

SPECIFICATION

Product Name: Ultrasonic Oxygen Sensor

Sensor Item No.: Gasboard-7500K-OAQ

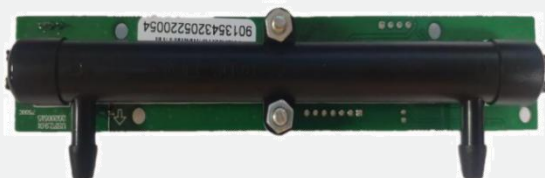
Version: V1.0

Date: August 02, 2020

Revision

No.	Version	Content	Reviser	Date
1	V1.0	First Edition	Una Zhan	2020-8-02

Ultrasonic Oxygen Sensor Module Gasboard-7500K-OAQ



Applications

- Digital Gas Analysis and Detection Instrument
- Particle Counter
- Measurement the Flow of Clean Gas
- Family&Medical Concentrator/Generator

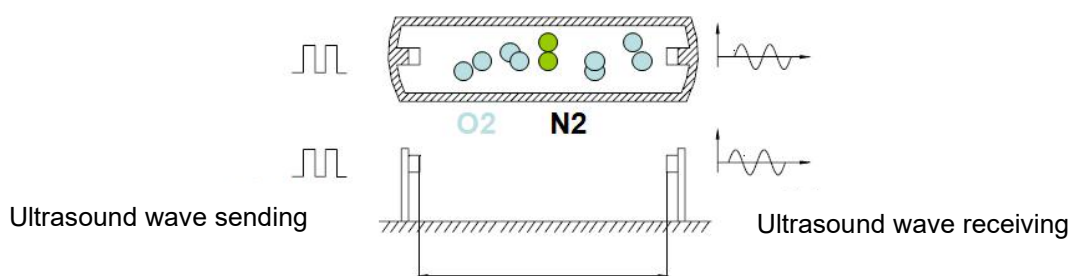
Description

The gasboard-7500K-OAQ ultrasonic flow sensor is an high performance-cost-ratio sensor for measuring gas flow and concentration in binary gases. Based on the mature ultrasonic detecting technology, this sensor has great performances of self-calibration, maintenance-free, no drift. This sensor also has full range matrix temperature compensation, can detect the the flow of binary gas more accurately, very functional in family and medical oxygen concentrator/generator and other gas detection in binary gas.

Working Principle

Principle of ultrasonic flow detection: when ultrasonic wave is propagating in the fluid, it is affected by the fluid velocity and carries the flow velocity information. The flow velocity can be measured by detecting the received ultrasonic signal, so as to obtain the flow rate. Ultrasonic flow measurement has the characteristics of not impeding fluid flow.

Ultrasonic concentration detection theory: when the binary gas mixture composition has molecular weight difference, sound travel speed varies from different gas composition.



Features

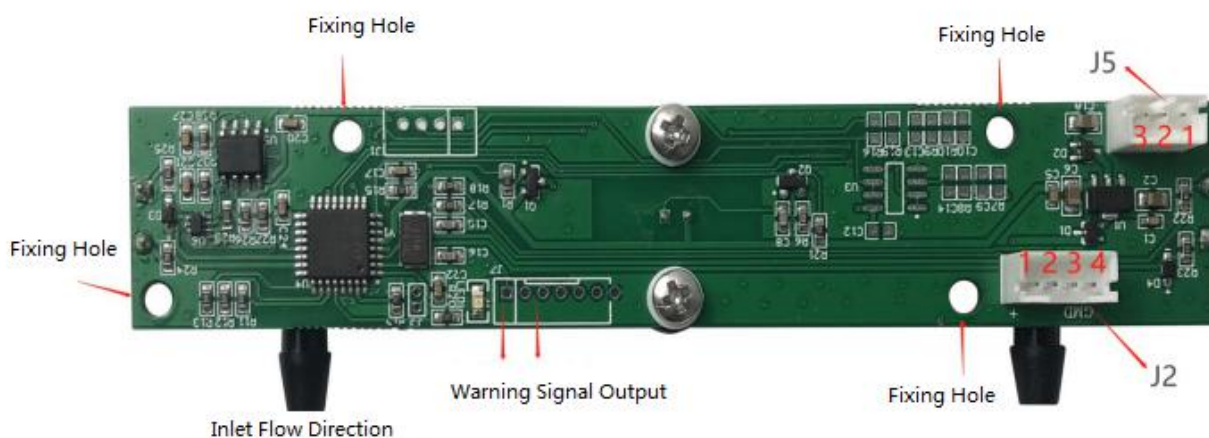
- ✧ Measure flow rate of binary gas
- ✧ Full scale matrix temperature and humidity compensation, not affected by humidity
- ✧ Small size, quick response, stable, high accuracy
- ✧ Long lifespan, self-calibration, maintenance-free
- ✧ RoHS, REACH, CMC, EMC, CE certificated

Specification

Ultrasonic Flow Sensor Specification	
Detect Principle	Ultrasonic Technology
Detection Range	Flow Rate: 0~20L/min ^①
Detection Accuracy	Flow Rate: $\pm 3\%$ or $\pm 0.3\text{L/min}@ (5\sim 45)^{\circ}\text{C}$
Resolution	Flow Rate: 0.01L/min
Response Time	Flow Rate: $\leq 0.3\text{S}$
Work Condition	-20~60°C; 0~95%RH (Non-condensing)
Storage Condition	-20~60°C; 0~95%RH (Non-condensing)
Work Voltage	DC 4.75V-12.5V, Ripple Wave <50mV
Average Work Current	$\leq 35\text{mA}$
Communication Interface	UART_TTL(5V)
Product Size	W120*H30*D22 mm
Life Span	≥ 5 Years

Remark^① Working condition flow, under current temperature, volume flow under current pressure.

Pin Definition



Drawing1_Gasboard-7500K-OAQ Pin Definition

Pin Definition List

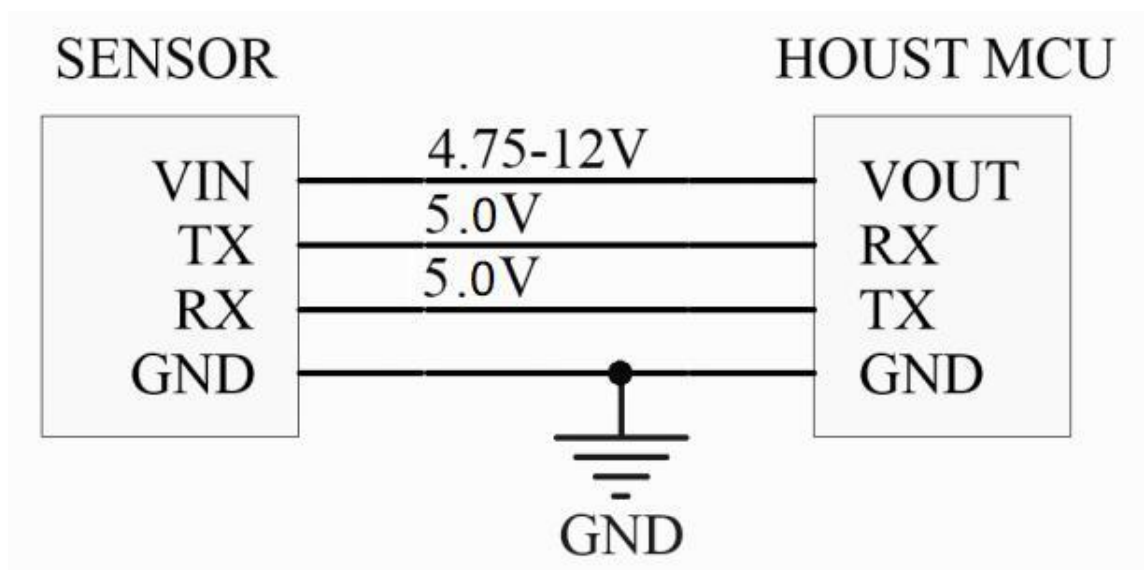
J5			J2		
NO	Pin	Description	NO	Pin	Description
1	Vcc	External Power Supply Input Pin, 4.75-12.6V	1	Vcc	External Power Supply Input Pin, 4.75-5.0V
2	NC	No Definition	2	Rx	UART-Rx Receiving (5V)
3	GND	Power Supply Input	3	Tx	UART-Rx Sending (5V)
			4	GND	Power Supply Output

Connectors Type

Port	Terminal	Connector	Pitch
J2	PH2.0-4A	PH2.0-4P	2.0mm
J5	PH2.0-3A	PH2.0-3P	2.0mm

Reference Circuit

Application Scenarios: UART TTL 5 V Output



Drawing 2 UART Communication Connection Circuit

Communication Protocol

UART Communication Protocol

1. Protocol Overview

- 1) Baud Rate: 9600, Data Bits: 8, Stop Bits: 1, Parity: No, Flow Control: No
- 2) The protocol data are hexadecimal data. For example "46" is [70] in decimal;
- 3) [xx] is single byte data(unsigned,0-255); In double byte, the high byte is in front of low byte;
- 4) The default is active sending, and the sending cycle is 0.5 seconds. If you need to read more other data, send the corresponding command directly to the host, and the host responds immediately.

2. Serial Communication Protocol Format

PC Send Format

Start Symbol	Length	Order No	Data 1	Data n	Check Sum
HEAD	LEN	CMD	DATA1	DATAn	CS
11H	XXH	XXH	XXH	XXH	XXH

Protocol Format Description

Protocol Format	Description
Start Symbol	PC sending is fixed to [11H], module response is fixed to[16H]
Length	Length of frame byte, =data length+1 (include CMD+DATA)
Order No	Directive number
Data	Read or written data, the length is variable
Check Sum	The sum of data accumulation, =256-(HEAD+LEN+CMD+DATA)

3. Serial Protocol Order Number List

No	Function Name	Order No
1	Read the measurement result	0x01
2	Read the software version number	0x1E
3	Inquiry instrument serial number	0x1F

4. Detailed Description

4.1 Read the Measurement Result

Send : 11 01 01 ED

Response : 16 09 01 DF1-DF8 [CS]

Function : Read the measurement result

Description :

Flow Value = (DF3*256 + DF4) /100 (L/min)

Temperature Value = (DF5*256 + DF6) /10 (°C)

(Remarks: The gas temperature value is the gas temperature in the gas chamber of the sensor)

Notice: DF7-DF8 reserve

Remark: The default is active sending. The sensor can also output the value automatically without sending the command.

Communication Protocol

Response Example:

Response: 16 09 01 00 00 01 1B 00 C2 00 1E 33

Instruction :

Hexadecimal Convert into Decimal: 01 1B is 1 27; 00 C2 is 0 194

Flow Value=(1*256+27)/100=2.83 (L/min)

Temperature Value=(0*256+194)/10=19.4 (°C)

4.2 Read the Software Version Number

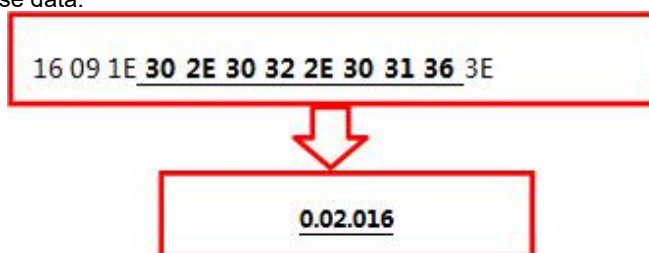
Send : 11 01 1E D0

Response : 16 09 01 DF1-DF8 [CS]

Function : Read the software version number

Instruction : DF1-DF8 refers to the ASCII code of particular version number

For Example: When module version number is 0.02.016, response data:



4.3 Inquiry Instrument Serial Number

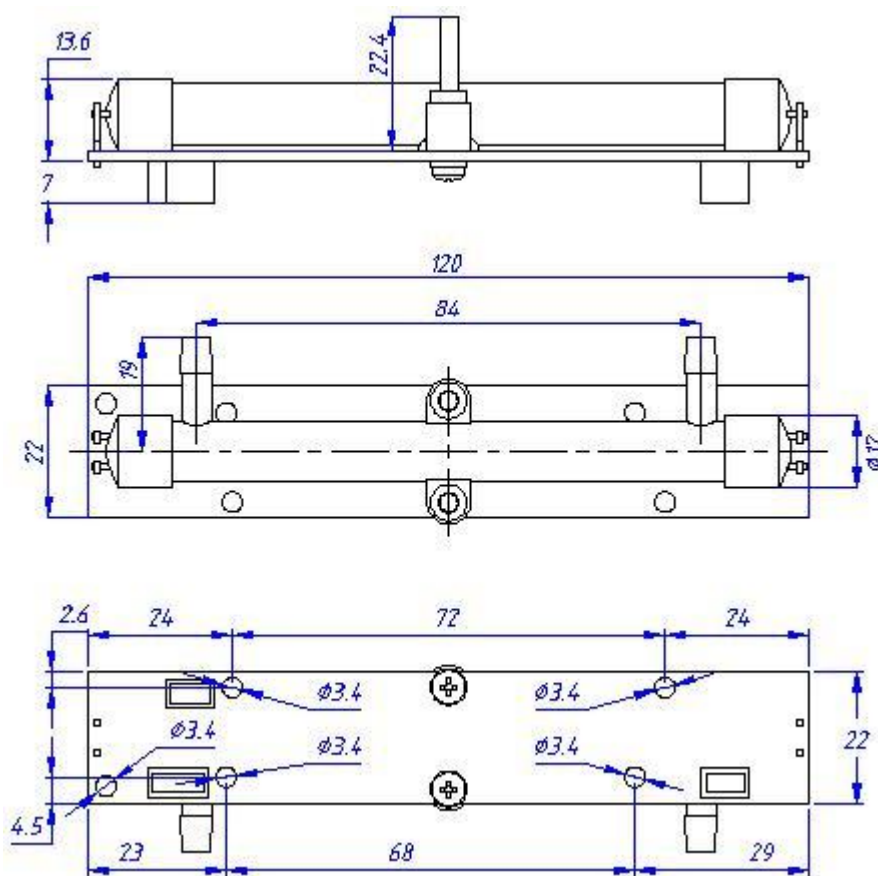
Send : 11 01 1F CF

Response : 16 0B 1F (SN1) (SN2) (SN3) (SN4) (SN5) [CS]

Function : Read version number for module firmware

Explanation : Instrument serial number of output software. SNn range is 0~9999, 5 integer type constitute 20 serial number

Dimension

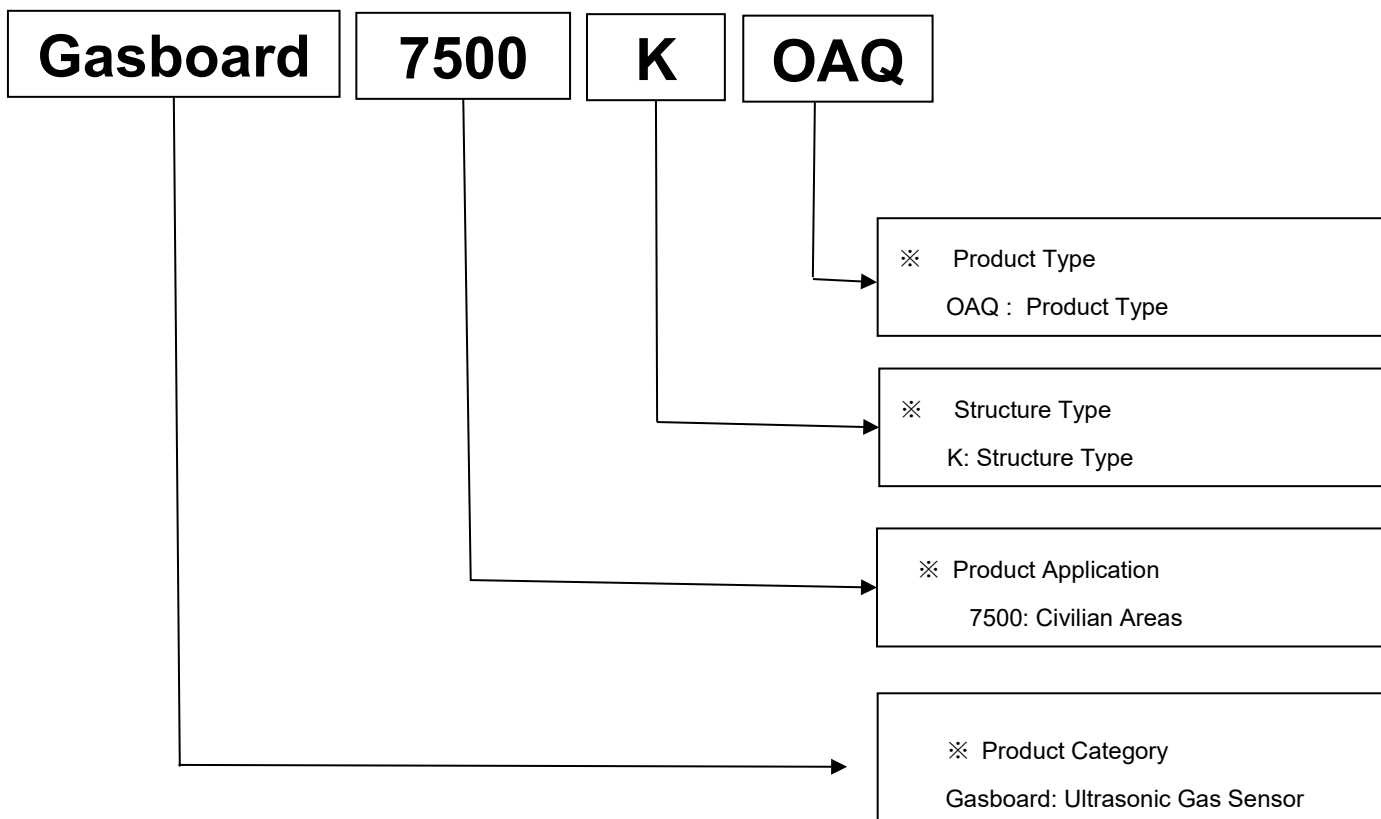


Drawing 3 (Unit:mm, Tolerance: ± 0.2 mm)

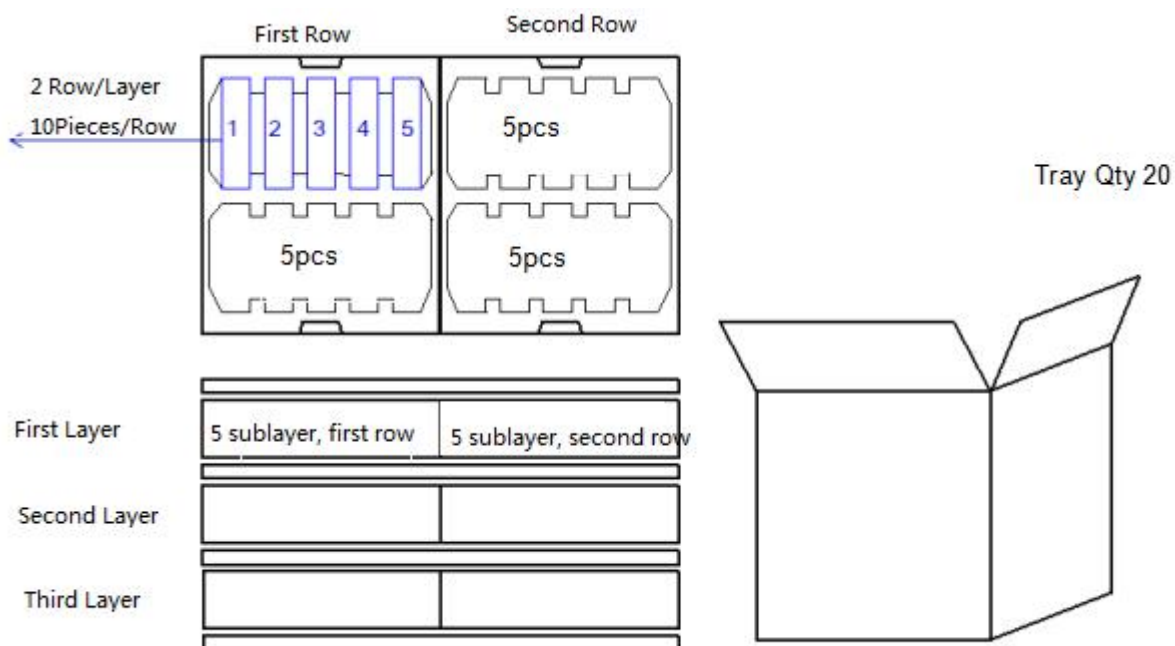
Reliability Testing

Item	Requirement	Criterion	Sample (n) Failed (c)
Flow Performance	Indoor temperature requirement: $25\pm 2^{\circ}\text{C}$, humidity $(50\pm 10)\% \text{RH}$, after the sensor connect with serial port and power on, switch over the flow in 3L/min、5L/min、8L/min respectively to make measurement of oxygen concentration and accuracy.	Make new tests in different oxygen flow, all can meet deviation criterion.	n=70 c=0
Low Temperature Storage	Storing the sensor for 96H with no power under $-20^{\circ}\text{C}\pm 2^{\circ}\text{C}$ environment condition, then test the measuring deviation under normal temperature condition.	After staying under normal temperature condition for 2 hours, the test all can meet deviation criterion.	n=0 c=0
Low Temperature Operation	Indoor temperature requirement: $-10\pm 2^{\circ}\text{C}$, test the measuring deviation of sensor under normal temperature condition after operating for 96H with electricity.	After staying under normal temperature condition for 2 hours, the test all can meet deviation criterion.	
High temperature Storage	Storing the sensor for 96H with no power under $60^{\circ}\text{C}\pm 2^{\circ}\text{C}$ environment condition, then test the measuring deviation under normal temperature condition.	After staying under normal temperature condition for 2 hours, the test all can meet deviation criterion.	
High Temperature Operation	Indoor temperature requirement: $50\pm 2^{\circ}\text{C}$, test the measuring deviation of sensor under normal temperature condition after operating for 96H with electricity.	After staying under normal temperature condition for 2 hours, the test all can meet deviation criterion.	
High-low Temperature Shock	Keep the sensor under -20°C for 60 mins, then switch it to 60°C in 10s and stay for another 60 mins, this is one cycle. Totally 10 cycles with the sensor power off.	After staying under normal temperature condition for 2 hours, the sensor accuracy should meet the specification standard.	
High Temp &Humidity	Keep the sensor under high temp & humidity ($40\pm 2^{\circ}\text{C}$, 95%RH), after working under rated voltage for 500H, test the measuring deviation under normal temperature condition.	After staying under normal temperature condition for 2 hours, the sensor accuracy should meet the specification standard.	n=2 c=0
Salt Spray Test	Standard :GB/T2423.17, place the sensor in the salt fog box under 35°C and spray it with Nacl solution (concentration is 5%) for 24 hours, then flushing it with distilled water and drying it with airflow.	Keep the sensor under standard environment more than 1h and less than 2h, it should no appearance defect, no corrosion.	
Vibration Test	Bare sensor should bear the specified vibration test in X/Y/Z direction, frequency range 10~55~10Hz/min, amplitude 1.5mm, scan circulation 2 hours.	No appearance defect after vibration test, the sensor can meet basic performance test standard.	n=4 c=0
Package Drop Test	Drop height: setting the height as specified weight according to standard GB/T 4857.18. Making the drop test according to the GB/T4857.5 standard. Test sequence is one corner, three edges, six sides.	No appearance defect after drop test, no components fall off, the sensor should work normally.	n=1 ctn c=0

Product Code Instruction



Packing Information



Qty/Layer	Small Tray Qty	Big Tray Qty	Sensor per Carton	Carton Dimension	Packing Material
20 pcs	5 Layers	3 Layers	300pcs	W395 * L320 * H470mm	Anti-static Plastic Tray

Consultancy & After-sales Service

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