

SPECIFICATION FOR APPROVAL

Product Name: Ultrasonic oxygen sensor

Specification: OCS-3FRL-2.0

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-3FRL-2.0 is a multi-functional oxygen sensor developed based on the ultrasonic principle. It is equipped with humidity, pipeline pressure and environmental pressure compensation functions, and can be used for the detection of mixed gases such as PSA+air and pure oxygen+air. It also has built-in environmental pressure compensation to adapt to the altitude of the environment. The sensor features high accuracy, good consistency, high stability, and long lifespan. The detection results are output through UART digital output, LED indicator lights, and in various forms such as 0-2.5V.

Features

- High accuracy
- Strong anti-interference ability
- Good long-term stability
- No need for user calibration
- Lifespan is more than 5 years
- Temperature and humidity compensation, atmospheric pressure compensation and Pipeline pressure compensation

Application scene

- Molecular sieve oxygen generator
- HFNC、detection of oxygen concentration in the environment

Usage Notes

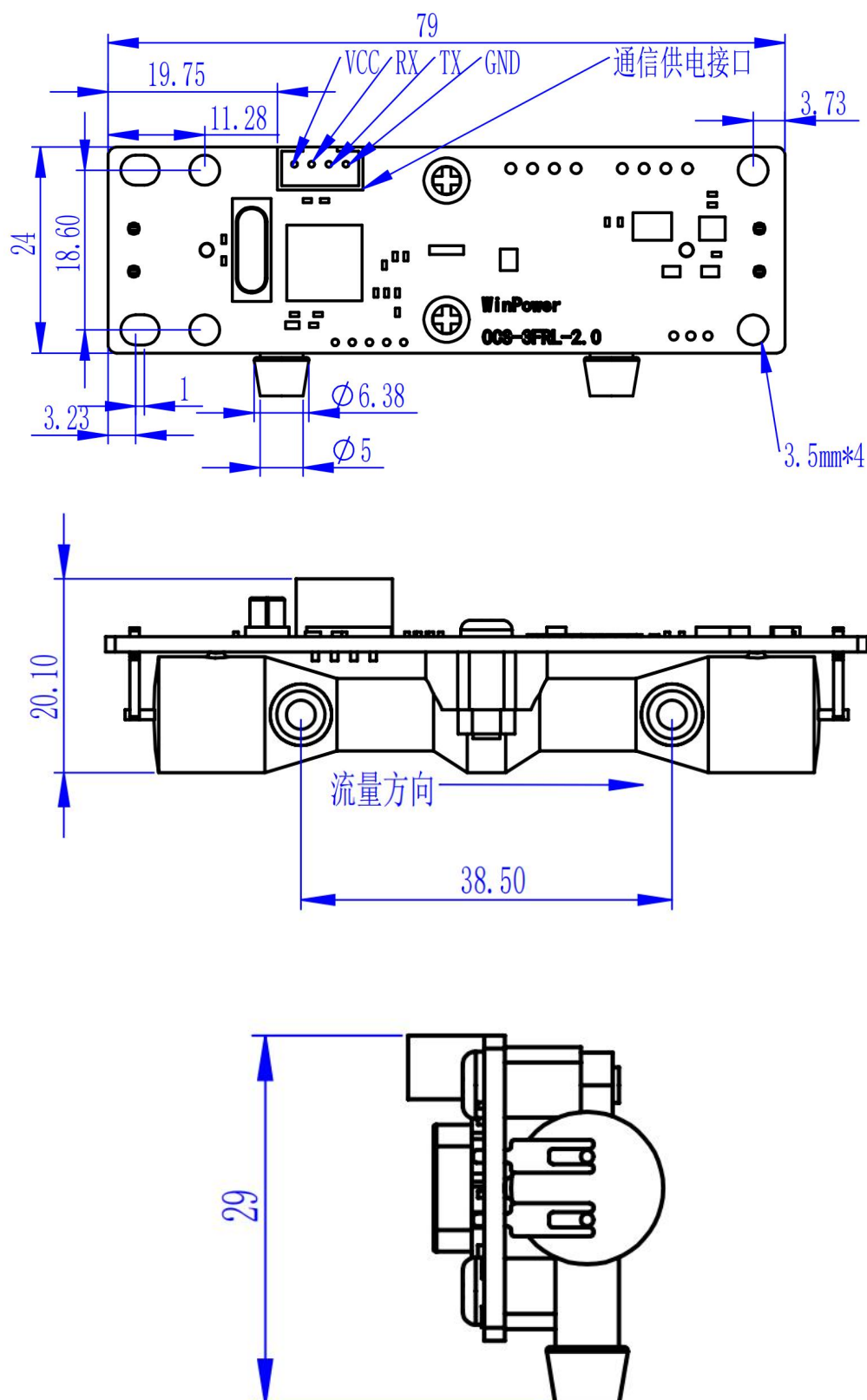
- ◆ Ensure that the detected gas is free of water, oil and dust.
- ◆ Installation location: Gas storage tank - Pressure regulating valve - Float flowmeter / Electronic flowmeter / Control knob - Sensor - Check valve - Humidifier bottle
- ◆ Without the permission of the manufacturer, do not disassemble the sensor. Any damage to the sensor caused by such actions will not be covered by warranty or repair by the manufacturer.
- ◆ This sensor and the data manual may be changed due to product technical improvements. No prior notice will be given. Please forgive us.
- ◆ Our company has the final interpretation right for the data manual of this sensor.

Specification

Range of Concentration	PSA oxygen generator: 21 - 95.6% Pure oxygen mixed with air: 21 - 100%	Other customizable options (please note.)
Resolution	0.1%	
Accuracy	$\pm 1.5\%FS @ (5 - 55) ^\circ C$	
Range of Flow	0-25L/min	
Resolution	0.1L/min	
Accuracy	$\pm 0.2L/min$ or 5% reading, which is bigger@ $(5-55) ^\circ C$	
Sample gas requirements	Gas cylinder mixed with air, PSA oxygen generator, PSA oxygen generator mixed with air	Arefaction(No condensation);Dust filtration(<1um)
The spacing time of UART data	500ms by default	Other customizable options (please note.)
Digital Output	9600bps UART TTV level	Compatible with 5V/3.3V levels. Don't connect directly to RS485/232.
LED Output	Green: O2 concentration $\geq 82\%$ Red: O2 concentration $< 82\%$ Yellow: O2 flow rate $< 0.5L/min$	Other customizable options (please note.)
Dual-channel DAC	0-2.5V	Requires customization. (please note)
Direction	follow the arrow	
Working temperature	5~55 $^\circ C$	
Temperature accuracy	0~3 $^\circ C$	
Storage temperature	-5~65 $^\circ C$	
Working humidity	5~95%RH	
Humidity accuracy	The maximum deviation is $\pm 6.5\%$ when the relative humidity is below 20%. The maximum deviation is $\pm 3.5\%$ when the relative humidity is between 20% and 80%. The maximum deviation is $\pm 6.5\%$ when the relative humidity is above 80%.	
Atmospheric pressure measurement range	30-115 kPa	Absolute pressure
Atmospheric pressure compensation range	55-110kpa	Absolute pressure
Atmospheric pressure accuracy	Within the range of 30 - 110 Kpa, with an error of ± 30 pa.	Absolute precision
Pipeline pressure measurement range	30-500Kpa	Absolute pressure
Pipeline pressure compensation range	0-100Kpa	Relative pressure
Pipeline pressure accuracy	Within the range of 30 - 120 Kpa, with an error of ± 500 pa.	Absolute precision
Power Supply	DC 4.5V~12V, 50mA	
Dimensions	79mm x 24mm x 22mm (L x W x H)	
Weight	25g	

Connectors

Main socket (numbered J2, size PH2.0 * 4 pins)



UART communication parameters

Baud rate: 9600bps

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

Communication Description

1. The data in this protocol are all in hexadecimal format. For example, "46" is the decimal equivalent of [70].

2. The protocol verification must include 0x16, 0x09, 0x01 and the CS bit. Only the data that passes the verification can be used normally.

The sensor defaults to reporting 2 pieces of data every 1 second. When the mainboard queries, the sensor automatically switches to the response mode and starts reporting data according to the mainboard's query, no longer performing the operation of reporting 2 pieces of data every 1 second.

3. The sensor has 2 detection methods corresponding to 2 query instructions. Query instruction 1 corresponds to air + oxygen generator, and query instruction 2 corresponds to air + pure oxygen. If the sensor is powered on and has never received a query instruction, the sensor defaults to working in the state of query instruction 1; if the sensor is powered on and has received a query instruction, the sensor will work in the corresponding query instruction state; if the sensor is powered on and has received a query instruction but no subsequent query instructions are received, the sensor will work in the state corresponding to the last received query instruction.

4. Protocol format description for sensor data reporting

Byte count	Byte0, Byte1, Byte2	Byte3, Byte4	Byte5	Byte6
Explanation	data head	Concentration 2 Byte	volume flow	mass flow

Byte count	Byte7	Byte8	Byte9, Byte10	Byte11
Explanation	temperature	humidity	atmospheric pressure	check sum

Sample program:

1. Query Measurement Mode 1 (Gas Source: Air + Oxygen Generator)

(The motherboard receives data transmitted by the sensor and performs data parsing.)

```
temp_u8=0;
```

//It must be 8-bit unsigned data, and the operation must first clear it to zero. Assume that motherboard serial port 2 is used for sensor data reception.

```
for(i=0;i<12;i++) temp_u8 += USART2_RXbuffer[i];
```

```

    if((temp_u8==0)&&(USART2_RXbuffer[0]==0x16)&&(USART2_RXbuffer[1]==0x09)&&(U
SART2_RXbuffer[2]==0x01)) //All packet headers are correct and the sum is 0
{
    o2_concent = USART2_RXbuffer[3]*256 + USART2_RXbuffer[4];
    //Gas concentration ( o2_concent/10 ) %
    o2_flow_ACT  = USART2_RXbuffer[5]
    o2_flow_STD  = USART2_RXbuffer[6];
    //Gas-flow rate (o2_flow_ACT/10) L/min or (o2_flow_STD/10) L/min
    o2_temp     = USART2_RXbuffer[7];
    //Gas temperature ( o2_temp ) °C
    o2_humi     = USART2_RXbuffer[8];
    //Gas humidity ( o2_humi ) %
    Atm = USART2_RXbuffer[9]*256 + USART2_RXbuffer[10];
    // Atmosphere pressure(Kpa)
}

```

(The motherboard sends **query commands** to the sensor.)

```

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

```

2. Measurement Mode Inquiry 2 (Gas Source: Air + Pure Oxygen)

(The motherboard receives data transmitted by the sensor and performs data parsing.)

```
temp_u8=0;
```

//It must be 8-bit unsigned data, and the operation must first clear it to zero. Assume that motherboard serial port 2 is used for sensor data reception.

```
for(i=0;i<12;i++) temp_u8 += USART2_RXbuffer[i];
```

```

    if((temp_u8==0)&&(USART2_RXbuffer[0]==0x16)&&(USART2_RXbuffer[1]==0x09)&&(U
SART2_RXbuffer[2]==0x02)) //All packet headers are correct and the sum is 0
{

```

```

    o2_concent = USART2_RXbuffer[3]*256 + USART2_RXbuffer[4];
    //Gas concentration ( o2_concent/10 ) %
    o2_flow_ACT  = USART2_RXbuffer[5]
    o2_flow_STD  = USART2_RXbuffer[6];
    //Gas-flow rate (o2_flow_ACT/10) L/min or (o2_flow_STD/10) L/min
    o2_temp     = USART2_RXbuffer[7];

```

```

//Gas temperature ( o2_temp ) °C
o2_humi  = USART2_RXbuffer[8];
//Gas humidity ( o2_humi ) %
Atm = USART2_RXbuffer[9]*256 + USART2_RXbuffer[10];
//Atmosphere pressure(Kpa)
}

```

(The motherboard sends **query commands** to the sensor.)

```

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

```

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
		

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