



Electrochemical CO Module

(Model: ZE07-CO)

User's Manual

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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 CO Module ZE07-CO

Product Description

ZE07-CO is a general-purpose and miniaturization electrochemical carbon monoxide detection module. It utilizes electrochemical principle to detect CO in air which makes the module with high selectivity and stability. Built-in temperature sensor can do temperature compensation; and it has digital output and analog voltage output. It is a combination of mature electrochemical detection principle and sophisticated circuit design.

Features

- *High sensitivity & resolution& Stability
- *Extremely low power consumption
- *Provide UART/Analog Voltage/PWM wave output
- *Excellent ability of Anti-interference
- *Provide Temperature compensation
- *Excellent Linear output



Main applications

Portable detector, air-quality monitor device, air ventilation system, smart home &etc.

Technical Parameters and Structure

| | |
|------------------|--|
| Model No. | ZE07-CO |
| Target Gas | CO |
| Interference Gas | Alcohol and other gases |
| Output Data | DAC (0.4~2V standard voltage output) |
| | UART Output (3V Electrical Level) |
| Working Voltage | 5V~12V (No voltage reverse connect protection) |
| Warm up time | ≤3minutes |
| Response time | ≤60s |
| Resume time | ≤60s |
| Detection Range | 0~500ppm |
| Resolution | 0.1ppm |
| Operating Temp. | -10°C~55°C |
| Operating Hum. | 15%RH-90%RH(No condensation) |
| Storage temp. | -10°C~55°C |
| Working life | 3-5 years (in air) |

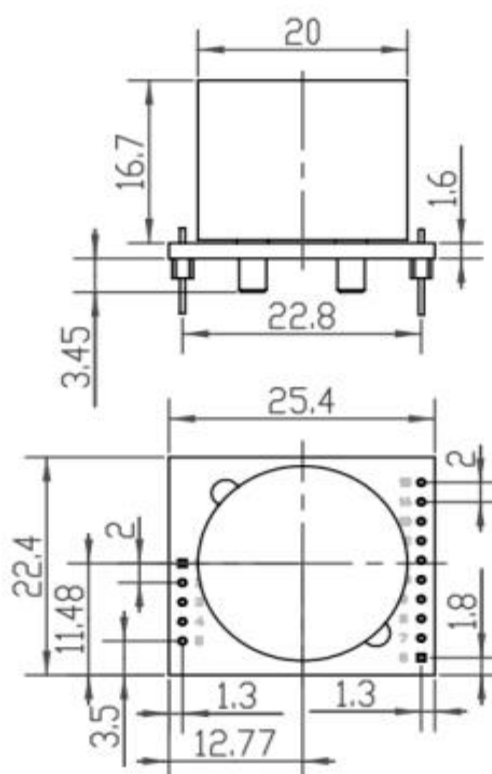


Fig1. Structure

Pin Description

| | |
|------------------------------------|------------------------------|
| PIN15 | Vin (Voltage input 5V-12V) |
| PIN5、PIN14 | GND |
| PIN1 | VOOUT(Voltage output 3.0V) |
| PIN3 | Reserved |
| PIN4 | Reserved |
| PIN7 | UART (RXD) 0~3.0V Data input |
| PIN8 | UART(TXD) 0~3.0V Data output |
| PIN9 | Sensor analog signal |
| PIN10 | DAC 0.4V-2V (0 - full range) |
| PIN2/ PIN6/ PIN11/ PIN12/ PIN13 | NC |

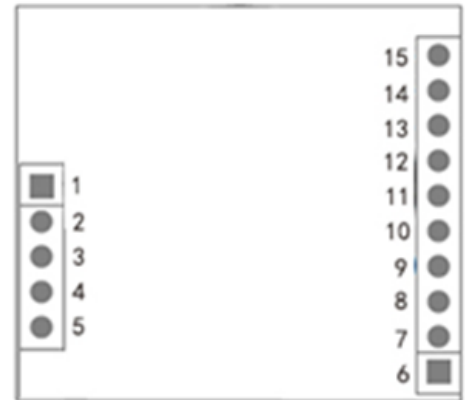


Fig 2 Pins Diagram

Communication Protocol

1. General Settings

Table 3

| | |
|------------|------|
| Baud Rate | 9600 |
| Data Bits | 8 |
| Stop Bits | 1 |
| Check Bits | Null |

2. Communication Commands

There are two kinds of communication, initiative upload mode and question & answer mode. We take initiative upload mode as the default settings. The module upload a gas concentration value every 1S, and the command line format is as follows: **Table 4**

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte6 | Byte 7 | Byte 8 |
|------------|----------|----------|----------------|---------------------------|--------------------------|------------------------|-----------------------|-----------|
| Start Byte | Gas Type | Unit | No. of decimal | Concentration (High Byte) | Concentration (Low Byte) | Full Range (High Byte) | Full Range (Low Byte) | Check sum |
| 0xFF | CO=0x04 | ppm=0x03 | 1= 0x01 | 0x00 | 0x25 | 0x13 | 0x88 | 0x25 |

Gas concentration value = (High Byte*256+Low Byte) x 0.1

Please note that in the above calculation formula, the byte4 and byte5 means the decimalism value changed from hexadecimal. For example: Original byte4 is 1B and original byte5 is 2C.

1B is hexadecimal and it is 27 after changing to decimalism.

2C is hexadecimal and it is 44 after changing to decimalism.

So, concentration= (27x256+44)x0.1

Switch command to the question & answer mode, the command line format is as follows: **Table 5**

| 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 |

Switch command to the initiative upload mode, the command line format is as follows: **Table 6**

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

Question & answer mode, the Question 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 |

Question & answer mode, the Question command line format is as follows: **Table 8**

| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte6 | Byte 7 | Byte 8 |
|------------|---------|---------------------------|--------------------------|---------|---------|---------------------------|--------------------------|-----------|
| Start Byte | Command | Concentration (High Byte) | Concentration (Low Byte) | Reserve | Reserve | Concentration (High Byte) | Concentration (Low Byte) | Check sum |
| 0xFF | 0x86 | 0x00 | 0x20 | 0x00 | 0x00 | 0x00 | 0x20 | 0x30 |

Gas concentration value = (High Byte*256+Low Byte) x 0.1

3. Check sum and calculation

* Function Name: unsigned ucharFucCheckSum(uchar *i,ucharIn)

* Functional description: Sum check 【Not (Byte1+Byte2+...Byte7) +1】

*****/

unsigned char FucCheckSum(unsigned char *i,unsigned char In)

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

Cautions

1. DO NOT insert or extract the sensor on the PCB board.
2. DO NOT change or move the electronic part on the module.
3. Avoid sensor contact with organic solvent, coatings, medicine, oil and high concentration gases.
4. Excessive impact or vibration should be avoided.
5. Please keep the modules warming up for at least 5 minutes when first using.
6. Please do not use the modules in systems which related to human being's safety.
7. Please do not use the modules in strong air convection environment.
8. Please do not expose the modules in high concentration organic gas for a long time.

Note: To keep continual product development, we reserve the right to change design features without prior notice.

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