



Ammonia Gas Module 0-100ppm  
**TB200B-ES1/ES4-NH<sub>3</sub>-100-01**  
Technical Specification

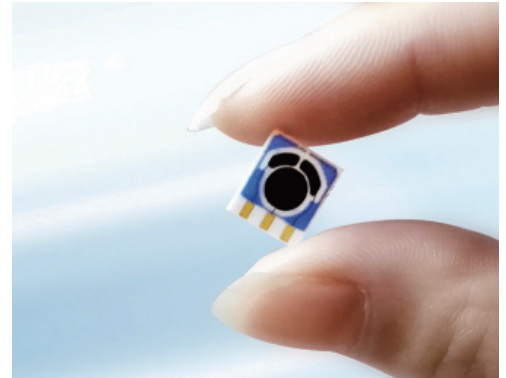
## » Product Overview

The TB200B-Series Ammonia 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 TB200B module serves an UART digital output for ease-of-use, eliminating the need for customers to understand the sensor application and the tedious work of calibration.

## » Features

- ☞ Non-consumable longlife design, can be used stably in long-term exposure to ammonia concentration environment
- ☞ Resistant to high humidity applications, can be used stably in a high humidity environment above 85% for a long time
- ☞ Wide temperature range from -40 to 55°C
- ☞ Anti-interference, can achieve high-precision measurement in complex gaseous environment
- ☞ Independent temperature and humidity digital sensors output, combined with intelligent algorithms, stronger environmental adaptability
- ☞ Fast response, fast return to zero, plug and play
- ☞ Easy to use, UART digital signal output, zero drift
- ☞ Durable and reliable, long lifetime and stable detection
- ☞ New microcircuit design, strong anti-electromagnetic interference ability, good anti-toxicity
- ☞ With fixed mounting holes for easy installation
- ☞ Low power consumption and sleeping mode (suitable for and IoT applications)
- ☞ RoHS approved eco-friendly design



## » Application

- ☞ Livestock breeding (pig house, chicken house, cattle farm environment, etc.)
- ☞ Smart public toilet ammonia odor monitoring
- ☞ Ammonia monitoring in landfill plants and sewage treatment plants



## » 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.

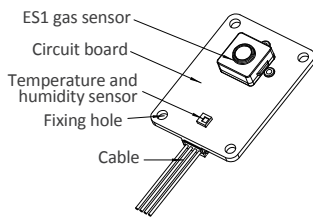
The sensor is composed of three electrodes in contact with the electrolyte. A typical electrode consists of a large surface area of noble metal and other materials. The electrode, electrolyte and the surrounding air are in contact and the gas diffuses into the working electrode. Here the gas will be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

## » Order Informations

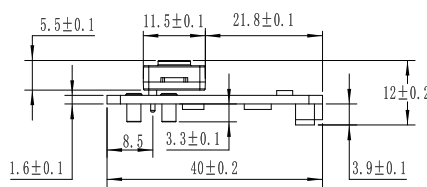
Product	Part Number	Range	Resolution
Ammonia Gas Module	04-TB200B-ES1-NH <sub>3</sub> -100-01	0-100ppm	0.1ppm
Ammonia Gas Module	04-TB200B-ES4-NH <sub>3</sub> -100-01	0-100ppm	0.1ppm
4Pin Cable	02-MOD-CABLE-4PIN-01		

## » Structure Diagram (unit: mm)

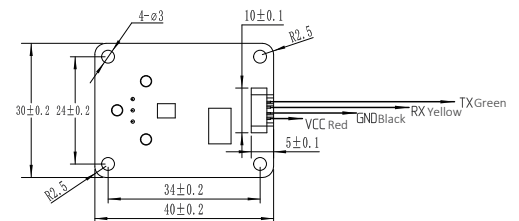
TB200B-ES1-NH<sub>3</sub>-100-01 Dimension diagram



Product Schematic

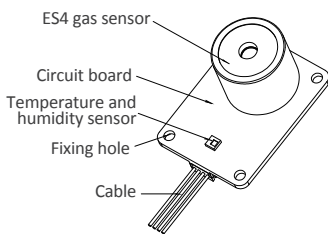


Side View

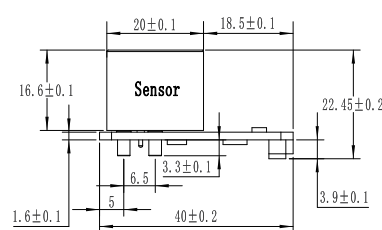


Bottom View

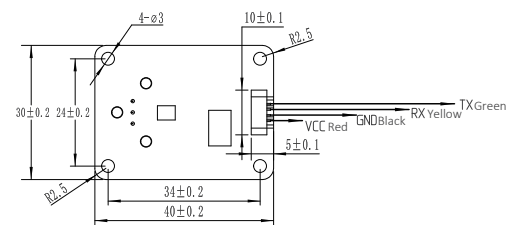
TB200B-ES4-NH<sub>3</sub>-100-01 Dimension diagram



Product Schematic

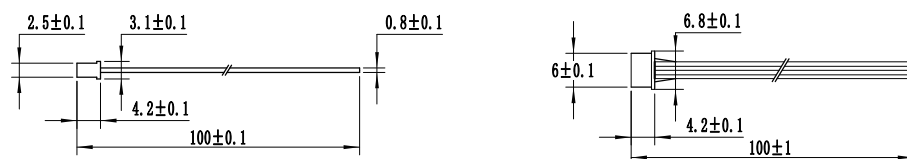


Side View



Bottom View

4Pin cable size diagram



## » Specification

Principle	Solid Polymer Electrochemical Sensing Technology	
Detection of Gas	Ammonia Gas	
Detection Range	0-100ppm	Resolution: 0.1ppm
Lowest Detection Limit	0.1ppm	
Full-scale Accuracy Error	± 5% F.S	
Repeatability	< 2%	
Settling Time	Stored in clean air for the first power on < 5 minutes	
Response Time	< 3 seconds	
Calibration Gas	100ppm measurement range: 50ppm Ammonia gas calibration Note: The air distribution standard is based on clean air as the background air, with a humidity of 50%, and a normal temperature environment	
Sensor Storage Life	> 3 years	
Sensor Expected Lifetime	> 2 years (in a relatively clean environment at room temperature and humidity, no need for vacuum storage)	
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	
Working Voltage	3.3-5.5V DC	
Working Current	< 5mA	
Power Consumption	25mW @ 5V DC	
Working Temperature	-40 °C to +55 °C	
Optimal Working Temperature	20 °C to 35 °C	
Working Humidity	15% - 95% RH. (Non-condensing)	
Optimum Working Humidity	50% RH.	
Working Pressure	Atm ± 10%	
Circuit Board Size	40 x 30 x 5.6 (mm)	
Module Size	With ES1 sensor: 40 x 30 x 12 (mm);    With ES4 sensor: 40 x 30 x 22.45 (mm)	
Weight	TB200B-ES1-NH <sub>3</sub> -100-01< 15g;    TB200B-ES4-NH <sub>3</sub> -100-01< 25g	
Temperature and Humidity Sensor Data	Temperature Range: (-40 to 85) °C      Relative Error: ± 0.2 °C	
	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 <sub>3</sub>	50	50
Carbon Monoxide	CO	20	1.50
Ethanol	C <sub>2</sub> H <sub>6</sub> O	50	1.43
Methanol	CH <sub>4</sub> O	50	1.61
Ethylene	C <sub>2</sub> H <sub>4</sub>	20	0
Chlorine	Cl <sub>2</sub>	10	0
Ethylene Oxide	ETO	20	0
Hydrogen Chloride	HCl	10	0
Nitrogen Dioxide	NO <sub>2</sub>	50	0
Sulphur Dioxide	SO <sub>2</sub>	20	7.50
Tetrahydrothiophene	C <sub>4</sub> H <sub>8</sub> S	5	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.



**Business Centre**  
**Europe and the rest of the world**

EC Sense GmbH  
Wangener Weg 3  
82069 Hohenschäftlarn, Germany  
Tel: +49(0)8178-99992-10 Fax: +49(0)8178-9999-211  
Email: [office@ecsense.com](mailto:office@ecsense.com)  
[www.ecsense.com](http://www.ecsense.com) [www.ecnose.de](http://www.ecnose.de)

**Business Centre**  
**Asia**

Ningbo AQSystems Technology Co., Ltd.  
F4-17 Building, Zhong Wu Technology Park No.228,  
Jin Gu Bei Road, Yinzhou District NingBo,  
Zhejiang Province, P.R. China Post Code: 315100  
Tel: +86(0)574 88097236, 88096372  
Email: [info@aqsystems.cn](mailto:info@aqsystems.cn)  
[www.ecsense.cn](http://www.ecsense.cn), [www.ecnose.com](http://www.ecnose.com)