EC Sense
Easy Gas Sensors

CO Gas Module 0-10000ppm

TB200B-ES1/ES4-CO-10000-01

Technical Specification

Product Overview

TB200B Series Carbon Monoxide Gas Module is the perfect combination of state of the art sensing device with a sophisticated circuit board. The EC Sense gas sensor is a solid polymer sensor featuring long lifetime, robustness, low power consumption, and many other advantages based on electrochemical principles.

The module is equipped with a standard UART Digital output for ease of use without the need for customers to understand the sensor application and the tedious work of calibration.

Features

- Sleeping function good for low power request IOT applications
- Combined with intelligent algorithms, it has stronger adaptability to the environment, more accurate detection, and stable zero point
- Good anti-toxicity, no consumption of chemical materials, more than 5 years Life time
- New micro circuit design, strong anti-electromagnetic interference ability
- Fast response, fast return to zero, plug and play
- Independent temperature and humidity digital sensor output
- The smallest size and lowest power consumption in the electrochemical field
- RoHS approved eco-friendly design

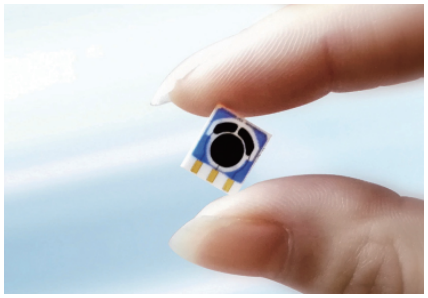
Application

- Industrial process analysis
- Boiler emission monitoring
- Smoke emission monitoring
- Gas preparation
- Waste treatment and incineration
- Industrial and agricultural fuel burning occasions

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 electro-chemical 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, electro-lyte 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.

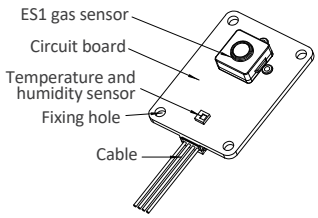


Order Informations

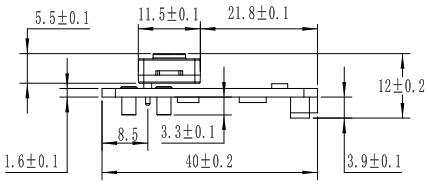
Product Name	Part Number	Range	Resolution
Carbon Monoxide Gas Module	04-TB200B-ES1-CO-10000-01	0-10000ppm	10ppm
Carbon Monoxide Gas Module	04-TB200B-ES4-CO-10000-01	0-10000ppm	10ppm
4Pin Cable	02-MOD-CABLE-4PIN-01		

Structure Diagram (unit: mm)

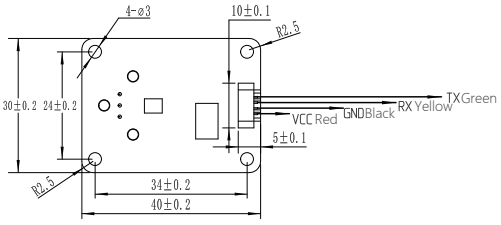
TB200B-ES1-CO-10000-01 Dimension diagram



Product Schematic

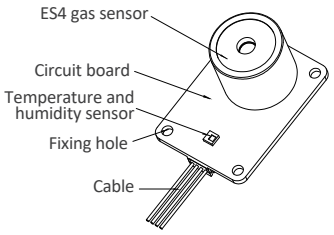


Side View

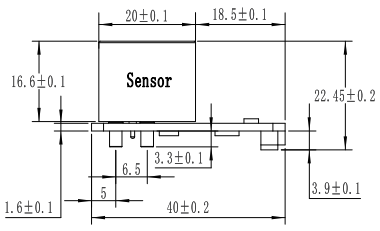


Bottom View

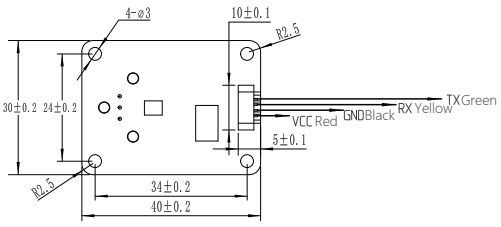
TB200B-ES4-CO-10000-01 Dimension diagram



Product Schematic

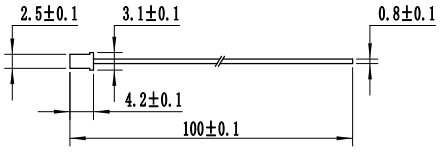


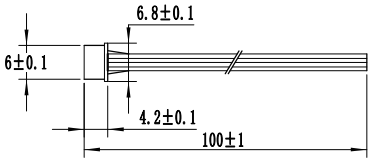
Side View



Bottom View

4Pin cable size diagram





Specification

Principle	Solid Polymer Electrochemical Sensing Technology
Detection of gas	Carbon monoxide gas
Detection Range	0-10000ppm; Resolution: 10ppm
Lowest Detection Limit	10ppm
Full-scale accuracy error	± 5% F.S
Repeatability	< 2%
Settling time	The first power-on under storage in clean air < 120 seconds
	The first power-up under storage in non-clean air < 240 seconds (except in the presence of high concentrations of polluted gas)
Response time	T50: < 10 seconds; T90: < 30 seconds
Zero return time	< 120 seconds (Pass 99.999% high purity nitrogen)
Calibration Gas	Carbon monoxide standard gas
	Note: The standard gas uses air as the background gas
Sensor expected life time	>3 years
	Note: Temperature (0-25) ℃, Humidity (30-70)% RH, the measured gas concentration is within the range, and there is no gas environment that affects the warm-up time mentioned above
Output	The standard output is: 3.3V UART digital signal (see below for communication protocol) ; Optional custom Modbus protocol
	Interface definition: VCC- Red, GND- Black, RX- Yellow, TX- Green;
	Baud rate: 9600 Data bits: 8 bits Stop bits: 1 bit
Get data command	The communication is divided into active uploading and Q & A. The default is Q & A mode after power-on. You can use instructions to switch between the two modes.
	Return to Q & A mode after power off or switch power mode
	See next page for details
Working Voltage	3.3-5.5V DC
Working Current	< 5mA
Power Consumption	25mW @ 5V DC
Working temperature	(-40 - 55) ℃
Optimal working temperature	(20 - 35) ℃
Working humidity	(15-95) % RH. (Non-condensing)
Optimum working humidity	50% RH.
Working pressure	Atm ± 10%
Circuit board size	40X30X5.6 (mm)
Module size	With ES1 sensor: 40X30X12 (mm); With ES4 sensor: 40X30X22.45 (mm)
Weight	TB200B-ES1-CO-10000-01 < 15g; TB200-ES4-CO-10000-01 < 25g
Temperature and humidity sensor Data	Temperature Range: (-40 ~ 85) ℃ Relative error: ± 0.2 ℃
	Humidity measurement range: (10 ~ 95)% RH. non-condensing Relative error: ± 2%
Warranty	12 months from the date of shipment

Cross Sensitivity

Gas	Formula	Concentration (ppm)	Response(ppm)
Ammonia	NH_3	50	0
Chlorine	Cl_2	1	0
Ozone	O_3	50	0
Hydrogen	H_2	1000	500
Hydrogen sulfide	H_2S	50	0
Hydrogen cyanide	HCN	50	0
Nitrogen dioxide	NO_2	10	0
Sulfur dioxide	SO_2	10	0
Benzene	C_6H_6	986.5	0
Ethanol	C_2H_6O	104.2	0
Ethylene oxide	C_2H_4O	14.4	0
Methane	CH_4	3%vol	0
Acetylene	C_2H_2	1%vol	0
Formaldehyde	HCHO	1	0
Isobutene	C_4H_8	300	0
Methylene chloride	CH_2Cl_2	30	0

Note: 1) The above interference factors may vary due to different sensors and service life. Please refer to the actual test results.
2) This table is not complete for all gases, and the sensor may be sensitive to other gases.

Disclaimer

The EC Sense performance data stated above is based on data obtained under test conditions using the EC Sense gas distribution system and AQS test software. In the interest of continuous product improvement, EC Sense reserves the right to change design features and specifications without notice. We are not responsible for any loss, injury or damage caused by this. EC Sense assumes no responsibility for any indirect loss, injury or damage resulting from the use of this document, the information contained therein or any omissions or errors herein. This document does not constitute an offer to sell. The data it contains are for informational purposes only and cannot be considered a guarantee. Any use of the given data must be evaluated and determined by the user to comply with federal, state and local laws and regulations. All specifications outlined are subject to change without notice.

Warning

EC Sense sensors are designed for use in a variety of environmental conditions. However, due to the principles and characteristics of solid polymer electrochemical sensors and to ensure normal use, users must strictly follow this article during storage, assembly and operation of the module. General-purpose PCB circuit board application methods and illegal applications / violation of the application will not be covered by the warranty. Although our products are highly reliable, we recommend checking the module's response to the target gas prior to utilization to ensure on-site use. At the end of the products service life, please do not discard any electronics in the domestic waste, instead follow the local governments electronic waste recycling regulations for disposal.

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