Active load two-wire system 4-20mA current loop display control isolation conditioner

4-20mA active signal control PLC/DCS current loop active load Display control table: DIN 1X1 ISO 4-20mA-E (LED1)

Features

●High-precision and intuitive display of the input loop current value, which is convenient for on-site debugging and monitoring

●Four-digit LED digital display, high precision, display resolution ±2 characters at the end

●Programmable setting of two-way lower limit isolated switch alarm signal output

●4-20mA current input and output precision is high, precision grade: 0.1 grade, 0.2 grade

●Non-linearity in full range <0.2%

●Active 4-20mA signal acquisition voltage (5 ~ 32V) ultra-wide range input

●Signal input and output 3KVDC high isolation

●Active signal input and output can control the active load in the current loop loop

●No need for external power supply, two-wire signal loop power supply output mode

●Frequency response (small signal bandwidth): 100HZ (Io=20mA)

●Low cost, small size standard DIN35 rail type installation

●Industrial temperature range:-25℃ ~ + 70℃

Typical application

●Two-wire active load signal matching and control

●Signal acquisition and isolation between PLC/DCS channels to prevent interference

●Ground circulating current isolation and interference suppression

●Reliable sending and receiving monitoring between instrument signals and sensors

●Analog data acquisition isolation and long-line distortion-free transmission

●Monitoring and isolation barriers for electrical instruments, medical equipment

●The sensor signal matches the analog input and output interface

●Sensor 4-20mA acquisition isolation, conditioning and transmission

●Industrial equipment operation measurement, monitoring and remote control

●Petrochemical, environmental protection, and mining system control point monitoring

●Temperature, pressure, flow, liquid level signal monitoring display

●Display of working status of sensors and transmitters

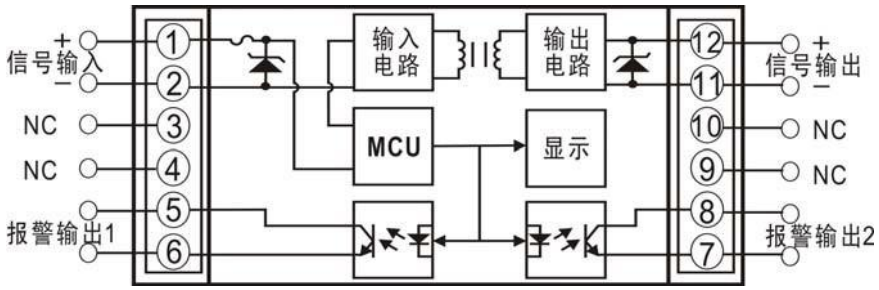
Summarize:

SunYuan DIN1X1 ISO 4-20mA-E (LED1) is an intelligent two-wire active sensor 4-20mA signal display control isolation conditioner, which can converter the input active 4-20mA current signal into an isolated passive control signal output , control two-wire power supply (explosion-proof mode)4-20mA current loop . The sensor signal acquisition is matched with the active load of the analog input interface , which effectively solves the problem of the power conflict between the acquisiton of the active 4-20mA current signal and the receiving port of the two-wire current loop power supply loop. Using low-power loop power stealing technology, the product does not require independent power supply . It integrates display , alarm , isolation ,conditioning and transmission. The product contains current signal modulation and demodulation circuit,signal coupling isolation conversion circuit, display and alarm control circuit . Wait, the small input equivlent resistance enables the IC to collect the voltage value of the current signal from the sensor output loop to an ultra-wide range(5-32VDC)to meet the needs of users without external auxiliary power supply to achieve long-distance signal transmission without distortion needs.It is convenient for signal matching measurement, remote transmission, isolation ,display and other functions . The internal integration process and new technology isolation measures enable the device to meet the requirements of 3KDC insulation volage and industrial-grad wide temperature, humidity , and vibration on-site harsh environments. DIN1X1 ISO 4-20mA-E(LED1) series products are very convenient to use .They adopt standard DIN35 rail-mounted design, which is convenient for users to install and use. The product can realize 4-20mA current loop isolation and signal display functions without anyexternal components.

DIN1X1 product adopts intelligent design and has a variety of functions that traditional products do not have. The product is a passive design solution that can isolate the 4-20mA analog quantity in the input loop. It will be displayed in decimal digits according to the set range linearly corrspondingly. This two-wire passive working mode does not require other auxiliary power supply, so the wiring is simple and when used, small in size, high in precision, and low in cost. The traditional embedded analog display meter is adjusted by a potentiometer, an d the adjustment parameters are single, inflexible, and greatly affected by temperature. Compared with the traditional analog display meter, thi s intelligent digital display meter adopts a combination of two keys for operation, which is controlled by the central processing unit CPU, whic h can realize the setting of various parameters such as zero point, full scale, decimal point, alarm, and delay. , With strong flexibility and practi cality. The digital display meter adopts an LED display panel, and each segment of the display panel is driven by a constant current to make th e brightness uniform in the range of 4-20mA ,and has the funtion of reverse and overcurrent protection . Product are widely used in industrial control, petrochemical,environmental protection , smart home,mining and other industrials to monitor temperature, pressure, displacement, flow ,liquid level and other physical quantity control points.

DIN 1X1 ISO 4-20mA-E (LED1) products are mainly used to solve the problem of power conflict between collecting active 4-20mA current signal and the receiving port of the two-wire current loop power supply loop, and isolate the signal for transmission and display. Its embedded digital display meter is used to measure 4-20mA signal, without external power supply, it can directly take power to measure on the 4-20mA loop signal. The displayed number is not a direct current measurement value, but the preset value of 4mA and 20mA, and the measured current value is displayed linearly with respect to these two preset values. For example: 4mA is set to 0, 20mA is set to 8000, then when 8mA i s input, the meter will display 2000, and when 12mA is input, the meter will display 4000; for example, if 4mA is set to 1000, 20mA is set to -1000, and 12mA is input , the meter will display it will display 0, and the meter will display -500 when 16mA is input ,The maximum display range of the digital display meter is 9999, which is four digits; the minimum is -1999. At the same time, it has the function of alarm signal output, with two-way isolated switch output, which can display, control and alarm on the spot. Two alarm points are set, and there are positive and negative alar m direction settings. The alarm object of the alarm point is for the display reading, the last decimal point of the LED panel flashes when alarmi ng, and the alarm information is isolated and output the alarm signal through the digital optocoupler. For products that need to set the alarm fu nction, the upper or lower limit alarm value and alarm mode can be modified by the programmer. For detailed setting methods, please refer to the "Instruction Manual for Display Meters".

Remarks: The alarm signal is output by OC gate (open collector). Please refer to the description of [Alarm Output and Application] for specific application methods.



Product principle block diagram

General Parameters:

Accuracy, linearity error level --- 0.1, 0.2

Auxiliary power supply------No

Working temperature---------- -25 ~ +70℃

Working humidity ----10 ~ 90% (non-condensing)

Storage temperature ---------- -20 ~ +70℃

Storage humidity 10 ~ 95% (non-condensing)

level return difference <0.5%

isolation Signal input and output

Insulation resistance ≥20MΩ

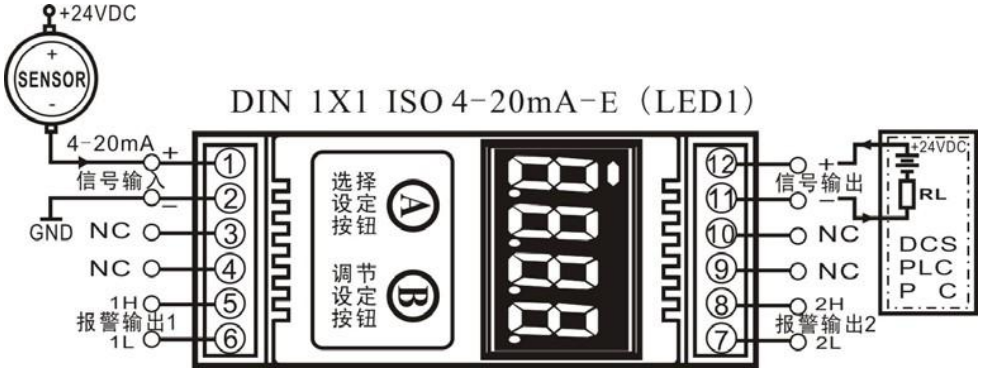
Withstand voltage ---------- 3KV (60HZ / S), leakage current 1mA

Impact resistance voltage ---------- 3KV, 1.2/50us (peak value)

Technical parameter

parameter	Test Conditions	Minimum	Typical value	Maximum	Unit
Isolation voltage DC，50Hz	10S	3000			VDC
Insulation resistance			10^{12}‖1		Ω‖Pf
Leakage current	240Vrms，60Hz		0.5		uA
Temperature drift			±50	±100	PPm/℃
Non-linearity			±0.2	±0.5	%FSK
load capacity	24VDC			600	Ω
Input overload capacity			22	24	mA
Input signal voltage range	20mA	5	24	36	V
Output signal voltage range	RL=250Ω	13	24	36	V
Output linear range		1.2		22	mA
Output current Io		0.5		24	mA
Output signal ripple	No filtering		10	20	mV/rms
Response time			20	50	mS
Frequency response (small signal bandwidth)	Io=20mA		100		Hz

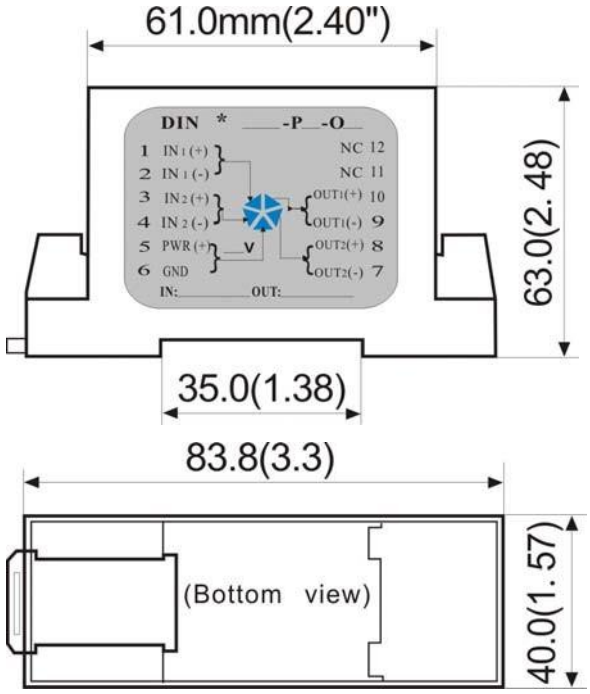
Typical application wiring diagram



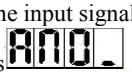
产品图片

Product size and pin function description

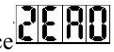
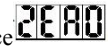
Pin	Pin function	
1	Signal IN+	Input signal positive terminal
2	Signal IN-	Input signal negative terminal
3	NC	Empty feet
4	NC	Empty feet
5	Alarm1	Alarm output 1 (high level)
6	Alarm1	Alarm output 1 (low level)
7	Alarm2	Alarm output 2 (low level)
8	Alarm2	Alarm output 2 (high level)
9	NC	Empty feet
10	NC	Empty feet
11	IOut+	Positive terminal of output signal
12	+24VDC	24V positive power supply



LED Display meter commissioning manual

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.

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

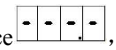
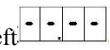
Press A+B to display the zero setting interface  ， Press A+B again to enter the zero setting, the interface displays the current set value  ， At this time, the last digit flashes, press A and the four-digit digital tube flashes alternately, and the flashing digit is the adjustment digit. Press B, the value of the flashing digit changes cyclically from 0-9 (where the first digit on the left is from " - ; -1; 0~ 9" cyclical change), so as to set each digit according to the display 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  。

②**Full 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  。

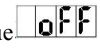
③Decimal point setting

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 point flashing. After setting, press A+B to confirm and return to the menu. The factory setting is  。

⑥**The 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 same⑥， After setting, press A+B 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 alarm

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 dn, 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 less than 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 an alarm state)

⑨The second alarm point alarm direction setting

Continue to press A to enter the second alarm point alarm direction setting interface Hd Ir, 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 dELA, Press A+B key to display the current set value 00, 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 setting the delay, when the alarm condition is met, it will not alarm immediately, but require the display value to 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.

5、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 4.00, Release the button for 3S, then press the A button, the digital display shows 0F4, 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 20.00, After 3S, press the A key, the digital display shows 0F20, 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.

Product setting selection example

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

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

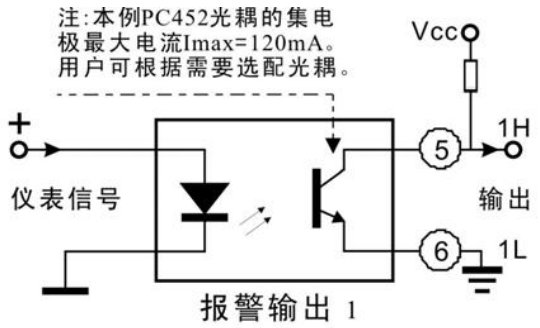
		Input 16mA corresponding display: 200.0
		Input 20mA corresponding display: 0.0
4-20mA	-100.0～100.0	Input 4mA corresponding display: -100.0
		Input 8mA corresponding display: -50.0
		Input 12mA corresponding display: 0.0
		Input 16mA corresponding display: 50.0 Input 20mA corresponding display: 100.0
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: -50.0
		Input 20mA corresponding display: -100.0

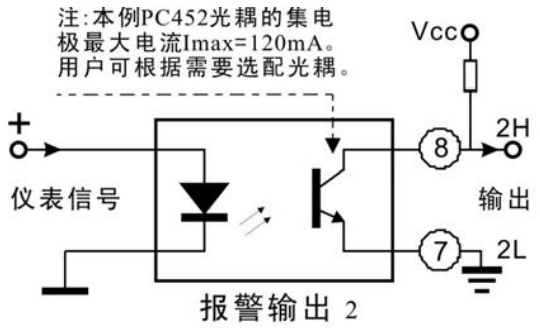
Alarm output and application

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, the minimum working current is 3mA, so the alarm signal is also very weak, the minimum is only

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 type photocoupler is shown in the figure below: 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 is set by 4mA to display "0.0" and 20 mA to display "200.0".
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. When ordering, please indicate the type and parameters of the connected signal: AC, DC, resistance (displacement, potentiometer), bridge (pressure, weighing), etc.