SPECIFICATION

Product Name：**Ultrasonic Flow Senor**

Sensor Item No.: Gasboard-7500H-OPC
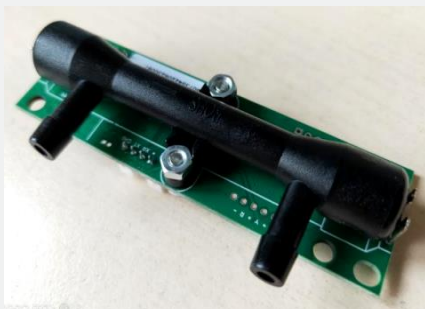
Version: V1.0

Date: August 01, 2020

Revision

No.	Version	Content	Date
1	V1.0	First Edition	2020-08-01

Ultrasonic Flow Sensor Module Gasboard-7500H-OPC

Applications

➢ Digital Gas Analysis and Detection Instrument

➢ Particle Counter

➢ Measurement the Flow of Clean Gas

Description

Gasboard-7500H-OPC ultrasonic flow sensor is an economical sensor for measuring air flow. Based on the mature gasboard-7500 ultrasonic oxygen sensor module, this sensor has outstanding characteristics of quick response, high accuracy, great stability, no drift, etc. Gasboard-7500H-OPC sensor has full scale matrix humidity compensation, not affected by humidity. This product is very suitable for digital gas analysis and detection instrument, particle counter and other air monitoring equipment.

Features

✧ Measure air flow rate 0~5L/min

✧ Full scale matrix temperature and humidity compensation

✧ Quick response, stable measurement, high accuracy

✧ Self-calibration, maintenance-free, no drift

✧ Perfect EMC performance, long life span

✧ Compact size W80*H22*D25 mm

Working Principle

The principle of ultrasonic flow detection: the time difference method is adopted, measure the flow time and the reverse flow time of ultrasonic waves propagating in the fluid, and the fluid flow rate can be measured by detecting the time difference of the received ultrasonic signal, thereby obtaining the fluid flow rate.


Ultrasound Wave Sending   O2   N2   Ultrasound Wave Receiving
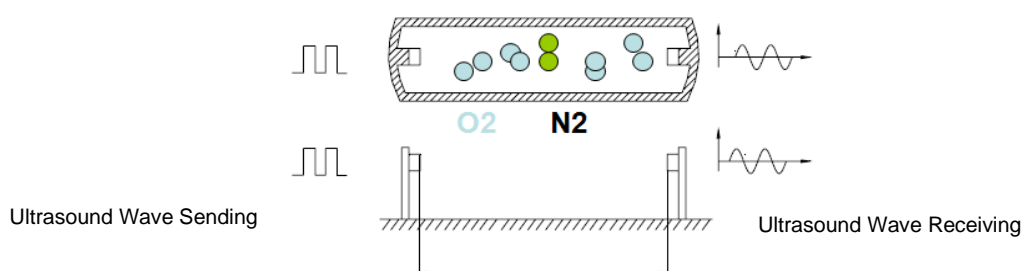
Specification

<table>
<tr><td colspan="2" align="center">Ultrasonic Flow Sensor Specification</td></tr>
<tr><td>Detect Principle</td><td>Ultrasonic Technology</td></tr>
<tr><td>Detection Range</td><td>0~5L/min①</td></tr>
<tr><td>Detection Accuracy</td><td>±3% or ±0.06L/min (Condition: (5~45℃)</td></tr>
<tr><td>Resolution</td><td>0.01L/min</td></tr>
<tr><td>Response Time</td><td><0.3S</td></tr>
<tr><td>Work Condition</td><td>-20~60℃; 0~95%RH（Non-condensing）</td></tr>
<tr><td>Storage Condition</td><td>-20~60℃; 0~95%RH（Non-condensing ）</td></tr>
<tr><td>Work Voltage</td><td>DC 4.75-12.6V, Ripple Wave <50mV</td></tr>
<tr><td>Average Work Current</td><td>＜35mA</td></tr>
<tr><td>Communication Interface</td><td>UART_TTL (3.3V)</td></tr>
<tr><td>Product Size</td><td>W80*H22*D25 mm</td></tr>
<tr><td>Life Span</td><td>≥5 Years</td></tr>
</table>

Remark① Working condition flow, under current temperature, volume flow under current pressure.

Pin Definition
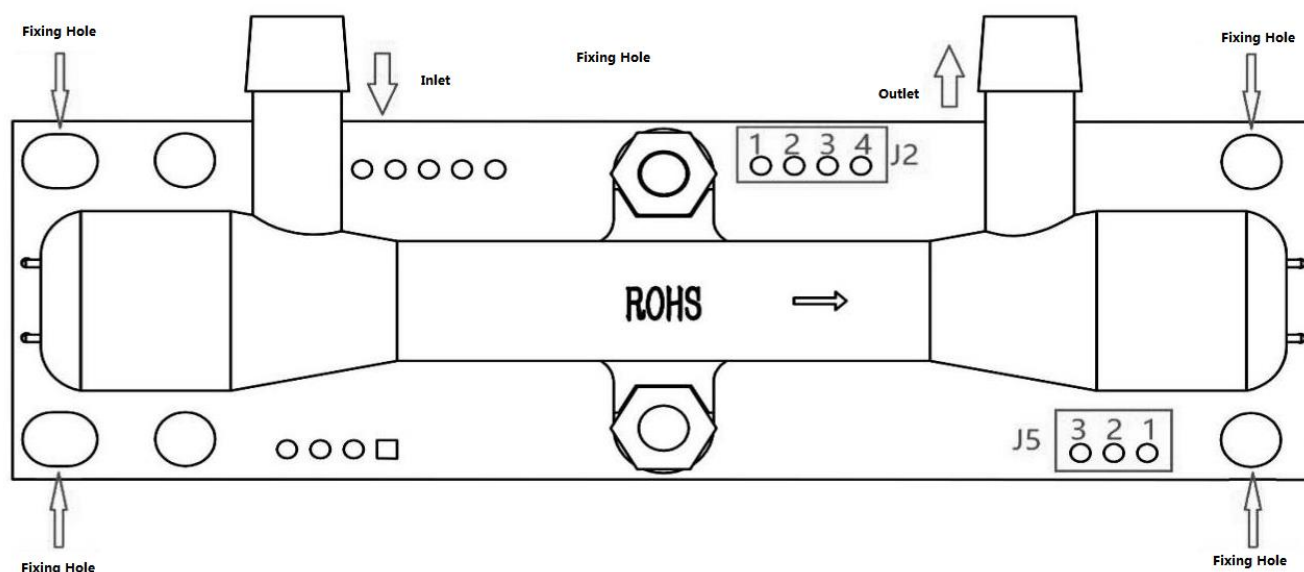
Drawing1 Gasboard-7500H-OPC Pin Definition

**Table 1. Connector Pin Definition**

J2			J5		
NO	**Pin**	**Description**	**NO**	**Pin**	**Description**
1	Vcc	4.75-12.6V, External Power Supply Input Pin	1	Vcc	4.75-12.6V, External Power Supply Input Pin
2	Rx	UART-Rx Receiving (3.3V)	2	NC	No Definition
3	Tx	UART-Rx Sending (3.3V)	3	GND	Power Supply Input
4	GND	Power Input			

Table 2. Connector Description

Port	Terminal	Connector	Pin Pitch
J2	PH2.0-4A	PH2.0-4P	2.00mm
J5	PH2.0-3A	PH2.0-3P	2.00mm

Reference Circuit

Application Scenarios:　UART 3.3V Output
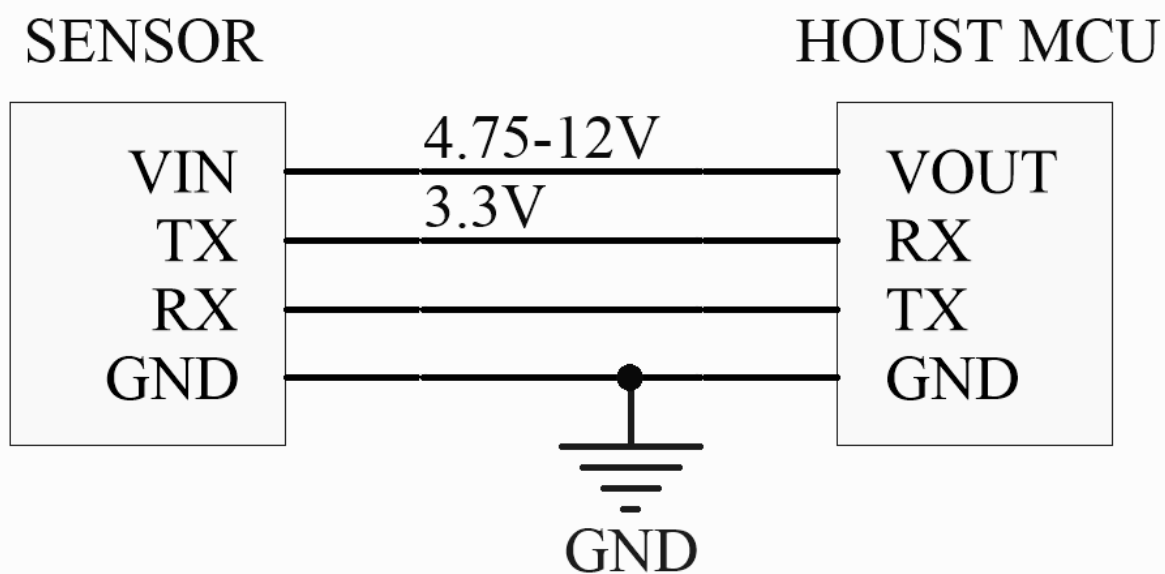
Drawing 2 UART Communication Connection Circuit

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 of gas	0x01
3	Read the software version number	0x1E
5	Inquiry instrument serial number	0x1F

4. Detailed Description

4.1 Read the Measurement Result of Gas

Send: 11 01 01 ED

Response: 16 09 01 DF1-DF8 [CS]

Function: Read the measurement result of gas

Description: gas flow value = （DF3*256 + DF4）/100 （L/min）

              gas temperature value = （DF5*256 + DF6）/10 （℃）

              (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.

When send 11 01 07 E7, can change active data sending mode to request-response mode.

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 00 194

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

Temperature Value= (0*256+194)/10=19.4 （℃）
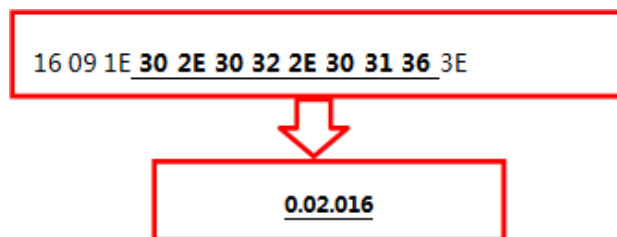
4.2 Read the Software Version Number

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:

16 09 1E **30 2E 30 32 2E 30 31 36** 3E

Hexadecimal Convert into ASCII Code:

0.02.016

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
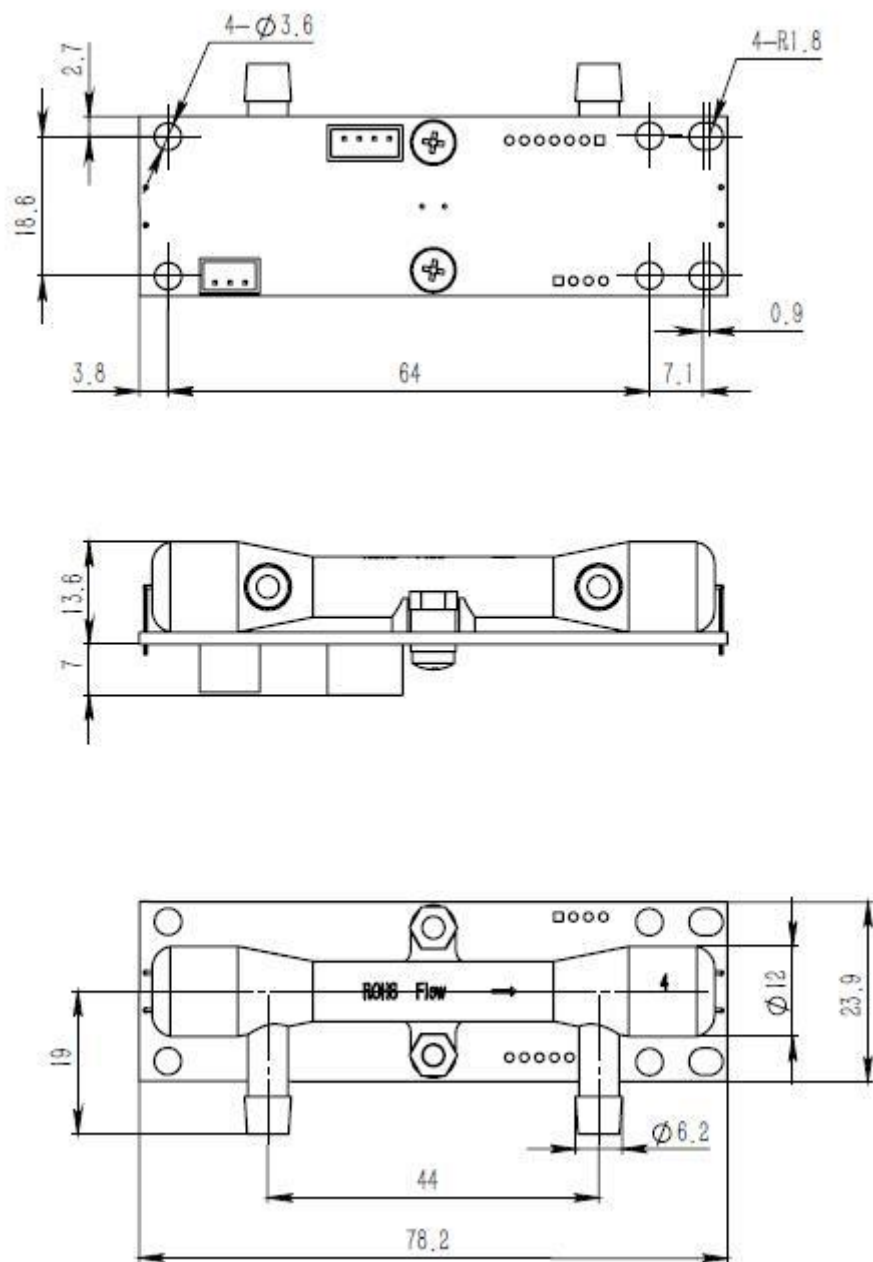
4.4 Stop and Restart Automatically Readding

Send: 11 01 07 E7

Function: Stop or enable reading the measurement value of the gas automatically

Explanation: When sensor in the model read the measurement gas value automatically, the command 11 01 07 E7 can stop the automatically reading, if send the command once again, the sensor will back to the model reading the measurement value of the gas automatically.
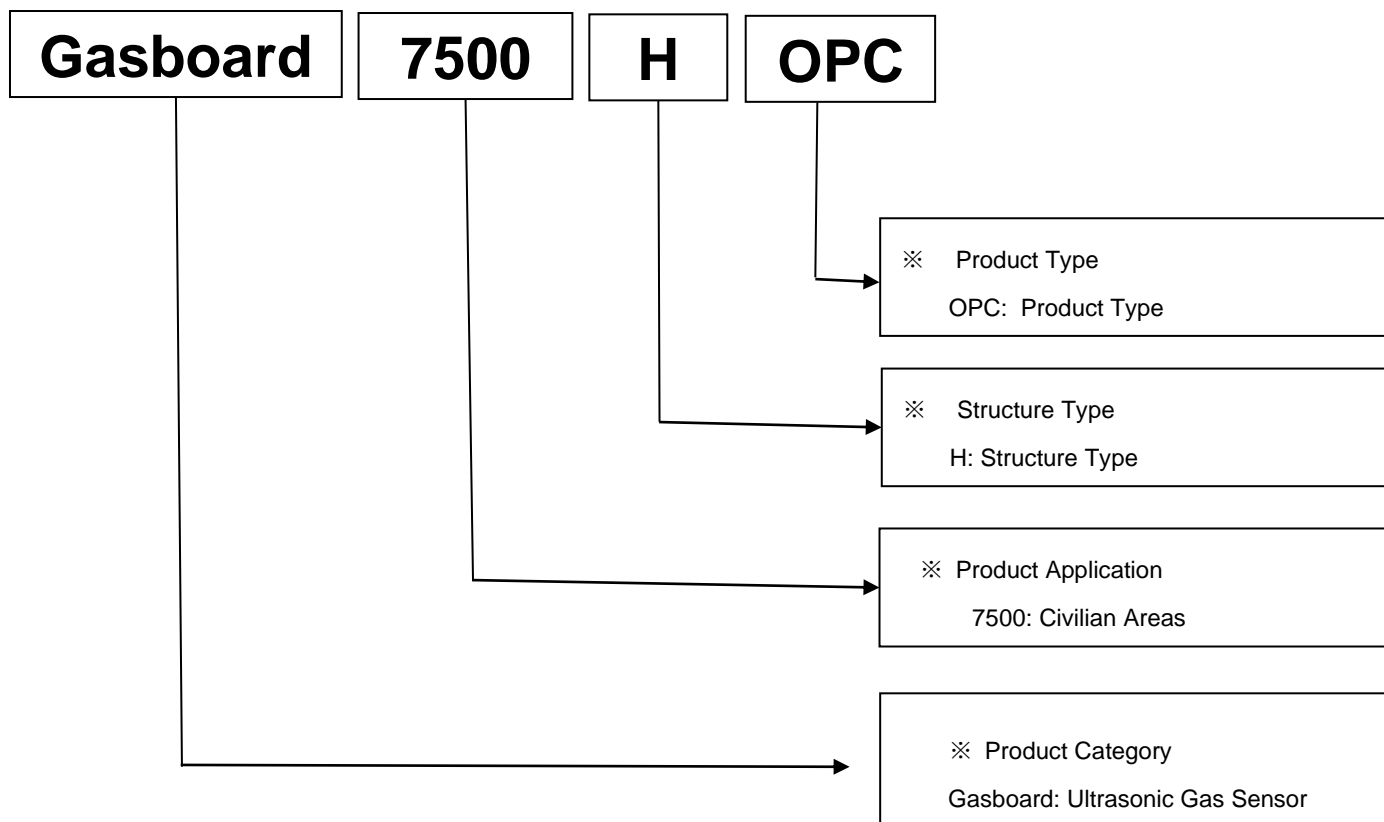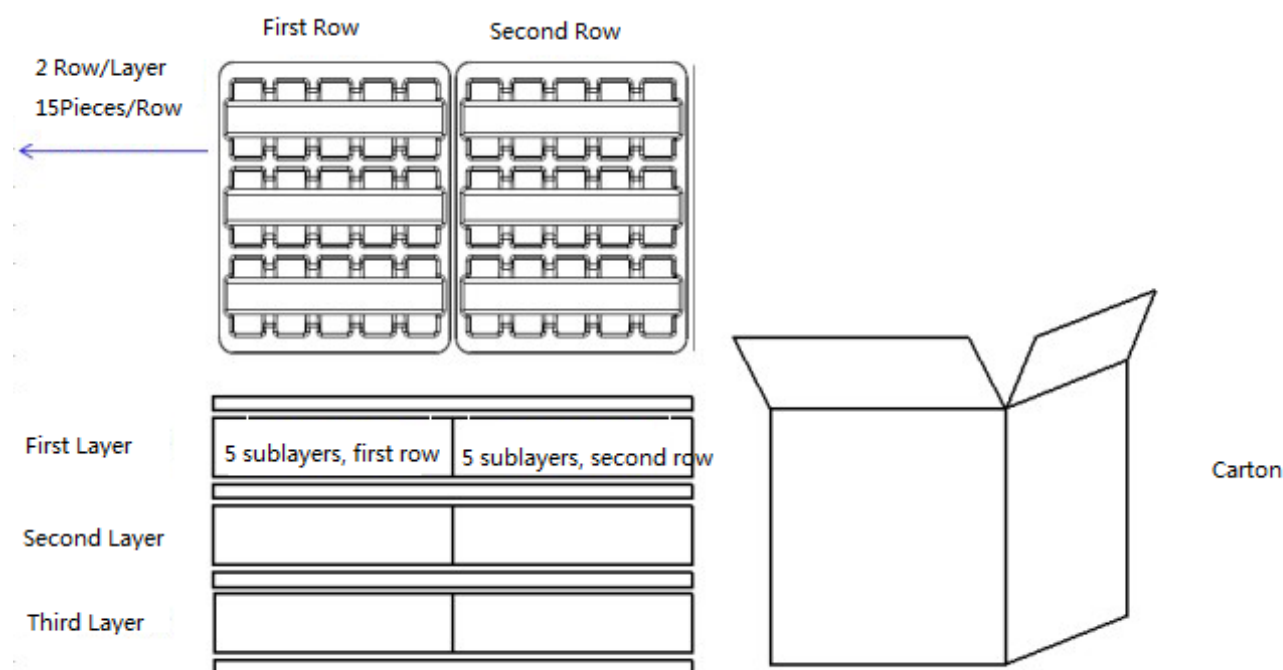
Dimension

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

Product Code Instruction

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Gasboard    7500    H    OPC
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※   Product Type

OPC: Product Type

※   Structure Type

H: Structure Type

※ Product Application

7500: Civilian Areas

※ Product Category

Gasboard: Ultrasonic Gas Sensor

Packing Information

Qty/Layer	Small Tray Qty	Big Tray Qty	Sensor per Carton	Carton Dimension	Packing Material
30 pcs	5 layers	3 layers	450pcs	W395 * L320 * H470mm	Anti-static Plastic Tray

User Attention

Please pay attention to below:

(1) Install the sensor as far away as possible from the heat source and heat dissipation outlet of the compressor, and install the sensor as close as possible to the air outlet.

(2) In order to ensure reliability and long service life, do not use or store the sensor in a place where the temperature is higher than the rated temperature, and do not use the sensor in an environment where the voltage is higher than the rated voltage of the sensor.

(3) Without necessary compensations, please do not use the sensor in the environments of high humidity water steam, abnormal pressure, and low temperature.

(4) The product shall not be used or stored in a place with corrosive gas, especially hydrogen sulfide gas, acid, alkali, salt or similar. The products stored in the warehouse should be stored in normal temperature and humidity, and avoid direct sunlight.

(5) When there is a problem with the Cubic's products, please contact Cubic team in time; the sensor must not be disassembled privately, and Cubic will not bear any consequences if it is damaged by disassembled privately.

Consultancy & After-sales Service

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