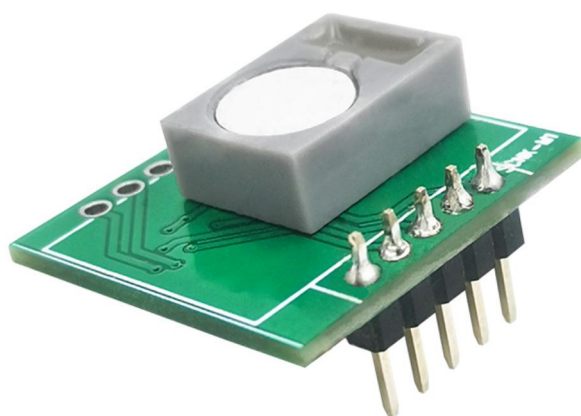


Carbon Monoxide Sensor

(model:SC16-CO)

Technical Information



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Electrochemical carbon monoxide module SC16-CO

◆ Product Description

SC16-CO electrochemical carbon monoxide module is a general-purpose, miniaturized module. The electrochemical principle is used to detect CO in the air with good selectivity and stability. The module has digital output and analog voltage output mode, which is convenient to use. SC16-CO is a general-purpose gas module designed and manufactured by closely combining mature electrochemical detection technology with sophisticated circuit design.



◆ Module features

High sensitivity, high resolution, low power consumption, long service life

High stability, good anti-interference, temperature compensation, excellent linear output

Provide UART/PWM data output, alarm output

◆ Main Application

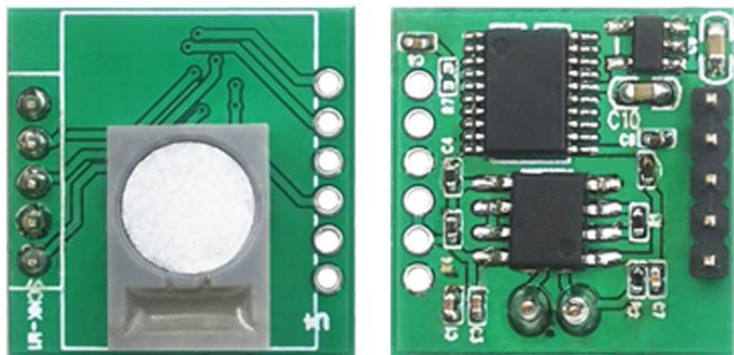
Portable instruments, air quality monitoring equipment, air purifiers, fresh air ventilation systems, air conditioners, smart home equipment, etc.

◆ Technical Indicators

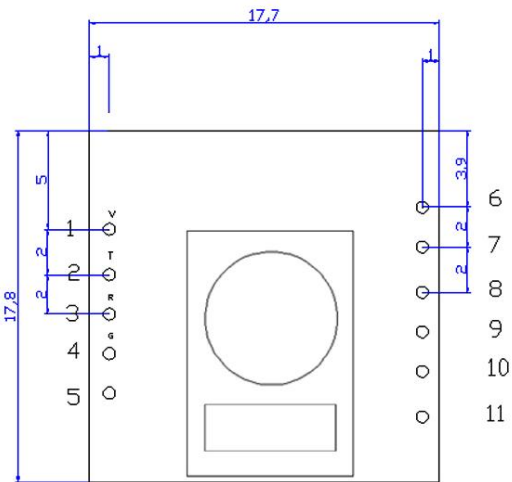
Table 1

Product Model	SC16-CO
Detection gas	carbon monoxide
Output data	UART (3.3V level) Customizable (PWM or Alarm) output
Working voltage	4.2V~5.5V
Warm-up time	≤3 minutes
Response time	≤30 seconds
Recovery time	≤30 seconds
Range	0~1000ppm(extendable to 2000)
Resolution	≤1ppm
Working temperature	-10°C~40°C
Working humidity	15%RH-90%RH(non-condensing)
Storage temperature	-20°C~60°C
Service life	5 years (0°C~35°C in air)
Module size	Length 17.7mm×width 17.8mm×height 8mm

◆ Appearance size and pin definition



Pin Name	Pin Description
Pin1	Vin(voltage input 3.7V~5.5V)
Pin2	UART (TXD) 0~3V data output
Pin3	UART (RXD) 0~3V data input
Pin4	GND
Pin5	PWM or Alarm (Only one output mode can be selected Factory setting)



Module pin diagram

◆ Communication protocol

1、General settings

Table3

Baud rate	9600
Data bits	8 bits
top bit	1 bit
Check Digit	None

2、Communication command

There are two modes of communication: automatic mode and non automatic mode.
The factory defaults to automatic mode and sends concentration values every 1s.
The data display format for automatic mode is as follows:

Table 4

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start bit	Gas Name (CO)	Unit (PPM)	NC	gas concentration high	gas concentration low	alarm concentration high	alarm concentration low	check value
0xFF	0x18	0x04	XX	0x00	0x25	XX	XX	SUM

Notes: Gas concentration value (PPM)=(gas concentration high byte*256+ gas concentration low byte).

When the user needs non automatic mode, the following command needs to be sent.
Send once, automatic mode turned off.

Power on again is required to restore to automatic mode

The command is as follows:

0xFF 0x01 0x86 0x00 0x00 0x00 0x00 0x00 0x79

Return data (the format is the same as automatic mode)

Table 5

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Start bit	gas name (CO)	Unit (PPM)	NC	gas concentration high	gas concentration low	alarm concentration high	alarm concentration low	check value
0xFF	0x18	0x04	XX	0x00	0x25	XX	XX	SUM

Gas Concentration Value (PPM)=(Gas Concentration High*256+ Gas Concentration Low).

3、Alarm Output (Mass customization required)

Alarm system:

Send: C0 03 03 DF1 DF2 CS

Answer: 16 01 03 DF1 DF2

Function: CO concentration alarm settings

Illustrate:

1、 alarm value = DF1*256 + DF2. The unit is ppm, the range is (20 to 900 ppm)

E.g:

When you need to set the module alarm point to 150ppm, send the command: C0 03 03 00 96 CS (CS is the checksum)

Hexadecimal to decimal conversion: 00 is 0; 96 is 150

CO alarm value = 0*256 + 150=150ppm

Pin 5 can be used as an alarm output. When the CO concentration is greater than the set value, the 5th pin outputs a high level. When it is lower than the set value minus 5. output low level.

For example: set the value to 150.

When the CO concentration is 0~149, the output is low. When it is greater than or equal to 150, it outputs a high level.

When CO is greater than the set value, it becomes a high level. When the value drops slowly again, it will not output a low level immediately when it is less than the set value. It needs to fall back to 140 before outputting a low level.

4、Checksum calculation

Checksum = (Inverse(Byte1+Byte2+...+Byte7))+1

The reference routine is as follows:

```

/*****
****

```

```

* Function name: unsigned char FucChecksum(uchar *i,ucharln)

```

```

* Function description: sum check (invert the sum of 1\2\3\4\5\6\7 of the
sending and receiving protocols +1)

```

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* Function description: Add the elements 1 to the penultimate element of the

```

```

array and then negate +1 (the number of elements must be greater than 2)
*****
*****/

unsigned char FucChecksum(unsigned char *i,unsigned char ln)
{
    unsigned char j,tempq=0; i+=1;
    for(j=0;j<(ln-2);j++)
    {
        tempq+=*i; i++;
    }
    tempq=(~tempq)+1; return(tempq);
}

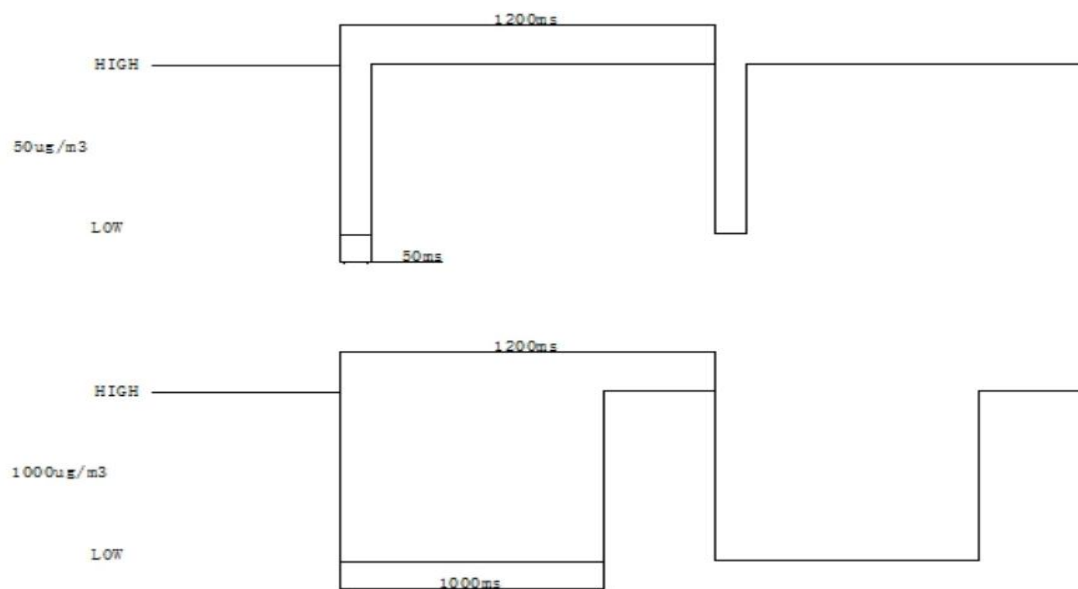
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5、 PWM output (**Two output methods: PWM or UART, selected at the factory**)

The sensor outputs a PWM signal through the PWM port (pin 5), the PWM period is 1.2S, and the dust concentration value is calculated according to the low level width.

For example: the low level width is 50ms, the corresponding dust concentration is 50PPM.

The concentration output range is 0ug/m³ ~ 1000ug/m³.



CO Output Waveform

◆ Notice Matters

- Electrolyte leakage will cause damage, do not disassemble the sensor at will;;
- The sensor should avoid contact with organic solvents (including silicone rubber and other adhesives), paints, pharmaceuticals, oils and high-concentration gases;
- All electrochemical sensors cannot be completely encapsulated with resin materials, nor can they be immersed in an oxygen-free environment, otherwise the performance of the sensor will be damaged;
- All electrochemical sensors cannot be used in environments containing corrosive gases for a long time, and corrosive gases will damage the sensors;
- The air inlet surface of the sensor shall not be blocked or polluted;
- The waterproof and breathable membrane above the sensor is strictly prohibited to be opened or damaged;
- The sensor should not be subjected to excessive shock or vibration;
- Please do not use it when the casing is damaged or deformed;
- After long-term use in a high-concentration gas environment, the sensor recovers slowly to its initial state;
- It is forbidden to encapsulate the sensor with hot melt adhesive or sealant whose curing temperature is higher than 80°C;
- It is forbidden to store and use it in high concentration alkaline gas for a long time.