Gas Control Panel

User Manual

V1.6

*The picture is for reference only,
please refer to the real product.

sisco

Contents

1. Foreword

You are welcome to use this control panel, if you find anything unclear, wrong in this manual, please contact our agent or after-sales service department, thank you!

Before any operation on this device, please read the manual carefully!

Dissemination of the contents of this manual without permission is prohibited.

Our company is committed to the continuous improvement of product performance, and the company reserves the right to improve any content in the manual without prior notice.

The color and configuration of the product are only for reference in the description of this manual, please refer to the actual product.

Warning

- **Any operations such as installation and disassembly must be performed by professionals.**
- **The power must be cut of when installing or disassembling. And can only be installed and used in non-hazardous areas.**
- **This instrument is suitable for 3-hole power plug, please make sure that the socket has a reliable ground connection.**
- **Cable installation must comply with local or national electrical standards.**
- **Please do not plug or unplug the SD card when device is still on, or the data files will be damaged.**

Note: Before making any settings, please perform "Address scan" function on the control panel to input detectors.

To avoid scanning error, the detector with RS485 connection needs to preset different device address (offset address).

The detector with 4~20mA connection needs to configure the gas information of each channel on the "Parameter configuration" page.

2. Product Features

This product can realize real-time accurate management of remote monitoring and cloud monitoring multiple integration. Relying on accurate gas detect monitoring and controlling various devices through the control panel, it can be applied in various fields and realize automatic operation.

The system integrates real-time monitoring, output control, sound and light alarm, network communication and other functions, can customize a variety of system combination solutions to meet various application scenarios.

- **The system interface supports touch operation, which is flexible and convenient to operate.**

- **Modular design supports flexible customization:**
  - ► Support up to 132 sensors (For RS485 connection,100 sensors are the max; for 4~20mA connection, 32 sensors are the max)
  - ► Support 8 to 32 channels of 4~20mA signal input (optional), support up to 32 channels of 4~20mA signal output (optional).
  - ► Standard 4 relays, optional up to 38 relays.
  - ► Support optional LORA, WIFI, 4G wireless communication.
  - ► Support optional backup power supply system.
  - ► Support to connect with external fire fighting display screen.

- **Aplenty system functions and simple interface operation:**
  - ► Support power-on self-test and manual self-test functions.
  - ► Support monitor “Alarm Lock” or “Alarm auto reset” switch control.
  - ► Support event data viewing.
  - ► Support storage and viewing of alarms, faults, and calibration events.
  - ► Support operation permission restriction, automatic or manual exit after 30 minutes.
  - ► Support calibration function.
  - ► Support channel shielding.
  - ► Support inhibit mode.
  - ► Support user-defined high and low alarm values (4~20mA channel).
  - ► Support named channels in Chinese and English.
  - ► Support one-key alarm clear function.

3. Product Parameter

Control panel capacity: supports up to 132 sensors (Communication only, excluding power supply. For RS485 connection,100 sensors are the max; for 4~20mA connection, 32 sensors are the max)

Display screen: 7 inches, 800*480 touch color screen

Display mode: adaptive display of channel quantity, automatic page turning

Alarm mode: Sound, indicator, interface display

Sensor name: user-defined name (in Chinese and English)

Display language: Chinese, English

Data storage: a total of 100,000 history data (larger-capacity memory cards is optional), 1000 alarm records, 1000 fault records, 100 calibration records

Communication mode:4G/RS485/LORA/WIFI/4-20mA

Data transmission interval: 200ms (sample interval, support user-defined)

Communication rate: 9600bps (customizable)

Power input: AC 220V 50Hz

Power output: DC 24V, 0.25A/each channel

Backup battery: optional, 8400mAh/18.5V rechargeable lithium battery (connecting 8 pcs SG100 gas detector can work continuously for no less than 8 hours)

Relay: 4 channels (optional 6 channels), can be expanded to 38 channels at most, contact load 5A/30VDC

Indicator: power, bat, alarm, fault, shield

Working temperature: -20℃~50℃

Working humidity: ≤90%RH, no condensation

Working pressure: 91~111kpa

Installation method: wall mounted

Product dimension: 464*280*100mm

Weight: 4.7kg

Material: Sheet metal

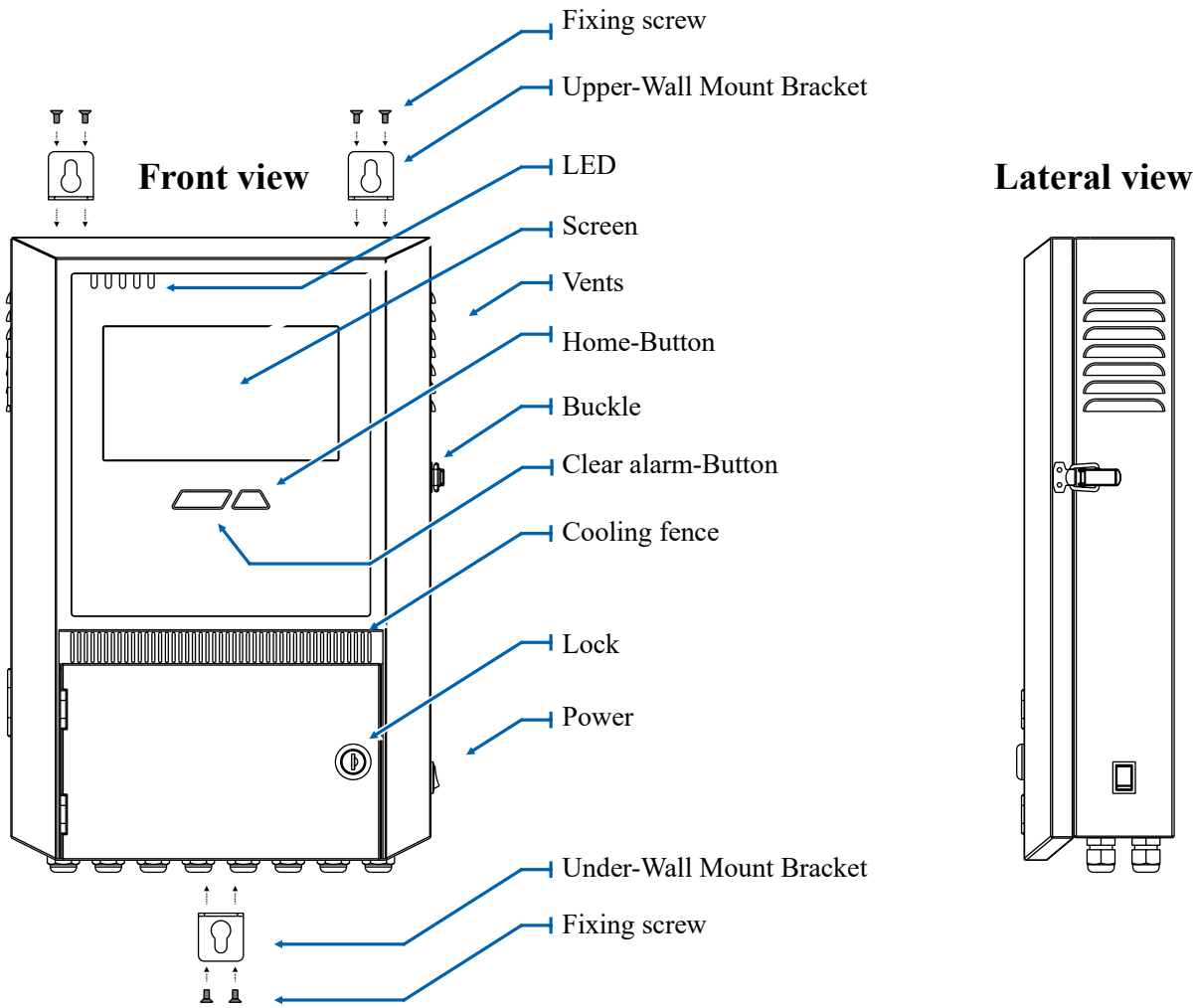
4. Product Configuration

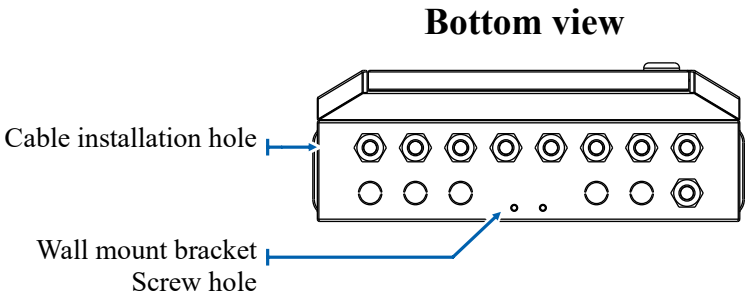
Please refer to the order for detailed configuration.

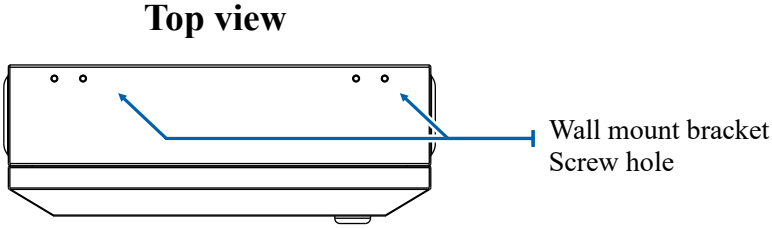
Standard configuration:

1. One control panel
2. One product manual

5. Product Structure







6. Product Installation

6.1. Installation environment

This control panel is non-explosion-proof designed, please do not install it in hazardous areas and the installation must follow local regulations.

The following environments should be avoided during installation:

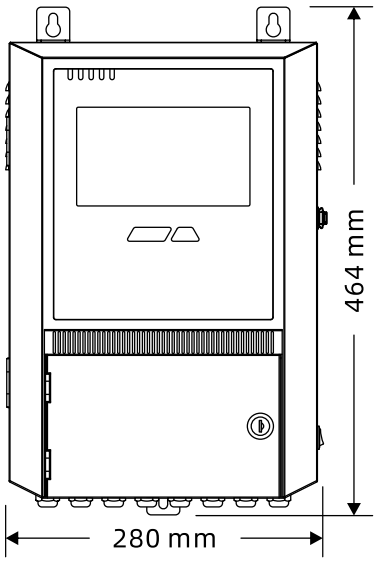
●High humidity ●Mechanical vibration ●Strong electromagnetic radiation ●High voltage electricity

*Please follow the working environment requirements of the device.

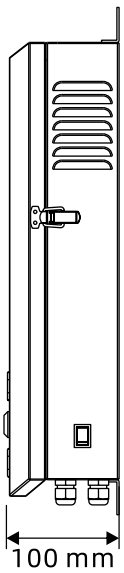
***Connect to a power socket with a reliable ground wire to avoid personal safety accidents or instrument damage caused by leakage or static electricity.**

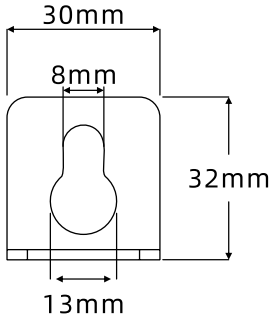
6.2. Installation dimensions

The external dimension of the control panel is:464x280x100mm (height x width x thickness)
As shown in the figure below.



Control panel dimension





Wall-mounted hole size

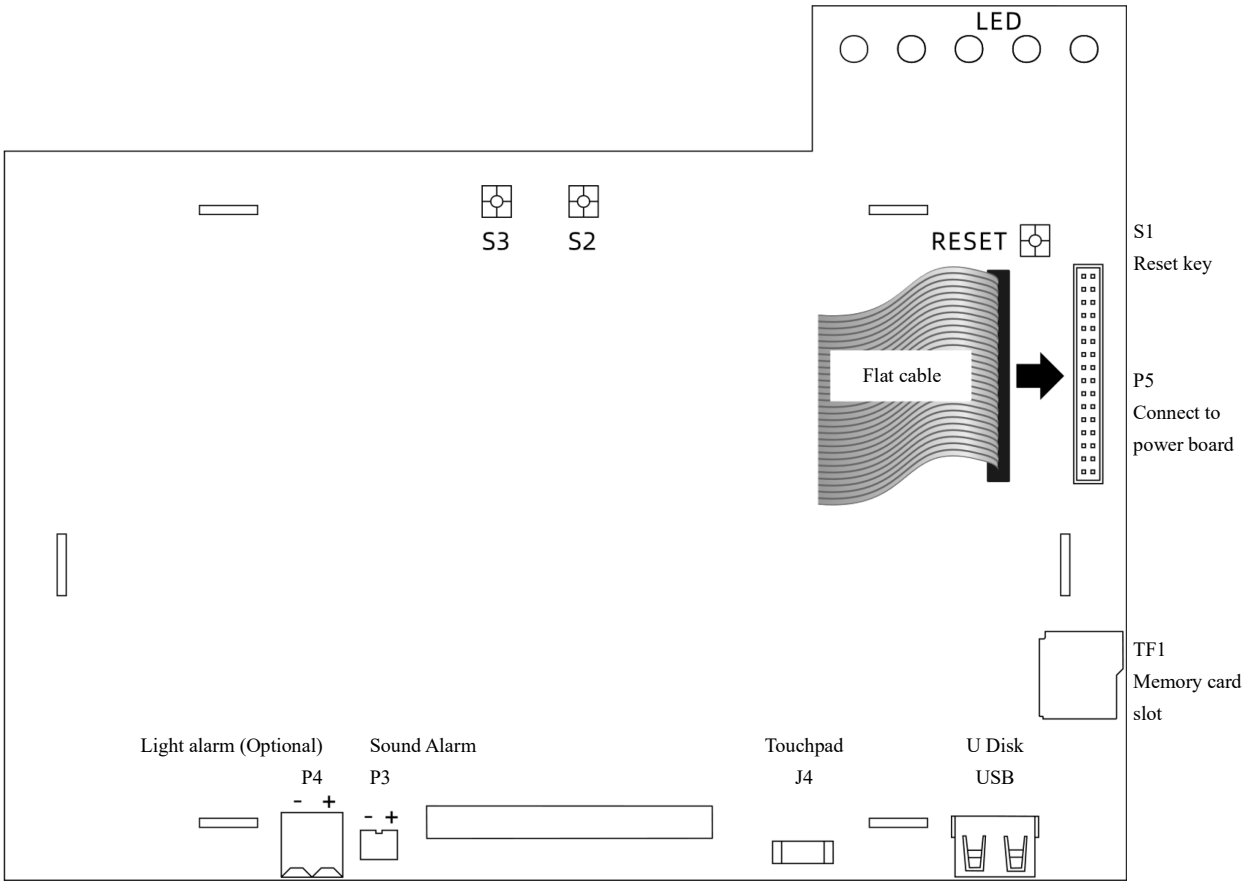
Length between holes

6.3. Installation type

This control panel shall be wall-mounted installed. According to the size of the above three wall-mounted holes, drill holes to install expansion screws, and use nuts to fix.

6.4. Main board

P3, Sound alarm interface
P4, Light alarm interface (Optional), Output 24V.
P5, Claw socket interface connect to P1 on power board.
TF1, TF memory card slot.
USB1, which can be connected to a U disk for firmware upgrade.
J4, “Clear Alarm” and “Home” touchpad interface.
S1, RESET key, when the system crashes, press this key to reboot



Warning: Unmarked interface, do not operate or connect anything.

6.5. Power board

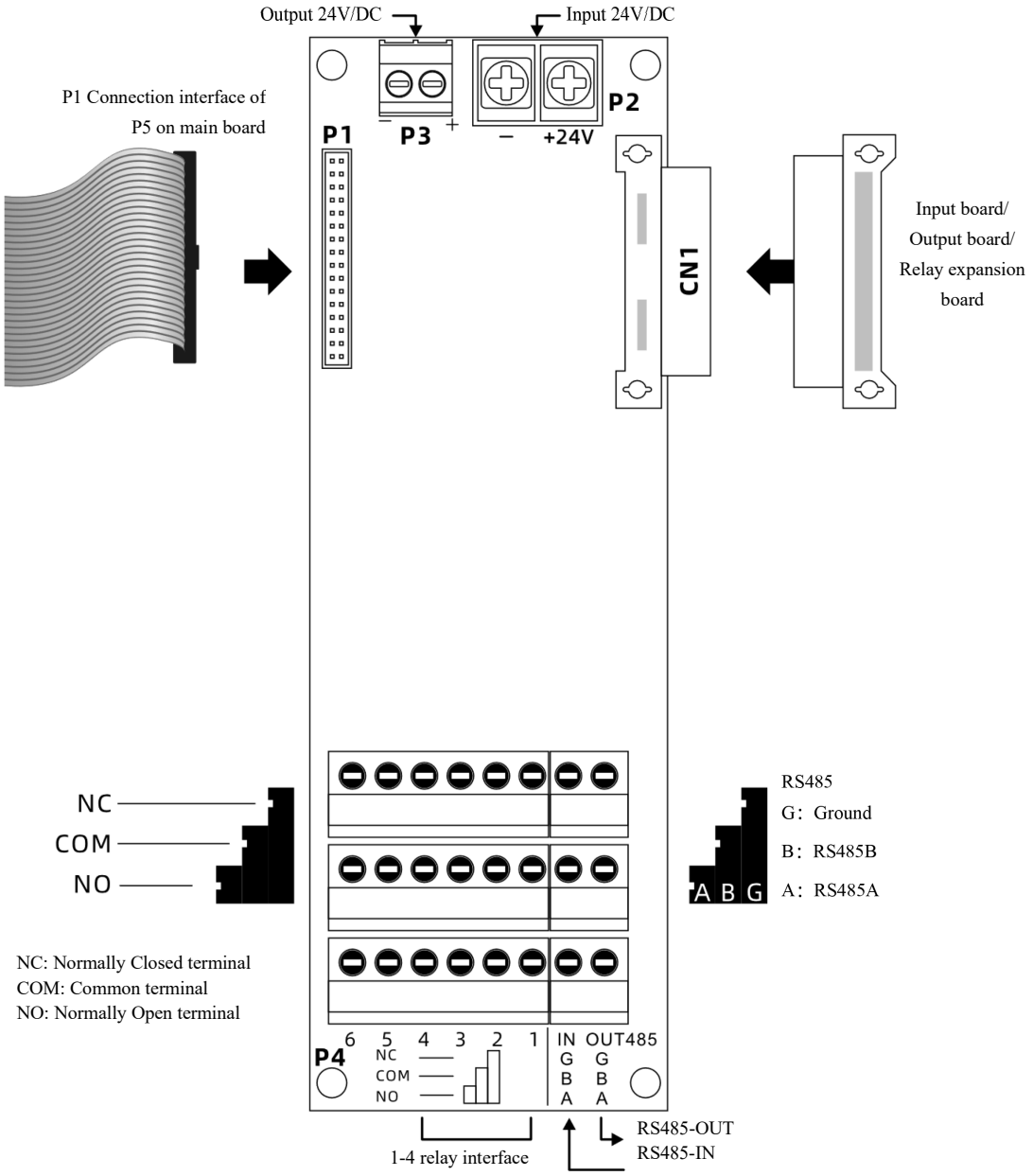
P1, the cable connection port that is connected with the P5 on main board

P2, Power supply interface input 24V DC.

P3, 24V DC output.

P4, from right to left, 1~4 channels are relay output interface; IN is RS485 input interface (Connect to wire from detector); OUT is the RS485 output interface, which can be connected to the PC, external DTU or other equipment.

CN1 is expansion interface, can expand the output or input interface through the module.



*Standard 4 relays; Optional 6 group of relays.

6.6. Backup power control board (Optional)

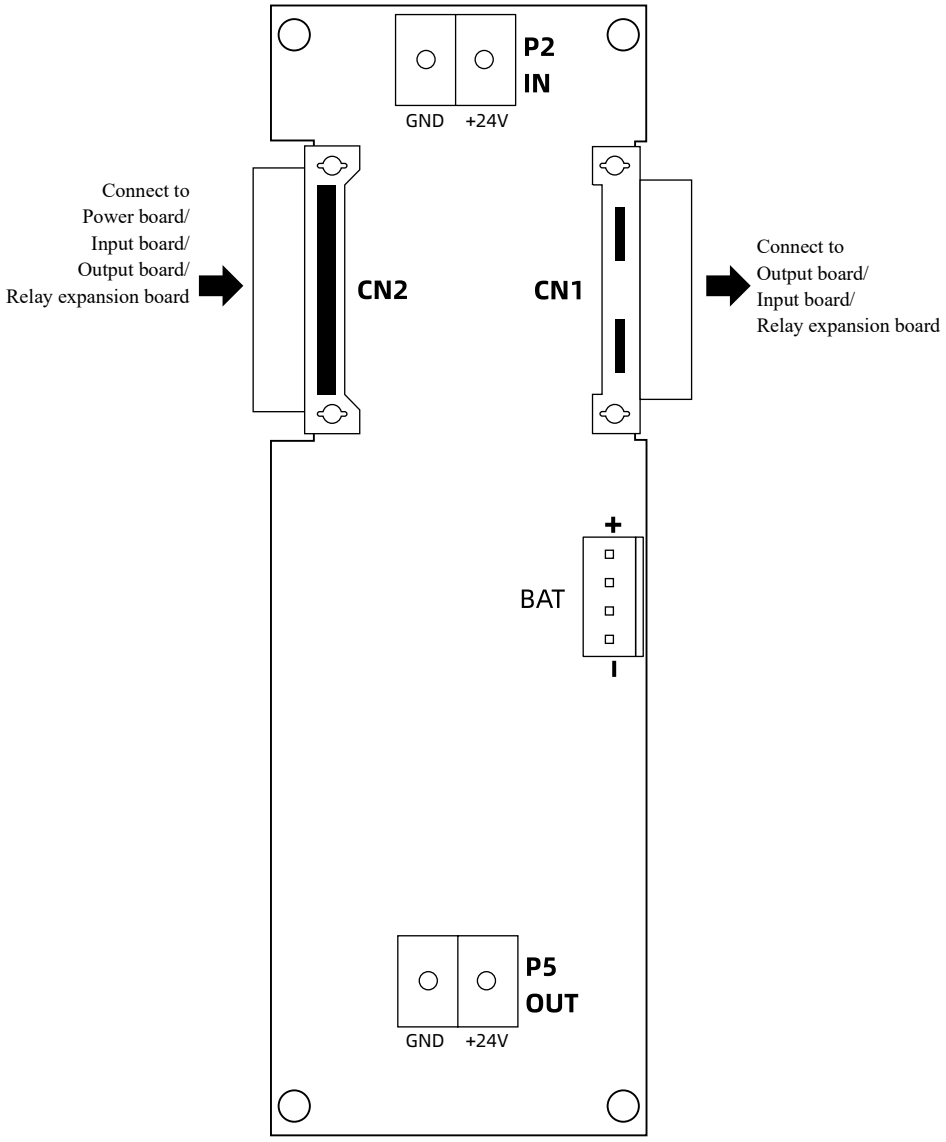
The backup power control board is a power supply management subsystem, responsible for the switching between main power and backup power, and backup power charging management.

P2, power supply (24V/DC. This one and the p2 power supply port on power board, choose one to input power.)

P5, power output (24V/DC), when the battery voltage is lower than 17.5V, P5 stops outputting.

BAT, connect the battery. The battery has a low-battery protection mechanism (power off when the battery voltage is lower than 15V). The specific details are subject to the order.

The CN1 and CN2 connectors can combine power boards, acquisition boards, and output boards, etc. for extended connection.



* Working logic: When the main power is normal, the backup power is charged or dormant. When the main power is abnormal, the backup power is enabled. For details, please refer to the bat indicator in the <LED/Buzzer status> section.

Note: Before use, please connect the battery plug to the BAT terminal. When the battery is sufficient, the system will start up (when the battery is insufficient, the system will not respond. Please connect the control panel to the AC power supply, the system will start up and charge the battery.).

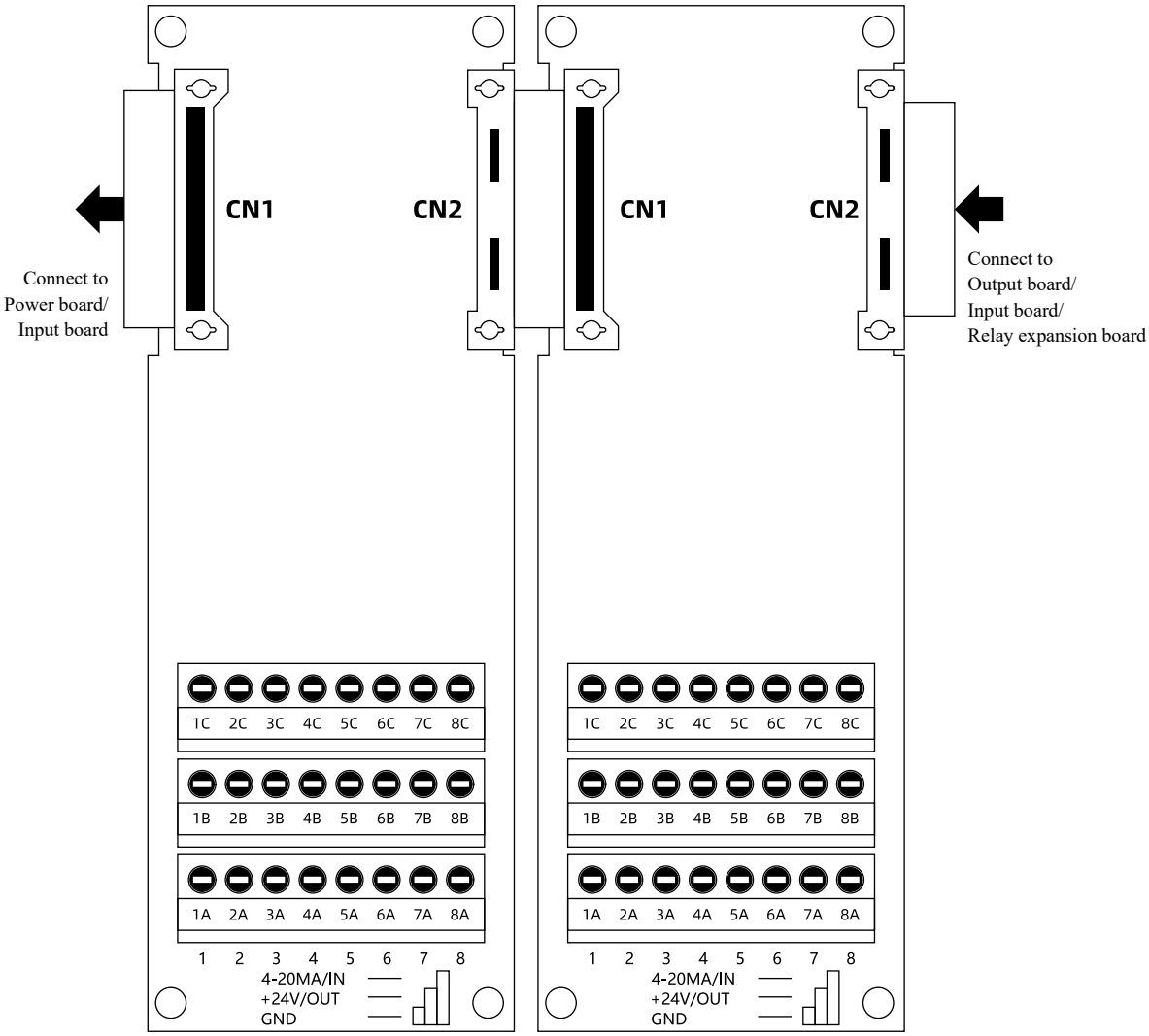
6.7. 4-20mA input board (8CH, Optional)

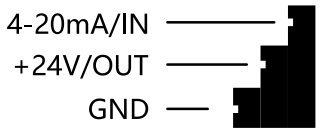
Every input board with 8 channels 4-20mA input, the system supports up to 32 channels of 4-20mA input (1-4 input board, every board 8 channels).

From left to right channel number increase. The first channel of 4-20mA is default 101(Address scan menu can check it).

The CN1 slot is connected to the CN1 expansion interface of the power board, or the output board; the CN2 socket can be connected to the input board or the output board.

*Up to 4 pieces of 4~20mA signal input boards form a 32-channel input combination interface. The value of each interface is fixed for the channel, which is not affected by the setting of the channel address (device address / transmitter address) of the detector. Use the "Address Scan" function to scan, confirm that the cable is correctly connected and powered on, you can scan the address 101, address 102...address 132.





4-20mA/IN: 4-20mA signal input

+24V/OUT: Power out (power supply) +

GND: Power ground

*If the detector detects accurately, but the control panel shows that the concentration does not match, please recalibrate the 4~20mA output interface of the detector.

Note that when connecting to a cloud service, detectors using a 4-20mA connection will not upload data to the cloud. The sensor connected to RS485 can upload data to the cloud.

*4~20mA channels can only transmit analog concentration data, and cannot transmit device information such as serial numbers.

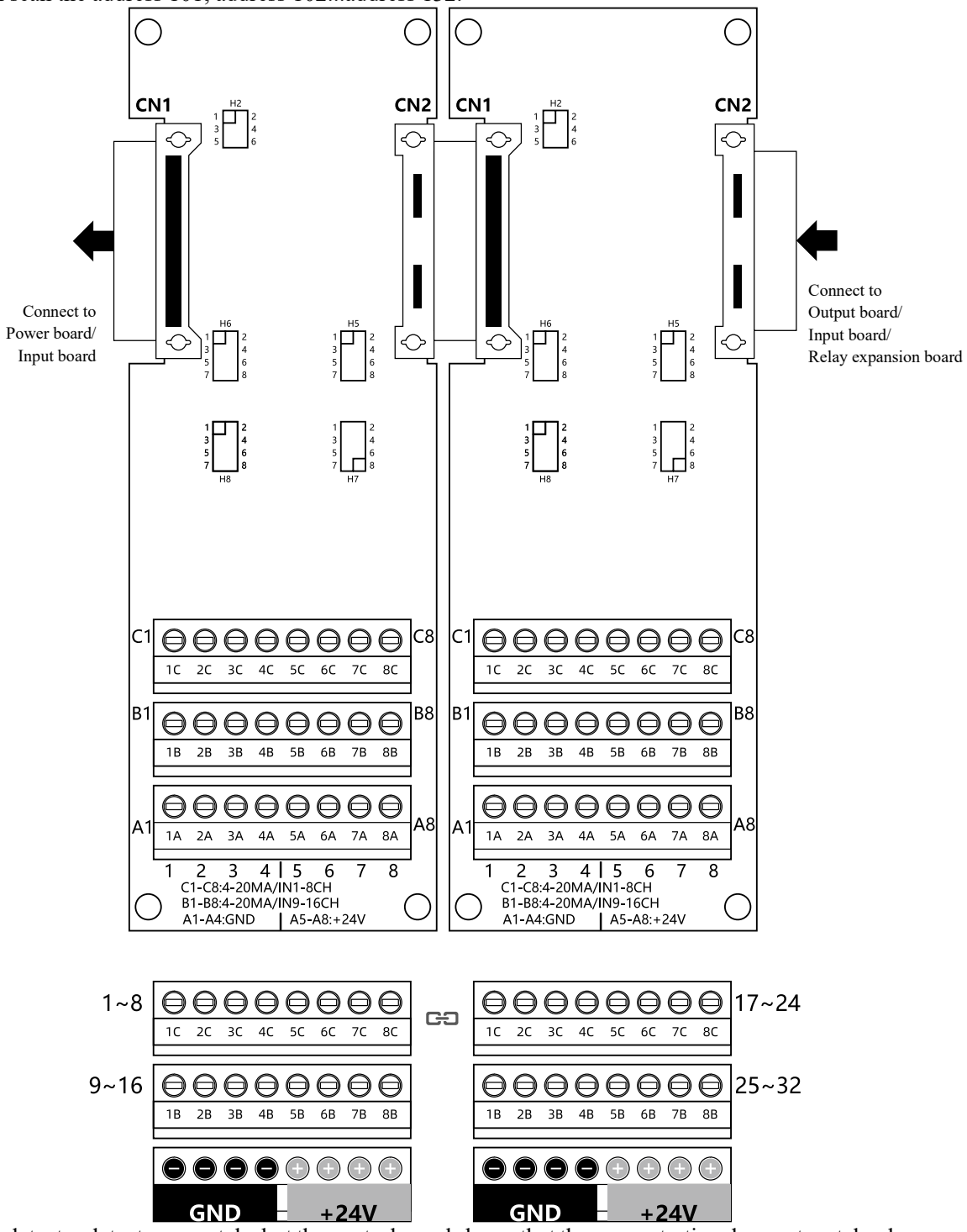
6.8. 4-20mA input board (16CH, Optional)

Every input board with 16 channels 4-20mA input, the system supports up to 32 channels of 4-20mA input (2 input board, every board 16 channels).

From left to right channel number increase. The first channel of 4-20mA is default 101 (Address scan menu can check it).

The CN1 slot is connected to the CN1 expansion interface of the power board, or the output board; the CN2 socket can be connected to the input board or the output board.

*Up to 2 pieces of 4~20mA signal input boards form a 32-channel input combination interface. The value of each interface is fixed for the channel, which is not affected by the setting of the channel address (device address / transmitter address) of the detector. Use the "Address Scan" function to scan, confirm that the cable is correctly connected and powered on, you can scan the address 101, address 102...address 132.



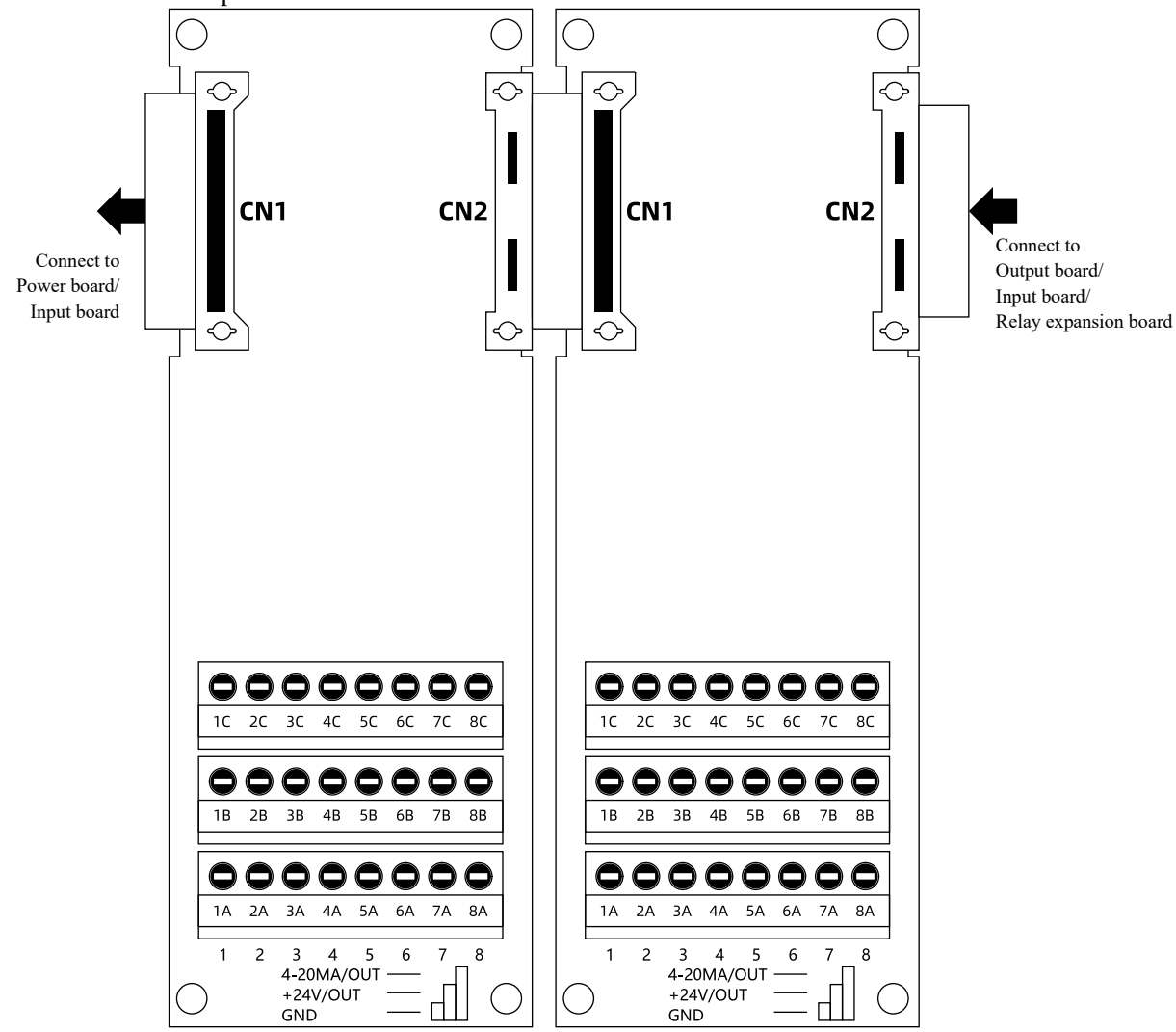
*If the detector detects accurately, but the control panel shows that the concentration does not match, please recalibrate the 4~20mA output interface of the detector.

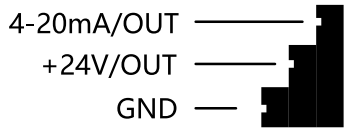
6.9. 4-20mA output board (8CH, optional)

Each output board consists of 8 output interfaces.

The panel supports the combination of up to two output boards, with a total of 16 output channels.

The "4~20mA output configuration" function in the system can calibrate the 4~20mA electrical signal of the output board and customize the output associated channel.





4-20mA/OUT: 4-20mA signal output

+24V/OUT: Power out (power supply) +

GND: Power ground

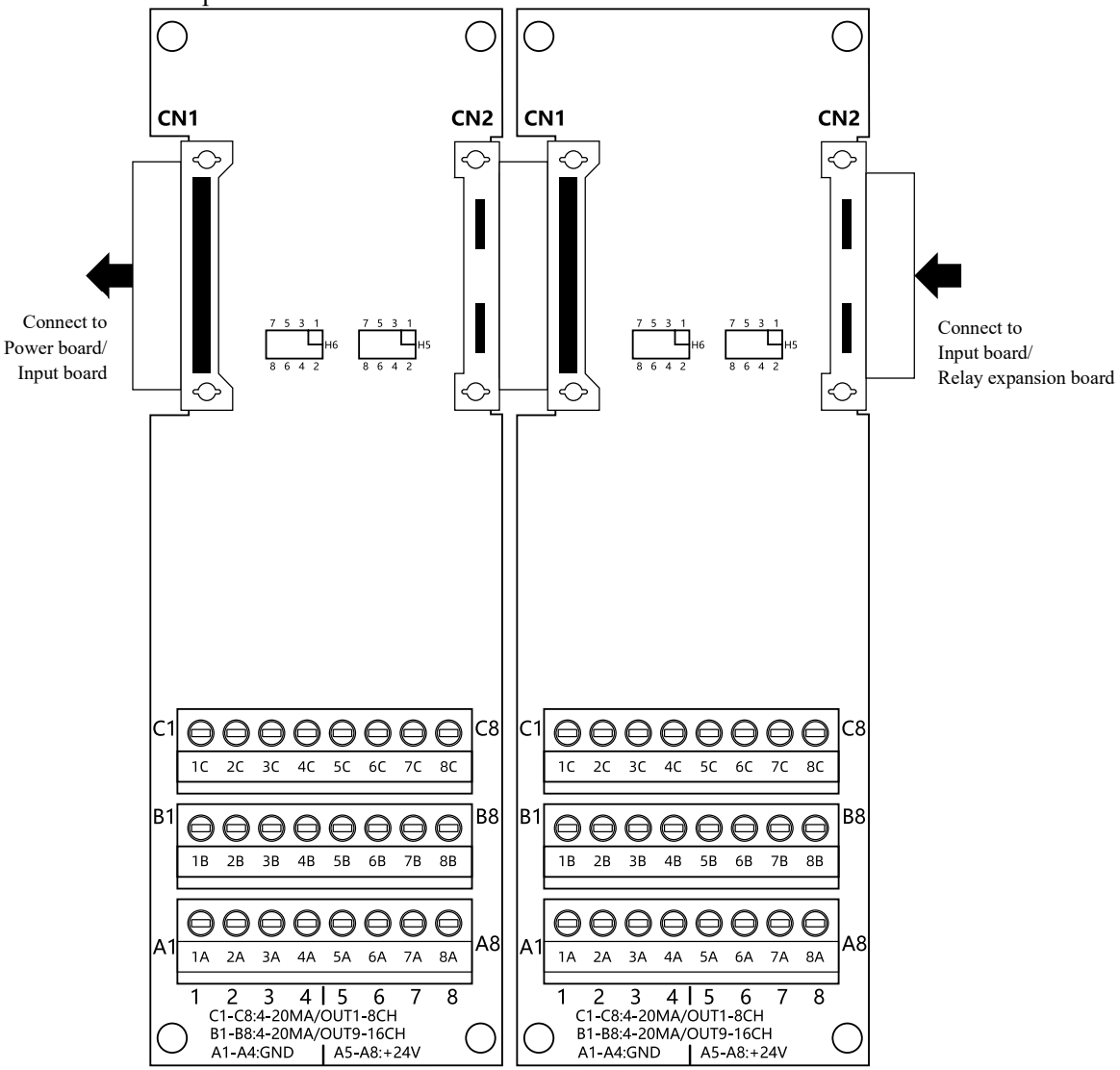
*If the detector detects accurately, and the control panel shows a same result, but the 4~20mA output terminal of the control panel displays an unmatched concentration. Please enter the "4~20mA parameter setting" interface, check and calibrate the 4~20mA interface of the terminal.

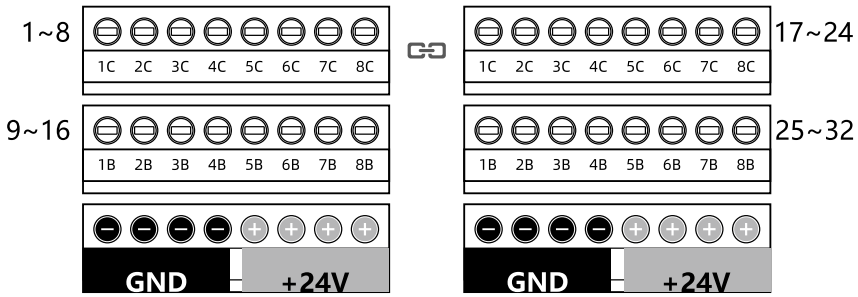
6.10. 4-20mA output board (16CH, optional)

Each output board consists of 16 output interfaces.

The panel supports the combination of up to two output boards, with a total of 32 output channels.

The "4~20mA output configuration" function in the system can calibrate the 4~20mA electrical signal of the output board and customize the output associated channel.





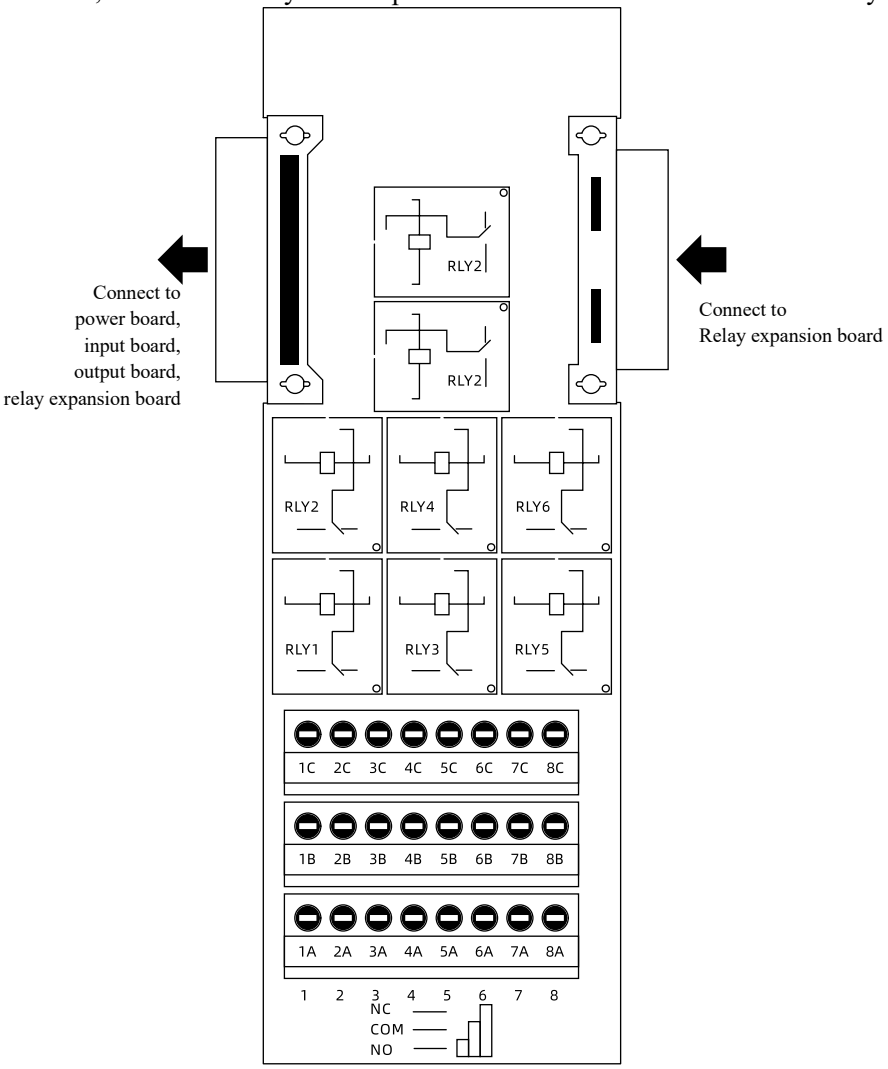
*If the detector detects accurately, and the control panel shows a same result, but the 4~20mA output terminal of the control panel displays an unmatched concentration. Please enter the "4~20mA parameter setting" interface, check and calibrate the 4~20mA interface of the terminal.

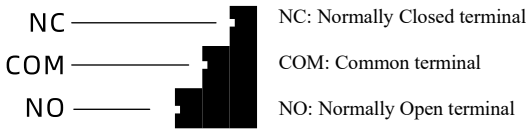
6.11. Relay expansion board (optional)

Each relay expansion board provides 8 control ports.

Support up to **4** relay expansion boards (when there is no 4-20mA input board and output board) collocation, a total of up to **38** output channels (including **6** relays on power board) can be selected.

User is able to program the relay in the "Relay setting" function. Each relay can be set up a single or continuous multiple channels for control, and the 1-4 relays on the power board can be used as the "main relay".





Inhibit a single channel: In the gas [Parameter configuration] interface, enable "Inhibit", the associated relay will not be activated.

Inhibit all channels: Enable the function [System Setting-Others-Inhibit-All channel], no output for all relays.

6.12. Cables and loads

RS485 transmission cable:

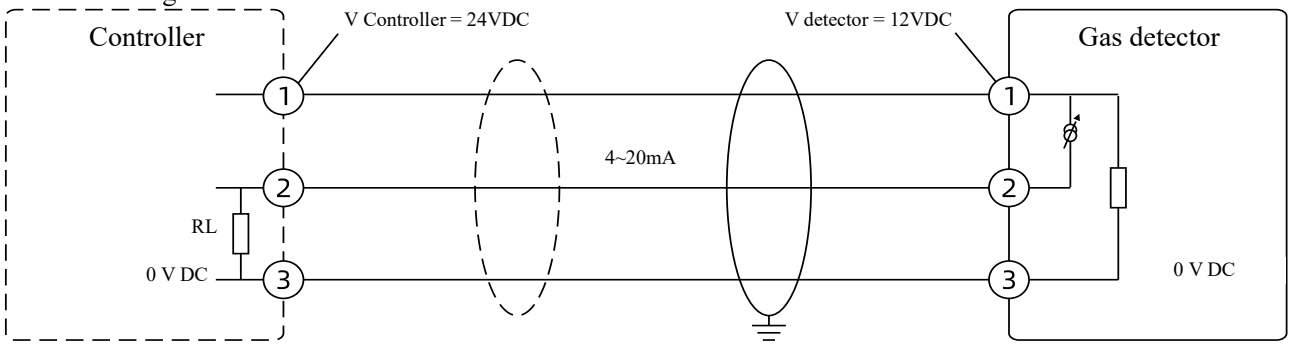
The RS485 cable is recommended to use twisted pair. When using RS485 communication to connect to the controller, in order to ensure signal stability. Under normal conditions, the RS485 signal transmission distance of our detector can reach more than 1000 meters. When the signal interference is large or the transmission distance is longer, it is recommended to add an RS485 repeater, a 120Ω/0.5W matching resistor should be connected in parallel between the A and B lines of the farthest detector.

4-20mA transmission cable:

It is recommended to use a shielded cable, the outer diameter of the cable is ≤8mm, and the core diameter is above 0.75mm^2.

When the detector is powered by the controller:

The power supply voltage of our company's controller is 24VDC, and the minimum working voltage of the detector is 12VDC. To ensure the normal operation of the detector, the circuit voltage drop must be less than or equal to 12VDC, as shown in the figure below.



Maximum Loop Resistance

- When the detector is powered by the control system (one cable is connected to one detector, the power line and the signal line are the same length), the transmission distance refers to the following formula: **L = ((U-12)/Ic)/ρ×S/2**

  L: Maximum transmission distance (m)
  U: controller output voltage (our controller is 24V)
  Ic: working current of detector (A)
  ρ: wire resistivity (copper: $1.85\times10^{-2}\Omega\cdot mm^2$)
  S: wire cross-sectional area (mm^2)

- When the detector is not powered by the controller (that is, powered by an independent power supply), the 4-20mA transmission distance is determined by the load resistance, which includes the output resistance of the control system (controller, DCS or PLC) and the internal resistance of the cable. Refer to the following formula for the maximum transmission distance allowed by a single cable: **L=(R-Rc)/(ρ/S)**

  L: Maximum transmission distance (m)
  R: Maximum load resistance (500Ω when powered by 24V, including control system input resistance and cable internal resistance)
  Rc: Control system input resistance (Ω)
  ρ: core resistivity (copper: $1.85\times10^{-2}\Omega\cdot mm^2$)
  S: core cross-sectional area (mm^2)

- When the controller supplies power to the detector, the maximum number of detectors allowed by a single cable refers to the following formula: **N=Im/Ic=((U-12)/R)/Ic=((U-12)/(ρ×L/S))/Ic**

  N: Maximum number of detectors
  Im: the maximum current passing through the wire (A)
  Ic: the average current of a single detector at the lowest starting voltage(A)
  U: controller output voltage (V) (our controller is 24V)
  R: internal resistance on the cable(Ω)
  ρ: core resistivity (copper: $1.85\times10^{-2}\Omega\cdot mm^2$)
  L: cable length (m) (the total length of the positive and negative lines of the power supply, if the length of a single line is 100m, the total length of the two lines is 200m)
  S: core cross-sectional area(mm^2)

6.13. Cable connection instruction

This control panel provides 4-20mA and RS485 2 different output mode which are different in wiring; the following wire connection example is for reference only, customer can connection cable according to the actual situation.

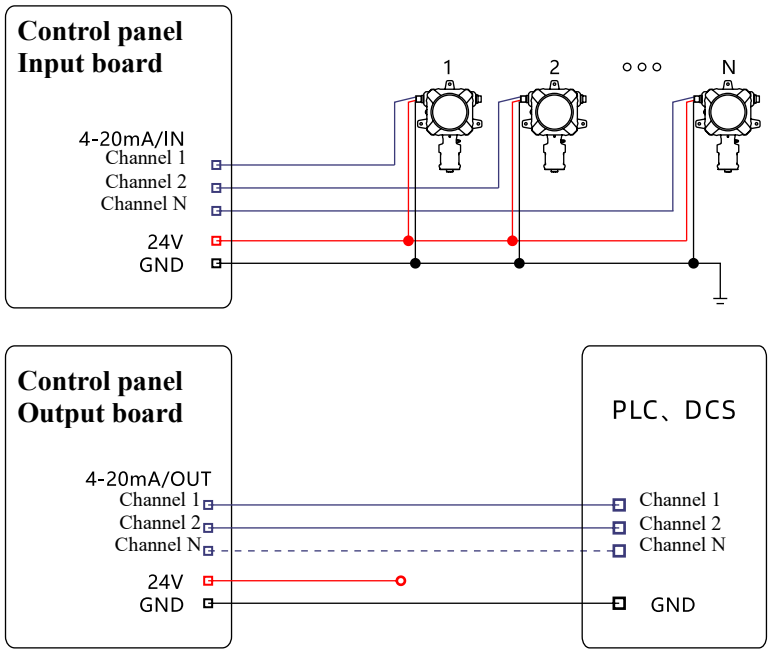
- **4-20mA current signal output connection mode. (Must be grounded together)**

Features: The 4-20mA current signal output connection mode only needs one cable and a common ground cable to form a communication system. The wiring is simple and the response speed is fast. But because a communication chain can only accommodate one communication node (so the cable wiring is more troublesome when the number of connected devices is large). Also 4~20mA signals are easily disturbed by the environment, and it is also necessary to perform standard signal calibration on the output and input interfaces.

1) 4-20mA input (cable access)

Connect the gas detector to the 4~20mA input board interface on control panel, then control panel will supply power for detectors (24V/DC). (Support up to 32 channels 4-20mA input)

Note: If the control panel needs to drive more than 8 detectors, please confirm whether the switching power supply on gas detector can meet the driving of the overall load (external devices, detectors, etc.).



2) 4-20mA output (cable out)

The control panel supports up to **32** channels of 4~20mA standard signal output interface, which can be connected to PLC, DCS system interface and PC. The output board provides 24V/DC output interface.

- **RS485 digital signal (two-wire, Modbus) connection mode. (Can be independently grounded)**

Features: The cables are connected in parallel makes wiring is simple and construction can be carried out quickly, which can reduce cost.

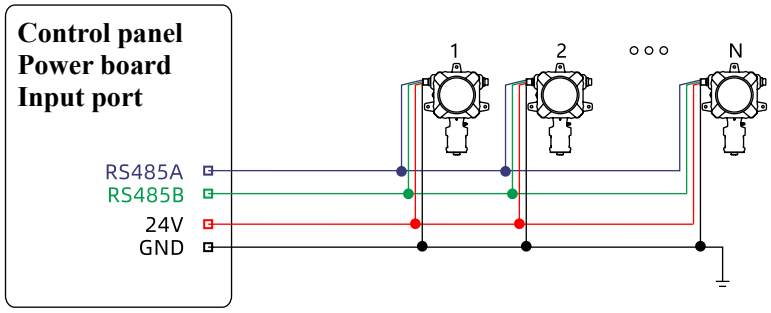
Note: The detector connected by RS485 must set the transmission address, so that the address of each sensor channel is not repeated.

1) RS485 input

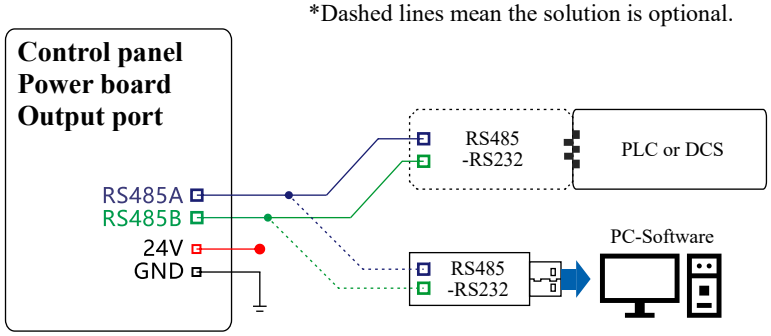
This control panel support up to 100 channels of RS485 input (One gas type is one channel).

The gas detector is powered by the control panel or independently powered (24V DC).

Note: When there are more than 8 detectors, it is recommended that the detectors use a segmented independent power supply.



*Dashed lines mean the solution is optional.



2) RS485 output

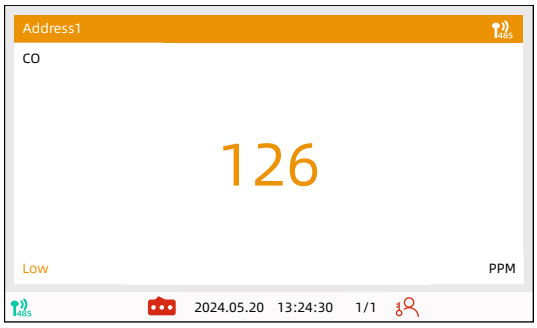
The RS485-OUT output terminal on power board can be connected to PLC and DCS systems (some PLC and DCS systems only have RS232 interfaces, which need to be connected through RS485-RS232 converters).

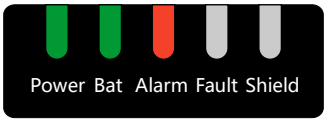
Or it supports connect the RS485-OUT output terminal on power board to PC through RS485-USB converter, and use the PC software to perform remote monitoring and management.

6.14. External Load Connection Example

In addition to the sound alarm that comes with the panel, an optional light alarm (connected to the P4 interface of the main board) is optional. In addition, the relay is used as a control port to support switch control of loads below 5A/30VDC.

Example: At the site, the detector detects that the concentration of harmful gas reaches the low alarm value. There will be display indicate, sound alarm, also low alarm indicator on. If the light alarm is selected, light alarm will also start working. In addition, the relay normally open end closes the circuit, (as shown in the connection diagram below) to drive the fan for ventilation or drive the alarm system to remind workers.

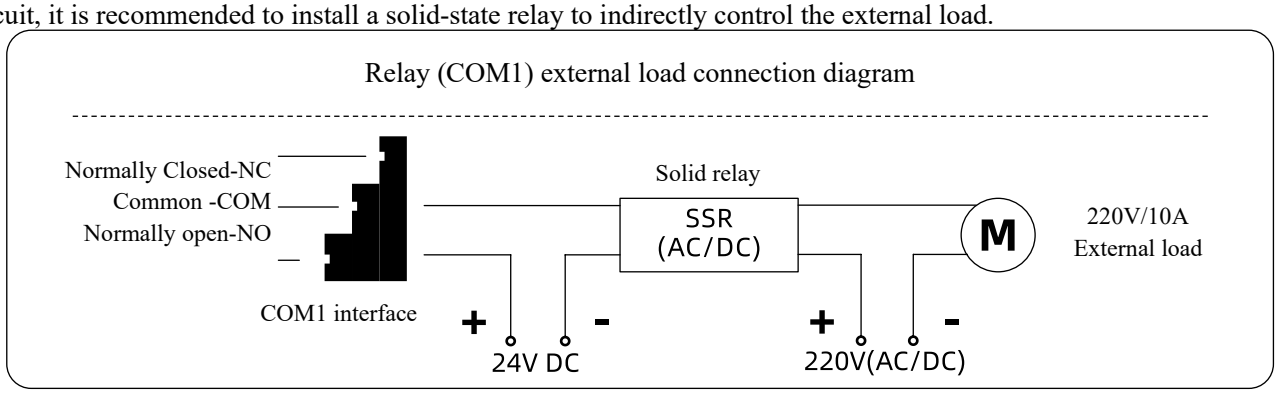




When alarm:
- Alarm indicators on
- Sound alarm starts
- Light alarm (Optional) starts
- The closed or open circuit of the relay controls the work of the external alarm system (external load)

*As shown in the above interface, the transmitter address is 1 (address 1), and the harmful gas is carbon monoxide. In the "Relay Setting" interface, set "COM1" to associate with the "Address 1" channel.

Note: Considering the safety of electricity use and avoiding the electromagnetic interference of the high-voltage circuit, it is recommended to install a solid-state relay to indirectly control the external load.



Warning: When an alarm occurs, the personnel in the workplace where the alarm detector is located must be warned to leave as soon as possible. Otherwise, serious personal injury or personal injury may be caused.

Clear Alarm: If confirm the dangerous situation has been removed, but the alarm of control panel continues. If you want to clear the sound and light alarm, please click the "Clear Alarm" key (a red mute icon will show on display), click the key again can to restore the alarm.

Please note that when the control panel is released from alarm status, only the sound alarm is turned off, and the interface alarm is not included. If the interface alarm prompt is still there, please checking the workplace where the detector in alarm is located and eliminate the danger. This function does not affect the alarm controlled by each sensor.

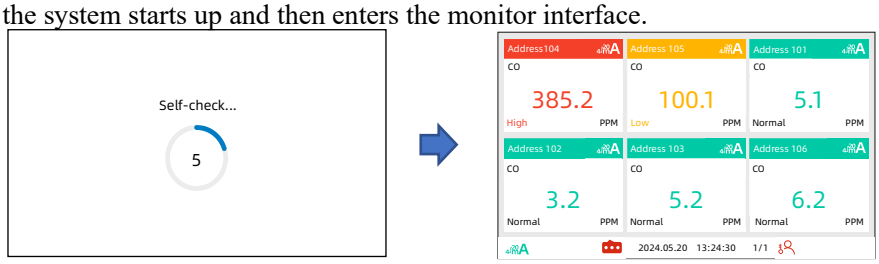
*For specific indicator definitions, please refer to <LED status>.

7. Operation Instructions

Please note that the system adopts a function menu with hierarchical permissions. After the maintenance engineer and operator log in, the operable functions will be different.

7.1. Power on

After the control panel is powered on, the system starts up and then enters the monitor interface.



7.1.1. Indicator

Power: After startup, the green indicator should be on; in case of power fault or abnormality, the red indicator is on (when there is backup power).

Bat: When the main power is supplied, the indicator is off (or the green indicator flashes during charging); when the backup power is supplied, the green indicator is on.

Alarm: When there is an alarm, the red indicator flashes.

Fault: When there is a fault, the yellow indicator is on.

Shield: A channel is shielded and the yellow indicator is on.

*Please refer to the <LED/Buzzer status> section for details.

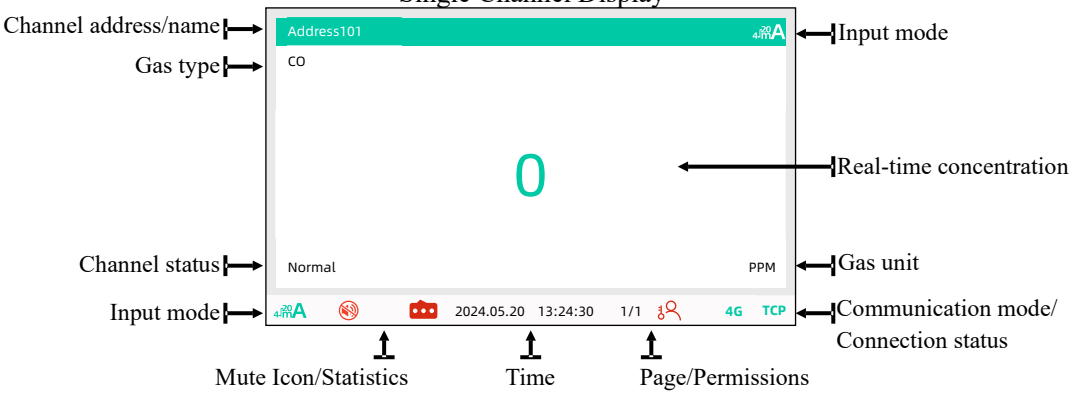
7.1.2. Monitor interface

There are three interfaces on the monitor interface: “Channel display” (main interface), “Parameter configuration” and “Information statistics”.

7.1.2.1. Channel display

When there is no operation on the monitor interface, if there are multiple pages (more than 7 channels), the interface will periodically turn pages to display the real-time gas concentration, or user can slide the touch screen left and right to switch pages.

Single Channel Display



As shown in the interface above, it is a single channel (4~20mA cable) input, channel 1 (address 101) is a carbon monoxide gas detector, the current gas concentration is 0ppm, the concentration is normal, the system time is 13:24:30 on May 20, 2024, and it is connected to the network through the 4G module and connected to the server.

Different colors of interface status:

- Green, normal status;
- Orange, low alarm status, alarm indicator flashes slowly, sound (indicator) alarm is activated;
- Red, high alarm status, alarm indicator flashes quickly, sound (indicator) alarm is activated;
  *The following statuses all displayed in red interface: high alarm, low battery alarm, anti-theft alarm, sensor communication abnormal alarm, fall alarm, over-range, calibration expired, sensor expired, sensor faults.
- Gray, the channel faults (pump fault, offline or unknown status), the fault indicator is on, and the sound (indicator) alarm is activated.

Meaning of device connection icon: connection method of the access device.

4~20mA connection mode, RS485 connection mode

Meaning of network status icon: green means connected. Gray means not connected.

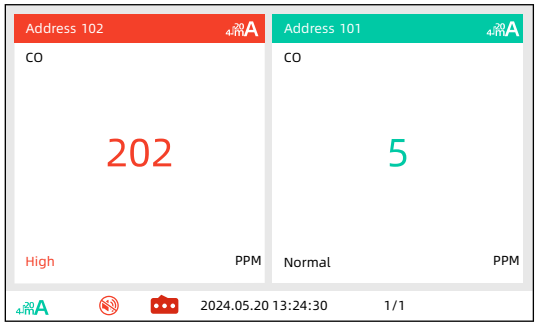
4G Connected to 4G network TCP Connected to server

Other icons mean: "Information statistics" icon flashes when there is a new record; "Maintenance engineer login" and "Operator login" icons flash after log in, **click the icon to log out**, after logging out, the icon is not displayed, re-enter the menu requires re-verification.

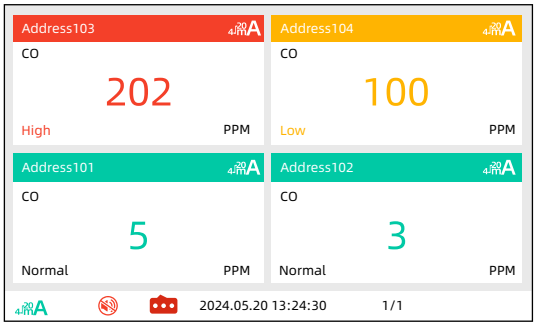
Information statistics Maintenance engineer login Operator login, Inhibit mode

***The control panel supports multi-channel interface adaptive display. For more than 7 channels, user can slide left and right on the screen to turn the page forward or backward to display the gas.**

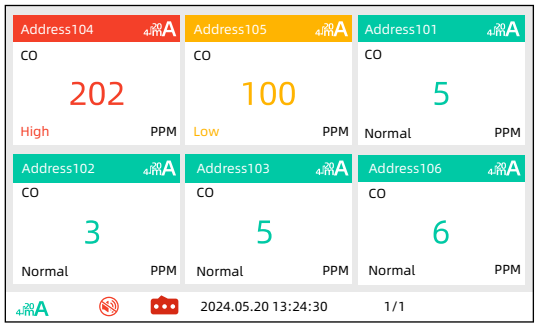
2 gases display



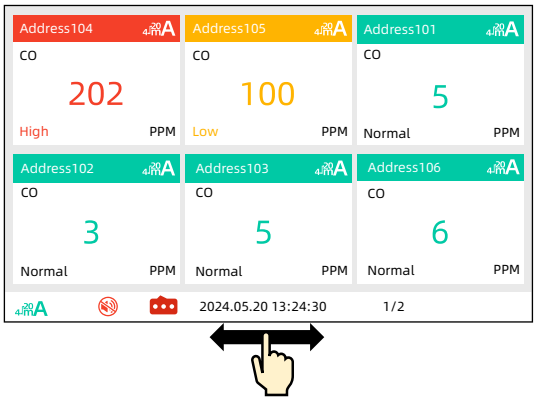
3~4 gases display



5~6 gases display



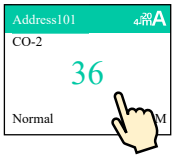
7 gases or more display



Flip Page

7.1.2.2. Parameter configuration

On the monitor interface, long press the gas channel to enter the "Parameter configuration" interface of the selected channel, as shown in the figure.



User can configure the gas parameters of the current channel in detail. The interface is different when the channel connection mode is 4~20mA and RS485.

Gas channel settings:

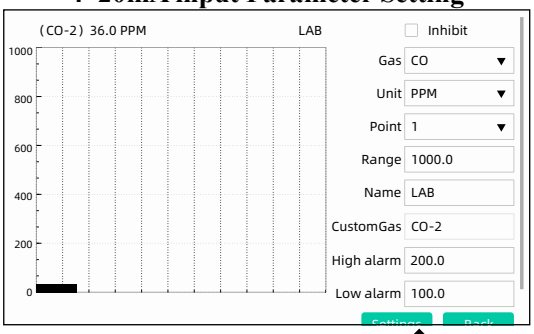
- **Inhibit:** Enable, the channel's sound (sound and light) alarm will not be triggered and the associated relay will not be activated, but it will not impact the interface alarm. Default off.
- **Gas type:** Select the measured gas type, only available for 4~20mA channel.
- **Gas unit:** Select the gas unit, only available for 4~20mA channel.
- **Decimal point:** Choose the effective digits after the decimal point for real-time concentration value, only available for 4~20mA channel.
- **Name:** User-defined channel name, up to 5 Chinese characters or 15 English letters.
- **User-defined gas:** User-defined gas name, support Chinese and English editing.
- **Low alarm value:** Set the gas low alarm value (RS485 channel cannot set. Setting range: zero point < low alarm value < high alarm value; oxygen supports high alarm ≤ low alarm, the alarm logic is concentration ≥ high alarm value is high alarm, otherwise it is low alarm).
- **High alarm value:** Set the gas high alarm value (RS485 channel cannot set. Setting range: low alarm value < high alarm value < range).
- **Gas range:** Set according to the current channel sensor range, only 4~20mA channel is available.
- **Set:** Save the changed setting items, only displayed after the maintenance engineer logs in.
- **Back:** Return to the monitor interface.
- **SN:** Display the product serial number, only the channel with RS485 connection shows.
- **Zero calibration:** Only RS485 channel available, only displayed after the maintenance engineer logs in. Toxic gas zero calibration, for gases originally existing in the air (such as carbon dioxide, oxygen, nitrogen), the device is calibrated as 450ppm for carbon dioxide; 20.93% VOL for oxygen; 78.1% VOL for nitrogen, cannot be entered.
- **Span calibration:** Only RS485 channel available, only displayed after the maintenance engineer logs in. User-defined input, the input value is greater than 0 and less than the range value.

*When there are user-defined characters in the "Name" column, the user-defined characters are displayed in the channel status bar; when the "Name" column is empty, the channel display status displays as: Address 1, "Address" + "Transmitter address (or the interface number of the 4~20mA access acquisition board, starting number 101)".

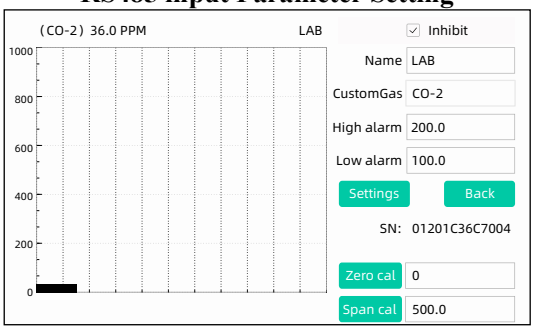
*When there are user-defined characters in the "User-defined gas" column, the user-defined characters are displayed on the left side of the concentration reading (in brackets); when the "User-defined gas" column is empty, the name set in the "Gas name" is displayed (4~20mA channel) or automatically displayed the gas type (RS485 channel obtains the gas type from the detector).

*Please refer to the calibration operation guide of the sensor (detector) for the calibration process.

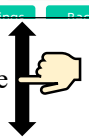
4~20mA input Parameter Setting



RS485 input Parameter Setting

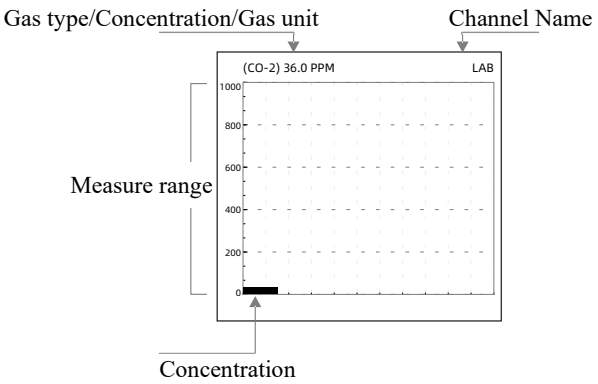


*Swipe up and down to operate



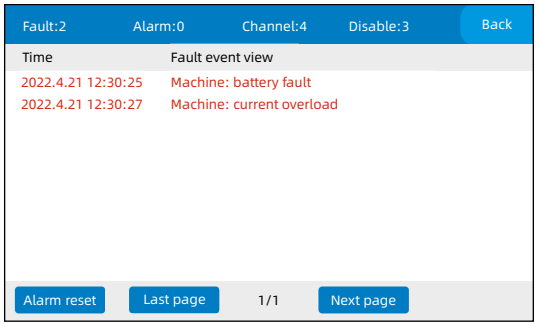
*The high and low alarm settings of the 4~20mA channel will not be synchronized to the detector. Therefore, after the 4~20mA channel device is scanned (Address scan) and entered into the system, the alarm value needs to be set independently.

Please note that when connected to the cloud service, detector with 4~20mA connection will not upload data to the cloud. Only detector with RS485 connection can upload data to the cloud.



7.1.2.3. Information statistics & Alarm reset

When the control panel is working, the system will automatically statistics related information after detecting the alarm, fault and other information. When new information is generated, the icon  flashes, click the icon to enter the interface.



Information statistics--

Total number of faults, control panel and sensor faults (pages can be turned to view fault history)

Total number of alarms, control panel and sensor alarms

Total number of devices, all channels that have been input

Total number of shielded channels, channels that have been input but shielded

Time: the detailed time of the event; Fault event: event type and specific information about the fault.

Refer to the exported table below for the fault record format:

Time	Event
2024.05.30 09:59:34	Machine: main power close
2024.05.30 10:00:59	Machine: battery fault
2024.05.30 12:07:01	Addr1: 01602C3BC0001 fault
2024.05.30 12:12:24	Addr6: 01201C36C7004 fault
2024.06.29 11:33:03	Machine: Current overload

The first record is the **main power close**, which means that the AC power supply is abnormal or the power supply circuit is abnormal. Please check the power supply line and restore the power supply before the backup power is exhausted or the panel will automatically shut down.

The second record is a **battery fault**. Please check the battery connection and whether the battery is normal. If it still doesn't work out, please contact us.

The third and fourth records are the **device fault** record, which contain the device address (address 1, address 6), device serial number.

The fifth record is **current overload**, please check and clean the residual metal objects in the chassis. If there are no abnormal residues, please contact us.

For other records, please refer to the <Event view> section; for troubleshooting guidance, please refer to <Common fault and Troubleshooting>.

In addition to viewing system information data and fault records, the information statistics interface can also operate the **Alarm Reset** function.

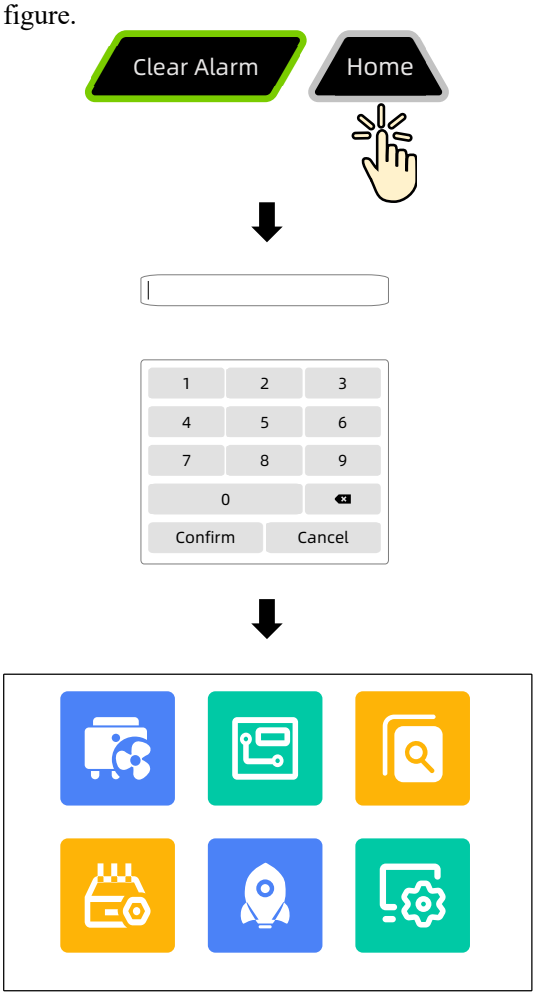
Alarm Reset: Temporarily clear the system alarm and restore the original sequence of the channels in the monitor (by channel value, low → high). This operation only affects the monitor display and does not affect the history records. But it is not recommended to operate this function when there is an alarm or fault.

* The alarm clear operation requires user password verification.

* If the <Alarm auto reset> function is turned on, there is no need to operate the "Alarm reset" function.

7.2. Main Menu

After powering on, when user press the “Home” button on the control panel for the first time, user will need to verify the password. After verification, user will enter the “Main menu interface”. Or cancel the operation and return to the “Monitor interface”, as shown in the figure.



* Password: Operator password 1234, maintenance engineer password please contact manufacturer. Different passwords corresponding to different permissions, please refer to the <Permission reference table> in the attached list for details.

7.2.1. Relay configuration

The controller is equipped with 4 relay outputs as standard. Each port can be controlled by single channel or continuous multi-channel control (an alarm on any channel can trigger the control associated relay).

Relay port: NC, closed (closed circuit) when not triggered; **NO**, open circuit when not triggered; **COM**, common terminal.

Take the standard 4 relay board as a reference:

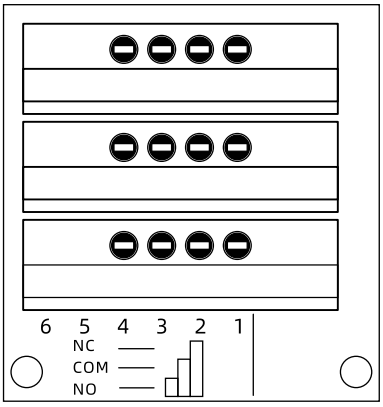
COM1~COM4 (standard configuration): The serial number corresponds to the silk screen of the PCB board (the power board as shown in the figure below: 1 corresponds to COM1), which are 1 to 4 relays, which can be associated with the control channels. Default is no association.

COM5~COM36 (optional): The serial number increases from left to right (as shown in the figure below 1~8 silk screen of expansion board 1: when the standard power board is equipped, it corresponds to COM5~COM12 on the interface), which can be associated with the control channels respectively. Default is no association.

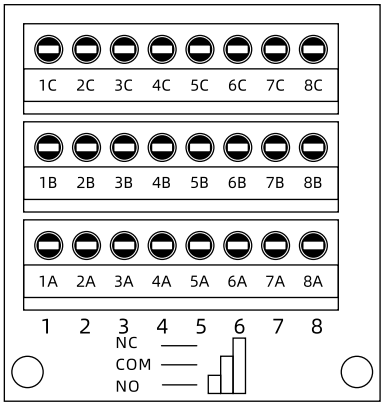
Main relay: Use any relay in the available COM interface as the overall alarm output control terminal, with control conditions for alarms in any channel.

Trigger mode: The default is "low & high alarm", which means, both low and high alarm with activate the relay; Or customer can set it as low alarm high relay or high alarm relay separately.

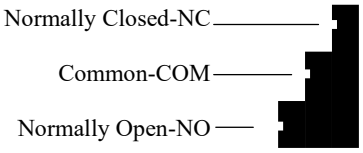
Trigger way: "Low & High alarm" (default); low alarm; high alarm; fault alarm.

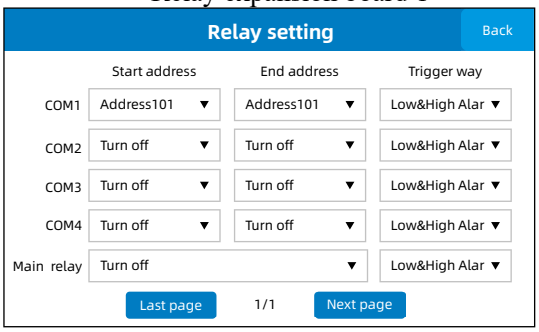


Power board



Relay expansion board 1





Example 1: As shown in the figure above, COM1 interface (1 relay), select the "address 101" channel association, then the COM1 relay will be triggered and controlled by the real-time concentration of the "address 101" channel.

Example 2: Set COM1 as the main relay.

Operation: In the interface, select COM1 for the general relay setting item, and it will take effect immediately.

Function: COM1 output is controlled by the alarm of any channel.

***Note: Enable "Inhibit" in the gas [Parameter configuration] interface, the associated relay will not be activated. Enable the function [System Setting-Others-Inhibit-All channel], no output for all relays.**

*[Reset setting] will reset this function.

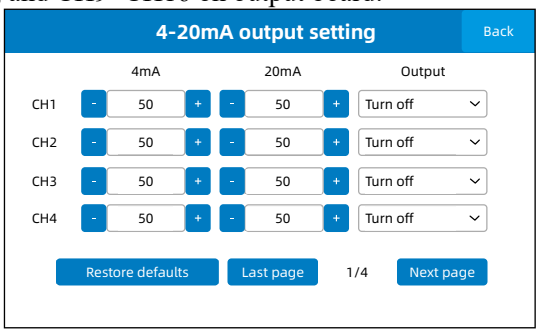
7.2.2. 4-20mA output setting (Optional)

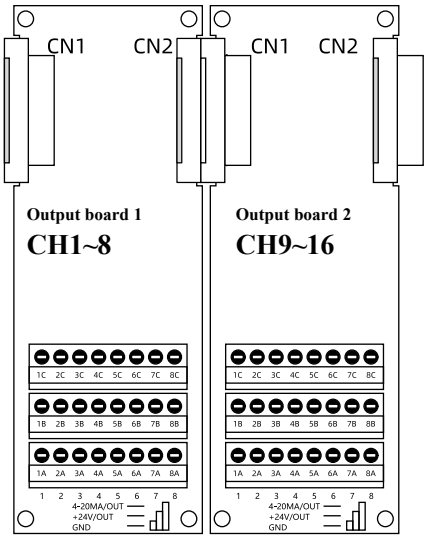
Please note that the control panel has been calibrated at the factory, and generally no additional adjustment is required.

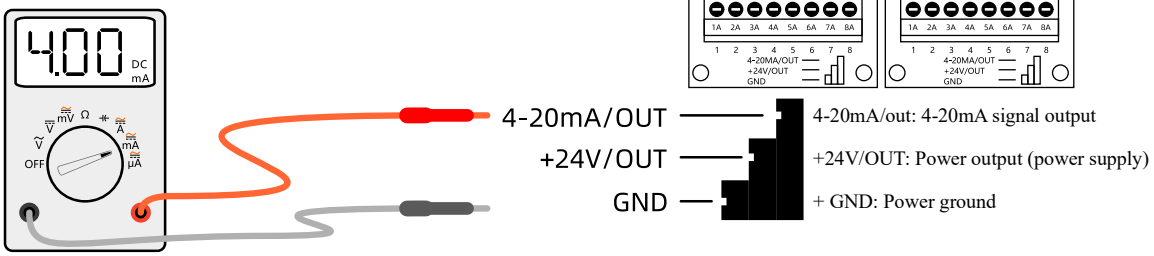
This function can fine-tune the 4mA and 20mA output current signal settings of each channel (up to **32** channels) and associate the output channel to specified input channel.

The example uses an "8CH output board" as a reference:

CH1~CH16 correspond to each interface on the output board, as shown in the figure on the right, CH1~CH8 on output board 1, and CH9~CH16 on output board.







4~20mA signal calibration instruction: Before operation, disconnect load cable from the terminal.

1) Connect the ammeter:

Confirm control panel is powered on properly, enter the "4-20mA output setting" interface, connect the red end of the ammeter to the 4-20mA/OUT signal terminal on 4-20mA output board, and connect the black end of ammeter to the GND terminal.

Warning: Do not connect the ammeter to another terminal, or the ammeter will be damaged.

Warning: The port layout of 16-channel output board and 8-channel output board is different. Please pay attention to distinguish the output signal and the power supply port to avoid damage the device due to wrong connection.

2) 4~20mA standard value configuration:

- **4mA configuration:** Click the plus or minus button of the corresponding channel in the "4mA" column and check the value on ammeter until the ammeter is stable at 4mA.
- **20mA configuration:** Click the plus or minus button of the corresponding channel in the "20mA" column and check the value on ammeter until the ammeter is stable at 20mA.

How to associate the output channel to specified input channel?

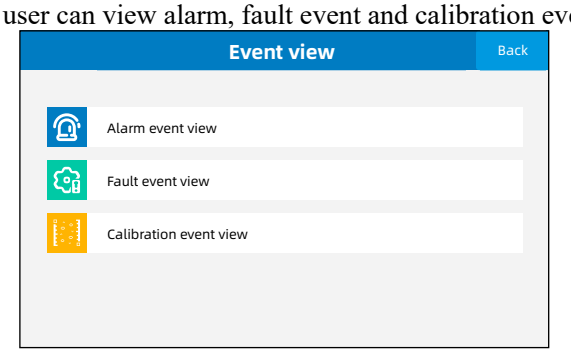
CH1~CH* on the left**:** Channel number on the 4~20mA output board;

Output on top right**:** Default turn off, then the output channel is in turn off state, user can select the specified input channel.

*【Reset setting】 will reset this function.

7.2.3. Event view

In the “Event view” interface, user can view alarm, fault event and calibration event records.



Event storage capacity and format:

1. Alarm events, 1000 records.

Alarm time	Address/Name	Gas name	Concentration value (unit)	Alarm status
2024.05.30 09:59:14	5	CO	214 PPM	Low alarm

Alarm events include: low alarm and high alarm.

2. Fault events, 1000 records.

Time	Events			
2024.05.30 09:59:34	This unit: Main power disconnected			

Fault events include: main power disconnection, current overload, battery fault; over-range, low battery alarm, anti-theft alarm, sensor communication abnormality alarm, mandown alarm, calibration due, sensor expiration, sensor fault, pump fault, lost signal, unknow etc.

*For handling, please refer to <Common problems and Troubleshooting>.

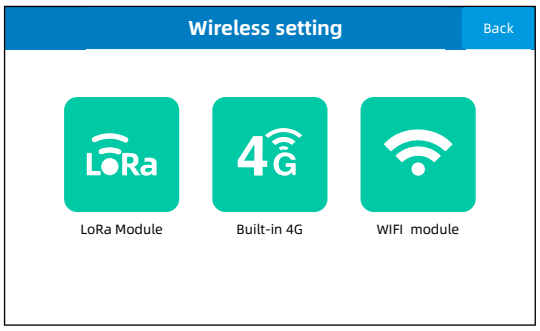
3. Calibration events, 100 records.

Time	Gas name	Before calibration	After calibration	Unit	SN
2024.06.03 10:26:53	EX	0	0	%LEL	01600C35B9004

*If user need to export records, can go to “Main menu → System settings → Storage settings” and use a U disk to export the record documents

7.2.4. Wireless setting (Optional)

Wireless setting is an optional function. User can choose one wireless module from LoRa Module, Built-in 4G or WIFI module. Please contact the sales team for more details.

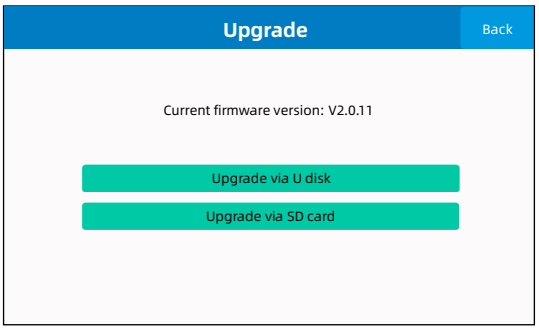


*[Reset setting] will reset this function

7.2.5. Firmware upgrade

This control panel supports firmware upgrade. Enter the “Firmware Upgrade” interface to directly view the current system firmware version.

To obtain firmware files: please consult sales team.



Upgrade steps:

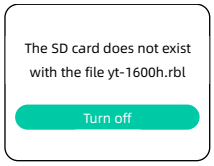
1) Copy the upgrade package “yt-1600h.rbl” to the root directory of the SD card (or U disk).
2) Insert the SD card (or U disk) with the upgrade package into the slot of the alarm control host that is not powered on.
3) Turn on the power switch on the right side of the chassis, and the alarm host is turned on.
4) Boot into the monitor interface, press the “Home” button on the panel, and select “Firmware Upgrade” in the menu.
5) Click the “Upgrade via SD card” (or “Upgrade via U disk”) button, the following interface will pop up.
6) The firmware version is different from the host version number. Click the “Upgrade” button to automatically upgrade and restart. please wait patiently.

*The version number is subject to the actual product.

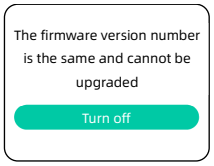
*Before the control panel shuts down, do not remove or insert the SD card.

Firmware detected

U disk not recognized
*Replug and restart the console.



Firmware not detected
*Re-copy the upgrade package and try again.



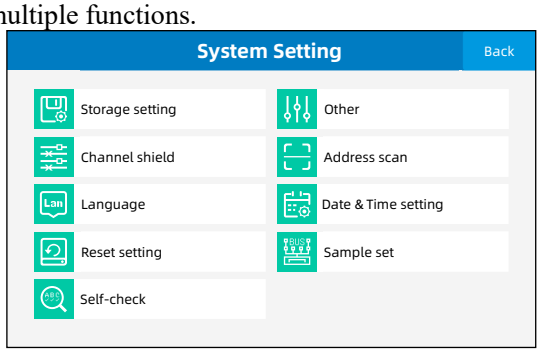
Same version
*Re-confirm the upgrade package.

***The file system of the U disk is in FAT32 format.**

Warning: During the upgrade process, it is forbidden to power off, pull out and insert SD cards, and U disks!

7.2.6. System Setting

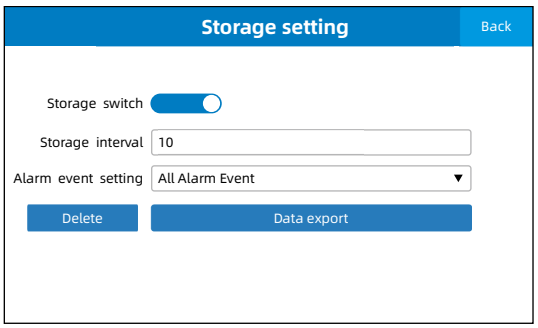
"System Settings" consists of multiple functions.



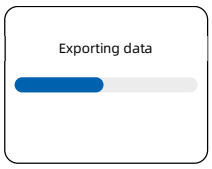
*Function sort in kind prevail!

7.2.6.1. Storage setting

"Storage settings" can enable the storage function, set the storage interval, store event type, or delete history data.
Storage switch: Enable / disable storage function
Storage interval: Set the storage interval (Unit: Second, 5~9999 optional).
Alarm event setting: Select the stored event type (Low Alarm, High Alarm, All Alarm Events).



U disk not inserted prompt



Data export is processing, the pop-up window will close automatically when finished

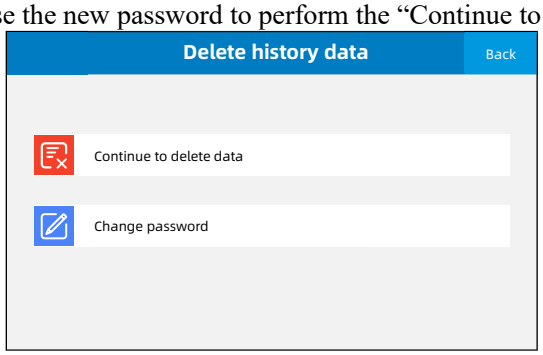
Data export: insert the U disk, go to the "Storage Settings", click the "Data Export" button, and automatically export the record files to the U disk. After completion, the interface returns to the "Storage setting" interface. And then user can unplug the U disk and check the record files on the computer (the root directory of the U disk).

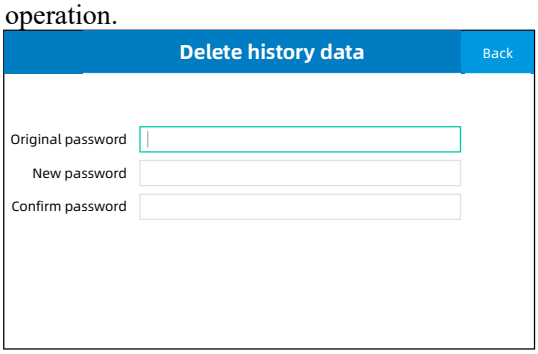
- Alarm records, alarm.csv, 1000 records.
- Fault event records (including lost signal records), fault.csv, 1000 records.
- Calibration event records, calibration.csv, 100 records.
- History records, history\year_month_day.csv, one record document per day.

***Please make sure the storage function is enabled and there is an event record.**
*[Reset setting] will reset this function.
Click the "Delete" button to enter the following function (delete history data).

7.2.6.1.1. Delete history data

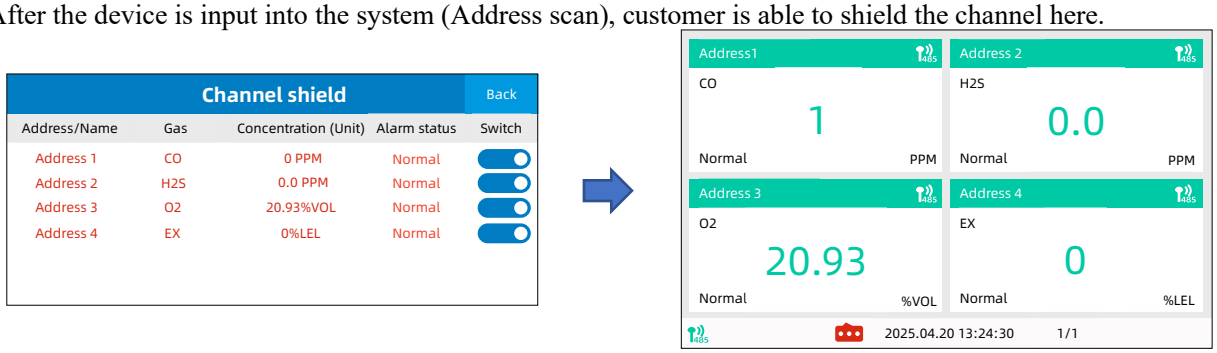
This function can clear the currently saved history data.
Please note that this operation is irreversible and the deleted data cannot be recovered, please operate with caution.
This operation requires password. If you forget the password (the factory default is 123456), please go to "Change password" interface, input "101010" in original password and new/confirm password, then password is modified. User can use the new password to perform the "Continue to delete data" operation.



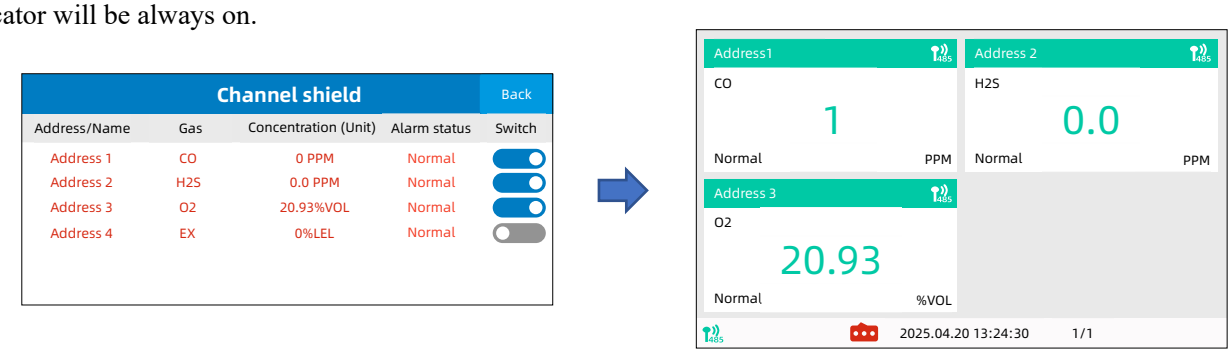


7.2.6.2. Channel shield

After the device is input into the system (Address scan), customer is able to shield the channel here.



After shielding, the shielded channel information will not be displayed on the monitor interface, the alarm will not be triggered, the associated relay will not be activated, the shielded channel records or events will not be stored, and the shield indicator will be always on.

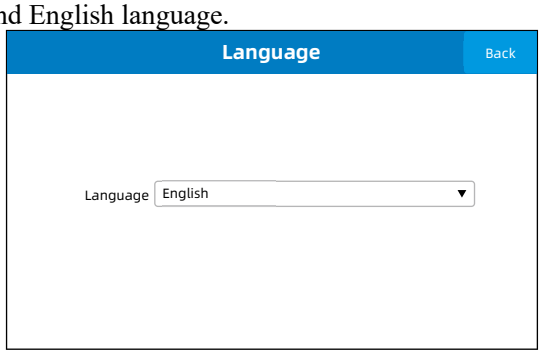


If there is a channel shield operation, there will be a shielding count in the Information statistics interface and the shield indicator will light up.

*Rescanning the address and restoring the factory settings will reset the shielded channel.

7.2.6.3. Language

The system supports Chinese and English language.



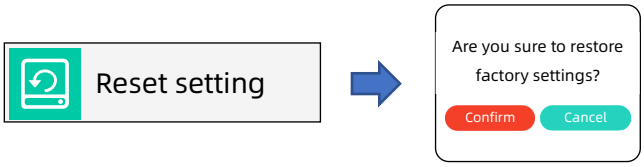
*[Reset setting] will reset this function.

7.2.6.4. Reset setting

Please proceed with caution!

This function can reset all parameters to the factory default setting.

* This operation does not affect historical data records.



*After clicking the function menu, select “confirm” in the pop-up window to start restoring factory data (reset function option), and “cancel” will return to the list of function menus.

After confirming the factory Settings restoration operation:

► Such as relay Settings, custom modify COM1:
Address 1 (start address) Address 1 (end address) fault (trigger mode).

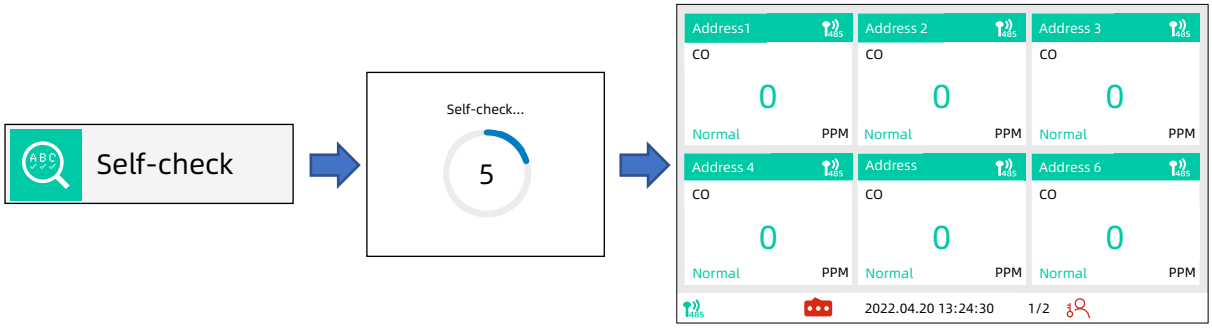
► After restoring factory Settings, the options of COM1 are:
Off (start address) off (end address), low & high alarm (trigger mode).

This function involves: Relay Configuration, Current 4~20ma Output Configuration, Wireless Configuration, Storage Settings, Channel Shield, Language, Alarm Reset, Sample Set.

7.2.6.5. Self-check

After powering on, user can manually operate the system self-test to check whether the system is running normally.

Click the self-test function to enter the self-test process: 5 LED indicators (flashing), buzzer (beeping) and sound and light alarm (alarm) start working, lasting for 5 seconds, and return to the monitor interface after completion.

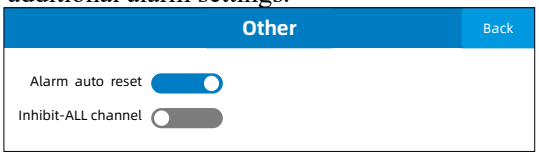


Please check:

1. Whether the LED indicators can light up normally.;
2. Whether the buzzer sounds normally;
3. Whether the sound and light alarm light (optional) are normal.

7.2.6.6. Other (Alarm settings)

In this menu user can configure additional alarm settings.



- **Alarm auto reset: Default on**
  After turning it on, the alarm status will automatically clear and no need to manually reset (which means no need to operate Alarm Reset in the Information statistics interface. The system will clear the alarm after the channel returns to normal for a period of time).
- **Inhibit-All channel:** Default off after reboot. Inhibit-All channel function is only used by maintenance engineers for debugging device.
  When this function is turned on, the alarm will be turned off (sound and light alarm will be turned off and the associated relay will not be activated), and the icon  will appear at the bottom of monitor interface. Log out (click the user logo  or ) to restore the original state of the function.

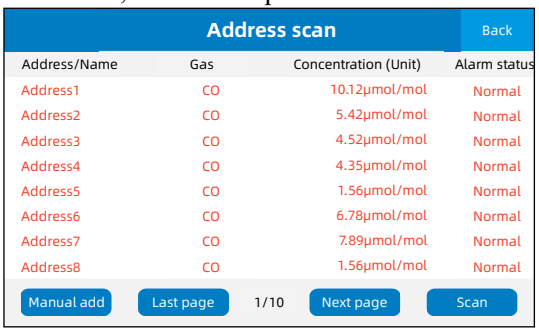
* Restoring the factory settings will reset this function.

7.2.6.7. Address scan

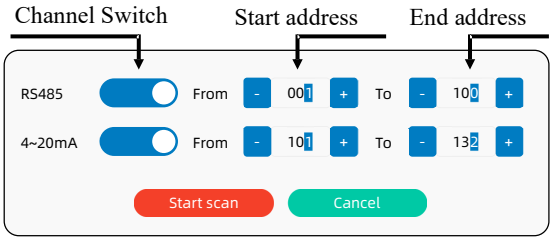
Note: Before making any settings, please perform "Address scan" function on the control panel to input detectors. To avoid errors in scan results, each gas detector needs to preset a different (offset) address.

After the device is connected correctly, by setting the "Address scan" function, the control panel will record all the scanned devices into the system. After the device is registered, the device information can be displayed and set on the monitor interface.

*If the device is not scanned. Please check the line to confirm whether the cable is connected correctly or whether the power supply is normal, or whether the device address and wireless link are normal, select the RS485 protocol for devices connected to RS485 port, and then scan again or add it to the list of existing devices by using" Manual add".



- **Scan** operation instructions**:**
  1) Click the "Scan" button.
  2) Channel switch: It can scan devices with RS485 channel or 4~20mA channel independently, or scan both channels fully (as shown in the figure).
  3) Scanning start and end addresses: You can manually set the scanning range, and click the "Minus" or "Add" button to adjust the scanning address range (the default is as shown, full-channel scanning, which takes a long time).



*Address range: 1~100 is RS485 channel, address 101~132 is 4~20mA channel.

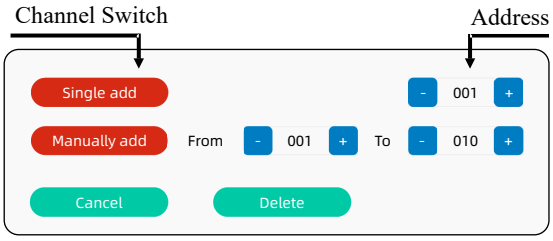
All your devices (detectors) are connected through the RS485 input port, you only need to choose to enable RS485 channel scanning; If the device is only connected with the 4~20mA acquisition board, you only need to enable the 4~20mA channel scan; If both access methods are used, both channel scans are enabled.

If you know the address number of the device and only need to set the range of the device address to scan, it can improve the scanning speed.

- **Manually add** operating instructions**:**

*Used in: Known device address, no address conflict.

1) Click the "Manually add" button.
2) Single add: Add a new device to the existing device list. Enter a known device address and click the "Single add" button.
3) Multiple add: The existing device list joins multiple devices with consecutive addresses.



Enter a known range of device addresses (consecutive addresses) and click the "Multiple add" button.

Delete button will clear all input channels.

***Warning:**

1. After the delete operation is executed, all input channels will be cleared at the same time, and the data cannot be restored

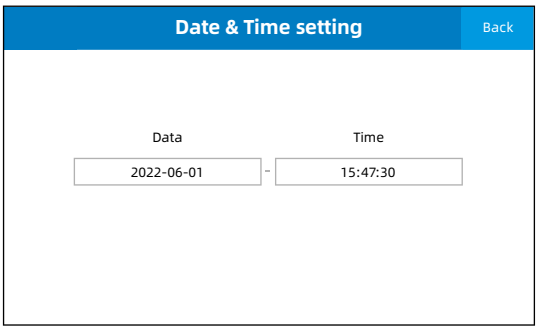
2. Scanning will clear the Channel shield record. After scanning, the originally shielded channels need to be shielded again.

3. Restoring the factory settings will clear the scan record.

7.2.6.8. Date & Time setting

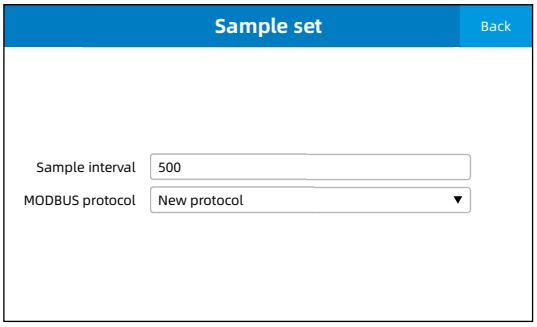
The time of the device has been calibrated at the factory. After the power is disconnected, the system time is kept in normal operation by the button battery of the motherboard.

After the button battery is exhausted, please go to the following interface to calibrate the time when replacing the battery.



7.2.6.9. Sample set

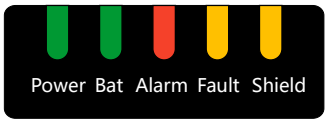
The system supports user-defined sampling. By changing the sampling interval, it can adapt to complex communication environment such as long distance, multiple detectors or LoRa, and improve communication. Compatible with old and new MODBUS protocols.



The default sampling interval is 200ms (200 to 60000ms is optional).
Please set the sample interval to be above 1000 when communicating via LoRa.
*[Reset setting] will reset this function.

8. Alarm and Prompt

8.1. Alarm



The alarm channel is automatically placed at the first channel on first page of the monitor interface. When an alarm occurs, user need to manually turn the page. After the alarm is eliminated, the automatic page turning will be restored. User can enter the [Information statistics] page and use the [Alarm Reset] function to restore the automatic page turning.

When the channel is in **low alarm**, the Alarm indicator **flashes red** to warn, and the interface of the concentration alarm channel turns **orange**, the sound (light) alarm starts to alarm, and the associated relay responds to the output.

When the channel is in **high alarm**, the Alarm indicator **fast flashes red**, the interface of the concentration alarm channel turns **red**, the sound (light) alarm starts to alarm, and the associated relay responds to the output.

When the channel **faults**, the Fault indicator turns **orange** and stays on to warn. At the same time, the interface of the alarm channel turns **gray**, the sound (light) alarm starts to alarm, and the associated relay responds to the output. When this warning appears, please check whether the detector or the circuit is abnormal.

Clear alarm: After an alarm or fault occurs, user can press the "clear alarm" button to temporarily silence the alarm sound, user can press it again to restore the alarm. After the function is activated, the interface will display the following red mute icon. When an alarm and a fault occur at the same time, activate the function, and the "Alarm + Fault" indicator on the control panel will flash at the same time.

*After all channels return to normal state, the "Clear alarm" function will be automatically closed, the mute icon will disappear and system automatic alarm turn on.

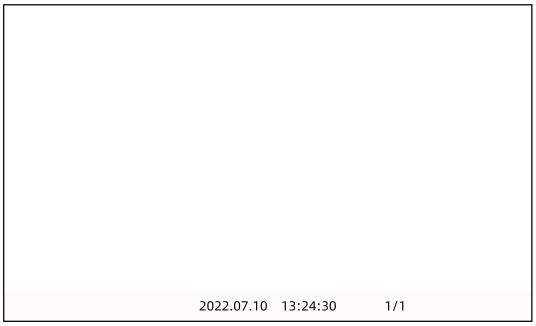
8.2. Prompt

When the following prompts appear, please follow the prompts.

8.2.1. Monitor interface

When there is a blank interface, it means that there is no device has been input.

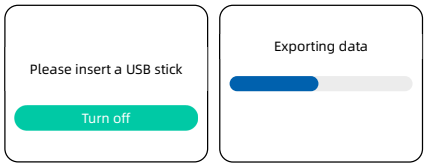
Press "Home page" button, go to menu interface →go to System setting Address After confirming that the device is connected, click the "Scan" button. After scanning, the system will display the device information.



8.2.2. Storage settings interface

This prompt is displayed when operating data export.

If the U disk is not detected, it will prompt to insert the U disk; after the U disk is correctly identified, "Exporting data" will be displayed when the export action is performed, and the prompt window will be automatically closed after the export record is completed. During the export process, it is forbidden to pull out the U disk, otherwise the U disk will be damaged.



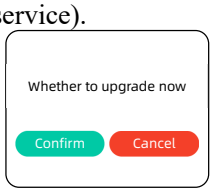
8.2.3. Reset setting interface

Showing this prompt is because this operation is irreversible: all settings and event records will be cleared! Please operate with caution.

8.2.4. Firmware upgrade interface

This prompt will show up when user is operating firmware upgrade.

During the upgrade process, please avoid the situation of power failure and unplug the U disk (the equipment damage caused by this is not within the scope of warranty service).



9. Attached table

9.1. Permission reference table

User	Function Menu
Operator	Information Query, Clear Alarm Button, Inhibit (Single Channel), Event View, Firmware Upgrade, Storage Setting, Language Setting, Date & Time Setting, Sample Set, Self-check
Maintenance Engineer	Include The Operator Menu, Parameter Configuration, Relay Configuration, 4-20mA Output Setting, Wireless Setting, Delete History Data, Address Scan, Reset Setting, Channel Shield Etc.

9.2. Password validation

User Type	PASSWORD
Operator	1234
Maintenance Engineer	Please contact manufacturer.

9.3. LED/Buzzer status

LED	Device Status	Indicator Status	Buzzer
Power	Main power normal	Green indicator	-
	Main power undervoltage or abnormality	Red indicator	alarm
Bat	The main power is normal and the battery is fully charged	off	-
	The main power is normal and the battery is charging	Green indicator flash	-
	The main power is normal, but the battery is abnormal (not connected, low power)	Red indicator	alarm
	The main power is abnormal, and the backup power is activated	Green indicator	alarm
Alarm	Normal concentration	off	-
	Low alarm/ High alarm	Red indicator flash (slow/fast)	alarm
Fault	Main power, backup power, sensor fault	Yellow indicator	alarm
	No fault	off	-
Shield	Any channel shielded	Yellow indicator	-
	No channel shielded	off	-
LED			
Alarm Fault	Alarm and fault occur at the same time After [Clear Alarm]	(Red + Yellow) indicator flashing simultaneously	-

*"-" means no sounds.

9.4. Reference standards

The product design complies with the following standards: GB16808-2008 Combustible gas control panel.

10. Common faults and Troubleshooting

Common Fault

Fault	Possible Situations	Troubleshooting
No gas on monitor interface	The sensor information is not scanned	Execute [Address scan] to input the connected sensor information
Unable to scan sensor Monitor interface channel display **shedding**	1) RS485 cable is reversed 2) Device address conflict 3) The backup power is insufficient 4) The detector is under load 5) The cable is disconnected or there is no power	1) Check the RS485 cable 2) Check the detector device (offset) address 3) Use mains power supply 4) Check whether the detector cable is properly connected, the power supply is normal, and the common ground terminal is normal 5) Check if the cable or power supply is well connected
Alarm without sound (Interface alarm, indicator flashes)	The sound alarm is not connected	Check whether the mainboard sound interface and the alarm are well connected
	Sound alarm damaged	Contact manufacturer
	1) The "Clear alarm" function has been activated 2) The "Inhibit" function has been activated	1) Press the "Clear Alarm" button on the control panel. 2) Long press the channel on the monitor interface to open the channel parameter configuration and confirm that "Inhibit" is not checked.
No display after power on	The power switch is not turned on	Turn on the power switch on the right side of the chassis
	The cable is not connected properly	Check whether the power cable is connected correctly
	Motherboard damage	Contact manufacturer
4~20mA configuration test no output	Current output not configured correctly	Reconfiguration
	Ammeter damaged	Replace the ammeter
	The ammeter is not correctly connected to the GND and 4~20mA/OUT interfaces	Reconnect the interface to test (Do not connect an ammeter to other ports.)
Buttons and interface operations are unresponsive	Touchpad cable fault	Reconnect or contact the manufacturer to replace the connection line
	System fault	Press the reset button on the motherboard
System time is inaccurate	The button battery is power off	Replace the button battery
The backup power is not enabled when the main power is disconnected	Circuit fault	Contact manufacturer

Fault Details

System Message	Possible Situations	Troubleshooting
Main power disconnected	Commercial power circuit or power supply fault	Check power supply line facilities
Current overload	There are metal debris in the chassis	Cleaning the chassis
Battery fault	1) The battery is not connected or is damaged 2) The backup power circuit board is damaged	1) Connect the battery or replace the battery 2) Contact manufacturer
Low battery alarm	The power supply of the detector/control panel is unstable	Check the power supply lines of related device
Anti-theft alarm	The detector has been dropped or moved	Check the detector
Sensor communication abnormality alarm	Connection fault between detector and control panel	Check the connection cables
Fall alarm	There may be personal distress events.	**Please take it seriously and arrange personnel to eliminate the danger and carry out rescue.**
Calibration expired	-	Recalibrate the detector in time
Sensor Expired	-	Replace the sensor in time
Sensor fault	The sensor is loose or damaged	Check the sensor connection or replace the sensor
Air pump fault	Air pump blockage	Check the gas line
Shedding	Device offline	Refer to the table above
Unknown (etc.)	-	-

11. After-sales service

Warranty Commitment

The company promises that all the equipment that leaves the factory will be calibrated. After purchasing the company's products, users do not need to perform the calibration operation unless there are special circumstances, and the operation must be carried out under the guidance of professional technicians. All purchases through our distributors will provide you with a twelve-month warranty service from the date of purchase.

The company promises only the mainframe, excluding accessories. During the service period, if under normal use and maintenance conditions (non-human factors), the fault occurs due to the problem of the product itself, after our inspection is true, you will receive our free service for you.

Repair time commitment

The repaired device or new device will be ready for shipment within 7 working days. In case of special circumstances, if it cannot be ready within 7 working days, we will call in advance to inform and negotiate a new date.

Limited Liability Warranty

Products returned to the factory for repair will continue to have the previous warranty period.

When you need warranty service, please present a valid warranty certificate, including warranty card and invoice or contract.

When the situation listed in the warranty description is not covered by the warranty, you can choose paid maintenance services.

If the repaired parts exceed the free warranty period, please pay the fixed maintenance service fee. The standard of the maintenance service fee is provided by our maintenance organization.

We have the right not to provide warranty service for product damage caused by the following circumstances:

1. Human-induced damage.
2. Damage caused by violation of operating regulations and requirements.
3. Damage caused by all natural disasters such as floods, fires, etc.
4. Damage caused by bad use environment.
5. The product is repaired, altered, modified or disassembled by unauthorized service personnel.