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Alcohol Sensor Module

User's Manual V1.1

（Model No.：ZE29A-C2H5OH）

Zhengzhou Winsen Electronics Technology Co., Ltd

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Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD

Electrochemical Alcohol Module ZE29A-C2H5OH

Profile

The ZE29A-C2H5OH electrochemical alcohol sensor module is to detect exhaled alcohol gas. With electrochemical alcohol sensor as core part and built-in temperature compensation sensor, it has high accuracy, high sensitivity, and strong anti-interference ability. It's integrated with pressure sensor, which can realize blowing action detection to further ensure the accuracy of measurement. This product is suitable for alcohol detection of drunk driving or before work.

Features

High-precision and high-sensitivity
UART output
Blow interruption alarm
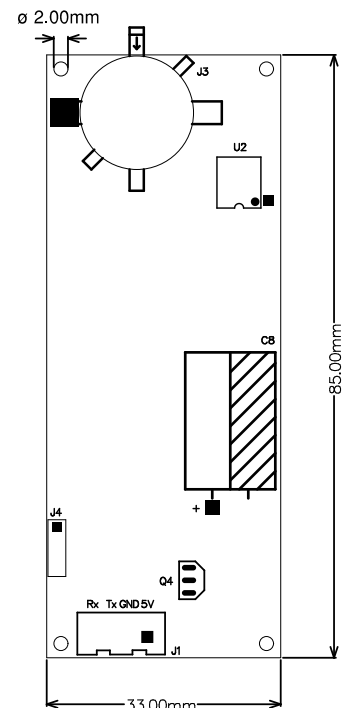High stability and strong anti-interference ability

## Application

Portable alcohol detector;
Car alcohol testing

Technical Parameters   table1.

Model No.	ZE29A-C2H5OH	
Sensor Type	Fuel cell alcohol sensor	
Target Gas	Alcohol	
Output	UART (3.3V TTL)	
Working Voltage	5V±0.3V	
Working Current	＜500mA	
Preheating time	≤10s	
Detection Range	0~1.0 mg/l	
Display accuracy	Gas concentration(mg/l)	Accuracy
	C＜0.400	±0.050mg/l
	C≥0.400	±10%
Blow continuity detection	4 second(can be customized, flow: ≥ 10L/min)	
Working temperature	10℃~40℃	
Storage temperature	-10℃~70℃	
Module size	85*33*18mm	

ø 2.00mm

85.00mm

33.00mm

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PIN Definition

Pin	Pin definition
1	Vin (voltage input 5V)
2	GND
3	UART (TXD) 3.3V TTL OUTPUT
4	UART (RXD) 3.3V TTL INPUT

Rx Tx GND 5V

4	3	2	1
●	●	●	■
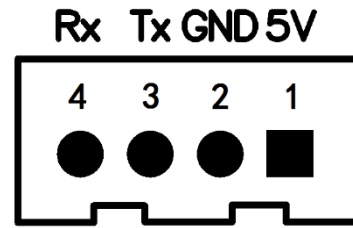
Communication protocol

General setting

Baud Rate	9600
Data Byte	8 bits
Stop Byte	1 bits
Check Byte	Null

Frame format

	Command	Function description							
SEND	Data 0	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7	Data 8
	Start	address	command	Data					Check sum
	0xFF	0x01		Data 1	Data 2	Data 3	Data 4	Data 5	
Return	Data 0	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7	Data 8
	Start	Command	Data						Check sum
	0xFF		Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	

1. The module address is fixed as: 0x01.
2. Integer data has the high byte first and the low byte last.
3．Check value algorithm: (negative (data 1 + data 2 + … + data 7)) + 1.
4．Command code:
    0x85: Query module status
    0x86: read test results
    0x87: Switch module working status
    0x88: Read blow time
    0x89: Set the blowing time
    0x90: Read drinking threshold
    0x91: Set drunk threshold
    0x92: Read blow pressure threshold
    0x93: Set blow pressure threshold

Guidelines of Commands

Command：0x85-Query module status

NO.	Comm and	Function description							
SEND	0	1	2	3	4	5	6	7	8
	Start	address	comm and	-	-	-	-	-	Check sum
	0xFF	0x01	0x85	0	0	0	0	0	0x7A
EXP.	FF 01 85 00 00 00 00 00 7A								
RETURN	0	1	2	3	4	5	6	7	8
	Start	comma nd	modul e status	-	-	-	-	-	Check sum
	0xFF	0x85	0x31	0	0	0	0	0	0x4A
EXP.	FF 85 31 00 00 00 00 00 4A								

Module Status：

0x31:In idle state, the module is in standby state, waiting for receiving instructions.

0x32: preheating state, in which the module is preheated for 10 seconds, and then automatically enters the 'waiting for air blowing state'.

0x33: waiting for blowing, the module waits for blowing, and automatically enters the 'blowing state' after blowing;If there is no air blowing, the module will automatically enter the 'idle state' after 1 minute.

0x34: in the blowing state, after continuous blowing for 4 seconds, the module automatically enters the 'calculating state';Otherwise, the module will enter the 'blowing interruption state'.

0x35: the air blowing is interrupted. After this state lasts for 3 seconds, it will automatically re-enter the 'preheating state'.

0x36: in the calculation state, after this state lasts for 2~5 seconds, it will automatically enter the 'read result state'.

0x37: reading the result state, in which the test result can be read, and it will automatically enter the 'idle state' after 20 seconds.

Command：0x86-Read Test Result

NO.	command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	-	-	-	-	-	Check sum
	0xFF	0x01	0x86	0	0	0	0	0	0x79
EXP.	FF 01 86 00 00 00 00 00 79								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Alcohol content		-	-	-	Alarm Status	Check sum
	0xFF	0x86	High Byte	Low Byte	0	0	0	0	
EXP.	FF 86 00 5A 00 00 00 02 1E								

Alcohol content: 0x005a (hexadecimal) =90 (decimal) unit: mg/100ml

Alarm status:

0x00: no alcohol, alcohol content <20mg/100ml.

0x01: drinking, 20mg/100ml ≤ alcohol content ＜ 80mg/100ml.

0x02: drunk, alcohol content ≥ 80mg/100ml.

 Note：This command can only be read when the module is in the 'read result state'.

Command：0x87-Switch module working status

NO.	Command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	Target Status	-	-	-	-	Check sum
	0xFF	0x01	0x87	0x31	0	0	0	0	0x47
EXP.	FF 01 87 31 00 00 00 00 47								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Switching Result	-	-	-	-	-	Check sum

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	0xFF	0x87	0x01	0	0	0	0	0	0x78
EXP.	FF 87 01 00 00 00 00 00 78								

Destination state: the state to be entered.

Switching result: 0x01: switching succeeded 0x02: switching failed

The three switchable states are as follows:

1) in the idle state (0x31), it can be switched to the warm-up state (0x32).

2) In the read result state (0x37), it can be switched to the idle state (0x31).

3) In the reading result state (0x37), it can be switched to the preheating state (0x32).

Command：0x88-Read blowing time

NO.	Command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	-	-	-	-	-	Check sum
	0xFF	0x01	0x88	0	0	0	0	0	0x77
EXP.	FF 01 88 00 00 00 00 00 77								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Blowing time	-	-	-	-	-	Check sum
	0xFF	0x88	0x04	0	0	0	0	0	0x74
EXP.	FF 88 04 00 00 00 00 00 74								

Blowing time: the blowing time set by the current module. When the continuous blowing time reaches this time, the electromagnet will act to sample the gas. Unit: s. The range of this parameter is 1~10.

Command：0x89-Set the blowing time

NO.	Command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	Blowing time	-	-	-	-	Check sum
	0xFF	0x01	0x89	0x04	0	0	0	0	0x72

EXP.	FF 01 89 04 00 00 00 00 72								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Setting Result	-	-	-	-	-	Check sum
	0xFF	0x89	0x01	0	0	0	0	0	0x76
EXP.	FF 89 01 00 00 00 00 00 76								

Blowing time: the blowing time set by the current module. When the continuous blowing time reaches this time, the electromagnet will act to sample the gas. Unit: s. The range of this parameter is 1~10.

Setting result: 0x01: setting succeeded 0x02: setting failed

Command：0x90-Read drinking threshold

NO.	Command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	-	-	-	-	-	Check sum
	0xFF	0x01	0x90	0	0	0	0	0	0x6F
EXP.	FF 01 90 00 00 00 00 00 6F								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	drinking threshold	Drunkenness threshold	-	-	-	-	Check sum
	0xFF	0x90	0x14	0x50	0	0	0	0	0x0C
EXP.	FF 90 14 50 00 00 00 00 0C								

Drinking threshold: the threshold for judging drinking alarm, 0x14 (hexadecimal) =20 (decimal), unit: mg/100ml. The parameter range is: 15~220mg/100ml

Drunkenness threshold: the threshold for judging drunkenness alarm, 0x50 (hexadecimal) =80 (decimal), unit: mg/100ml, the parameter range is: 15~220mg/100ml

Command：0x91-Set drunk threshold

NO.	Command	Function Description

SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	drinking threshold	Drunkenness threshold	-	-	-	Check sum
	0xFF	0x01	0x91	0x14	0x50	0	0	0	0x0A
EXP.	FF 01 91 14 50 00 00 00 0A								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Setting result	-	-	-	-	-	Check sum
	0xFF	0x91	0x01	0	0	0	0	0	0x6E
EXP.	FF 91 01 00 00 00 00 00 6E								

Drinking threshold: the threshold for judging drinking alarm, 0x14 (hexadecimal) =20 (decimal), unit: mg/100ml

Drunkenness threshold: the threshold for judging drunkenness alarm, 0x50 (hexadecimal) =80 (decimal), unit: mg/100ml

Setting result: 0x01: setting succeeded 0x02: setting failed

Note: the range of alcohol and intoxication threshold can be set as 15~220mg/100ml, and the alcohol and intoxication threshold must be greater than the alcohol threshold.

Command：0x92-Read blow pressure threshold

NO.	Command	Function Description							
SEND	0	1	2	3	4	5	6	7	8
	Start	Address	Command	-	-	-	-	-	Check sum
	0xFF	0x01	0x92	0	0	0	0	0	0x6D
EXP.	FF 01 92 00 00 00 00 00 6D								
Return	0	1	2	3	4	5	6	7	8
	Start	Command	Pressure threshold	-	-	-	-	-	Check sum
	0xFF	0x92	0x08	0	0	0	0	0	0x66
EXP.	FF 92 08 00 00 00 00 00 66								

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Pressure threshold: the threshold value for detecting the blowing pressure, 0x08 (hexadecimal) =8 (decimal), with a range of 5~200

Command：0x93-Set blow pressure threshold

NO.	Comm and	Function Description							
	0	1	2	3	4	5	6	7	8
SEND	Start	Addres s	Comm and	Blowing time	-	-	-	-	Check sum
	0xFF	0x01	0x93	0x08	0	0	0	0	0x64
EXP.	FF 01 93 08 00 00 00 00 64								
	0	1	2	3	4	5	6	7	8
Retur n	Start	Comm and	Setting result	-	-	-	-	-	Check sum
	0xFF	0x93	0x01	0	0	0	0	0	0x6C
EXP.	FF 93 01 00 00 00 00 00 6C								

Pressure threshold: the threshold value for detecting the blowing pressure, 0x08 (hexadecimal) =8 (decimal), with a range of 5~200

Setting result: 0x01: setting succeeded 0x02: setting failed

Note:
1. The module needs to be used in conjunction with the blowpipe when using it. The blowpipe structure must be designed by the customer.
2. Pay attention to the connection of the 5V power supply.
3. In the mold design, the alcohol sensor needs to be fixed on the structure to prevent the alcohol sensor from loosening after long-term work, which will cause failure.
4. When designing the blowpipe structure, two points need to be paid special attention to. One is that a barrier is needed in the blowpipe to generate piezoresistance. In addition, the blowing direction of the blow pipe needs to be fixed, that is, the pressure sampling hole needs to be in the front and the alcohol sampling hole is behind in the blowing direction.
5. The module must not be used in the environment containing corrosive gas, which will damage the sensor.
6. The air inlet of the sensor on the module must not be blocked or polluted.
7. The module must not be subjected to excessive impact or vibration.
8. After long-term use in a high-concentration gas environment, the time for the sensor to recover to its initial state is slow.