Propane Module

（TTL Propane module）

SM-C3H8-P01

Ver 2.1

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Catalogue

Chapter 1 Product profile

1.1 Product overview

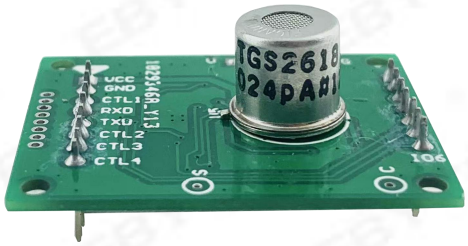
This module is widely used for the complete development of household gas leakage alarm and the detection parts of gas leakage.The input power supply in the sensor, the sensor probe, and the signal output are completely isolated.Safe and reliable, small volume, easy to install.

1.2 Functional characteristics

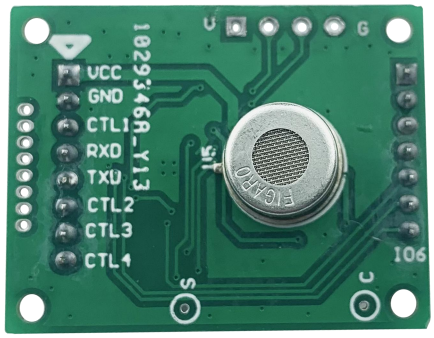
This product adopts a high-sensitivity semiconductor probe, with a stable signal and high precision.It has the characteristics of wide measurement range, open response speed, convenient use and easy installation.In particular, it has the basic function of home gas leakage alarm, which only need external state indication, buzzer, relay, solenoid valve can realize the function of home gas leakage alarm to meet the national standard.

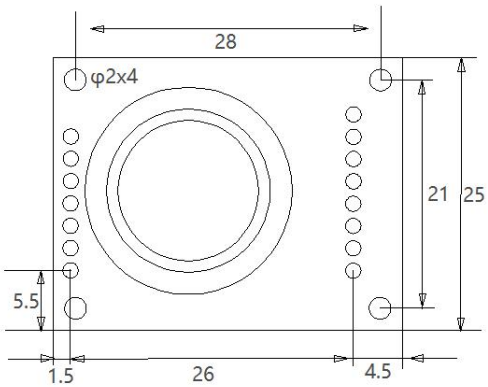
1.3 Main parameter

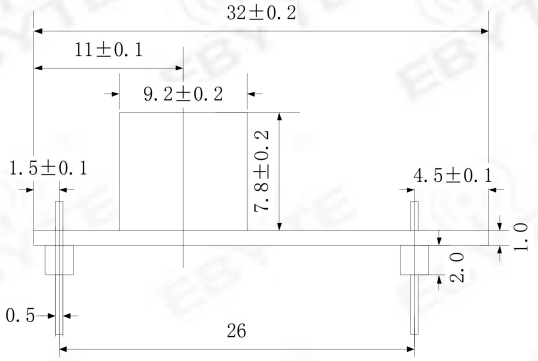
tracer gas	Propane (liquefied gas)
Sensor type	Figaro TGS2618
interface type	8pin and 7pin 2.0mm
signal output	TTL serial port (Modbus-RTU protocol)
response time	≤10 s
recovery time	≤10 s
working voltage	DC 4.8V～5.3V
working current	≤100mA
Measure the range	0～20%LEL（0～10000PPM）
resolution ratio	100PPM



Alarm value	Settable (default 4000PPM)
accuracy	± 3% LEL (at 8%LEL concentration)
expected life	More than 5 years
Follow the standard	National standard GB 15322.2
service environment	temperature:-10~55℃
Storage environment	Temperature ：-20 ～ 60 ℃ Humidity：20% ～ 65% RH
outline dimension	32mm×25mm×15mm







Description of pin function

Feet serial number	Feet serial number	Feet serial number
1	VCC	5V Module power input
2	GND	To refer to
3	CTL1	Control output 1: 1. Continuous low level with no alarm and failure state. 2. Continuous high level under the alarm state.
4	RXD	Serial port RXD data receiving pin
5	TXD	Serial port TXD data sending pin

6	CTL2	Control output 2: 1. Continuous low level with no alarm and failure state. 2. Continuous high level under the alarm state.
7	CTL3	Control output 3, buzzer control: high-level calling
8	CTL4	Control output 4, fault lamp control: high level light, low level off
9	VDD	Module 3.3V output, output current <100mA
10	IO1	Alarm lamp control port: high level lit, low level turned off
11	IO2	Power lamp control port: High level is on, low level is off
12	IO3	Self-test button input port: Low-level button is valid
13	IO4	continue to have
14	IO5	continue to have
15	IO6	NC(Stay suspended)

Work status introduction

1.Power self-inspection

Turn on the power supply, and the three lights light in turn. After the delay is about 5 minutes, the buzzer calls 1 into the normal working state, and the "power supply" light flashes.

2. Normal operation condition

In the no fault or alarm state of the module, the Power supply light flashes.

In this state, press the Self-test " key, and the module performs the audio-optical self-test.

3.Alarm status

If the module is not faulty and the field gas concentration is higher than the alarm setting value, the "alarm" light is always on, the buzzer makes a rapid sound, and the control signal is output.Press the Self-test button to silence sound.

When the gas concentration drops to the alarm setting, the module automatically returns to the normal operating state.

4.Fault condition

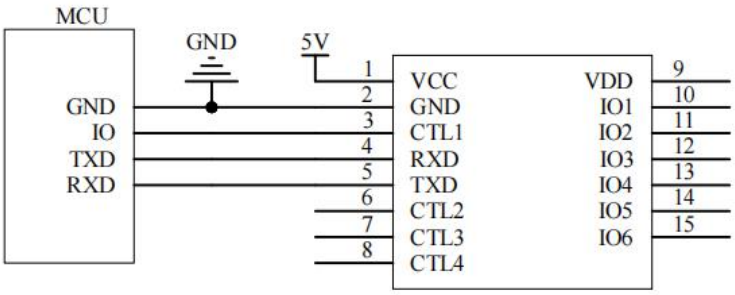
When the sensor fails, the "fault" light is on, and the buzzer is intermittent.

working status	trouble light (recommended yellow)	Alarmlamp (recommended red)	Power lamp (recommended green)	Buzzer
normal status	Extinguished	Extinguished	Flicker	Silent
fault state	Always bright	Extinguished	Extinguished	Showing on and off
Alarm status	Extinguished	Always bright	Extinguished	Continue to sing
Self-check status	waterfall light			Continue to call 5 times

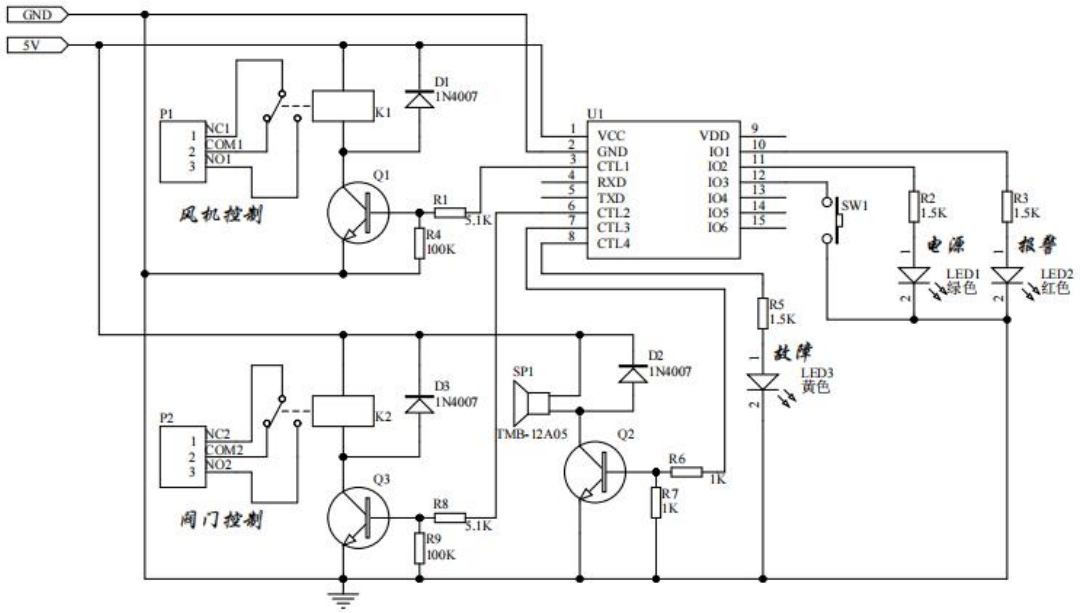
"Self-inspection" key: press "Self-inspection" key under normal state to conduct self-inspection; press "Self-test" key under the alarm state to conduct alarm noise.

1.4 System framework diagram

Application principle of testing parts



Application principle of the alarm device



1.5 Product types choosing

SM-				Company code name
	CH4-			Methane (natural gas)
		P01		TTL Serial Port Communication

				(Modbus-RTU protocol)
		N01-		485 Serial port communication (Modbus-RTU protocol)
			8	Flat card rail shell

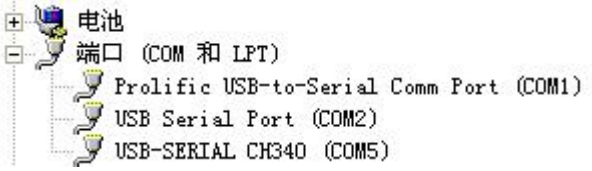
Chapter 2 Configure the software installation & use

We provide the matching "sensor monitoring software", which can easily use the computer to read the parameters of the sensor, while flexibly modifying the sensor device ID and address.

Note:Using the software to automatically obtain, it ensures that there is only one sensor on the bus.

2.1 Sensor access to the computer

After transferring the sensor through the USB to the correct computer and providing power, you can see the correct COM port in my computer-properties-"Device Manager-Port").



Open the package and select Debug Software- - -Parameter Configuration Software，find 

Open it.

If no COM port is found in Device Manager means you have not installed the USB to TTL driver (available in the package) or are not properly installed correctly, please contact the technician for assistance.

2.2 Use of the sensor monitoring software

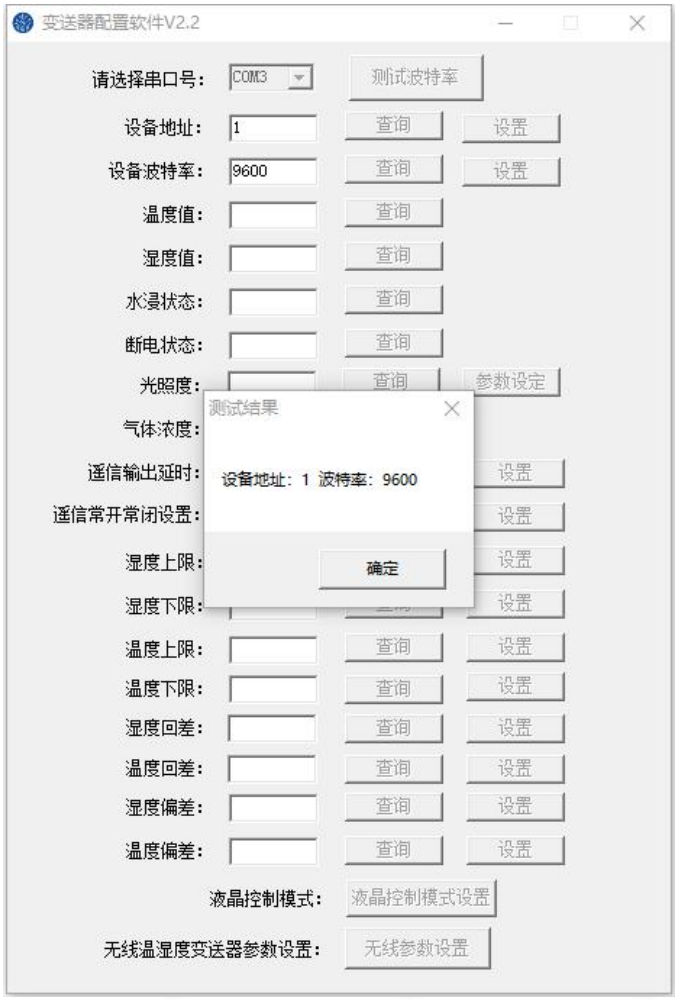
①、The configuration interface is shown in the figure. First, obtain the string slogan and select the correct serial port according to the method in Section 3.1.

②、Click on the test wave rate of the software, the software will test the port rate of the current device, the default port rate is 9600 bit/s, and the default address is 0x01.

③、Modify the address and port rate as required, and query the current functional

status of the device.

④、If the test is not successful, recheck the equipment wiring and drive installation.



Chapter 3 Communication protocols

3.1 Communication basic parameters

Make up, code	The 8-bit binary
data bit	8-bit
parity check bit	No
stop bit	1-bit
error check	CRC (redundant cycle code)
Baud rate	2400bit/s、4800bit/s、9600 bit/s Can set，factory default is 9600bit/s

3.2 Data frame format definition

Adopt Modbus-RTU Communication statute，The format is as follows：

Time of the initial structure of 4 bytes

Address code = 1 bytes

Function code = 1 bytes

Data zone = N bytes

Error check = 16-bit CRC code

Time to end the structure with 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code：

FC	Meaning	Operable register address
0x03	Read the register data	0x02、0x100～0x10D
0x10	Write multiple registers	0x102～0x10D

Data field： Data area is specific communication data, note 16bits data high bytes before！

CRC code：Two-byte check code.

The Host queries the frame structure：

Address code	Function code	Register start address	Register length	Calibration code low	Calibration code high
1Byte	1Byte	2Byte	2Byte	1Byte	1Byte

Answer answer frame structure：

Address code	Function code	Valid Byte number	Data area 1	The second data area	N Data Zone	check code
1Byte	1Byte	1Byte	2Byte	2Byte	2Byte	2Byte

3.3Register address

Register address	Quantity	Meaning	Condition	Date area
0x02	1	gas concentration	read only	0～10000PPM
0x100	1	unit type	read only	0～0xFFFF
0x101	1	Device software version	read only	0～0xFFFF
0x102	10	device name	read-write	0～0xFFFF

0x10C	1	device address	read-write	0～0xFF
0x10D	1	Serial port properties	read-write	See the serial port property register

Serial port properties：

Date bit	Meaning
BIT15~BIT8	The parity selection 0：No check（Factory default） 1： odd 2： even parity check
BIT7~BIT0	Porter rate selection0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps（Factory default） 4: 19200bps

3.4 Communication protocol example and explanation

Example 1: Read the gas concentration value of the device address 0x01

Inquiry frame (16 x)：

Address code	Function code	start address	DL	check code low-order	check code high-order
0x01	0x03	0x00 0x02	0x00 0x01	0x25	0xCA

Response frame (16 decimal system)：

Address code	Function code	Return to valid Byte count	Gas concentration value	check code low-order	check code high-order
0x01	0x03	0x02	0x00 0x03	0xF8	0x45

Gas concentration calculation：

Potency：0003 H(hexadecimal)= 3PPM

Example 2: Modify the device address 0x01 IS 0x02

Inquiry frame (16 x)：

Address code	Function code	start address	DL	Data area word	data field	check code

				pitch numbe r（2*N）		
0x01	0x10	0x01 0x0C	0x00 0x01	0x02	0x00 0x02	0x37 0x9D

Response frame (16 decimal system)：

Address c ode	Function cod e	start address	DL	check code low-order	check code high-order
0x01	0x10	0x01 0x0C	0x00 0x01	0xC0	0x36

Chapter 4 Matters needing attention

1.Cases that must be avoided

1.1 Exposure to volatile silicon compound vapor

The des shall be avoided exposed to silicon adhesives, rubber, silicone rubber, putty or other places where volatile silicon compounds are present.Otherwise, it will reduce the sensitivity of the module or even will not respond.

1.2 High-corrosive environment

The exposure of the module to high concentrations of corrosive gases (e. g., H2S, SOX, C12, HCl, etc.) will cause corrosion or damage of sensor heating materials and sensor leads in the module, and cause irreversible deterioration of sensitive materials, which will affect the performance and accuracy of the module.

1.3 Contact with water

splashing of the sensor in the module or immersion in water will cause decreased sensor sensitivity characteristics and affect the measurement accuracy of the module.

1.4 Freeze

Ice on the surface of the sensor sensitive material of the module causes fragmentation of the sensitive layer and loss of sensitive properties.

2.Avoid situations as much as possible

2.1 Condensate

Under indoor use conditions, slight condensation has a slight impact on the sensor performance in the module.However, if the water condenses

on the surface of the sensitive layer and remains for some time, the sensor characteristics in the module decrease and the measurement error of the module increases.

2.2 At a high concentration of gas

Whether the module is energized, prolonged placement in high concentration gas can affect the sensor properties in the module. If lighter gas is used directly sprayed into the sensor in the module, it will cause great damage to the sensor in the module and reduce the sensitivity of the module.

2.3 Term store

The module is stored for long periods without energization, and its sensor resistance produces a reversible drift, which is related to the storage environment. The module shall be stored in a sealed bag without volatile silicon compounds. Long-term stored modules require longer power supply to be stable before use.

2.4 Long-term exposure to extreme environments

module performance will be severely affected regardless of whether the module is energized and prolonged exposure to extreme conditions such as high humidity, high temperature or high contamination.

3. Make sure that the three-proof paint on the control board is completely dry before the module installation.

4. If you need to reset the module alarm value, contact our business personnel.

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