SPECIFICATION FOR APPROVAL

Product Name： Ultrasonic oxygen sensor

Specification： OCS-3F100P

Customer：

CUST P/N：

Supplies ： Winpower Technology Co., Ltd.

Date ：

CUSTOMER APPROVAL	CHK	APPD

DWN	CHK	APPD

.The product specification is for reference only and shall be signed for confirmation in case of batch supply

深圳市润普科技有限公司 Winpower Technology Co., Ltd.
Tel: +86-755-82415317
Web：www.winpower.com.cn
地址：中国 深圳 龙岗
ADD： SHENZHEN CHINA

User Manual

OCS-3F100P ultrasonic oxygen concentration sensor is the latest oxygen concentration sensor introduced by our company. It uses the ultrasonic principle to detect PSA oxygen concentration and flow, with the following features:

Features

- High accuracy
- Strong anti-interference ability
- Response quickly
- Long-term stability
- No need to adjust regularly
- long operating life
- Built-in compensation for atmospheric pressure

The OCS-3F100P ultrasonic oxygen concentration sensor is suitable for large oxygen generators and particle counters, and sends the test results in the form of UART digital output.

Precautions for use

- Ensure that the detected gas is water-free, oil-free and dust-free.
- Without the permission of the manufacturer, the sensor shall not be disassembled, and the sensor damage caused by the manufacturer will not be guaranteed or repaired.
- This sensor and data manual may change due to technical improvement of the product without prior notice, please forgive me.
- The company has the final interpretation of the sensor data manual.
- If there are other special customized requirements, please consult: +86 0755-82415317 or phc@winpower.com.cn
- Voltage data and air source data need to be provided before purchase.
- A bacterial filter should be added to the air intake of the sensor to filter the gas, and a check valve should be added to the air output of the sensor to avoid backward water absorption

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Technology Characteristics

Range of concentration	21.0%-95.6%
Resolution of concentration	0.1%
Accuracy of concentration	± 2.0%FS @（5 - 55）℃
Range of flow	0-100L/min
Resolutionof flow	0.1L/min
Accuracy of flow	±0.3L/min or 5% of the reading, whichever is greater
Pressure compensation range	300mbar~2500mbar
Sample gas requirements	Anhydrous(No condensation); Dust filtration(<1um)
The spacing time of UART data	500ms
Warm-up Time	Sensor works as soon as power on
Digital Output	9600bps UART 3.3V TTL level
Inlet and outlet direction	Arrow mark
Working temperature	5~50℃(non-condensing)
Storage temperature	-20~65℃(non-condensing)
Working humidity	0～95%RH(non-condensing)
Power Supply	DC 5V-12VDC，50mA
Dimensions	79mm x 34mm x 26.1mm (L x W x H)
Weight	18g

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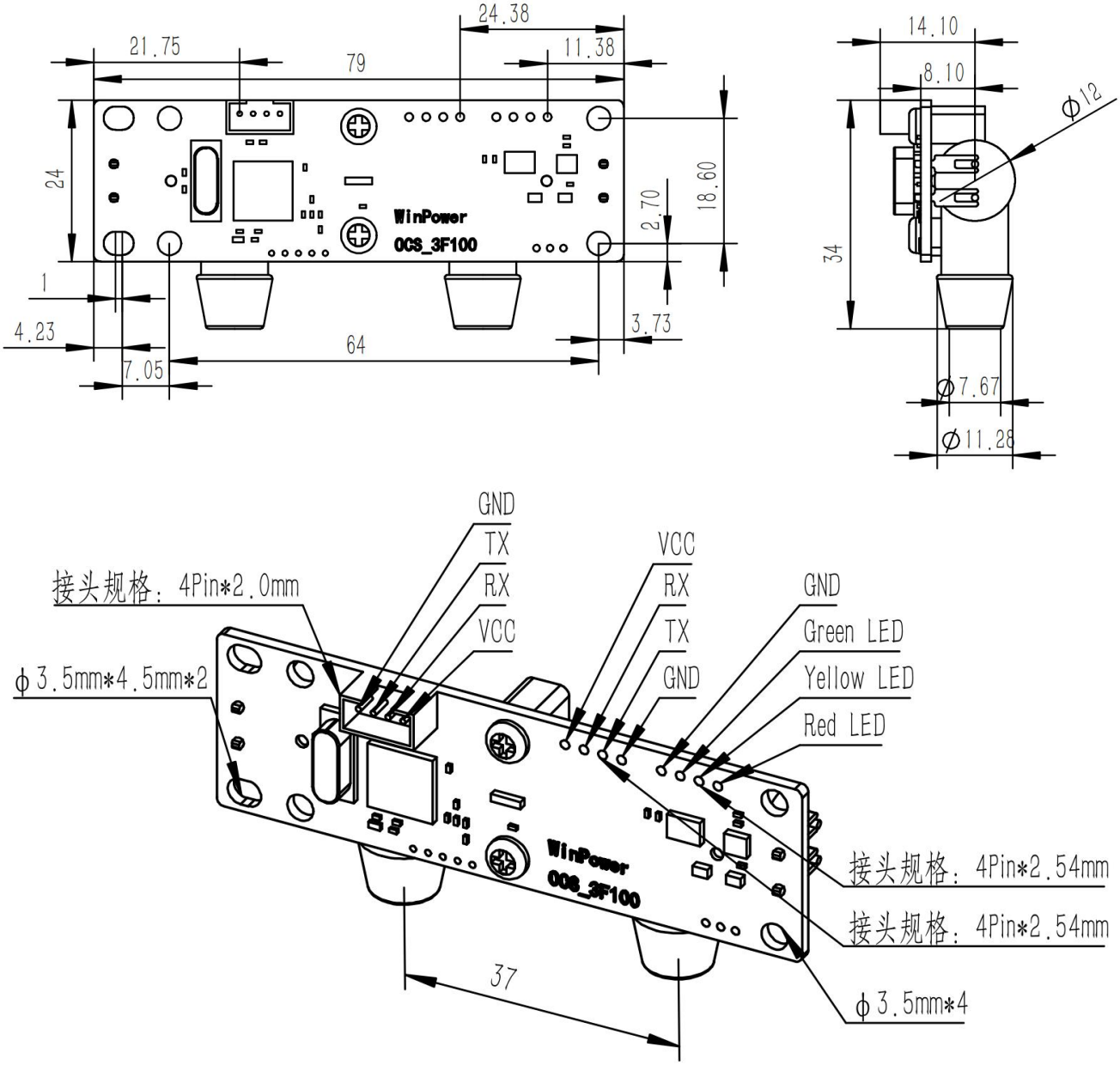
Interface definition description（Unit :mm, tolerance ±0.2mm）



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UART communication parameters Hardware

Baud rate: 9600bps

Character length: 1 start bit, 8 data bit, 1 stop bit, no check

Communication specification

1. All data hereunder shall be hexadecimal **unsigned** 8-bit data. E.g. "46" is decimal [70]

2. The protocol verification must contain 0x16 0x09 0x01 and CS bits, CS=0x00-sum[0:10]. That is, the lower 8 bits of sum[0:11] are 0x00. sum[0:11] indicates the sum of 12 bytes from data 0 to data 11.

3. Sensor data reporting mode: The sensor works in the default mode when powered on and automatically switches to the answer mode when receiving a query command.If no query command is received in 4 seconds, the system automatically switches to the default mode

3.1 Default mode: Data is reported twice every second.

3.2 Responsive model:Follow the motherboard to query the reported data, and reply immediately upon receiving the query instruction.

4.The default output of this sensor is the working condition flow. If a standard condition flow is required, it needs to be switched through an instruction. The main difference between the working condition flow and the standard condition flow is mainly influenced by high altitudes. For detailed explanations, please refer to the sample program.

5. Sensor data format:

0x16 0x09 0x01/0x02	0xoH 0xoL	0xfH 0xfL
Data head 3 bytes	Concentration 2 bytes	Flow 2 bytes

0xtH 0xtL	0xpH 0xpL	0xcs
Temperature 2 bytes	Pressure 2 bytes	Check 1 byte

6. Motherboard query instructions: 2 instructions according to customer needs to set themselves.

6.1

0x11 0x01	0x01	0xED
Fixed bit 2 bytes	Working condition 1 byte	Check 1 byte

6.2

0x11 0x01	0x02	0xEC
Fixed bit 2 bytes	Standard condition 1 byte	Check 1 byte

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7. Description of standard conditions and operating conditions

7.1 After the standard condition instruction is sent, the sensor is always in the standard condition flow reporting mode. Even if the instruction is not sent later, the sensor will report the standard condition flow data in the default mode

7.2 After the working condition instruction is sent, the sensor is always in the working condition flow reporting mode. Even if the instruction is no longer sent, the sensor will report the working condition flow data in the default mode

7.3 The instruction takes effect once and remains valid thereafter (it becomes invalid upon power loss). If necessary, they can be processed by instructions, and then judged by the header of the returned data. For details, refer to the following example program description

Sample program：

(The mainboard receives data from the sensor for data parsing)

```
temp_u8=0;  //The value must be 8 bits of unsigned data and must be cleared first. Assume that serial port 2 on the mainboard receives sensor data
for(i=0;i<12;i++) temp_u8 += USART2_RXbuffer[i];
if((temp_u8==0)&&(USART2_RXbuffer[0]==0x16)&&(USART2_RXbuffer[1]==0x09)&&((USART2_RXbuffer[2]==0x01)||(USART2_RXbuffer[2]==0x02)))
//All data headers are correct and the sum is 0. Note that USART2_RXbuffer[2]=0x01 represents the working condition flow and 0x02 represents the standard condition flow
{
  o2_concent = USART2_RXbuffer[3]*256 + USART2_RXbuffer[4];  //oxygen purity（o2_concent/10）%，
  o2_flow    = USART2_RXbuffer[5]*256 + USART2_RXbuffer[6];  //oxygen flow（o2_flow/10）L/min，USART2_RXbuffer[2] is needed to judge the standard condition or working condition
  o2_temp    = USART2_RXbuffer[7]*256 + USART2_RXbuffer[8];  //oxygen temperature（o2_temp/10）℃，
  o2_press   = USART2_RXbuffer[9]*256 + USART2_RXbuffer[10]; //Ambient pressure（o2_press/10）kpa
}
```

(The motherboard sends a query command to the sensor)

1. Command 1: The returned oxygen flow is the working condition flow (default mode)

```
USART2_TXbuffer[0] = 0x11;   //
USART2_TXbuffer[1] = 0x01;   //
USART2_TXbuffer[2] = 0x01;   //
USART2_TXbuffer[3] = 0xED;   //
```

2.Command 2: The returned oxygen flow is the standard condition flow

```
USART2_TXbuffer[0] = 0x11;   //
USART2_TXbuffer[1] = 0x01;   //
USART2_TXbuffer[2] = 0x02;   //
USART2_TXbuffer[3] = 0xEC;   //
```

Note: each command needs to be sent only once, and the sensor will change the mode after receiving the command.

The formula for calculating altitude through air pressure is:

H=44330 * (1.0 - pow(P / P0, 0.1903));

In the formula：H——altitude，P0=atmospheric pressure（0℃，101.325kPa）

*Altitude error±200m

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Package

Small box: Packing capacity 30PCS / layer* 5 layers = 150PCS Length, width and height: 42*30*24cm	Logistics box: length, width and height: 50*32*44cm Two small boxes inside: 150*2=300PCS	Net weight:5KG Gross weight: 7.2KG
		

Winpower Technology Co.,Ltd.

ADD：2ndfloor, Block 12, 2ndfloor, Block 6, Baosheng Industry Zone A, No.6, Tangbian Road, Bainikeng Village, Pinghu, Longgang District, Shenzhen, Guangdong,China 518111

TEL：86-0755-82415317

WEB：www.winpower.com.cn

E-mail:phc@winpower.com.cn