

SPECIFICATION FOR APPROVAL

Product Name : Ultrasonic oxygen sensorSpecification : OCS-3RL2.0

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

User Manual

OCS-3RL ultrasonic oxygen concentration sensor is the latest oxygen concentration sensor introduced by our company. It is suitable for oxygen purity detection in oxygen chamber, nitrogen machine and plateau space, and the test results are sent by UART digital output.

It uses the ultrasonic principle to detect the oxygen concentration in the air, with the following characteristics:

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 and ambient humidity



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](tel:+86-0755-82415317) or phc@winpower.com.cn
- ◆ Voltage data and air source data need to be provided before purchase.
- ◆ If it is detected in the space, it is equipped with a small fan to accelerate the diffusion of gas. If it is strung in the pipeline, it is necessary to increase the bacterial filter to prevent dust from entering.

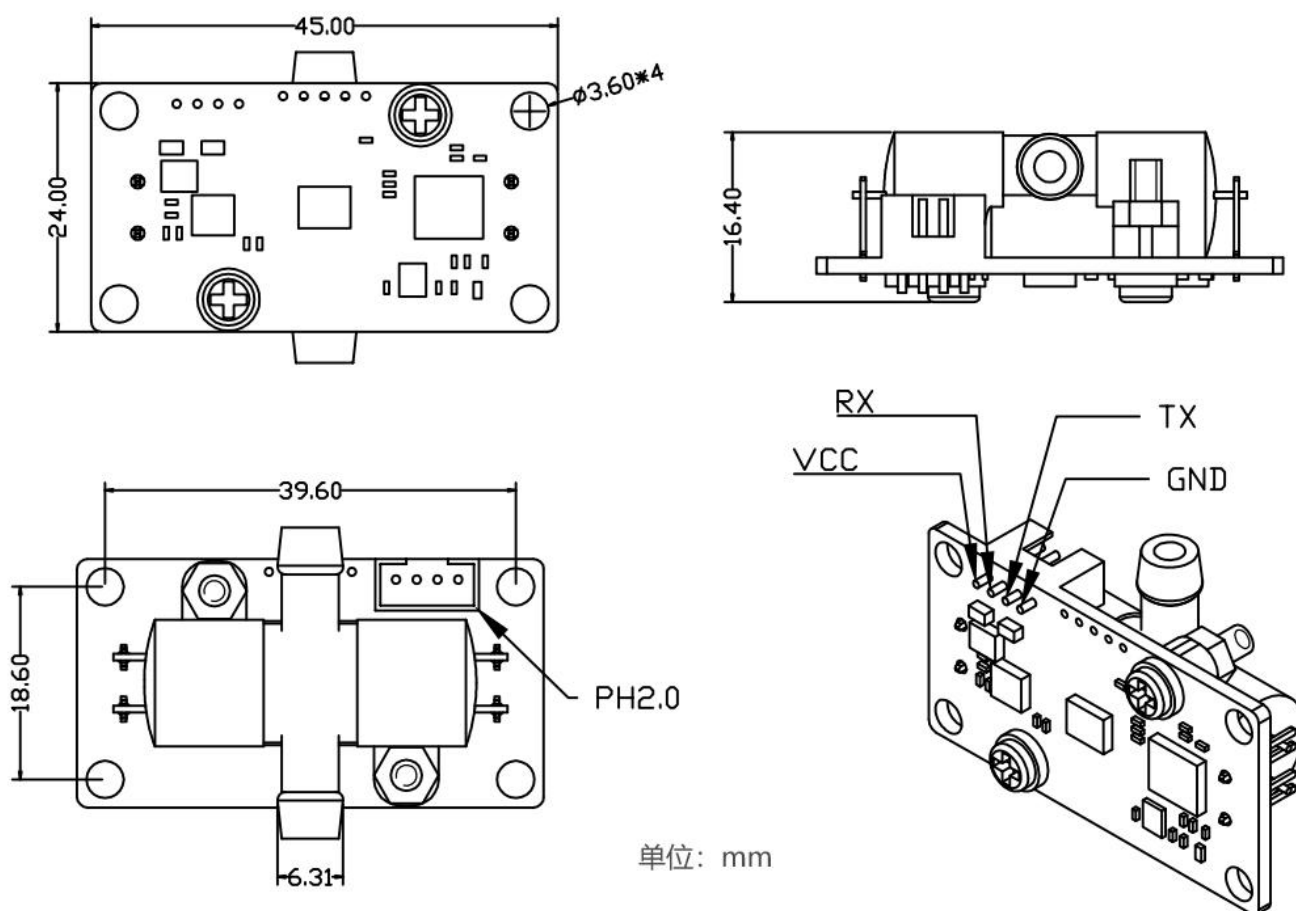
Technology Characteristics

Range of concentration (Need note whether it's sealed or not)	Pure oxygen: 21.0%-100%/0-100% PSA oxygen concentrator: 21.0%-95.6%/0-95.6%
Resolution	0.1%
Accuracy	$\pm 1.5\%FS @ (5 - 55) ^\circ C$
Humidity detection range and accuracy	0-100%RH and $\pm 3.5\%RH$
Temperature detection range and accuracy	0-60 $^\circ C$ and $\pm 0.2 ^\circ C$
Pressure detection range and accuracy	300mbar~1500mbar and $\pm 3mbar$ (Customizable: 300mbar ~3000mbar)
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; 10 seconds to within specified accuracy;
Digital Output	9600bps UART 3.3V TTL level
Direction	Any side is ok
Working temperature	5~50 $^\circ C$ (non-condensing)
Storage temperature	-20~65 $^\circ C$ (non-condensing)
Working humidity	0~95%RH(non-condensing)
Barometric pressure measuring range	50kpa-150kpa
Power Supply	DC 5V-12VDC, 50mA
Dimensions	45mm x 30mm x 17mm (L x W x H)
Weight	11g

Seal: It means that the purity reading is closed below 21%, and the purity reading goes up from 21%.

Unsealed:It means the purity reading starts at 0% and goes up

Interface definition description (Unit :mm, tolerance $\pm 0.2\text{mm}$)



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. By default, the sensor reports data twice every second. When the mainboard queries data, the sensor automatically switches to the answer mode and reports data to the mainboard instead of sending data twice a second.
4. The sensor works in the mode of measuring PSA oxygen generator mixed with air by default; If you need to measure pure oxygen mixed air, you need to switch by instruction, please refer to the example program for detailed instructions.

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 the data headers are correct and the sum is 0. Note that USART2_RXbuffer[2]=0x01 means that it
works in PSA oxygen generator mixed air mode, and 0x02 means that it works in pure oxygen mixed air mode
{
    o2_concent = USART2_RXbuffer[3]*256 + USART2_RXbuffer[4]; //oxygen purity (o2_concent/10) %, USART2_RXbuffer[2]
is required to determine the measurement mode
    o2_humi = USART2_RXbuffer[5]*256 + USART2_RXbuffer[6]; //Oxygen humidity (o2_humi/10) %
    o2_temp = USART2_RXbuffer[7]*256 + USART2_RXbuffer[8]; //Oxygen temperature (o2_temp/10) °C
    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. the first instruction: returned oxygen concentration is PSA+ air (default mode)

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

2. the second instruction: The returned oxygen concentration is pure oxygen + air

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

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

The formula for calculating altitude by air pressure is:

$H=44330 * (1.0 - \text{pow}(P / P_0, 0.1903));$

In the formula: H -- altitude, P0= atmospheric pressure (0°C, 101.325kPa)

* Altitude error ±200m

Package

Small box: Packing capacity 48PCS / layer* 5 layers = 240PCS Length, width and height: 42*30*24cm	Logistics box: length, width and height: 50*32*44cm Two small boxes inside: 240*2=480PCS	Net weight:5KG Gross weight: 7.2KG
		

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