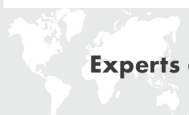




Oxygen Gas Sensor Module TB200B-ES1&ES4 Datasheet



» Overview

The TB200B-ES1&ES4 series is an intelligent digital gas sensor module using a smart microprocessor combining high-reliability solid polymer electrochemical gas sensor technology and intelligent algorithm calculation. The TB200B Gas Sensor Module is suitable for indoor and outdoor industrial applications. It detects gas, temperature and humidity and receives all data simultaneously. The data is output through the transmission command, which makes it easy and convenient to recognize the right time for maintenance and replacement. Each sensor module has been professionally calibrated with the gas, and the calibration information is stored in the flash chip. The sensor module has an I²C or a UART (TTL 3.3 V) output interface, which can be easily integrated with different devices and systems.

» Key Features

- ☞ Detects gas, temperature and humidity
- ☞ Detects with high selectivity a wide variety of gases
- ☞ Digital signal UART (TTL 3.3 V) or I²C output
- ☞ Low power consumption and sleep mode (suitable for battery and IoT applications)
- ☞ Typical warm-up time in seconds
- ☞ Wide temperature range of -20 °C to +55 °C
- ☞ RoHS approved
- ☞ Excellent accuracy
- ☞ Long lifetime > 5 years
- ☞ No-poisoning
- ☞ Fast response time
- ☞ Linear output
- ☞ No zero line drift
- ☞ No leakage



» Applications

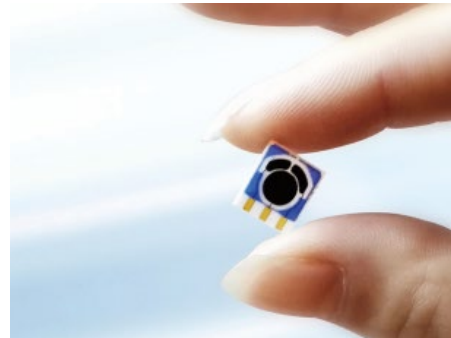
- ☞ Gas Manufacturing Process Monitoring
- ☞ Sewage/Water Treatment Plant
- ☞ Emission Monitoring
- ☞ Garbage Disposal
- ☞ Power Transformer
- ☞ Medical & Health Care
- ☞ Industrial Safety
- ☞ Leakage Detection
- ☞ Biogas
- ☞ Food Industry
- ☞ Fire Safety



» Principle

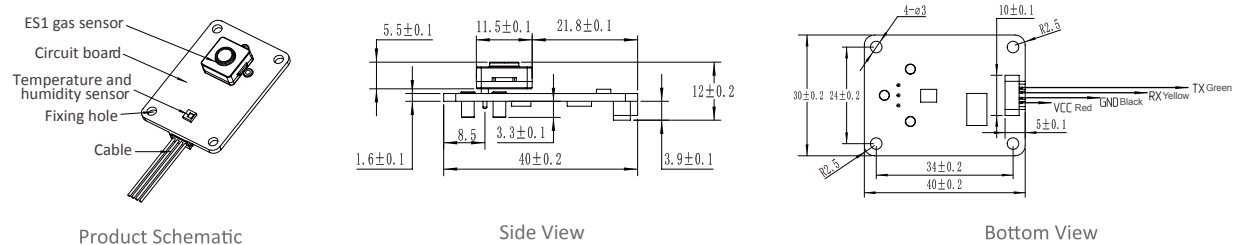
The EC Sense solid polymer electrochemical technology is a revolutionary innovation in the field of electrochemical detection. This technology is based on the principle of electrochemical catalytic reaction, detecting the output signals of the electrochemical reactions of different gases and accurately measuring the gas concentration through the signal.

The sensor is composed of three electrodes in contact with the electrolyte. A typical electrode consists of a large surface area of noble metal and other materials. The electrode, electrolyte and the surrounding air are in contact and the gas diffuses into the working electrode. Here the gas will be oxidized, this causes a current, which is proportional to the gas concentration.

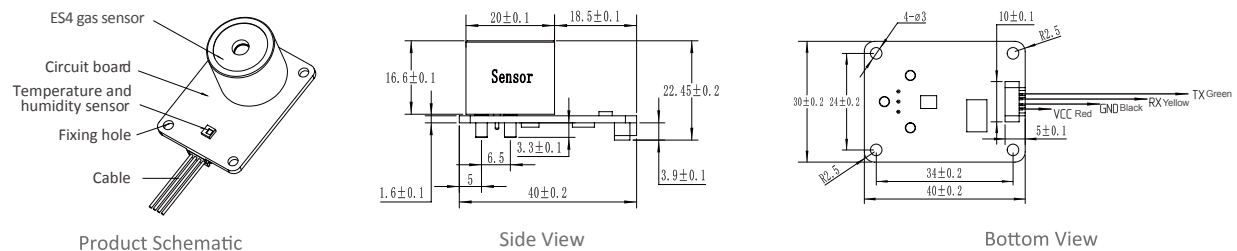


» Mechanical Drawing (Unit: mm)

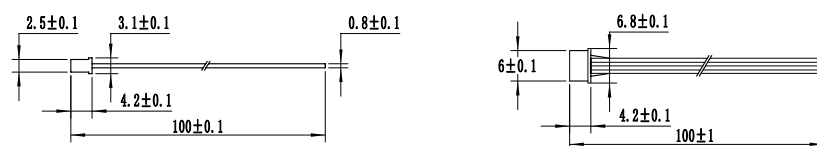
TB200B-ES1-O₂ Dimension diagram



TB200B-ES4-O₂ Dimension diagram



4Pin cable size diagram



» Order Information

Product	Partnumber	Range	Resolution	Response Time	Output
Oxygen Gas Sensor Module	04-TB200B-ES1-O ₂ -25%-01	0-25% vol.	0.01% vol.	< 3 s (T90 < 10 s)	UART (TTL 3.3 V)
	04-TB200B-ES1-O ₂ -25%-I2C-01	0-25% vol.	0.01% vol.	< 3 s (T90 < 10 s)	I ² C
	04-TB200B-ES4-O ₂ -25%-01	0-25% vol.	0.01% vol.	< 3 s (T90 < 10 s)	UART (TTL 3.3 V)
	04-TB200B-ES4-O ₂ -25%-I2C-01	0-25% vol.	0.01% vol.	< 3 s (T90 < 10 s)	I ² C
4Pin Cable	02-MOD-CABLE-4PIN-01				

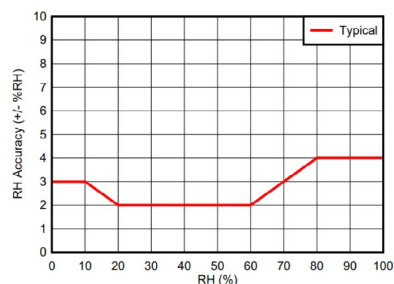
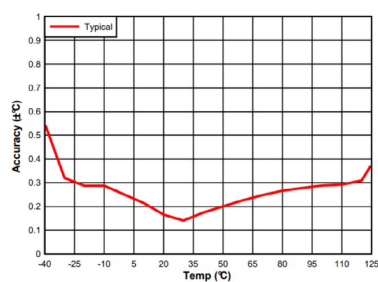
» Technology Specifications

Gas Sensor Specifications

Principle	Solid Polymer Electrochemical Sensing Technology
Detection Gas	Oxygen Gas
Accuracy	± 5% (Measurement value)
Linearity	Linear
Long-Term Drift	< 5 %/year
Expected Lifetime	> 5 years

Temperature & Relative Humidity Sensor Specification

Temperature Range	-20 °C to +70 °C
Temperature Accuracy	± 0.2 °C (Typical Value)
Humidity Range	0 to 100% RH
Humidity Accuracy	± 2 % (Typical Value)



Environment Specifications

Working Temperature	-20 °C to +55 °C
Working Humidity	15-95% RH. (Non-condensing)
Working Pressure	Atmospheric pressure ± 10 %

» Technology Specifications

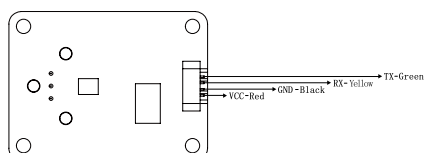
Mechanical Specifications

Size (Including gas sensor)	TB200B-ES1: 40 x 30 x 12 mm TB200B-ES4: 40 x 30 x 22.45 mm
Size (Without gas sensor)	40 x 30 x 5.6 mm
Weight	TB200B-ES1: < 15 g TB200B-ES4: < 25 g
Warranty	12 months from the date of shipment
Cable Length	100 mm, special length by request

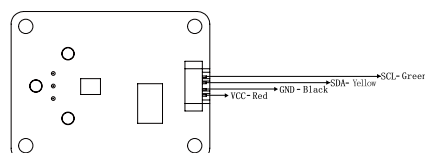
Electrical Specifications

Output Signal	UART (TTL 3.3 V) or I ² C digital signal, for more information please see "Communication Protocol"
	UART Interface definition: VCC- red, GND- black, RX- yellow, TX- green
	UART Baud rate: 9600 Data bits: 8 bits Stop bits: 1 bit
	I ² C Interface definition: VCC-red, GND-black, SDA-yellow, SCL-green I ² C Frequency: ≤ 20 kHz I ² C Signal Voltage: 3.3 V

UART TTL 3.3 V



I²C 3.3 V



Communication Notes	1) Communication has active upload and Q&A mode. The default mode is Q&A mode after power-on. You can use instructions to switch between the two modes.	
	2) If you switch off the module or switch to sleep mode, the module remains in Q&A mode.	
Supply Voltage	3.3 to 5.5V DC, Recommended 5V DC	
Working Current	< 5 mA	
Peak Current	UART: 3.8 mA @ 5V DC	I ² C: 6.2 mA @ 5V DC
Current (Switch on LED lamp)	UART: 2.5 mA @ 5V DC	I ² C: 4.7 mA @ 5V DC
Current (Switch off LED lamp)	UART: 1.2 mA @ 5V DC	I ² C: 3.4 mA @ 5V DC
Sleep Mode Current	UART: 0.8 mA @ 5V DC	I ² C: 0.9 mA @ 5V DC
Power Consumption	40 mW @ 5V DC	
Sleep Mode Power Consumption	25 mW @ 5V DC	

Certifications

RoHS Certification No.A2200167659101001C

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