Alcohol Module

User's Manual V1.1

（Model No.： TE31-C2H5OH）

Valid from: 2019-01-28

Taiyuan Tengxing sensor technology Co., Ltd

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Taiyuan Tengxing sensor technology Co., Ltd

Electrochemical Alcohol Module ΤE31-C2H5OH

Profile

The ΤE31-C2H5OH electrochemical alcohol module is a general-purpose, miniaturized module. The electrochemical principle is used to detect the presence of C2H5OH in the air, which has good selectivity and stability. Built-in temperature sensor for temperature compensation; digital output and analog voltage output for easy use. ZE31-C2H5OH is a universal gas module designed and manufactured by combining proven electrochemical detection technology with sophisticated circuit design.

Features

High sensitivity, high resolution, low power consumption, long lifespan
UART and analog voltage output
Good stability and excellent anti-interference, temperature compensation, good linearity.

Main Application

Alcohol detector, vehicle-mounted detector

Technical Parameters   table1.

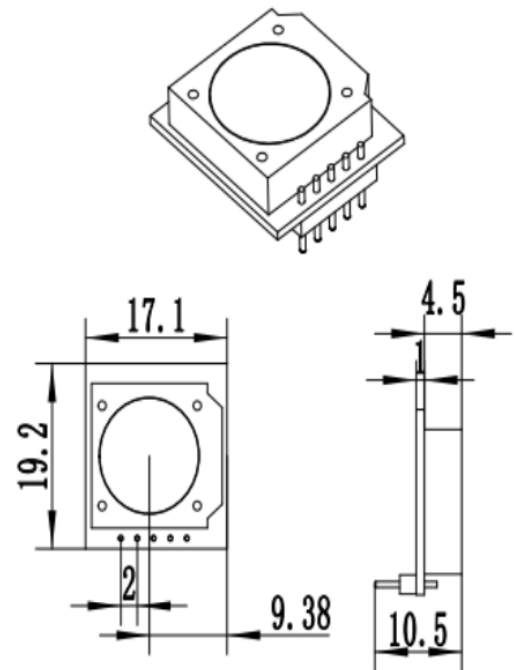| Model No.	ΤE31-C2H5OH
Target Gas	Alcohol
Interference gases	CO &etc gas
Output Data	UART Output (3V electrical level)
Working Voltage	3.7~5.5V
Preheating time	≤3 min
Response time	≤60 sec
Recovery time	≤60 sec
Detection Range	0~5 ppm
Resolution	≤0.01ppm
Operating Environment	Temp.: -20～50℃
	Humidity.: 15%-90％RH(no condensation)
Storage Temp.	0～25℃
Working Life	2 years (in air)

Fig1. Structure(tolerance ±0.2mm)

Pin Description   table2.

PIN1	Vin(Power input 3.7V~5.5V)
PIN2	UART（TXD） 0~3V data output
PIN3	UART（RXD） 0~3V data input
PIN4	GND
PIN5	Reserved
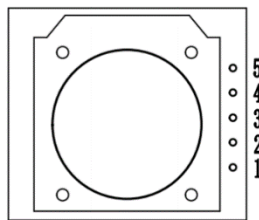
Fig2. Pins construction

Communication Protocol

1. General Settings

Table 3

Baud Rate	9600
Data Byte	8 bytes
Stop Byte	1 byte
Check Byte	Null

2. Communication Commands

There are two kinds of communication mode: initiative upload mode and question & answer (Q&A) mode.

We take initiative upload mode as the default settings.

If users want to switch back to initiative upload mode in Q&A mode, send the following command: **Table4.**

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte6	Byte 7	Byte 8
Start Byte	Reserve	**Switch command**	**Initiative upload mode**	Reserve	Reserve	Reserve	Reserve	Check sum
0xFF	0x01	**0x78**	**0x40**	0x00	0x00	0x00	0x00	0x47

The module sends the gas concentration value every 1s in initiative upload mode: **Table 5**

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte6	Byte 7	Byte 8
Start Byte	Gas Type (C2H5OH)	Unit (ppb)	No. of decimal	**Concentration (High Byte)**	**Concentration (Low Byte)**	Full Range (High Byte)	Full Range (Low Byte)	Check sum
0xFF	0x17	0x04	0x00	**0x00**	**0x25**	0x13	0x88	0x25

Gas concentration value ppb = High Byte*256+Low Byte,   ppm=ppb/1000

Please note that in the above calculation formula, the byte4 and byte5 means the decimalism value changed from hexadecimal.

Switch to the question & answer (Q&A) mode, send the following command line format: **Table 6**

Byte 0	Byte 1	**Byte 2**	**Byte 3**	Byte 4	Byte 5	Byte6	Byte 7	Byte 8
Start Byte	Reserve	**Switch command**	**Q&A mode**	Reserve	Reserve	Reserve	Reserve	Check sum
0xFF	0x01	**0x78**	**0x41**	0x00	0x00	0x00	0x00	0x46

To read concentration in Q&A mode, the command line format is as follows: **Table 7**

Byte 0	Byte 1	**Byte 2**	**Byte 3**	Byte 4	Byte 5	Byte6	Byte 7	Byte 8
Start Byte	Reserve	**Command**	Reserve	Reserve	Reserve	Reserve	Reserve	Check sum
0xFF	0x01	**0x86**	0x00	0x00	0x00	0x00	0x00	0x79

Return the concentration as follow: **Table 8**

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	**Byte6**	**Byte 7**	Byte 8
Start Byte	Command	Reserve	Reserve	Reserve	Reserve	Concentration (High Byte)ppb	Concentration (Low Byte)ppb	Check sum
0xFF	0x86	0x00	0x00	0x00	0x00	**0x00**	**0x20**	0x5A

Gas concentration value = High Byte*256+Low Byte

Please note that in the above calculation formula, the High byte and Low byte means the decimalism value changed from hexadecimal.

3.Checksum and calculation

```
        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);
}
```

Cross interference gas

Gas	Concentration/ppm	Equal to C2H5OH
C6H6	10	0.1
C7H8	10	0.46
CH3COOH	200	0.52
H2S	50	3
CO	200	0.64

Cautions

1. The module avoids contact with organic solvents (including silica gel and other adhesives), paints, chemicals, oils and high-concentration gases.

2. The module can not be completely encapsulated with resin material, nor can it be immersed in an oxygen-free environment, otherwise it will damage the performance of the sensor;

3. The module can not be used for long time in the environment containing corrosive gases, corrosive gases will damage the sensor;

4. The module cannot withstand excessive impact or vibration.

5. The module needs to be preheated for 24-48 hours when it is first powered on, so that the module can be fully stabilized and then tested normally.

6. Do not apply the module to systems that involve personal safety.

7. Do not install the module in a strong convection air environment.

8. Do not place the module in a high concentration of organic gas for a long time. If it is placed for a long time, the sensor zero point will drift and the recovery will be slow.

9. It is forbidden to use hot melt adhesive or sealant package module with curing temperature higher than 80 °C;

10. It is forbidden to store and use in high concentration alkaline gas for a long time.