Proportional adjustment control high-power isolation amplifier

Electro-hydraulic valve proportional valve linear adjustment control isolation amplifier: SY / ISO series

Features

- Low cost, small size, accuracy and linearity error level: 0.5
- PWM/4-20mA/0-10V/0-5KHZ/0-5KΩ/speed/displacement/
- Pressure/flow/temperature and other sensors/transmitters/PLC analog input.
- 3.0-100mA/0-500mA/0-1A/0-2A/0-3A and other linear current output
- Signal input and output 3000VDC anti-interference isolation protection
- Auxiliary power supply: 24VDC (18~36VDC) wide range single power supply
- The auxiliary power supply and the signal output terminal share the same ground output, which is convenient for on-site control and use
- Power reverse connection protection, signal output built-in self-recovery over-current protection circuit
- Standard DIN rail installation, industrial temperature range：- 40 ~ + 85 ℃

Typical application

- Industrial field analog quantity isolation amplification and proportional adjustment control
- Current signal amplification or voltage signal drive capability enhancement
- Linear drive control of stepping motor, solenoid valve, proportional valve
- PID output analog high current linear power amplifier control
- Electromagnetic driver or high-power load linear control
- Analog signal ground wire interference suppression and isolation acquisition and transmission
- Signal distortion-free remote analog transmission control and transmission
- PLC/DCS analog power proportional adjustment control and transmission

Summarize

SunYuan The proportional adjustment control high-power isolation amplifier is composed of a variety of analog isolation amplifier circuits and high-precision power amplifier circuits. It is mainly used in proportional valves, precision thermostats, electric flow control valves, precision electromagnetic displacement meters, etc., which require high-power loads. For precise drive control occasions.The product adopts the standard DIN35 rail installation method, which can simulate various sensors, transmitters, and PLC outputs such as PWM/4-20mA/0-10V/0-5KHZ/0-5KΩ/speed/displacement/pressure/flow/temperature Isolate and amplify the power, output 0-100mA/0-500mA/0-1A/0-2A/0-3A and other linear high-precision analog large drive currents.

The product design is small in size, simple in structure, low cost and high in reliability, and is suitable for industrial sites at-40 ~ + 85 ℃. Widely used in electro-hydraulic proportional valves, CNC machine tools, robots, engineering vehicles, shipbuilding, petrochemicals, water industry, hydraulic transmission, industrial automation and other fields。

Model and definition **（DIN: Indicates the product standard DIN 35 rail installation; 1X1: Indicates that a single channel signal enters and exits）**

DIN 1X1 ISO(SY) U(A)□ -P□ -□A

Signal input & output isolation selection

ISO：Signal input and output isolation

S Y： Signal input and output non-isolated

input signal *

U1： 0-5V A1：0—1mA

U2：0-10V A2：0—10mA

U3：0-75mV A3：0—20mA

U4：0-2.5V A4：4—20mA

U8：customized A8：customized

Auxiliary power

P：DC24V （18~36VDC wide volt range ）

Output signal

1A： 0-1A(max 35Ω) 2A： 0-2A(max 10Ω) 3A：0-3A(max 4.5Ω)

* Input signal classification description

1、**Z-W：RTD signal Input**

2、Thermal resistance type

Z1: Pt100 Z2: Pt10 Z3: Cu100 Z4: Cu50

Input temperature range

W1: -20-100℃ W2: 0-100℃ W3: 0-150℃ W4: 0-200℃ W5: 0-400℃ W8: customized

2、PWM：Pulse width modulation signal input

D1：50Hz-99Hz PWM signal input D2：100Hz-0.9KHz PWM signal input D3：1KHz-9KHz PWM signal input D4：10KHz-19KHz PWM signal input D5：20KHz-50KHz PWM signal input D8：customized

3、AC：AC signal input

Input the rated voltage AC：0~1Vrms

4、R：Electronic ruler, displacement signal input

R1：0-50Ω R2：0-100Ω R3：0-200Ω R4：0-500Ω
R5：0-1KΩ R6：0-2KΩ R7：0-5KΩ R8：customized R9：0-10KΩ

5、RMS：True RMS signal input

200RMS：0-200mV； 1000RMS：0-1000mV

6、F：Frequency signal input

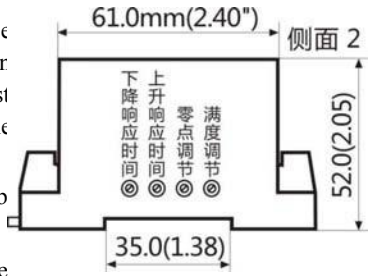
F1：0-1KHz F2：0-5KHz F3：0-10KHz F8：customized

Product selection example

Example 1: Input and output isolation type; Input signal: 4-20mA; Output signal: 0-3A, max 4.5Ω; Auxiliary power supply: 24VDC Model Number： DIN 1X1 ISO A4- P-3A

Example 2: Input and output non-isolated type; Input signal: 0-1KHz; Output signal: 0-2A, max 10Ω; Auxiliary power supply: 24VDC Model Number: DIN 1X1 SY F1-P-2A

Potentiometer adjustment instructions



The user can tell us the field application parameters before ordering the product, so that it can be adjusted and sealed according to the technical requirements before leaving the factory. As shown in the figure: the four multi-turn potentiometer knobs on the side of the housing, turn clockwise to adjust to decrease, and counterclockwise to increase.**Zero point calibration adjustment:**Given the minimum input signal, adjust the potentiometer knob to make the output current zero.

Full scale calibration adjustment： Given the maximum input signal, adjust the potentiometer knob so that the output current is the maximum.

Rising edge response time： Connect the wave generator to both ends of the output load, adjust the potentiometer, and observe the rising edge time of the waveform.

Falling edge response time: Connect the oscilloscope to both ends of the output load, adjust the potentiometer, and observe the falling edge time of the waveform.

General parameters

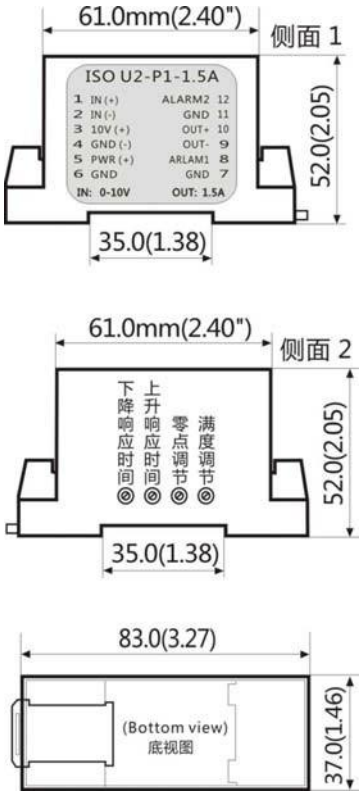
Precision	------- 0.1% 0.2% 0.5%	Response time	------- ≤300mS
Auxiliary power	------- DC24V，±10%	Product power consumption	------- < 40W
input signal	Voltage/Current/Frequency/PWM/Displacement/Pt100	Temperature drift	------- 200ppm/℃
load capacity	------- < 40W	isolation	--- Signal input / signal output
Operating temperature	------- -40 ~ +85℃	Insulation resistance	------- ≥20MΩ
Working humidity	------- 10 ~ 90% (No condensation)	Withstand voltage	Signal input / signal output 2500VDC，1 minute, leakage current 1mA
storage temperature	------- -45 ~ +80℃		
Storage humidity	------- 10 ~ 95% (No condensation)	Impulse withstand voltage------- 3KV， 1.2/50us(Peak)	

Electrical parameters

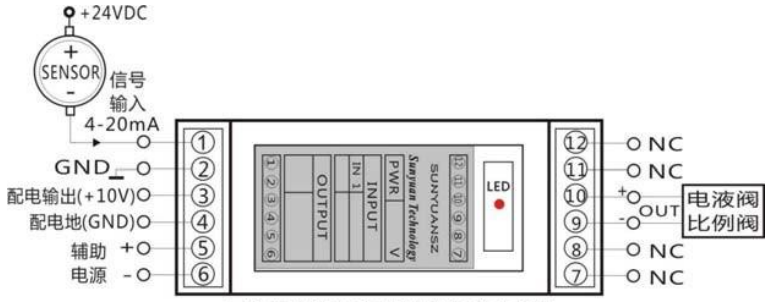
voltage	24VDC Nominal value	Power consumption	< 40W
Power supply voltage range	18VDC-36VDC	Response time	Internal adjustable rise/fall time 0.02-5S
Maximum output current	1A / 2A / 3A	Insulation resistance	≥20MΩ
input signal	0-10V/0-5V/4-20mA/0-5KHz	Operating temperature	-40~+85℃
Output load impedance	2.2-30Ω	Storage humidity	10 ~ 95% (No condensation)
Dither frequency	200Hz	storage temperature	-55 ~ +85℃
Temperature drift	0.3mA/℃	size	83*37*51（mm）

Dimensions and pin definition （The product brand model is printed on the shell）

Pin	Pin function	
1	Signal IN+	Input signal positive terminal
2	Signal IN-	Input signal negative terminal
3	+10V	Power distribution output positive terminal
4	GND	Distribution output ground
5	Power +	Auxiliary power positive terminal
6	Power -	Auxiliary power negative terminal
7	NC	Empty feet
8	NC	Empty feet
9	Out-	Output signal negative terminal
10	Out+	Positive terminal of output signal
11	NC	Empty feet
12	NC	Empty feet

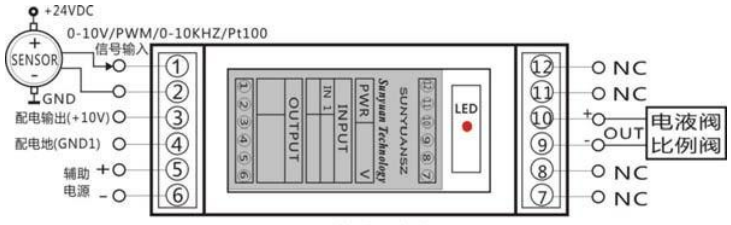


Typical application



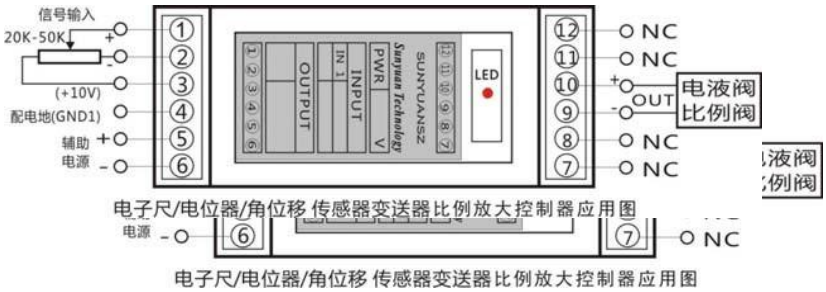
电液阀比例调节控制器典型应用图

Application 1: 0-10V/PWM/0-10K/Pt100/0~1Vrms/RMS and other sensor transmitter signal direct input application mode.In this application mode, the signal input, signal output and auxiliary power supply are isolated from 3000VDC.



0-10V/PWM/0-10KHZ/Pt100 传感器变送器比例放大控制器应用图

Application 2: Application module's own power distribution output 10VDC, and external resistance or potentiometer to form an electronic ruler or bridge input application mode.In this application mode, the signal input ground (GND) and the power distribution output ground （GND1）It is connected to the common ground. Therefore, the signal input and signal output are separated by 3000VDC.



电子尺/电位器/角位移 传感器变送器比例放大控制器应用图

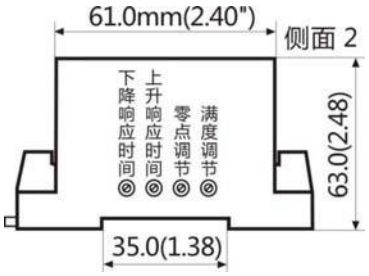
Intelligent proportional valve display control transmission table (intelligent electro-hydraulic valve display control table)

SunYuan DIN 1X1 ISO（SY）□-P-A-（LED1） series proportional zoom display control transmission meter adopts an intelligent design and has a variety of functions that traditional products do not have. The intelligent transmission meter can convert the standard analog quantity into a 0%-100% duty cycle output and display the analog quantity as a decimal digital quantity corresponding to the set range linearly. This kind of embedded intelligent digital display meter adopts two key combination operation, which is controlled by the central processing unit CPU, which can realize the setting of various parameters such as zero point, full scale, decimal point, alarm, delay, etc., with strong flexibility And practicality. Two multi-function boards with basic functions and extended functions are embedded in the intelligent transmission meter. The output of this product is mainly designed for electro-hydraulic valves and proportional control valves, as well as linear and high-precision analog large-drive current devices in the industrial field. The product is normal. Not only can output 0-100mA/0-500mA/0-1A/0-2A/0-3A and other linear high-precision analog large drive currents after electricity, but also can display the closing degree of the electro-hydraulic valve in real time, which is practical and intuitive Strong sex. The internal integration process and new technology isolation measures enable the device to achieve 3KV isolation voltage and industrial-grade wide temperature, humidity, and vibration on-site harsh environment requirements. This new generation of low-cost, small-volume, multi-functional intelligent isolation transmitter instrument has multiple functions such as industrial field signal conversion, anti-interference isolation, display control, etc., and is widely used in electro-hydraulic valves, proportional valves, and hydraulic drives. , CNC machine tools, robots, engineering vehicles, shipbuilding, petrochemical, water industry, hydraulic transmission, industrial automation and other fields are widely used.

DIN 1X1 ISO (SY) □-P-A- (LED1) products are mainly used in applications that require precise drive control of high-power loads, such as proportional valves, precision thermostats, electric flow control valves, and precision electromagnetic displacement meters. The product adopts the standard DIN 35 rail installation method, which can output various sensors, transmitters, and PLCs such as PWM/4-20mA/0-10V/0-5KHZ/0-5KΩ/speed/displacement/pressure/flow/temperature etc. The analog quantity is isolated and power amplified, and it outputs 0-100mA/0-500mA/0-1A/0-2A/0-3A and other linear high-precision analog large drive currents. At the same time, it has the function of real-time display control. The embedded digital display meter is used to measure the input voltage and current signals. Because the signals correspond linearly, it can indirectly display the physical quantities that users want to monitor, such as the speed of the motor, the degree of closure of the valve, the flow rate of the liquid level, etc., and also With output alarm control function. The number displayed by its embedded smart digital display is not a direct signal measurement value, but a preset value of the signal. The zero point and full scale value of the measured signal are displayed linearly with respect to these two preset values by setting. For example: signal input 4-20mA, 4mA is set to 0, 20mA is set to 8000, then when 8mA is input, the meter will display 2000, and when 12mA is input, the meter will display 4000; another example is 4mA is set to 1000, 20mA is set to -1000 , The meter will display 0 when 12mA is input, and -500 when 16mA is input. The maximum display range of the digital display is 9999, which is four digits; the minimum is -1999. It has an alarm function, with two-way isolated switch output, which can be displayed, controlled and alarmed on the spot. The two set alarm points have positive and negative alarm direction settings. The alarm object of the alarm point is for the display reading, the last decimal point of the LED panel flashes when the alarm is triggered, and the alarm information is isolated and output the alarm signal through the digital optocoupler. For products that need to set the alarm function, the upper or lower limit alarm value and alarm mode can be modified by the programmer. For detailed setting methods, please refer to the "Transmission Table Software Setting Instructions" on the following page.

Remarks: The alarm signal is OC gate (open collector) output. For specific application methods, please refer to the description of [Alarm Output and Application] on the next page.

Smart product pictures and potentiometer adjustment instructions



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Zero point calibration adjustment：Given the minimum input signal, adjust the potentiometer knob to make the output current zero.

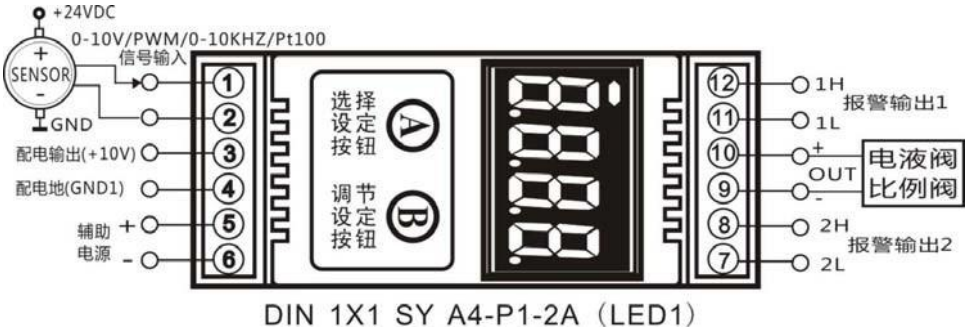
Full scale calibration adjustment： Given the maximum input signal, adjust the potentiometer knob so that the output current is the maximum.

Rising edge response time： Connect the oscilloscope to both ends of the output load, adjust the potentiometer, and observe the rising edge time of the waveform.

Falling edge response time： Connect the oscilloscope to both ends of the output load, adjust the potentiometer, and observe the falling edge time of the waveform.

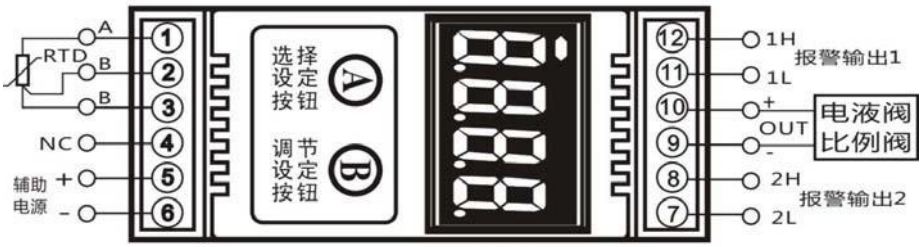
Typical application diagram of smart products

1、Sensor analog signal input, output 0-2A (max 10Ω) linear drive current, and has a display control function.



DIN 1X1 SY A4-P1-2A（LED1）

2、Temperature sensor (Pt100) analog signal input, output 0-3A (max 4.5Ω) linear drive current, and has a display control function.

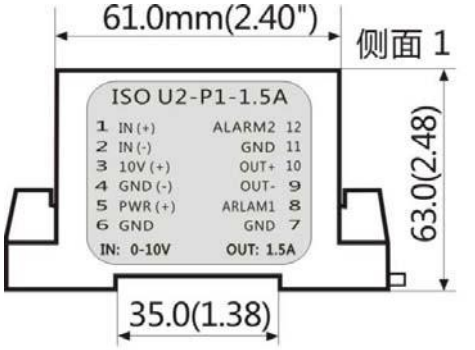


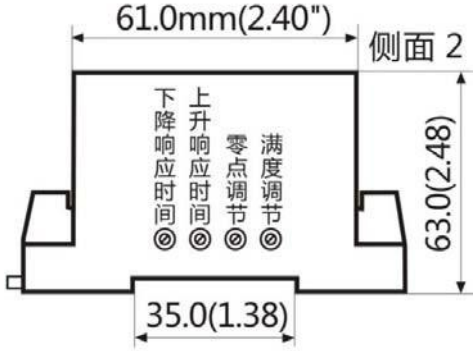
DIN 1X1 ISO Z1-W4-P1-3A (LED1)

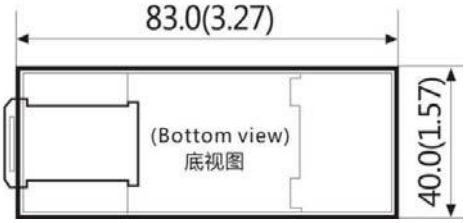
Intelligent product size and pin function description

（The product brand model is printed on the shell）

Pin	Pin function	
1	Signal IN+	Input signal positive terminal
2	Signal IN-	Input signal negative terminal
3	+10V	Power distribution output positive terminal
4	GND	Distribution output ground
5	Power +	Auxiliary power positive terminal
6	Power -	Auxiliary power negative terminal
7	Alarm2	Alarm output 2 (low level)
8	Alarm2	Alarm output 2 (high level)
9	Out-	Output signal negative terminal
10	Out+	Positive terminal of output signal
11	Alarm1	Alarm output 1 (high level)
12	Alarm1	Alarm output 1 (low level)



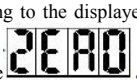




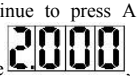
Smart product LED digital display meter debugging instructions

After the input signal is connected to the instrument, it enters the power-on state self-test, and the start-up logo interface appears  , Then enter the measurement display state.

①Zero point setting（Set when the loop current is 4mA input）

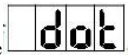
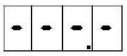
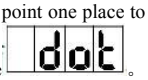
Press A+B to display the zero setting interface  , Press A+B again to enter the zero setting, the interface displays the current set value  , At this time, the last digit flashes, press A. The four-digit digital tube flashes alternately, and the flashing digit is the adjustment digit. Press B to change the value of the blinking digit cyclically from 0-9 (the first digit on the left changes cyclically from " - ; -1; 0-9"), so as to set each digit according to the displayed value (Note: the display value range at 4mA is -1999 ~9999, the factory default is "0.0"). After setting, press A+B to confirm and return to the interface  。

②Full scale setting（Set when the loop current is 20mA input）

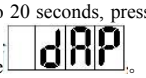
Continue to press A to enter the full scale setting interface  , Press A+B to enter the full scale setting, the interface displays the current set value  ,

（Note: The display value range at 20mA is -1999～9999, the factory default value is "200.0"). The rest of the operation is the same as ①, after setting, press A+B to confirm and return to the interface  。

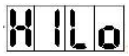
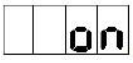
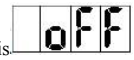
③Decimal point setting

Continue to press A to enter the decimal point setting interface  , Press A+B to enter the current setting value interface  , Press B to move the decimal point one place to the left , Press B continuously to move the decimal point to the left in a circle, after setting, press A+B to confirm and return to the interface  。 

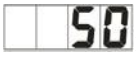
④Damping time

Continue to press A to enter the damping time setting interface  , Press A+B to enter the current setting value interface  , The damping time can be set from 0 seconds to 20 seconds, press A value ↓, press B value ↑, when setting, the value will increase in multiples of 0.5s, after setting, press A+B to confirm and return to the interface  。

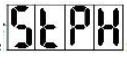
⑤Alarm switch setting

Continue to press A to enter the alarm switch setting interface  , Press A+B key to enter the alarm switch setting, display the current set value  , Indicates that the following alarm settings are not effective. Press A or B to switch to  , It means that the following setting alarm parameters are effective. No matter what the situation is, the alarm is indicated by the last flashing point. After setting, press A+B to confirm and return to the menu. The factory setting is  。

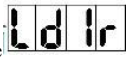
⑥The first alarm point setting

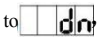
Continue to press A to enter the first alarm point setting interface  , Press A+B key to enter the current set value of the first alarm point  ,At this time, the first digit on the left flickers, press A and the two-digit digital tube will flicker alternately, the flickering digit is the adjustment digit, and the flickering digit will change cyclically from 0 to 9 by pressing B. In this way, the zero point of the alarm will be set according to the displayed value (Note: The alarm setting value indicates the percentage of the input current signal, for example, it is set to  Indicates that the alarm zero point is (20mA-4mA)*50%+4mA=12mA. When the input current is greater than or less than 12mA (determined by the alarm direction setting, greater or less than), the single-chip microcomputer outputs an alarm signal to drive the optocoupler, which is externally connected to the meter. The alarm device sends out an alarm (the alarm function is customized according to customer requirements). After setting, press A+B to confirm and return to the menu.

⑦Second alarm point setting

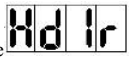
Continue to press A to enter the second alarm point setting interface  , The setting method is the same as ⑥, after setting, press A+B key to confirm and return to the menu.

⑧The first alarm point alarm direction setting

Continue to press A to enter the first alarm point alarm direction setting interface  , Press A+B key to display the current set value  , Indicates that the value changes from low to high and alarms. For example, set the alarm zero point to 12mA. When the input current rises from 4mA to more than 12mA, it will alarm. When the input current drops from 20mA to less than 12mA, it will not alarm.

Press B to switch to  Indicates that the value changes from high to low to alarm. For example, set the alarm zero point to 12mA. When the input current rises from 4mA to more than 12mA, it will not alarm. When the input current drops from 20mA to 12mA, an alarm signal will be issued. When the input current returns to the current value before the alarm state, the alarm state is released. After setting, press A+B to confirm and return to the menu. (Note: The last decimal point of the LED display panel flashes when alarming, indicating that it is currently in alarm state)

⑨The second alarm point alarm direction setting

Continue to press A to enter the second alarm point alarm direction setting interface  , The adjustment method is the same as ⑧, after setting, press A+B key to confirm and return to the menu.

⑩Alarm delay time setting

Continue to press A to enter the alarm delay time setting interface  , Press A+B key to display the current set value  , The alarm delay time can be set from 0 to 30s, press A value ↑, press B value ↓, when setting, the value will increase in multiples of 1s. After setting, press A+B to confirm and return to the menu. (Note: When set to 0, it means no delay. After the delay is set, when the alarm condition is met, it will not immediately alarm. Instead, the displayed value will continue to meet the alarm condition for several seconds before entering the alarm state. When the display returns to the non-alarm value The alarm state will be released without delay.)

Continue to press A to return to the display measurement interface and end all settings.

4mA and 20mA calibration (this menu setting needs to be cautious)

Input 4mA signal to the meter, and press button A at the same time and hold it down until the digital display shows  , Release the button for 3S, then press the A button, the digital display shows  , At this time, the current input 4mA current signal sampling has been saved as a standard. Change the signal input to 20mA,

Press the A key, the digital display shows  , After 3S, press the A key, the digital display shows  , At this time, the current input 20mA current signal sampling has been saved as a standard. Press the A key again to return to the measurement state.

LED digital display meter setting example

When the AD digit of the IC measurement limit is exceeded or the displayed value is greater than 9999 and lower than -1999 without a decimal point, an over-range display will appear.

If it exceeds the limit of IC measurement AD bit (4-20mA calibration)

0 is displayed for 4mA, 2000 is displayed for 20mA, oLL is displayed when 3.01mA is input, and oHH is displayed when 26.01mA is input

2000 is displayed for 4mA, 0 is displayed for 20mA, oLL is displayed when 3.01mA is input, and oHH is displayed when 26.01mA is input

The displayed value is greater than 9999 and lower than -1999 without decimal point:

4mA displays 0, 20mA displays 9999, when 20.01mA is input, because there is no decimal point that can be shifted, it displays oHH

4mA displays -1999, 20mA displays 5000, when input 3.99mA, because there is no decimal point to do shift, so it displays oLL

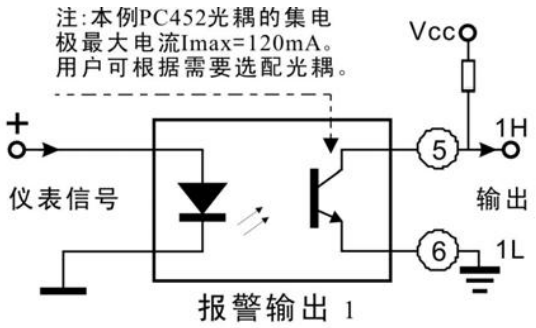
Input Current	Output display	Linear correspondence
4-20mA	0.0～800.0	Input 4mA corresponding display: 0.0 Input 8mA corresponding display: 200.0 Input 12mA corresponding display: 400.0 Input 16mA corresponding display: 600.0 Input 20mA corresponding display: 800.0
4-20mA	800.0～0.0	Input 4mA corresponding display: 800.0 Input 8mA corresponding display: 600.0 Input 12mA corresponding display: 400.0 Input 16mA corresponding display: 200.0Input 20mA corresponding display: 0.0

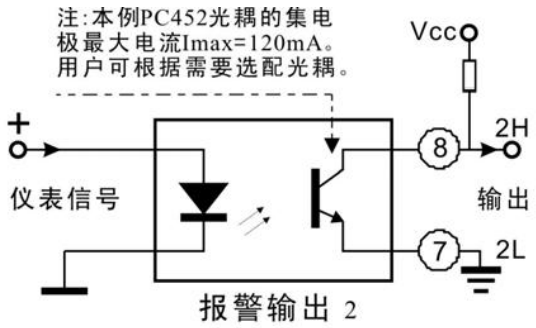
4-20mA	-100.0～100.0	Input 4mA corresponding display: -100.0 Input 8mA corresponding display: -50.0 Input 12mA corresponding display: 0.0 Input 16mA corresponding display: 50.0 Input 20mA corresponding display: 100.0
4-20mA	100.0～-100.0	Input 4mA corresponding display: 100.0 Input 8mA corresponding display: 50.0 Input 12mA corresponding display: 0.0 Input 16mA corresponding display: -50.0Input 20mA corresponding display: -100.0

Alarm output and application

1. The DC level signal generated by the two alarm signals in the main CPU chip is isolated and output by the optocoupler. The output low level indicates the alarm state, and the output high level indicates the non-alarm state.

2. Because the display controller works in a passive two-wire system with a minimum operating current of 3mA, the alarm signal is also very weak, with a minimum of 0.5mA. The signal is isolated with the help of a phototransistor photocoupler with strong current expansion capability, and an open collector (OC gate) output is adopted. The output is connected to the pull-up voltage, and the maximum current can be expanded to 120mA. The principle of this phototransistor photocoupler is shown in the following figure: the instrument signal in the figure is isolated by optocoupler, ⑤, ⑥ "1H /1L", ⑦, ⑧ "2L /2 H" wiring ports are optocoupler OC gates The signal output terminal is connected to the external power supply circuit of the instrument to further amplify and increase the alarm signal, and finally it can drive the required sound, light, electricity, refrigeration, heating, motor and other actuators. ⑤, ⑥ "1H /1L" is the first alarm output, ⑦, ⑧ "2L /2 H" is the second alarm output, "1H" and "2H" are connected to the collector of the photosensitive transistor, "1L", "2L" "Connect the emitter.





3. Due to the limitation of the maximum current of the phototransistor Ic, its current expansion and drive load capacity are limited. If users need more drive current to drive relays, solenoid valves, stepping motors and other devices on site, they can connect external power expansion circuits by themselves (Power amplifier tube or servo circuit) for expansion and amplification processing or special customization.

Order selection instructions

Please read the entire contents of this manual carefully before ordering to make sure whether this product meets the user's on-site application and correct selection.

1. The factory default value of this product: 4mA current display "0.0", 20 mA display "200.0" setting.

2. It is best for users to put forward the display specification requirements when placing an order. We will adjust the digital display before leaving the factory, so that it is convenient for users to use directly.

3. The type and parameters of the connected signal must be indicated when ordering: AC, DC, resistance (displacement, potentiometer), bridge (pressure, weighing), etc.