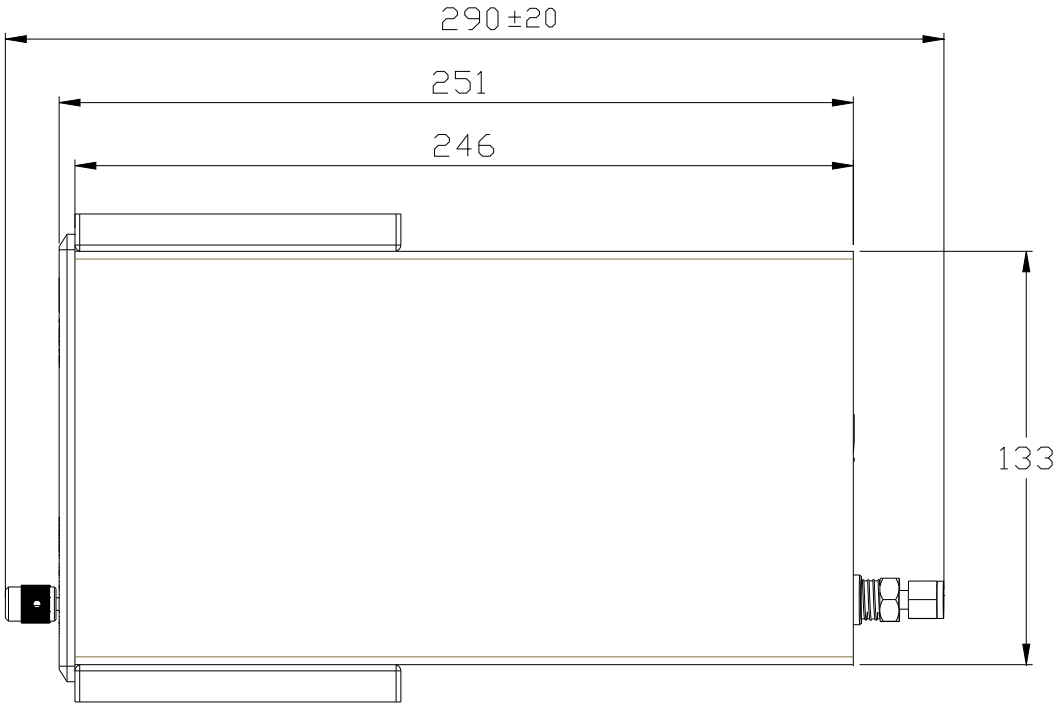
Picture 1a TC30 Front panel size



Picture 1b TC30 Rear panel size



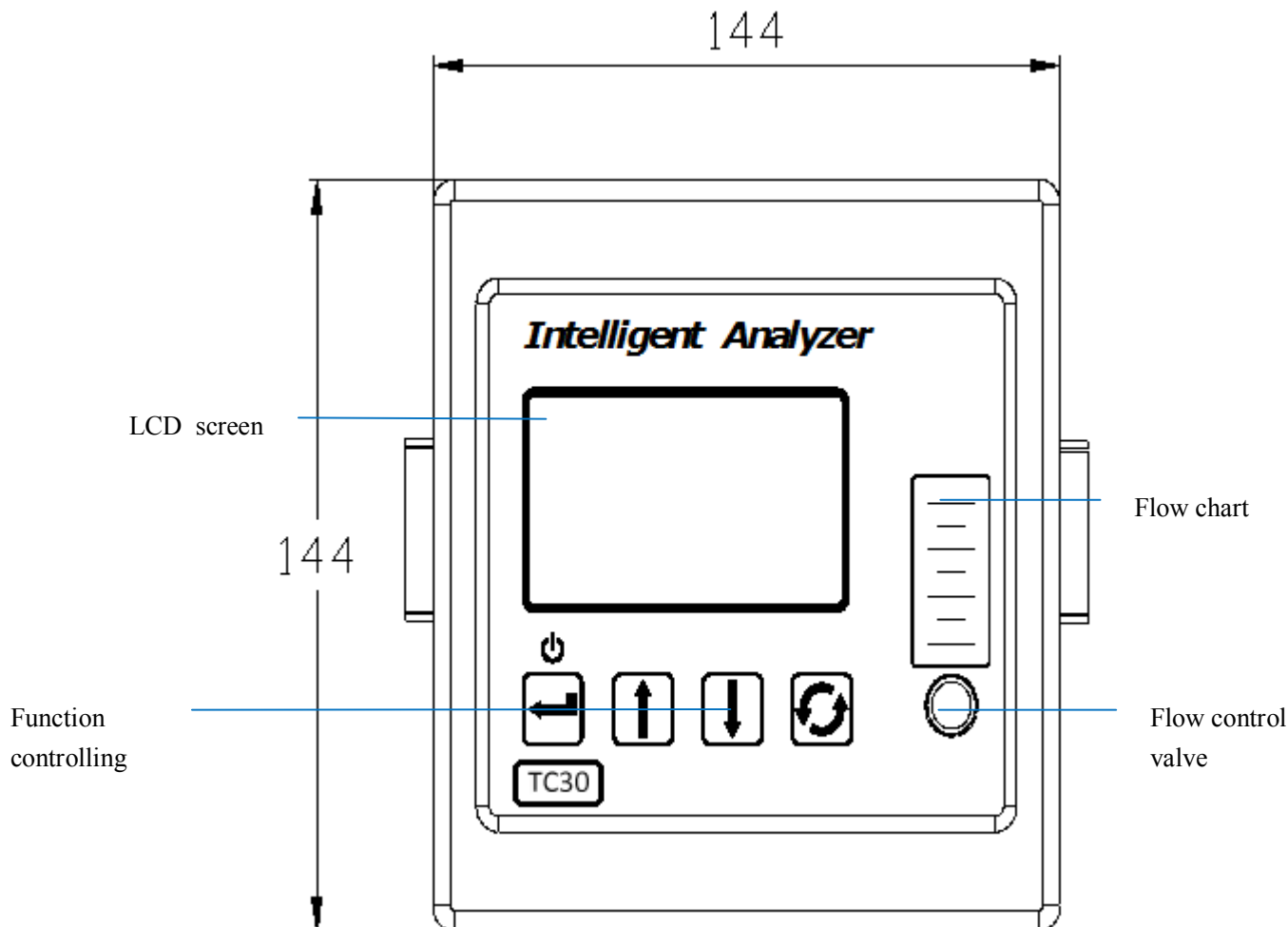
Picture 1c TC30 side panel size



Picture 1d TC30 upper side

4 TC30 analyzer structure

5.1 Front panel



Picture 2 Front panel

- **LCD screen:**

The screen are made of one 128×64 LCD module, which are the display screen of human-computer interaction.





In the standard detection mode : The screen will show the oxygen concentration, alarm type, date, time, instrument status /error (Refer to 8.1, Page 18) ; In the menu mode : the screen can show the menu, option, value etc (refer to Chapter 9, page 22~61)。

- **Function controlling area:**

Display the function buttons, which are the input device of the human-computer

interaction, it are made of four touch buttons, it's function and name are as chart 1.

Chat 1 Button name and function of each button

Button	Name	Function
	Menu button	1. In the standard detection mode, click this button to enter the menu mode ; 2. Select the menu and then click this button to enter the selected menu.
	Confirm button	1、 After selected the menu, click this button to enter the selected menu; 2、 After change the parameter of the menu, click this menu to make the confirmation.
	Standby button	1、 Standby: In the detection mode, press and hold the button and operate according to the tips, the analyzer will enter into charge off status; 2、 Warm boot: When the analyzer are under charge off status , open the analyzer through this button.
	Page up	Page up to select menu
	add	When setting the value, click one time of this button, the current value will add 1
	Page down	Page down to select menu
	reduce	When setting the value, click one time of this button, the current value will reduce 1
	Position change	When setting the value ,click one time of the button, the cursor will move to the right for 1 bit

Note: The analyzer uses the latest touch-button technology, operation is very simple, just a click away with the pulp gently!

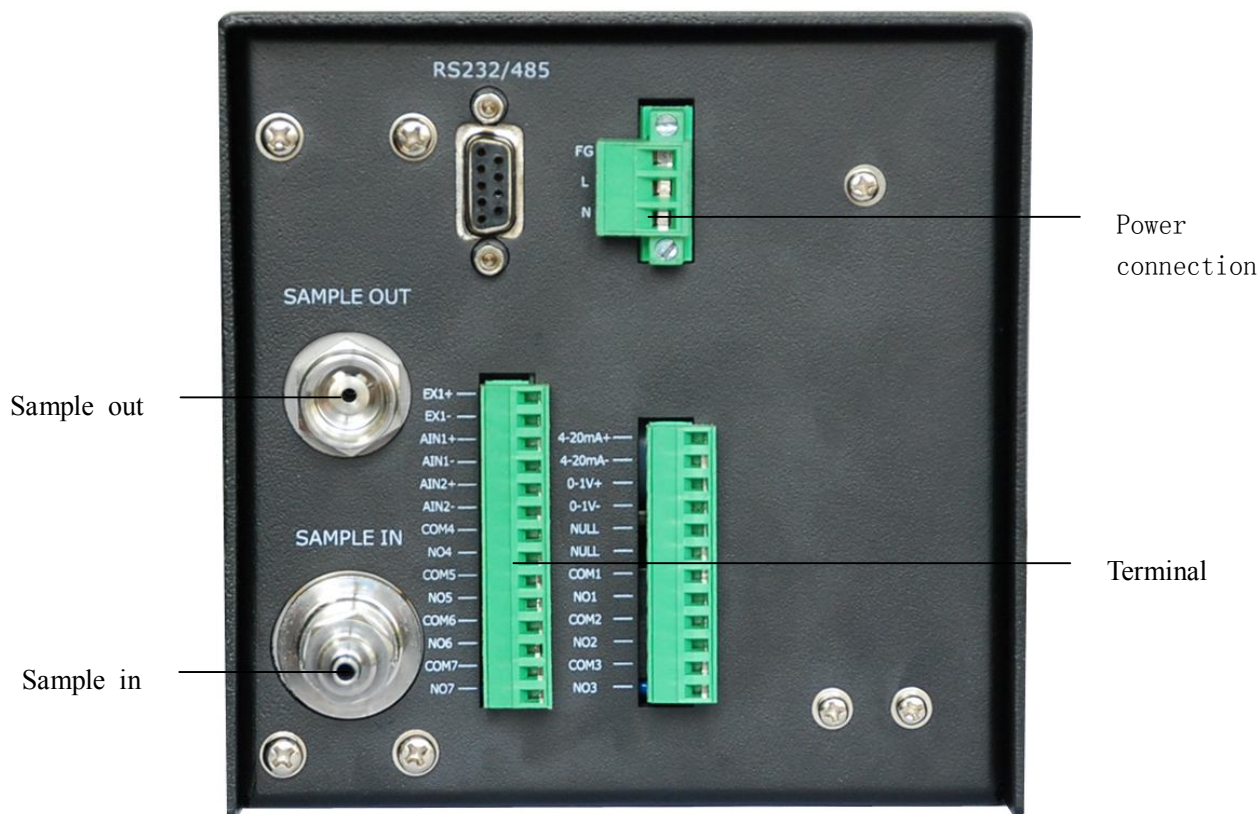
- **Meter:** Which are used for indicate the gas flow of the internal gas path.
- **Flow control valve:** which are used for control the gas flow of the internal gas path, clockwise to reduce the flow , counter-clockwise to increase traffic.

Note:

The front panel of the display instrument are covered by a toughened glass, which not only make the instrument more beautiful, but also has a good protective effect, and makes the LCD screen not easy to be damaged, while it also extending the life of the buttons, But the following points should be noted while using:

- 1, Avoid exposure to organic solvents or chemical detergents;
- 2, Avoid sharp tool to scratch the glass;
- 3, No hard object impact the instrument.

5.2 Rear panel instruction



Picture 3 Rear panel of the analyzer

- **SAMPLE IN: Gas inlet port** (Refer to 6.2.2, Page 13) ;
- **SAMPLE OUT: Gas outlet port** (Refer to 6.2.3, Page 14) ;
- **RS232/485: Analyzer RS232/485 communication terminal**, Which are used for connect the external computer or other digital communication instrument , can use the standard DB 9 hole type plug to connect with it . Regarding the

communication interface pin functions and communication protocols, please check the Communication protocol specification .

- **Power interface: Analyzer power supply interface**

Chart 2 The mark and the function of the power interface

Interface mark	Function
FG	Earth Wire (Must connect with the earth, or the case will charged)
L	85~264VAC Power L
N	85~264VAC Power N



Note

In order to ensure the measurement accuracy and stability of the instrument ,must prevent various disturbances on the electrically, please don't one power with large equipment such as large fans, high-frequency furnace, electric drill, air conditioners, large motors. Including the situation that use one phrase of the three-phrase power as power. Even through that the distance will affect the interfacing signal ,but might will have inference, such as filed condition is limited, please add one more clean power supply (Power no less than 100W), To eliminate the influence.

- **Connecting terminal: Analyzer analog signal output, alarm switch output, external controlling signal, and interfacing gas 4-20mA's connecting terminal, the mark and function are as chart 3.**

Chart 3 The mark and function of connecting mark and function

Terminal	Function
4-20mA+	The first group analog output positive
4-20mA-	The first group analog output negative
0-1V+	The second group analog output positive

0-1V-	The second group analog output negative
NULL	No use
NULL	No use
COM1	Alarm 1 witch common port, when alarm 1 alarming, it will connect with No 1, or it will disconnect
NO1	Alarm 1 normal open port, when alarm 1 alarming ,it will connect with COM1, or it will disconnect.
COM2	Alarm 2 witch common port, when alarm 2 alarming, it will connect with No 2, or it will disconnect
NO2	Alarm 2 normal open port, when alarm 2 alarming ,it will connect with COM2, or it will disconnect.
COM3	Status relay common port , when analyzer error alarm it will connect with NO3, Or it will disconnect
NO3	Status relay normal open port, when analyzer error alarm it will connect with COM3, Or it will disconnect
EX1+	External controlling pump 9~28VDC positive input terminal
EX1-	External controlling pump 9~28VDC negative input terminal
AIN1+	Interfacing gas 1's 4-20mA positive input terminal
AIN1-	Interfacing gas 1's 4-20mA negative input terminal
AIN2+	Interfacing gas 2's 4-20mA positive output terminal
AIN2-	Interfacing gas 2's 4-20mA negative input terminal
COM4	Relay 4 common port, when auto detection range , use as detection range mark output (Refer to chart 10,Page 25)
NO4	Relay 4 normal open port, when auto detection range , use as detection range mark output (Refer to chart 10,Page 25)
COM5	Relay 5 common port, when auto detection range , use as detection range mark output (Refer to chart 10,Page 25)
NO5	Relay 5 normal open port , when auto detection range , use as detection range mark output (Refer to chart 10,Page 25)
COM6	No use
NO6	No use
COM7	No use
NO7	No sue

Note: The air pump are user optional, Only when user choose the air pump,The

“EX1+” and “EX1-” can be used.

TIPS: Regarding the communication protocol, please refer to the communication protocol manual.

5 TC30 Analyzer installation

6.1 The installation condition

The analyzer should be installed in an indoor place which has low humidity (No higher than 90%RH), dustless, vibration-free, non-corrosive gases and without mixed explosive gas.

The working temperature should be around 5-45°C. This is because that there are a lot of electrical devices inside the analyzer, when the temperature is too high, it will affect the use of the analyzer.

The analyzer should be closed to the sampling point ASAP. The installation point should avoid heat and machines which generate strong magnetic fields (such as power cables, power relays, motors, transformers, etc).

**Special
attention**

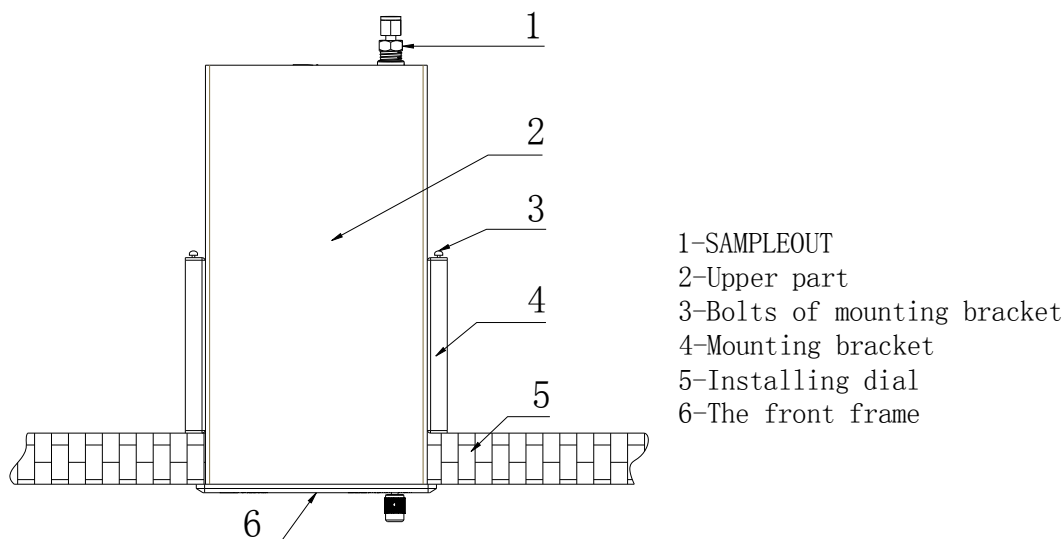


6.2 The installation of the analyzer

6.2.1 Fixation of the analyzer

The analyzer adopts dial-mounted installation. The installation steps are as follows:

- 1、After choosing the installation point, open a 136mm×136mm installation hole on the dial;
- 2、Take off the installation bracket on both sides of the analyzer;
- 3、Slide the analyzer into the application hole, then install the bracket on both sides of the analyzer, screw the fixed screw, then finish the installation of the analyzer, please refer to picture 4.



Picture The installation of the analyzer

6.2.2 The connection of the inlet port

1. TC30 terminal conductivity analyzer's pressure must control at 80kPa~110kPa (Absolute pressure) , When less than 80kPa, can connect 1 air pump to sample the gas(when connect with the air,even if the air pump leak won't cause the accurate detection of the analyzer);when bigger than 110Pa, must install pressure leak valve , and control the pressure in the required range.
2. The gas which input into the analyzer must clean and no-corrosive, if the gas contain impurities or corrosive substances, before the gas transported to the analyzer, must pass through the post-filter or a chemical adsorbent to clean the gas first, such as such as a sintered metal filter (filter diameter 20 ~ 30um), activated carbon filter (filter diameter 20 ~ 30um)etc.
3. To make the detection more accurate and reduce the delay time, please shorten the gas circuit of the detection gas and analyzer. If the installation condition are limited, when the gas path is too long, can install one three-way valve and an exhaust pipe (the length of the exhaust pipe must be larger than 300mm)on the

Note !



nearby of the inlet port, to fasten the gas flow speed and gas exchange rate.

6.2.3 Outlet port connection

1. The outlet port must connect with air, prohibit blocking, Otherwise it will cause permanent damage to the sensor. This is because that the sensor are signal path, which can only exhaust gas via outlet port, when the outlet port are blocking, the pressure of the analyzer will increase quickly, which cause the damage of the sensor.
2. If the sampling gas can exhaust to the air directly, then the outlet port can exhaust directly, if the sampling gas can't exhaust to air directly(**Such as containing toxic or harmful gases**),need to exhaust the gas to a safety place. and prohibit the blocking.
3. **The gas emissions, please refer to the local, city, state of the relevant legal provisions.**

Note !



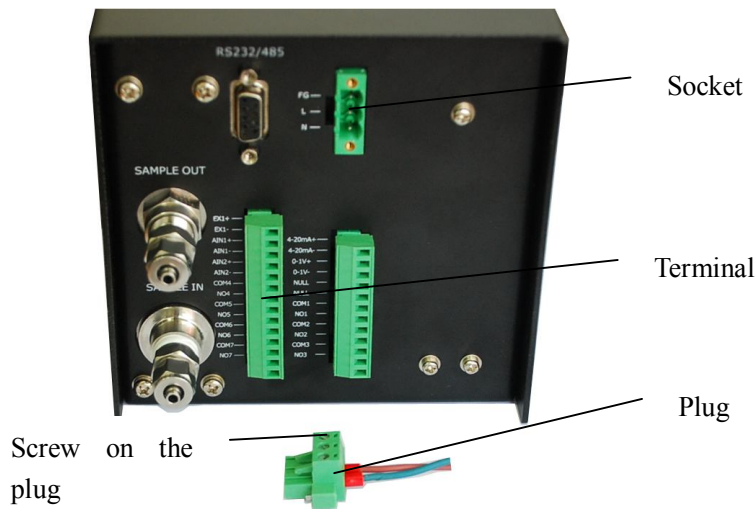
6.2.4 Line connection

The analyzer line can only connect with other instrument via the terminal in the rear panel, Terminals soldering on the PCB socket and plug in the socket used to connect the plug of the wire and terminal blocks the port function, see chart 2 and chart 3.

Wiring steps are as follows: :

- 1、 Take off one end of wire insulation package layer about 5 mm, and the twist the wire together; ;
- 2、 Take off the plug off the terminal, Release the screw of the plug by screwdriver;
- 3、 According to identify on the terminals ,press the wire into the plug, and tighten the screw with the screw drive;

4、 Insert the plug into the socket which on the rear part of the analyzer.



Picture 5 Wire Connection

WARNING: To avoid electrical shock, When connect the line, Please make sure the line is connect correctly before power is turned on , when pull the plug, you should disconnect the power.

Note: Please do not short-circuit the terminals and wires or terminals connected to the chassis short, to avoid damage the device.

6 The boot of the analyzer

The analyzer have two kind of boot type: Cold boot and warm boot

Cold boot: The analyzer will only power on and boot when power off

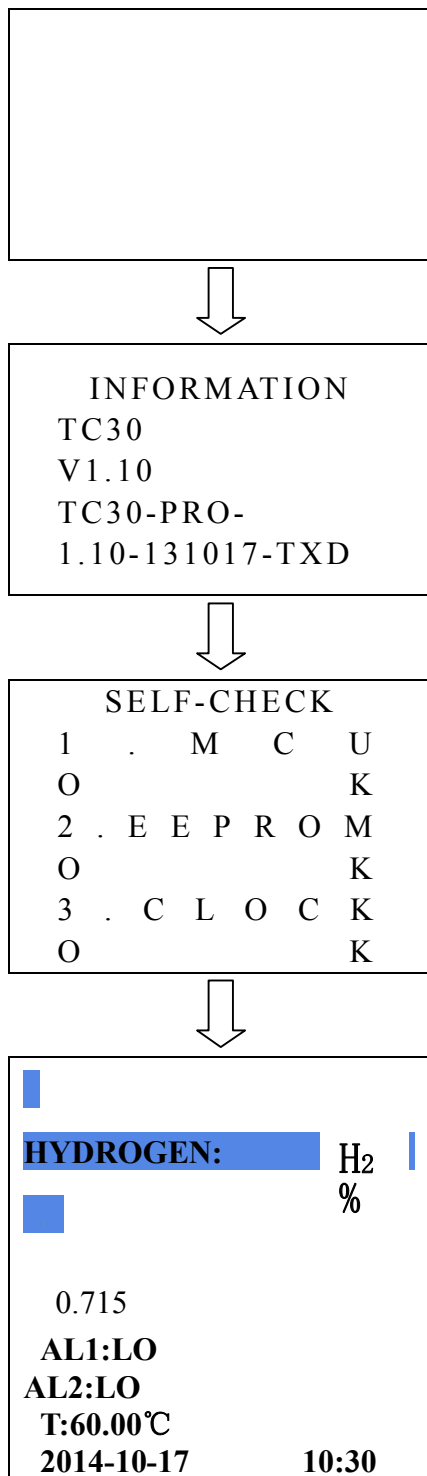
Warm boot: The analyzer will restart when power on (standby status)

7.1 Cold boot

Before power on , please make sure the analyzer's connection line are no short circuit or reverse polarity, then boot the analyzer.

Note: The analyzer are prohibit quick power off/on, which will cause the damage to the electronic because of the residual charge, when the instrument are power off and need power on again , please wait at least 10 s.

After the analyzer boot, first will show the brand and name of KC company, then will show instrument information and software information, then start the self-checking, the self-checking information please refer to chart 4, after self-checking, the analyzer will enter into standard detection mode.



Picture 6 Boot flow chart




Note: This analyzer can be used to detect hydrogen, argon, this manual will only give an example of hydrogen gas detection, when detecting other kinds of gas, the operation steps are all the same, please refer to it.


Chart 4 Self-checking instrument information

Self-checking No.	Description	Detection result
1.MCU	Microprocessors working voltage detection	OK: Running normally; FAULT: Detection failed, But if the instrument keeps running, when entering into the detection mode, it will prompt error tips (Refer to chart 6, Page 17)
2.EEPROM	Memory detection	
3.CLOCK	Clock detection	

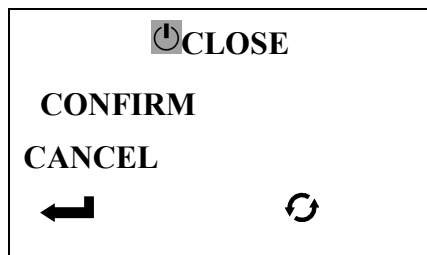
7.2 Warm Boot

The premise of the warm boot is the analyzer under power on status, when the analyzer is not used temporarily, can use the blow method to make the quick power off, and didn't need to turn off the power.

Power off: When the analyzer is under standard detection mode, Click “” button and keep holding for 4 seconds, release the button when the analyzer issues a second “tick” sound, enter the power off prompt screen, like picture 7, click “” button, Shut down the analyzer, At this time only the microprocessor is in standby mode, which are used to detect the boot signal; click “” button to cancel the operation.

Boot (warm boot): After power on via the above method, if user need reboot, please click and hold “” button for 2 seconds, After the analyzer issues a “tick” sound, The LCD screen will enter boot tip screen, like picture 8, at this time

click “←” button to open the analyzer, The analyzer will running the boot process of cold boot. (Refer to picture 6) ; Click “↻” button to cancel the boot.



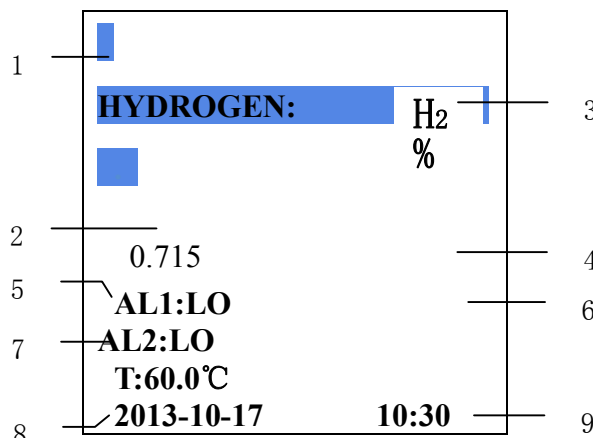
Picture 7 Power off tips



Picture 8 Boot tips

7 Operation and parameter setting

8.1 Standard detection mode



Picture 9 Analyzer standard detection mode

Chart 5 The meaning of each displayed information in the standard detection mode

No	Picture information	Display information	Description
1	HYDROGE N:	HYDROGEN:	Prompt that the below value are hydrogen concentration

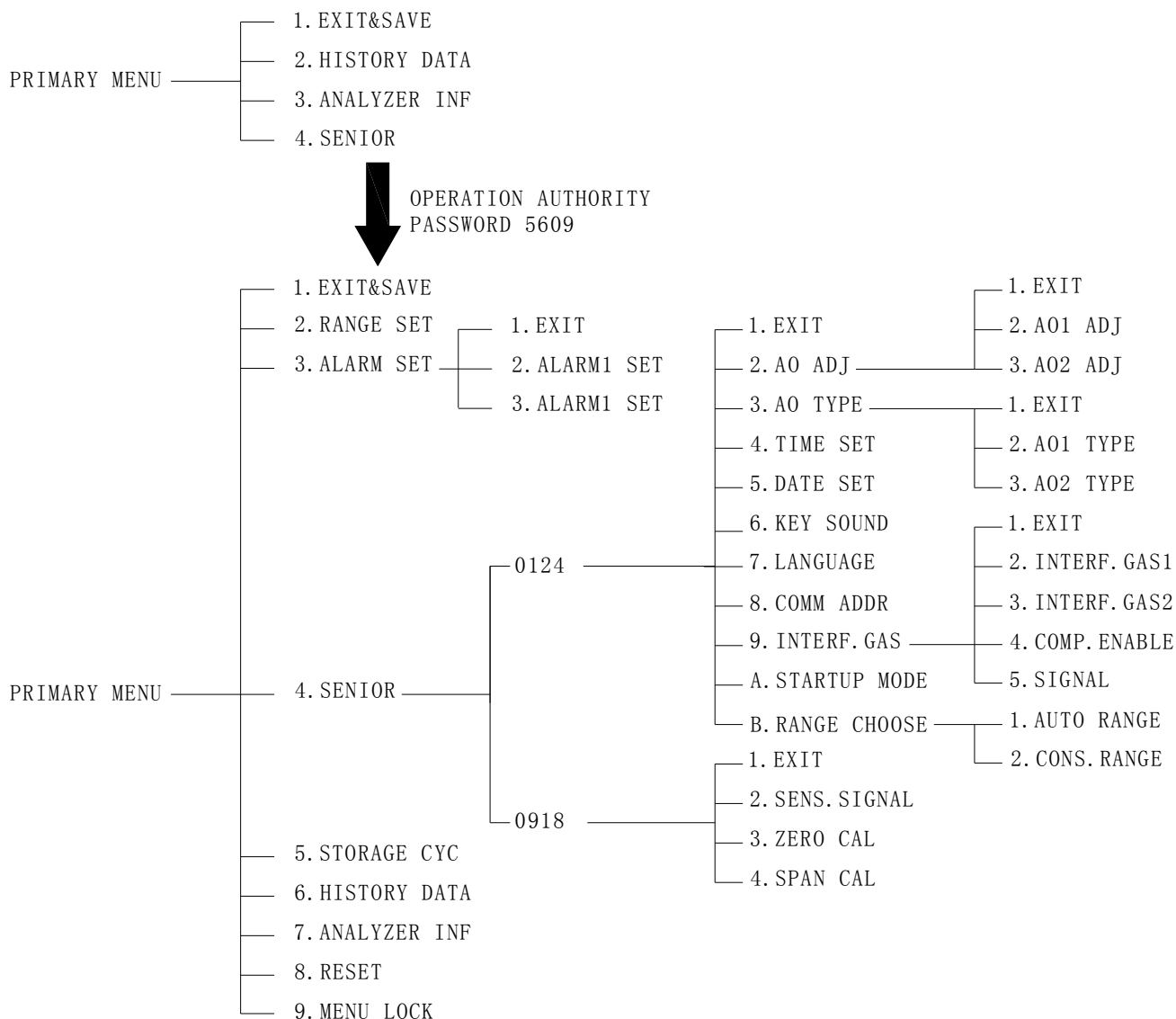
2	0.715	0.715	The hydrogen concentration which detect by the sensor
3	H2	H2	Prompt detection gas are H2
4	%	%	Hydrogen concentration unit
5	AL1: LO	AL1: HI/LO/Not display	Alarm 1 High alarm/low alarm/No alarm
6	AL2: LO	AL2: HI/LO/Not display	Alarm 2 High alarm/low alarm/No alarm
7	T:60.0°C		Sensor's working temperature
8	2014-10-17	Date or error tips	Show the current date or error tips
9	10: 30	Time or error tips	Show the current time or error tips

Note: When the self-checking failure or machine defects, the analyzer will show the error tips on the position where usually show the time and data. As chart 6:

Chart 6 Analyzer error tips

Statu s	Error tips	Description
1	ERROR1	A/D working abnormal
2	ERROR2	Microprocessor operating voltage working abnormal
3	ERROR4	Heating circuit working abnormal
4	ERROR5	Memory red and write abnormal
5	ERROR6	Time working abnormal

8.2 Menu description



Picture 10 Menu dendrogram

Chart 7 The parameter list which user can set

Parameter	Set range	Description
UPPER/LOWER LIMIT	0~99.99%	When fixed range, corresponding analog output, request upper limit are bigger than lower limit
SPAN 1、2、3、4	0~99.99%	When auto range,the analog's upper limit, request set value successively larger
ALARM1 、 2 VALUE	0~99.99%	Set the alarm value of the concentration alarm
ALARM TYPE	HI/LO/NO	Set the alarm type of the concentration alarm

1、2		
SENIOR	5609、0124、0918	Input the password then enter menu setting mode, function menu, calibration menu
STORAGE CYC	0~99 Min	Set the interval of data storage
RESET	YES/NO	Reset to standard configuration
MENU LOCK	ON/OFF	Turn on/off menu lock switch
4mA1、20mA1、1V1、5V1、10V1 ADJ	0~59999	Use high precision multi-meter to calibrate the first group of output signal
4mA2、20mA2、1V2、5V2、10V2 ADJ	0~59999	Use high precision multi-meter to calibrate the second group of output signal
AO1 TYPE	4-20mA1/0-20mA1/ 0-1V1/0-5V1/0-10V 1	Set the first group analog output mode, Standard configuration 4-20mA, user can set the first group of analog output freely
AO2 TYPE	4-20mA2/0-20mA2/ 0-1V2/0-5V2/0-10V 2	Set the second group of analog output mode, standard configuration 0-1V, user can set the second group of analog output mode freely via this menu.
TIME SET		Set current time
DATE SET		Set current date
KEY SOUND	ON/OFF	Turn on/off key sound
LANGUAGE	CHINESE/ENGLIS H	Set the language
COMM ADDR	0~255	Set the communication address of the analyzer when multi-communication
INTERF.GAS1	0~99.99%	Set interfacing gas 1's 4-20mA signal's upper limit and lower limit
INTERF.GAS2	0~99.99%	Set interfacing 2's 4-20mA signal's upper limit and lower limit
COMP.ENABLE	ON/OFF	Turn on/off interfacing gas compensation function
STARTUO	POWER ON/KEY	Set the boot way when power on

MODE	CONTROL	
RANGE CHOOSE	AUTO/CONS.RAN GE	Set range switch mode
ZERO CAL	0~99.99%	Calibrate the analyzer's zero point
SPAN CAL	0~99.99%	Calibrate the analyzer's range point

8 Menu function and setting


Special attention:

1. The setting of the analyzer must be done via the button area below the screen(refer to 5.1,page 6).

2. In case the misuse changing instrument parameters which affecting its normal operation, the instrument has a menu lock switch. When switch on the menu lock switch, the instrument can only enter the simple menu mode ,check part of the parameters,If user want to change the menu parameters; must enter “4.SENIOR” and input “5609”then enter the complete menu to finish the setting of the instrument. The menu are as picture 10, when shut down the menu lock switch, user can enter into the menu setting directly









3. we suggest user turn on the menu lock switch after finish setting the parameters . (refer to 9.11,page 55)

9.1 Enter menu

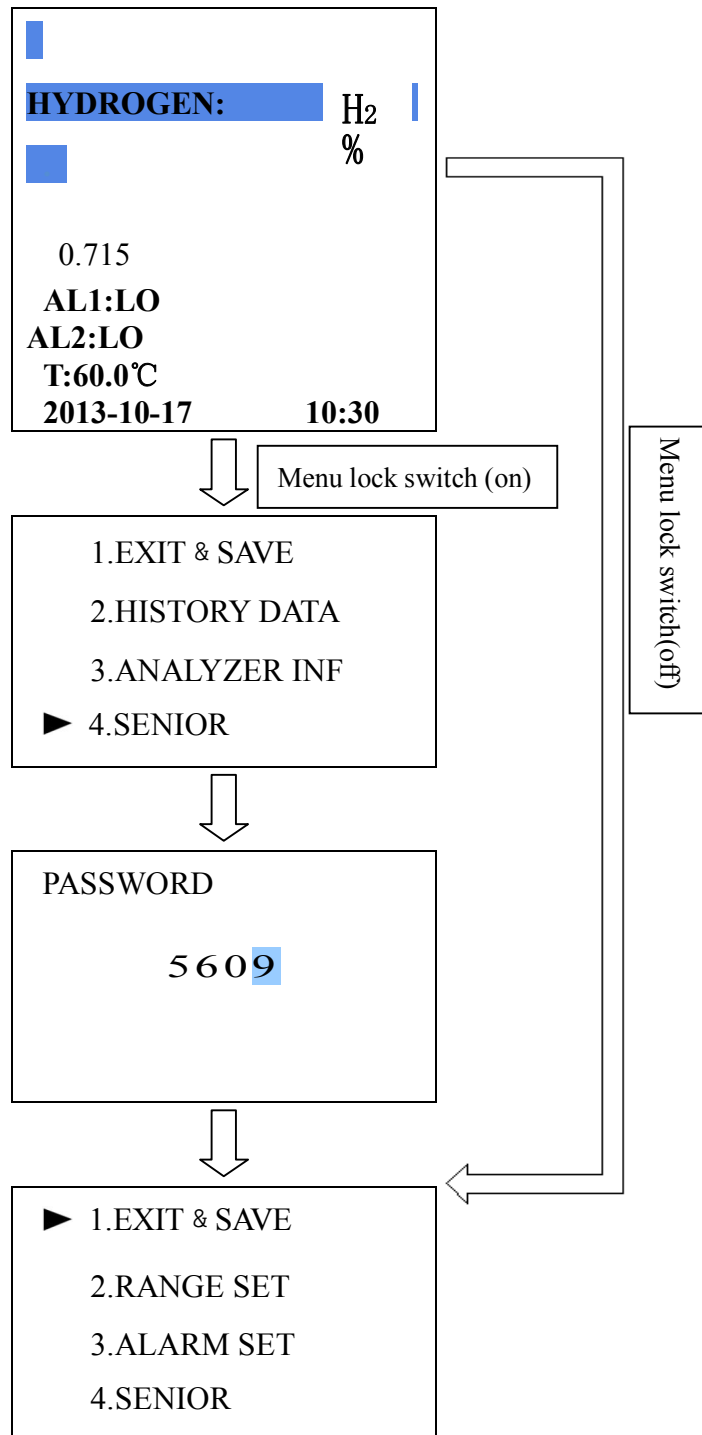
In the standard detection mode , click“”button and keep holding for 2 second, when the analyzer issue a “tick”sound, release the button. if the menu lock switch are turn off, then user can enter the menu setting mode , the analyzer will show all the main menu:

No	Main menu	Function
1	EXIT&SAVE	Exit to standard detection mode, and meanwhile save all the setting parameter
2	RANGE SET	Set analog output range's upper/lower limit
3	ALARM SET	Set two group concentration's alarm value and alarm type.

4	SENIOR	Input the password then enter the analyzer calibration menu and function setting menu
5	STORAGE CYC	Set the interval of the parameter storage
6	HISTORY DATA	Show the historical detection data
7	ANALYZER INF	Check the analyzer's running time, instrument No, sensor No, order No
8	RESET	Restore the factory standard setting
9	MENU LOCK	Turn on/off the menu lock switch

If the menu lock switch was turn on , click“”button to enter the menu mode, the analyzer will only show part of the menu, user can check the instrument information and the storage parameter, can't set the analyzer, if user need to set the analyzer, must click“  ”or“  ”button and select“4.SENIOR” , After click“”button, Analyzer will show: please input the password , click“”button to change the position of the cursor, Click“”button or“”button to change the value of the cursor, input the password No“5609”, Click“”button to enter menu setting mode and show all the main menu:

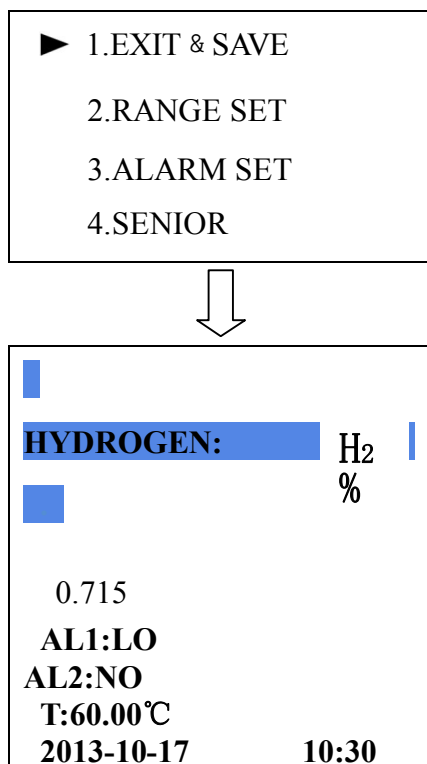
No	Part menu	Function
1	EXIT&SAVE	Exit to standard detection mode
2	HISTORY DATA	Check the historical detection data (refer to 9.8, page 58)
3	ANALYZER INF	Check the instrument information (Refer to 9.9, Page 59)
4	SENIOR	Input the password 5609 to enter the menu setting mode



Picture 11 Enter the menu setting mode flow chart

9.2 Exit menu

In the menu setting mode, click “↑”button“↓”button to select “1.EXIT & SAVE”, Then click“←”button, The analyzer will exit the menu setting mode and return to standard detection mode, during the exiting, the analyzer will save all the parameter.



Picture 12 Return standard detection mode

In the main menu or the sub-menu, if no operation is performed for intervals, the analyzer will return to the previous menu automatically , until return to the standard detection mode, when analyzer return to standard detection mode automatically, it won't save all the setting parameters.

9.3 Range setting

The function of this menu is setting two group of analog output range, the analog output range including upper limited and lower limited. “2.RANGE SET”'s sub-menu are decided by the range mode (refer to 9.6.11, Page 56) , Set as“**AUTO RANGE**”or“**CONS.RANGE**”'s showed menu are different ,please refer to chart 8.

Chart 8 Range setting sub-menu

MENU	MENU	function	Restore	to
------	------	----------	---------	----

			factory setting
AUTO RANGE	1.EXIT	Return to main menu	
	2.SPAN1	Set the upper limit of auto range 1	25.00%
	3.SPAN2	Set the upper limit of auto range 2	50.00%
	4.SPAN3	Set the upper limit of auto range 3	75.00%
	5.SPAN4	Set the upper limit of auto range 4	99.99%
CONS.RANGE	1.EXIT	Return to main menu	
	2.UPPER LIMIT	Set the analog output upper limit of the fixed range	99.99%
	3.LOWER LIMIT	Set the analog output lower limit of the fixed range	0%



Tips

When in the auto range mode, the lower limit is 0%, the upper limit is the range of the first group analog output, it will changed according to the gas concentration's increase and decrease (refer to 9.3.1);

When in the fixed range mode, the upper limit and lower limit is the setting value, only can be changed according to menu, won't change according to the gas concentration's increase and decrease.(refer to 9.3.2).

9.3.1 Auto range mode

“AUTO RANGE”mode's lower limit is 0%, can't be changed; the lower limit is the range of the analog output, and will changed according to the concentration's changing.:

1、 Gas concentration increase:

When the gas concentration increase from the current range to the next range, the analog output will set the next range as the analog output range.

Give an example: Factory default value (refer to chart 8) : If the concentration of the gas is 10%, then the analog output range is 0-25%; When the gas concentration increase, Exceed 25% and lower than 50%时, The analog output range will change to 0-50%; If the gas concentration keep increase, Exceed 50% and lower than 75%, Analog output range will change to 0-75%。

2、 Gas concentration decrease:

When gas concentration decrease from to previous range's 90%, the analog output range will changed to previous range.

Give an example of factory default value (refer to chart 8) : If the gas concentration are 80% , Then the analog output range is 0-99.99%; when the gas concentration decrease to 75%, analog output range won't change right away, it will keep decrease to 75%'s 90% (67.5%), the analog output range will change to 0-75%.



Note!

In auto range mode, the relationship of first group analog output and the detection range as following:

4-20mA analog output mode:

$$I = \frac{16}{H-L} \times (H_2 - L) + 4 \quad \text{..... (Formula 1)}$$

0-20mA analog output mode:

$$I = \frac{20}{H-L} \times (H_2 - L) \quad \text{..... (Formula 2)}$$

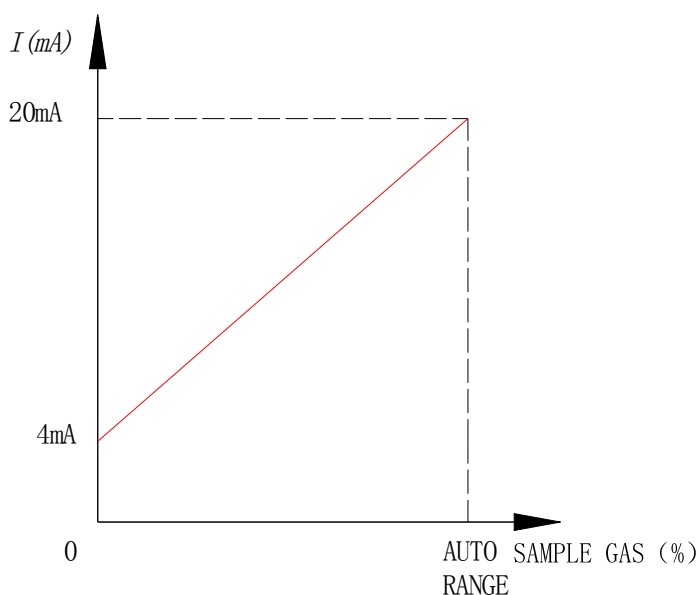
0-1V/5V/10V analog output mode:

$$V = \frac{1/5/10}{H-L} \times (H_2 - L) \quad \text{..... (Formula 3)}$$

Description:

- I: Analog output current theoretical value when the Analog output mode is 4-20mA or 0-20mA;
- V: The analog output voltage theoretical value when the analog output range is 0-1V,0-5V,0-10V;
- H: Decided by the range, When auto range, The upper limit is the range of the first analog output; when fixed range, it's "2.UPPER LIMIT"'s setting value;
- L: Decided by the range mode, when auto range, The lower limit is 0%; When fixed range, It's "3.LOWER LIMIT" menu's setting value (The initial value are 0%) ;
- H2: The displayed value when the analyzer are under standard detection mode.

Give an example of 4-20mA: The Relationship of first group analog output and analog output range as below picture (red line) :



Picture 13 The relationship of 4-20mA and auto detection range



Note!

When in the auto range mode, the second group analog output range and relay 4,5 are used for show the first group analog output range mark (Refer to

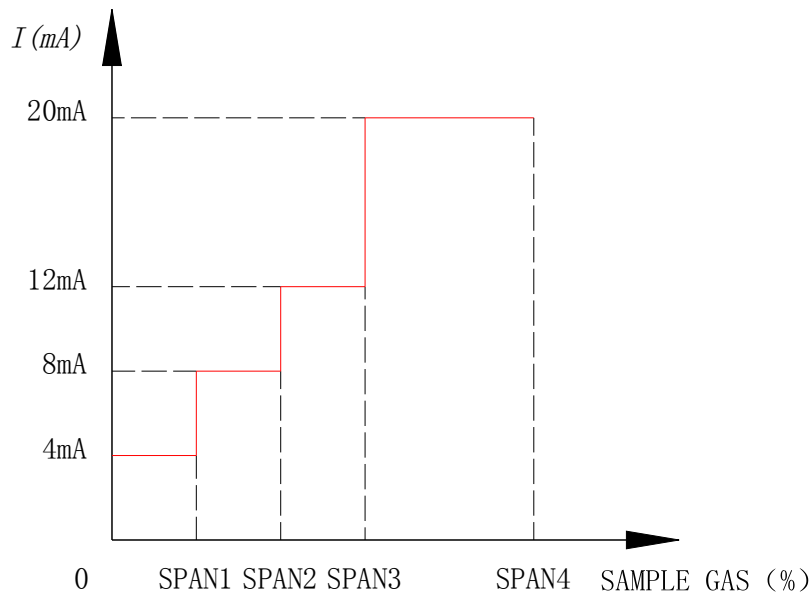
chart 9 and picture 10) .

When in fixed range, two group analog output are linear relationship with upper limit and lower limit, Relay4、 5 have no output.

Chart 9 Auto range mode's second analog output

AO TYPE AUTO RANGE	4-20mA	0-20mA	0-1V	0-5V	0-10V
SPAN1	4mA	0mA	0V	0V	0V
SPAN2	8mA	5mA	0.25V	1.25V	2.5V
SPAN3	12mA	10mA	0.5V	2.5V	5V
SPAN4	20mA	20mA	1V	5V	10V

Give an example of 4-20mA: When auto range, The second analog output are as following chart (red line):



Picture 14 The second group of analog (4-20mA) output

When in auto range, the relay 4、 5and the range of first group analog output mode are as picture 10:

Chart 10 The relay 4,5 output in the auto range

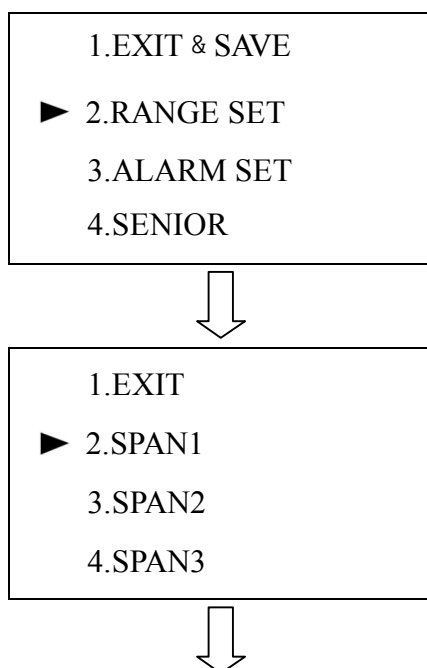
RELAY	RELAY 4	RELAY 5
-------	---------	---------

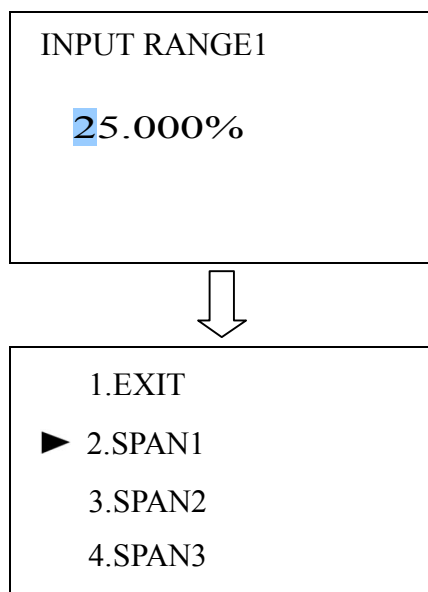
AUTO RANGE	COM4	NO4	COM5	NO5
SPAN1	ON		ON	
SPAN2	OFF		ON	
SPAN3	ON		OFF	
SPAN4	OFF		OFF	

The setting of auto range must fit: SPAN1<SPAN2<SPAN3<SPAN4。

SPAN1~SPAN4's setting method are same, this user manual will give an example of“2.SPAN1”:

Set the “RANGE CHOOSE” menu as “AUTO RANGE” (refer to 9.6.11, Page 56), Enter“2.RANGE SET” menu, Click“↑”or“↓”to select “2.SPAN1”, Click“←”button to enter menu, at this time ,analyzer will show the previous showed range 1,Click“↻”to change the current cursor's position, click“↑”or“↓”button to change the cursor's value and position, after finish the setting, click“←”button to return to previous menu.



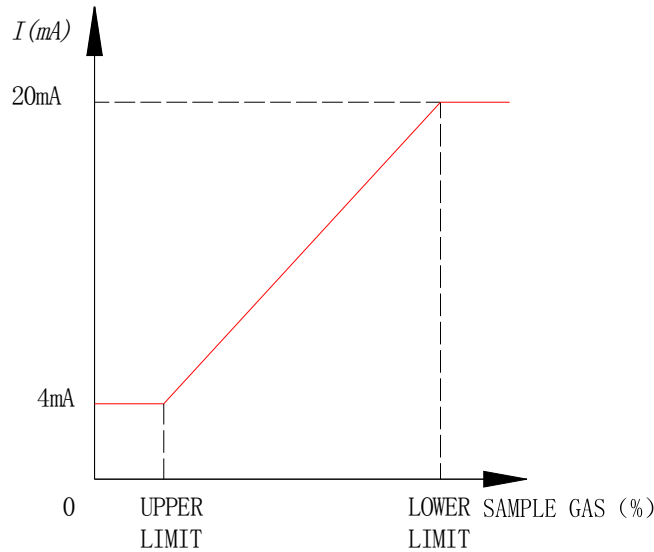


Picture 15 Auto range 1's setting flow chart

9.3.2 Fixed range mode

When in the fixed range mode, request the upper limit bigger than the lower limit. analyzer's upper limit and lower limit are all mean hydrogen's concentration, which are corresponding two group's analog output.

In the fixed range mode, The two group analog output and analog output range are linear relationship, please refer to formula 1,2,3(page 23), and picture 16.



Picture 16 Relationship of 4-20mA output and upper/lower limit

1.Exit

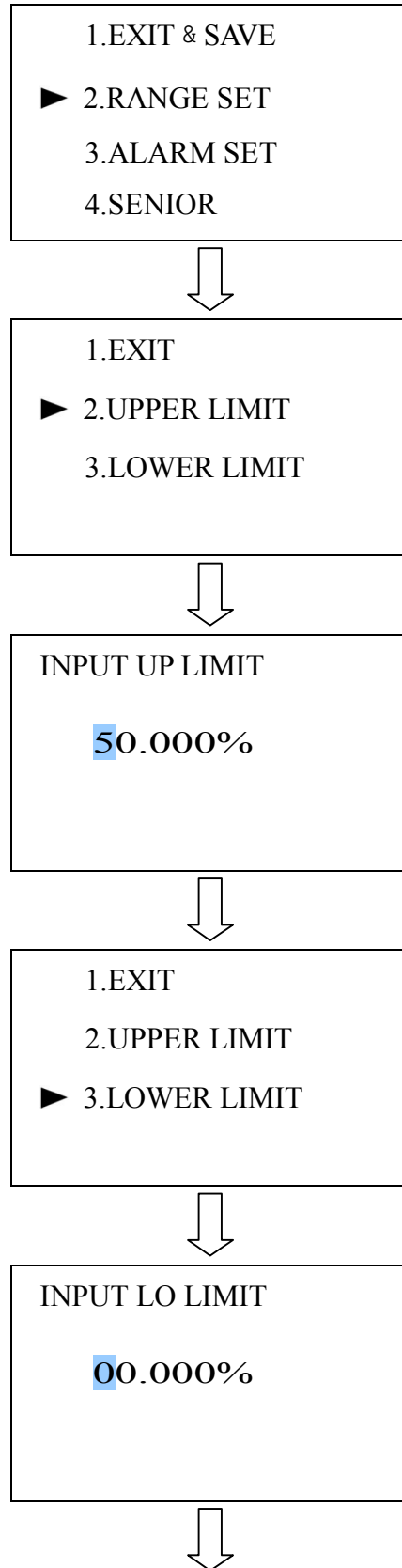
This menu are used to exit“2.RANGE SET”menu, Exit to main menu, at this time didn’t keep the setting data, if need keep the setting data, must exit to standard detection mode.

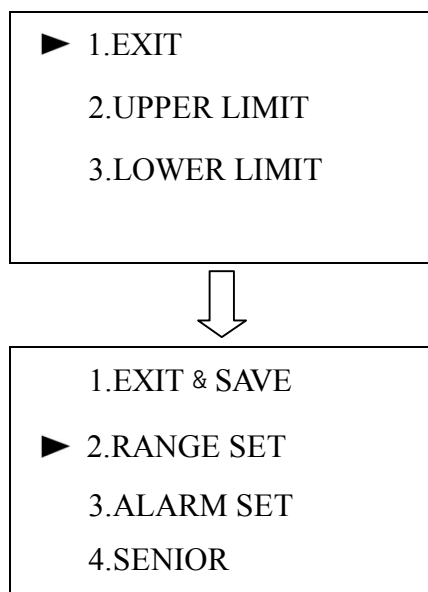
2.Upper limit

In the menu setting mode, click“↑”button or“↓”button to select “2.RANGE SET”menu, Then click“←”button to enter menu, click“↑”button or“↓”button to select“2.UPPER LIMIT”menu, Then click“←”button to enter menu, At this time the analyzer will show the analog output value, Click“↻”button to change the position of the cursor, Click“↑”button or“↓”button to change the value and position of the cursor, After finish the setting of the upper limit, click “←”button and keep holding for 1 second to return to the previous menu.

3.Lower limit

Select“3.LOWER LIMIT”, and click“←”button to enter into menu, “3.LOWER LIMIT”’s setting method are same with “2.UPPER LIMIT”, please refer to it .





Range 17 Range setting flow chart

9.4 Alarm setting

The function of this menu is setting two group of concentration's alarm value and alarm type, the principle and setting method of two group are same, this manual will only give an example of "2.ALARM1 SET":

Enter into the menu setting mode, Select "3.ALARM SET", Click "←" button to enter into menu, Click "↑" button or "↓" button to select "2.ALARM1 SET" menu, Click "←" button and keep holding for 1 second to enter into the setting mode of alarm 1, click "↻" button to change the position of cursor, click "↑" button or "↓" button to change the value of the cursor, After finish setting the alarm 1, Click "←" button to enter into alarm 1's setting mode, click "↑" button or "↓" button to select alarm 1, The analyzer provide 3 type of alarm method:

1.HI, The displayed value higher than the alarm value, the instrument will alarm, or it won't alarm;

2.LO, The displayed value lower than the alarm value, the instrument will alarm, or it won't alarm;

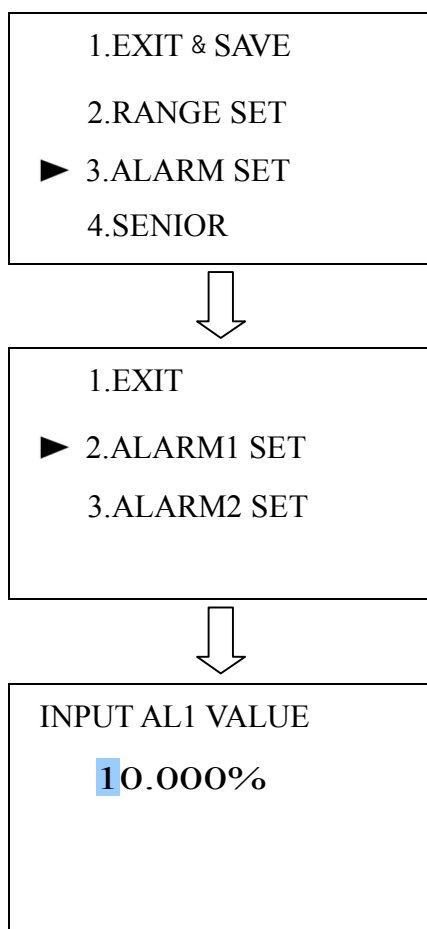
3.NO, Shut down the alarm function.

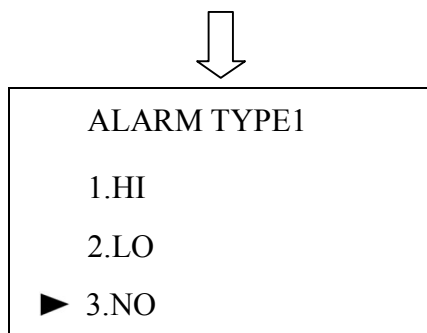
After finish the setting, click "←" button and keep holding for 1 second, return to the menu setting mode.

Note:

This analyzer have the function of delay alarm function, the delay time is 3 second.

The alarm value can been set at any value in the range, if the alarm type 1 set as high alarm, when the displayed value are higher than the alarm 1 value and keep 3 second , the alarm replay 1 will disconnect, COM1 will connect with NO 1, LCD screen will show “AL1: HI”; when the display value lower than the alarm 1, COM 1 and No 1 will disconnect. If the alarm type 1 is set as low alarm , when the displayed value lower than the alarm 1 value and keep for 3 second, COM1 and NO1 will disconnect, LCD screen will show “AL1: LO”, When the displayed value no less than Alarm 1 value, COM1 will disconnect with NO1. When alarm 1 set as No alarm , the analyzer will shut down the alarm 1’s alarm function, COM1 will disconnect with NO 1.





Picture 18 Alarm 1's setting flow chart

9.5 Advanced menu (Calibration)

The analyzer had already calibrated before it leave the factory , user can use it directly.

We suggest user calibrate one time each three month. To meet the accuracy requirement . The user can start the calibration according to the following steps.

This analyzer adopt two point calibration, Must calibrate the zero point first then calibrate the range point, the zero point calibration adopt the high purity nitrogen (Purity 99.999% or higher), Calibration point use gas (purity are around 90% of the detection range) .

Enter into the menu setting mode, select“4.SENIOR”, Click“←”, The analyzer will enter into the password status, click“↻”button to change the position of the cursor, Click“↑”button or“↓”button to change the value of the cursor, Input the password“0918”, Click“←”button and keep holding for 1 second, then enter the calibration menu :





Calibration menu	Function
1.EXIT	Exit to main menu
2.SENS.SIGNAL	Show the sensor's current output voltage
3.ZERO CAL	Calibrate the analyzer's zero point
4.SPAN CAL	Calibrate the analyzer's range point

Tips: The password of analyzer calibration menu are 0918, This password are set by the manufacture, user have no right to revise it .






1.Exit

This menu are used to exit the calibration menu, exit to main menu, after finish the zero calibration, must exit to the standard detection mode, then input the range point calibration gas,to start the range point calibration.

2.Sensor signal

The function of this menu is set the signal's strength and stable or not. Enter into the calibration menu, click“  ”button or“  ”button to select“2.SENS.SIGNAL”menu, Click“”button to enter menu, After finish the checking or after the signal is stable, click“”button to return to previous menu.

3 Zero point calibration

Input 200~400ml/min high purity nitrogen,after the sensor working temperature stable at $60.0^{\circ}\text{C}\pm 0.1^{\circ}\text{C}$, Enter into the calibration menu , Then enter the “2.SENS.SIGNAL”menu, After the sensor signal is stable, Click“”button to return to previous menu; The select“3.ZERO CAL”, Click“”button to enter into menu, Click“”button to change the position of current cursor, Click“”button or“”button to change the cursor value, Input high purity nitrogen's hydrogen concentration, Exit to the standard detection value,After exit to the detection mode, finish the zero point calibration.

4.Range calibration

The range point calibration menu are“4.SPAN CAL”, Input the standard gas which concentration are around 90% of the detection range, the flow are around 200~400ml/min, Then according “3.zero cal”s method to calibrate the detection range.

1.EXIT & SAVE
2.RANGE SET
3.ALARM SET
▶ 4.SENIOR



PASSWORD

0918



1.EXIT
▶ 2.SENS.SIGNAL
3.ZERO CAL
4.SPAN CAL



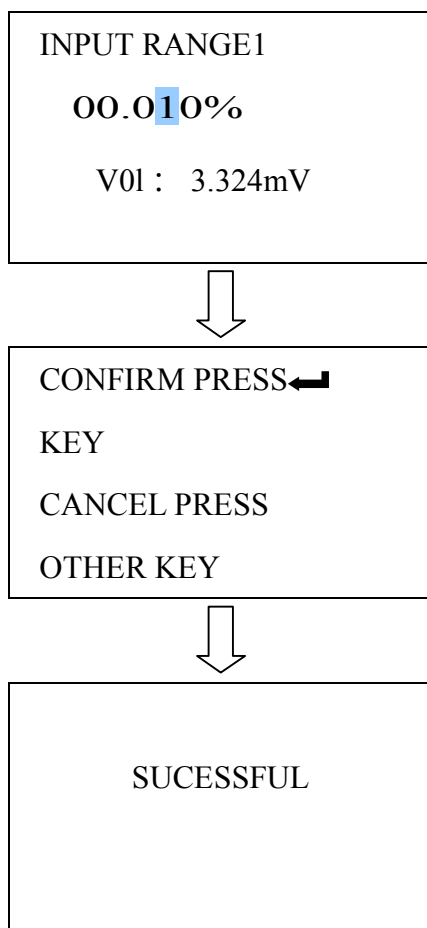
SENSOR SIGNAL

S : 3.324mV



1.EXIT
2.SENS.SIGNAL
▶ 3.ZERO CAL
4.SPAN CAL





Picture 19 Zero point calibration flow chart

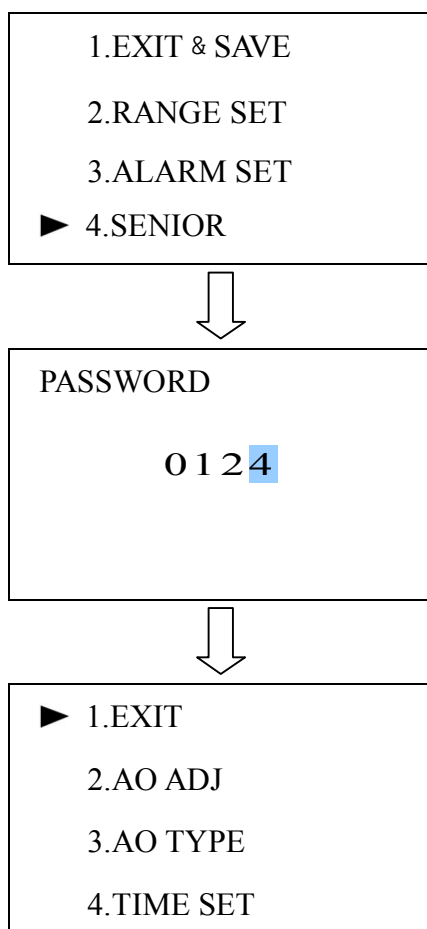
9.6 Advanced menu (Function setting)

Enter into the menu setting mode, select“4.SENIOR”, Then click“←”button to input the password, Click“↻”button to change the position of current cursor, Click“↑”or“↓”button to change the value of current cursor, Input the password No“0124”, Then click“←”button to enter into function setting menu:

MENU	Function
1.EXIT	Exit the function setting menu, exit to the main menu
2.AO ADJ	Use the high precision multimeter to calibrate two group analog output signal
3.AO TYPE	Set two group of analog output mode
4.TIME SET	Calibrate the time

5.DATE SET	Calibrate the date
6.KAY SOUND	Turn on or turn off the key sound
7.LANGUAGE	Set the menu displayed language
8.COMM ADDR	Set multi-communication's communication address
9.INTERF.GAS	Set the interfacing gas 1, interfacing gas 2's range and interfacing gas compensation switch
A.STARTUP MODE	Set the boot mode of when the analyzer power on
B.RANGE CHOOSE	Set the analyzer's range witch mode

Tips: The function setting menu password is 0124, this password is set by the manufacture, user have no right to amend it .



Picture 20 Enter the function setting menu

9.6.1 Exit

The function of this menu is exit the function setting menu, after exit to the main menu via this menu, all the setting data won't been saved, if user need save revised data, please exit to standard detection mode.

In the function setting menu, click“ ↑ ”button “ ↓ ”button to select“1.EXIT”menu, Click“ ← ”, Exit to main menu.

9.6.2 Analog output calibration

The function of this menu is calibrate two group analog output signal,if the analog output current error bigger than 0.05mA or analog output current error bigger than 0.05V, Need to calibrate the analog output signal.

Analog output error=Analog output **theoretical value** -Actual analog output

The analog output theoretical value can calculate via formula 1、2、3 (Page 23); actual analog output need use high precision multimeter to start the detection. Turn the multimeter to the direct current gear (4-20mA or 0-20mA mode)Or direct voltage gear (0-1V、0-5V、0-10V 时) , Connect the red and black pen of the multimeter at the positive or negative connect terminal of the first group and second group analog output, the high precision's reading are actual analog output.

Enter function setting menu, click“ ↑ ”button or“ ↓ ”button to select “2.AO ADJ”, Click“ ← ”button to enter the menu:

Menu	Function
1.EXIT	Exit the analog output calibration menu
2.AO1 ADJ	Calibrate the first group analog output signal
3.AO2 ADJ	Calibrate the second group analog output

signal



Description

This analyzer have two group of analog output, “2.AO1 ADJ”used to calibrate the first group analog output signal, “3.AO2 ADJ”used to calibrate the second analog output signal.

Calibrate 4mA、20mA current signal, Should adjust the multimeter adjust to the direct current gear ;calibrate 1V、 5V、 10V voltage signal, Should adjust the multimeter to direct current voltage gear.

This manual will only give an example of first group analog output“4mA ADJ” to show the analog output signal calibration method, other operation are similar to this , please refer to it.

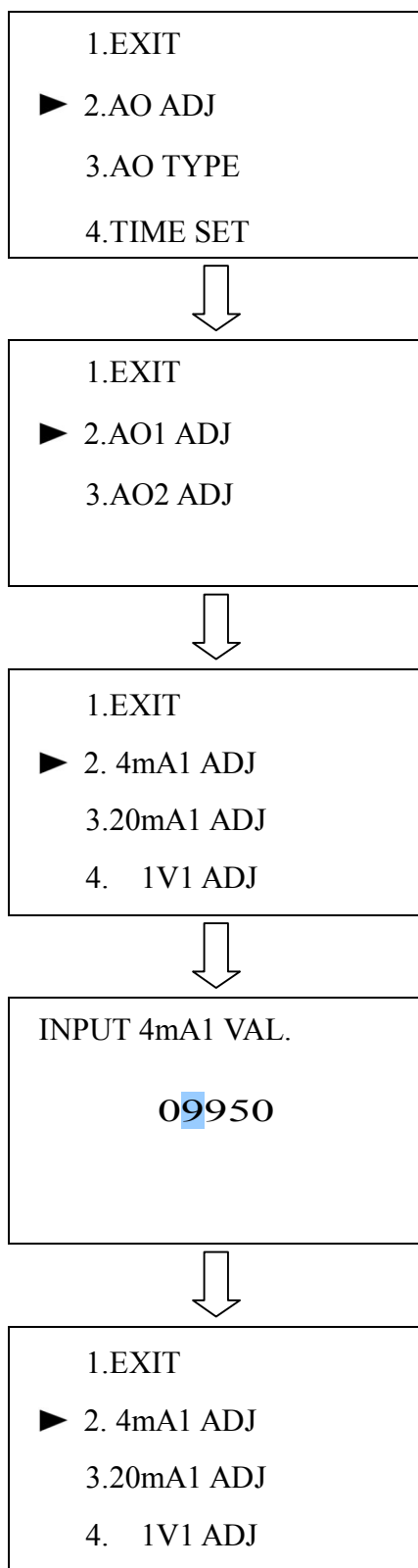
1.Exit

This menu are used to exit“2.AO ADJ”menu, Exit to function setting menu.

Click“↑”button or“↓”button to select “1.EXIT”menu, Click“←”button, Exit the function setting menu。

2.Output 1 calibration

Click“↑”button or“↓”button to select“2.AO1 ADJ”, Click“←”Button to enter the menu, then click“ ↑ ”button or“ ↓ ”button to select “2.4mA1 ADJ”menu , Click“←”button to enter menu, Click“↻”button to change the position of current cursor position, Click“↑”button or“↓”button to change the value of current cursor, Change the value of the menu to make the displayed value equal to 4mA (error≤0.05mA), after click“←” button to return to the previous menu.



Picture 21 4mA calibration

9.6.3 Analog output mode

The function of this menu is set two group of analyzer analog output mode, the analyzer provide 4-20mA、0-20mA、0-1V、0-5V、0-10V five mode for the user selection, After changed the output mode, there are no need to do any amend of the hardware .

Click“↑”button or“↓”button to select“3.AO TYPE”menu, Click“←”button to enter menu:

Menu	Function
1.EXIT	Exit the analog output mode menu
2.AO1 TYPE	Set first group analog output mode
3.AO2 TYPE	Set second group analog output mode



Description

This analyzer have two group of analog output, “2.AO1 TYPE”used to set first group of output mode,“3.AO2 TYPE”used to set the second group analog output mode.

This analyzer will only give an example of first group analog output mode, the second group of analog output mode’s setting method are same with this , please refer to it .

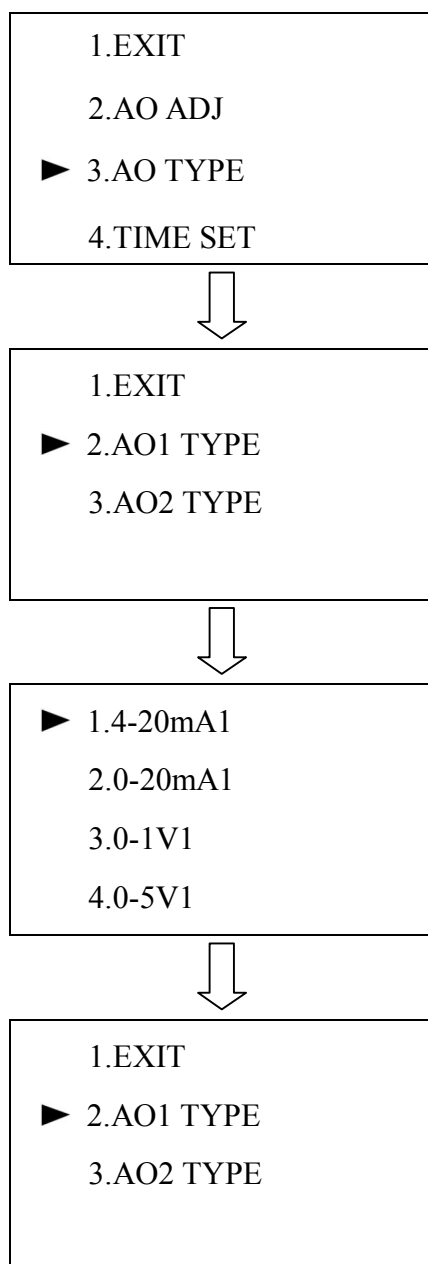
1.Exit

This menu are used to exit “3.AO TYPE”menu, Exit to function setting menu。

Click“↑”button or“↓”button to select“1.EXIT”menu, Click“←”button, Exit to the function setting menu.

2. Analog output mode

Click “↑” button or “↓” button “2.AO1 TYPE” Click “←” button to enter menu,
 Then click “↑” button or “↓” button to select analog output mode, After finish setting,
 Click “←” button to return to previous menu.



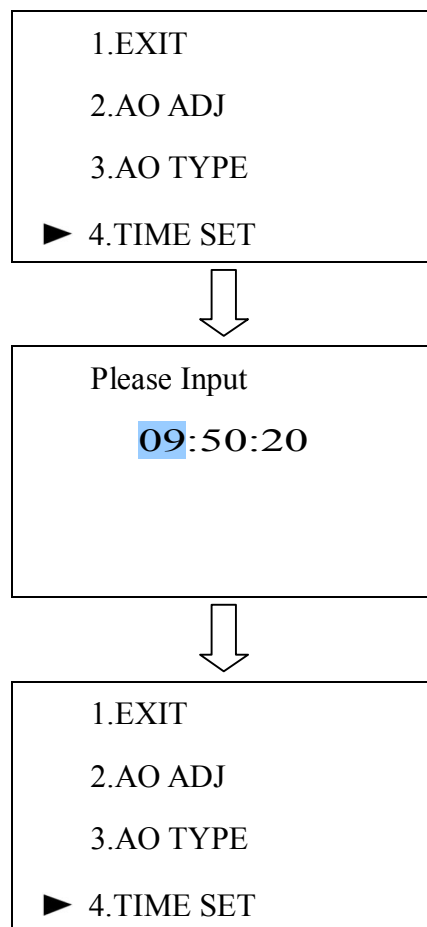
Picture 22 The first group output mode setting follow chart

9.6.4 Time set

The function of this menu is calibrate the analyzer's time

The time are displayed at the right lower part of the LCD screen (refer to picture 9, page 16), when the displayed time was incorrect ,need to calibrate the time, or it will affect the function of data storage,timing and so on.

Click“↑”button or“↓”button to select“4.TIME SET”menu, Click“←”button to enter the menu,click“↻”button to change the position of the cursor, click“↑”button or“↓”button to change the value of the cursor, input the accurate time, Click“←”button to exit previous menu.

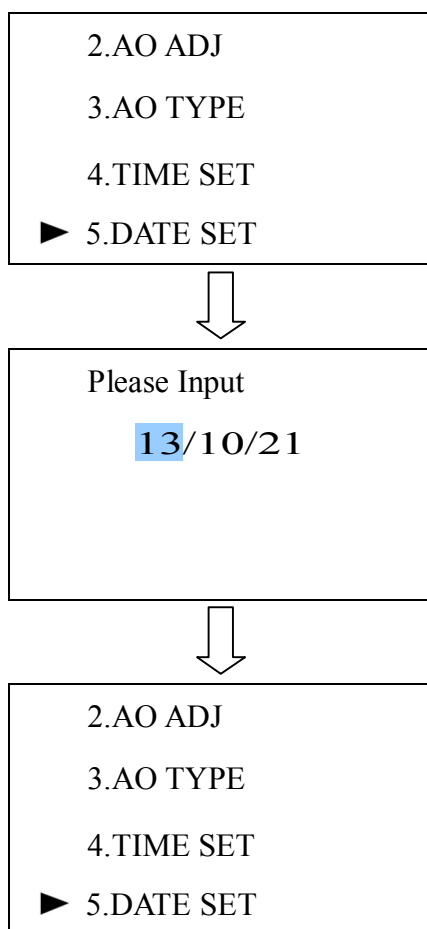


Time 23 Date setting flow chart

9.6.5 Date set

The function of this menu is calibrate the analyzer's date.

The date are display at the left blow of the screen (refer to picture 9, page 16) "5, DATE SET" and "4.TIME SET"'s operation are all same, please refer to it.

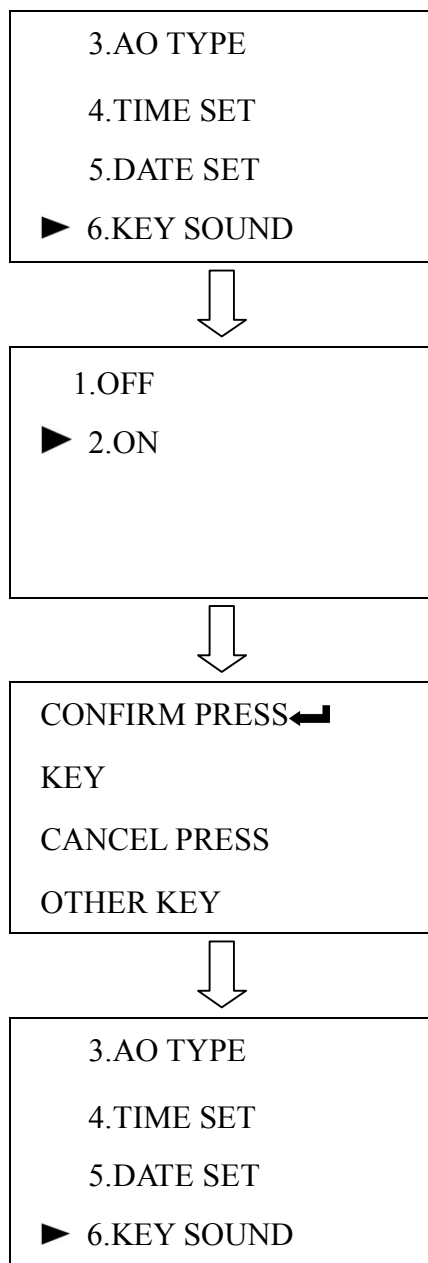


Picture 24 Date setting flow chart

9.6.6 Key tone switch

This menu are used to turn on/off the button tone.

Click“ ↑ ”button or“ ↓ ”button to select“6.KEY SOUND”menu ,
 Click“ ← ”button to enter menu , Click“ ↑ ”button or“ ↓ ”button to
 select“1.OFF”or“2.ON”, then double click“ ← ”button to exit to previous menu.



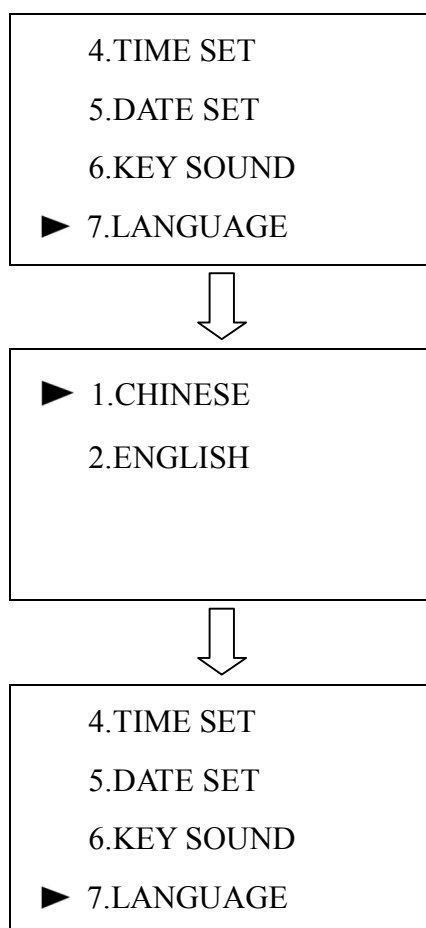
Picture 25 Turn on key tone

9.6.7 Menu language

The function of this menu is set the analyzer's displayed language, Can select Chinese or English.

Click“ ↑ ”button or“ ↓ ”button to select“7.LANGUAGE”menu , Click“ ← ”button to enter the menu , Click“ ↑ ”or“ ↓ ”button to select“1.CHINESE”or“2.ENGLISH”, Then click“ ← ”button to return to previous menu.

Note: After changed the language, Must exit to standard detection mode, Then the menu will change to the selected language.



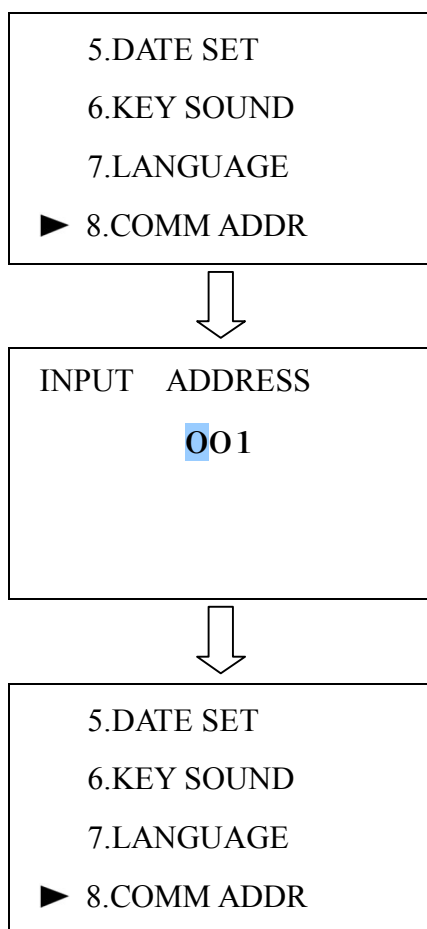
Picture 26 Follow chart of menu language selection

9.6.8 Communication address setting

The function of this menu is setting the communication address when multi-communication.

Click “↑” button or “↓” button to select “8.COMM ADDR”, Click “←” button to enter menu, Click “↻” button to change the position of the cursor, Click “↑” button or “↓” button to change the cursor value, After finish setting of the communication address.

The maximum permission value are 255, If the set value bigger than 255, Click “←” button then the analyzer will prompt “Fault”, and restore to previous value.



Picture 27 Communication address setting flow chart

9.6.9 The interfering gas setting

The function of this menu is set interfacing gas 1 and interfacing gas 2's 4-20mA current's upper/lower limit.

In the function setting menu , Click“ ↑ ”button or“ ↓ ”button to select“9.INTERF.GAS”, Click“ ← ”button to enter menu:

Menu	Function
1.EXIT	Exit to interfacing gas setting menu
2.INTERF.GAS1	Set interfacing gas 1's 4-20mA signal range, Must keep same with interfacing gas 1's 4-20mA analog output range
3.INTERF.GAS2	Set interfacing gas 2's 4-20mA signal range, must keep same with detection interfacing gas 2's 4-20mA analog output range.
4.COMP.ENABLE	Turn on/off interfacing gas's compensation function.
5.SIGNAL	Check the interfacing gas 1 and interfacing 2's analyzer signal

If the sampling gas contain CO,CO₂ or other interfacing gas, it will affect the accurate of the analyzer, to improve the accuracy of the analyzer, user can detect the concentration of the interfacing gas via other instrument, then output the 4-20mA which are linear relationship with interfacing gas. Let the output 4-20mA current from rear part “AIN1+”and“AIN1-”、 “AIN2+”and“AIN2-”terminal to input to the analyzer(can input two group of 4-20mA interfacing gas at the same time). Meanwhile,must set the“2.INTERF.GAS1”menu as interfacing 1 gas' analog output range,set“3.INTERF.GAS2”menu as interfacing 2's analog output range. Set“4.COMP.ENABLE”menu as“ON”, At this time ,analyzer will compensate the sample gas according to the input interfacing gas, which improve the accuracy.



Description

This analyzer can input two group of interfacing gas

signal,“2.INTERF.GAS1”are used to set interfacing gas 1’s 4-20mA output range, “3.INTERF.GAS2”are used to set interfacing gas 2’s 4-20mA, Default interfacing gas CO、CO2, If there other interfacing signal, please indicate it before place the order .

Interfacing gas 1’s 4-20mA current input terminal are“AIN1+”and“AIN1-” , interfacing 2’s 4-20mA current input terminal are“AIN2+”and“AIN2-”。

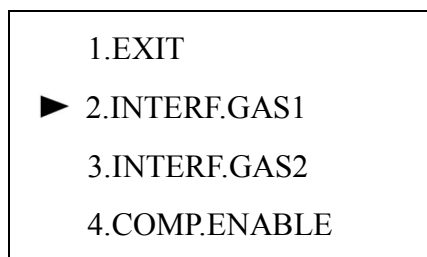
1.Exit

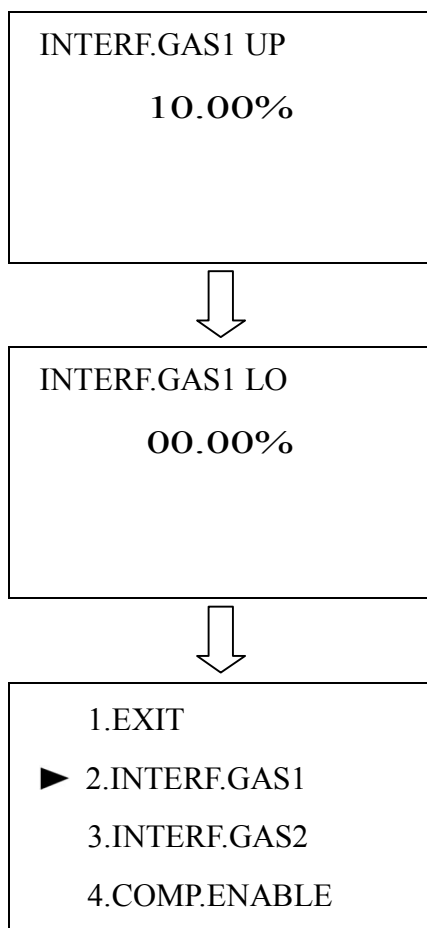
This menu are used to exit“9.INTERF.GAS”menu, Exit to function setting menu.

Click“↑”button or“↓”button to select“1.EXIT”menu, “←”button, Exit function setting menu.

2.INTERF.GAS 1 RANGE

Click“↑”button or“↓”button to select“2.INTERF.GAS1”, Click“←”button to enter interfacing gas 1’s upper limit mode, click“↻”button to change the cursor position, Click“↑”button or“↓”button to change the value of the cursor,Set it as interfacing gas 1 instrument’s 4-20mA analog output range upper limit, then click “←”button to enter the interfacing gas 1’s lower limit setting mode,set the value as interfacing gas 1 instrument’s 4-20mA analog output lower limit,click“←”button to return to previous menu.





Picture 28 Interfacing gas 1 range setting flow chart

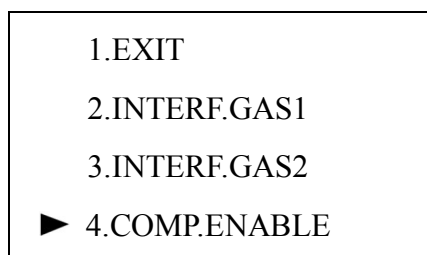
3.INTERF.GAS2 RANGE

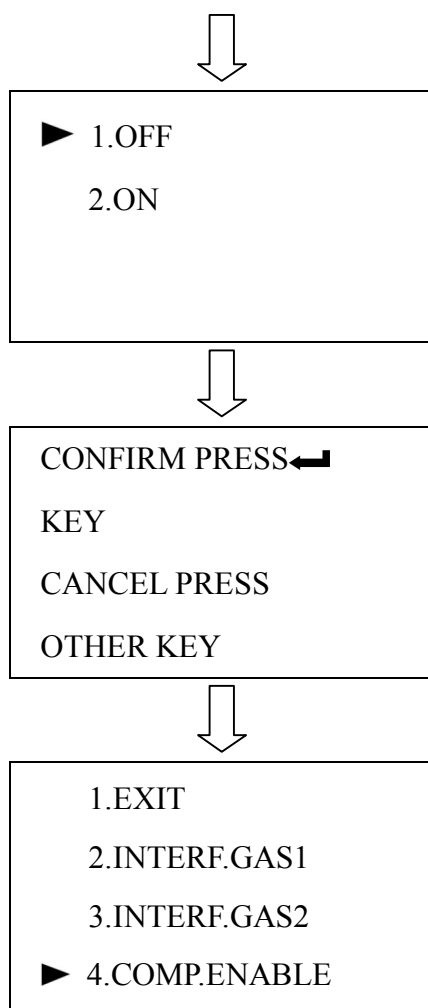
“3.INTERF.GAS2”’s setting method are same with“2.INTERF.GAS1”, Please refer to it.

4.COMP.ENABLE

The function of this menu is set the interfacing gas compensation function, only when the switch set as “ON”,The analyzer will have this function.

Click“↑”button or“↓”button to select“4.COMP.ENABLE”, Click“←”button to enter menu, Click“↑”button or“↓”button to select“1.OFF”or“2.ON”, After finish the setting, Click“←”button to return to previous menu.



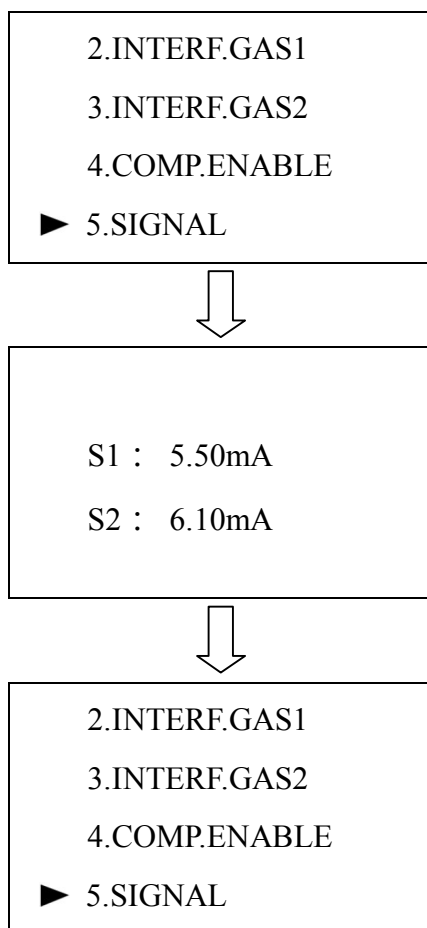


Picture 29 COMP.ENABLE setting

5.Signal

The function of this menu is checking the interfacing gas 1 and interfacing gas 2's instrument signal.

Click“↑”button or“↓”button to select“5.SIGNAL”, Click“←”button to enter menu, “S1: ****mA”are interfacing gas 1's input signal, “S2: ****mA”are interfacing gas 2's input signal, After finish the checking,click“←”button to return to previous menu.



Picture 30 Interfacing gas signal checking flow chart

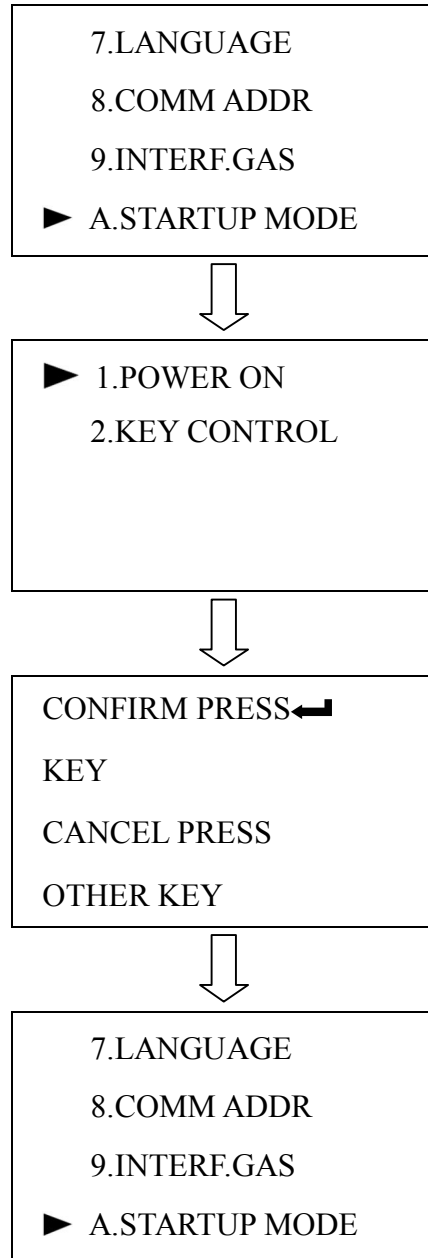
9.6.10 Boot mode

In the function setting menu, Select "A.STARTUP MODE" menu , Click "←" button to enter the menu , Click "↑" button or "↓" button to select "1.POWER ON" or "2.KEY CONTROL", After finish setting, Click "←" button to return to previous menu.

1.POWER ON: After power on the analyzer will boot;

2.KEY CONTROL: After power on , the analyzer will prompt boot or not,

click“←”button to boot, Click“↻”button to cancel the boot, If user need to reboot after cancel boot, Need to click“←”button and keep holding for 4 second, Analyzer will prompt whether boot, Click“←”button to open the analyzer.

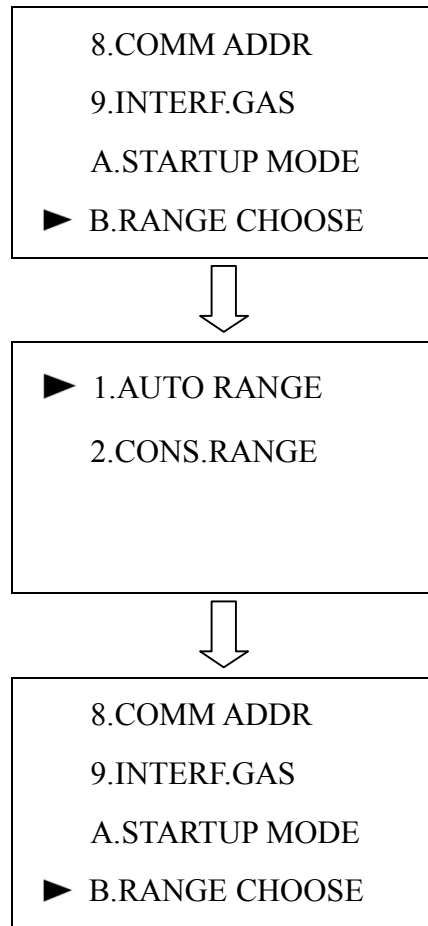


Picture 31 Boot mode setting flow chart

9.6.11 Range selection

The function of the menu is setting the range mode, after the range mode are changing,the sub-menu of the main menu “2.RANGE SET”will also change, analog output and relay 4、5’s output will also changing (Refer to 9.3, Page 25~34) 。

Click“ ↑ ”button or“ ↓ ”button to select“B.RANGE CHOOSE” ,
 Click“←”button to enter menu, Click“↑”button or“↓”button to select“1.AUTO
 RANGE”or“2.CON.S.RANGE”, After finish setting, Click“←”button to return to
 previous menu.

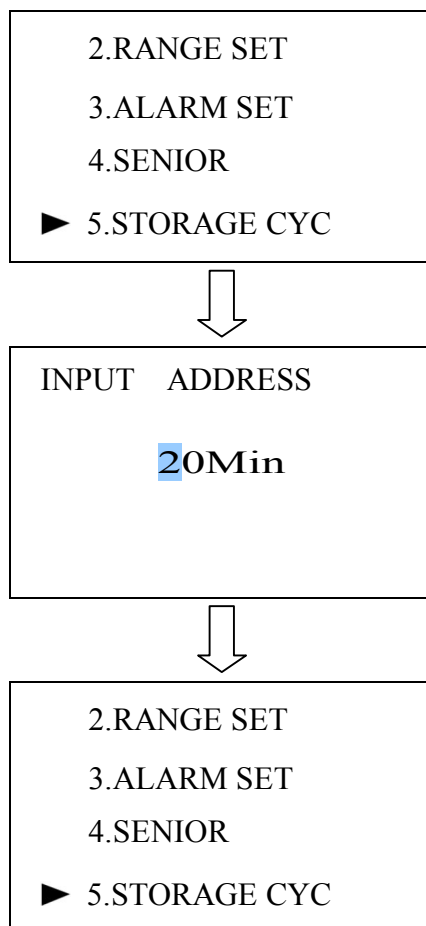


Picture 32 Range selection flow chart

9.7 Storage period setting

The function of this menu is setting the data storage’s interval time.

Enter menu's setting mode, select "5.STORAGE CYC" menu, Click "←" button to enter menu, Click "↻" button to change the position of current cursor, Click "↑" button or "↓" button to change the cursor value, After finish setting, click "←" button to return to main menu, The storage period can set at any value of 0~99 minutes. If it set as 5 minutes, the analyzer will store 1 group of detection data each 5 minutes, if set as 0, then won't save the data.



Picture 33 The storage period setting flow chart

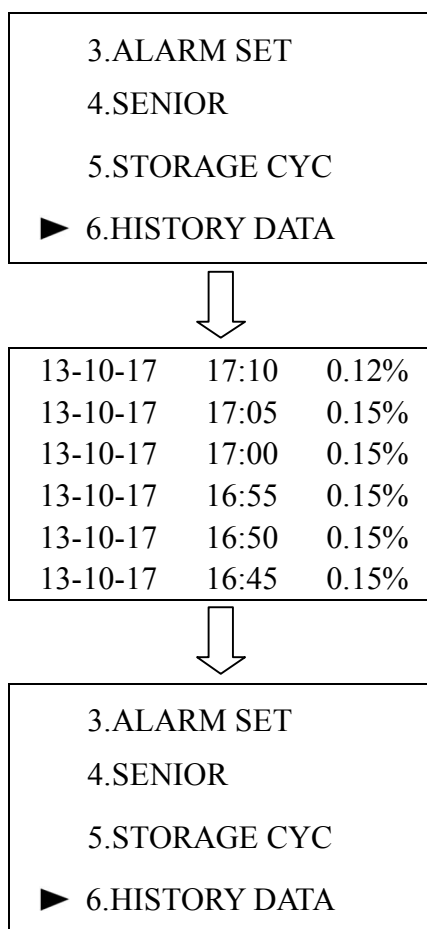
9.8 History Data

The function of this menu is check the history data.

Enter the menu setting mode, Select "6.HISTORY DATA" menu, Then

click “←” button to show the history data, the data including the detection date, time, and hydrogen concentration, the interval is the setting value of the storage period, at this time click “↑” button or “↓” button can check the storage data of different time. After finish the checking, click “←” button to return to main menu.

This analyzer can store 3750 group of data, if exceed the quantity, the exceeded data will cover the previous data automatically.



Picture 34 History data

9.9 Analyzer information

The function of this menu is checking analyzer's running time, instrument No, sensor No, order No.

Enter the menu setting mode, select "7.analyzer Inf", Click "←" button to enter the menu.

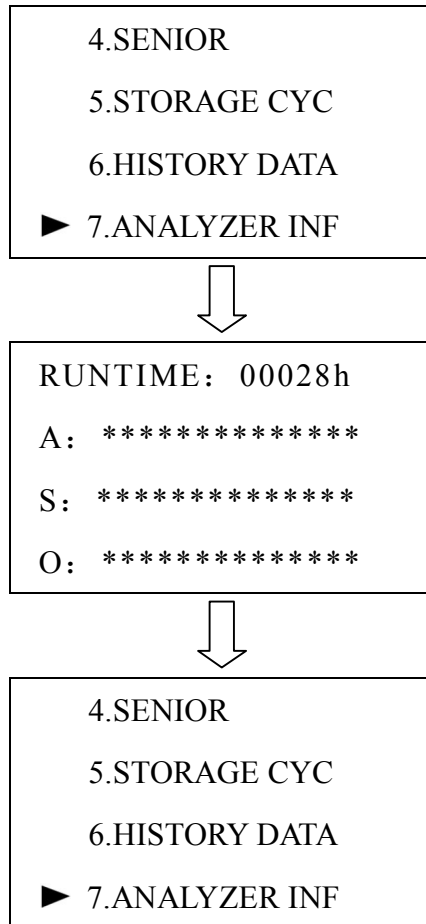
"Running time": Analyzer's total working time, the analyzer will start timing once the analyzer boot, easy for the user to know the use status;

A: Instrument No;

S: Sensor No;

O: Order No.





After finish checking, Click "←" button to return to main menu.

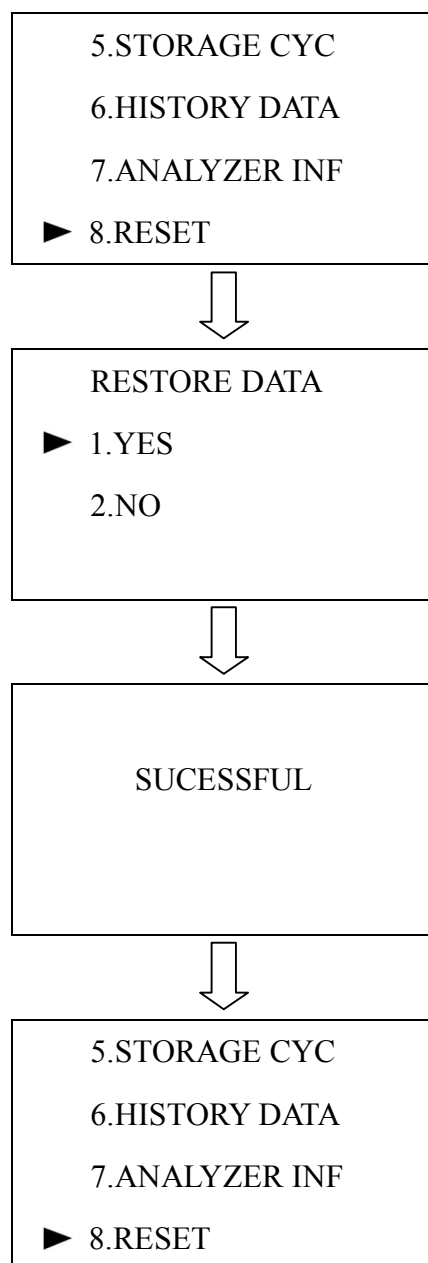


Picture 35 analyzer information

9.10 Reset

When there are unpredictable operation error, user can rest the analyzer to standard setting via the “8.RESET”.

Enter menu setting mode, select“8.RESET”, Click“”button to enter menu, Click“”button or“”button can select“YES”（Restore factory setting） or“NO”（didn’t make the reset）, After finish the setting, click“”button to return to main menu.

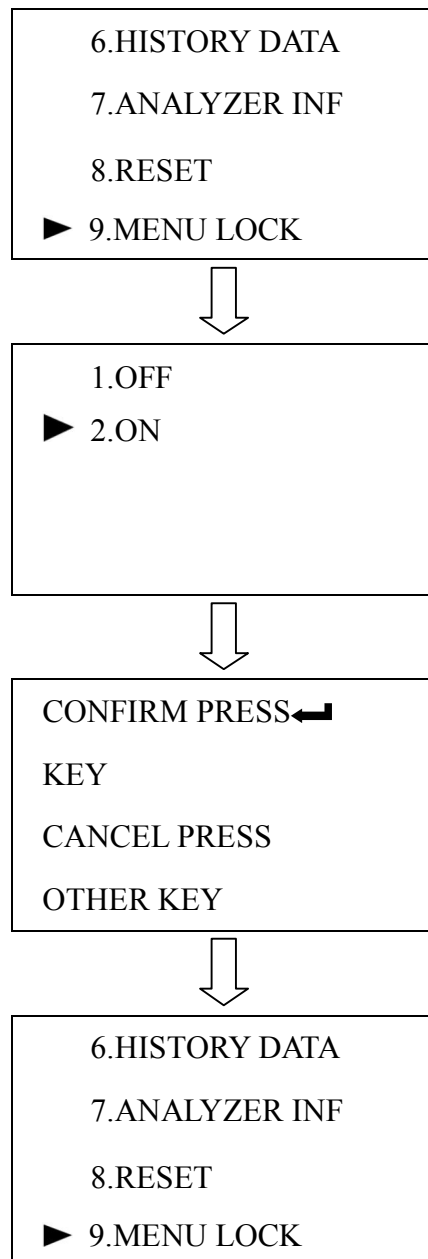


Picture 36 Restore to factory setting flow chart

9.11 Menu lock switch

The function of this menu is setting the menu lock switch, to in case the turn on/off, the analyzer have menu lock switch, when the menu clock switch was turn on, must input the password 5609, then can enter the main menu, to start the setting of the analyzer.

Enter into the menu setting mode, select “9.MENU LOCK”, Click“←”Menu to enter menu, click“↑”button or“↓”button can select“1.OFF”or “2.ON”, Then double click“←”button and return to menu setting mode.



Picture 37 Turn on the menu lock witch flow chart

9 Machine defects

Chart 11 defects cause and troubleshooting


Defects	Reason	Troubleshooting
Screen doesn't light	1、 Power off	Click  button and holding , do steps by steps as the tips
	2、 Power loss	Check the power, cable and socket
The measured value is higher or lower than the actual value	1、 Gas leak	Check tightness
	2、 The sensor is damaged or depleted life	Send the analyzer to manufacturer for replacing the sensor
	3、 The calibration is not accurate	Re-calibration
Respond time /stable time are slow	1、 Impurity in the gas line 气 2、 Interfered gas 3、 Gas line are too long 4、 Flow are too small 5、 Gas leak	1. Clean the gas line 2. Add filter device to decrease the interfered gas (refer to 9.6.9, Page 51) 3. Shorten the gas line of the inlet port and gas source 4. Flow keep at 200~400ml/min 5. Check gas leak or not
Flow chart motionless	1、 Flow adjustment valve shut down 2、 No flow 3、 The exhaust port and pipe are blocked 4、 There are impurity inside the flow chart (such as Rosin oil moisture etc) 5、 There are crack of the flow chart	1、 Open the needle valve or flow adjustment valve. 2、 Input the gas or open the air pump 3、 Check the exhaust port and pipe 4、 Clean the flow chart and gas line 5、 Replace the flow chart

Chart 12 Display unstable 's reason and trouble shooting

Reason	Trouble shooting
1. mechanical vibration	Install the instrument to a vibrationless place or install absorber
2. Power interfacing	Use independent power or one clean power
3. High-frequency component	Contact with KC

or sensor not work	
6、4. The exhaust port and pipe are blocked	Check the exhaust port and pipe (Forbidden block the exhaust port and exhaust pipe)
5. Instrument display fluctuation	Preheating time is not enough
6. Gas pressure and flow are unstable	Check the gas pressure and flow
7. Calibration error	Restart the calibration

11.Warranty, maintenance and storage

KC Technology CO.,LTD guarantee that the product which we manufacture and sell are made of the most reliable materials and components, and do the most comprehensive quality testing before leaving the factory . If the product has quality defects during the warranty period, Please contact with KC Technology CO.,LTD immediately , the Company will fix this defect by repair or replacement parts.

11.1Warranty

- **Warranty Content: In normal use, the material and disadvantages of all instruments are covered by the warranty, but the Nameplate cannot be lost or torn up.**
- *Non-warranty Range*
- *Natural wear and tear*
- *Products are not used in accordance with regulations*
- *Ignoring the manual regulation*
- *Nameplate was lost or torn up.*
- *Product 's installation, carrying, operation, and maintenance procedures are against the manual violation.*
- *Lack effective protective measures when operate the products.*

- Change the function and technical performance of products arbitrarily
- Disassemble the instrument parts or add other auxiliary instrument inside the instrument without permission of the manufacture.
- Violation of rules for maintenance or improper operation Do the maintenance and operation against the *operating rules*.
- Rough operation
- Except repair or replacement of the equipment, our company did not bear the loss of time, loss of repair inconvenience and other indirect loss which cause by the instrument failure. in addition , for accident , specifically damage , human operating error or damage cause by force damage doesn't belong to the free warranty ,instrument purchased from non-authorized channel can't get warranty service .

11.2 Maintenance

Routine maintenance is very important to the analyzer, it will effect the life of the instrument directly or indirectly.

When clean the appearance of the instrument , the instrument must power off, please wipe the appearance of the instrument gently with a wet soft cloth, , avoid the use of organic solvents or chemical detergents to clean the instrument.

11.3 Storage

After the transmitter was packed, kept it in a warehouse which temperature are 5 °C ~ 50 °C, relative humidity less than 90% RH, storage location should be dustless, no smoke, no moisture ; no acidic ;no alkali and other corrosive gases at surroundings.

Be careful ,No press !

12 Accessory

·TC30 thermal conductivity analyzer	1set
·TC30 thermal conductivity analyzer user manual	1set
·Warranty Card	1piece

·certificate	1piece
·Inspection Report	1piece