EC Sense
Easy Gas Sensors

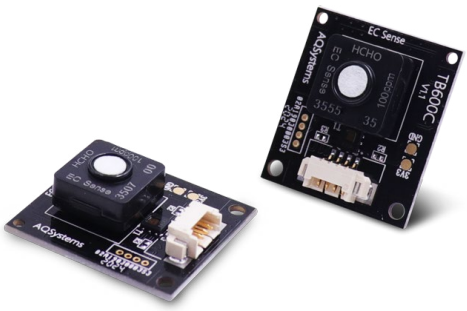

# Formaldehyde Gas Sensor Module
# TB600C Datasheet

TB600C-HCHO-5 | TB600C-HCHO-100

**Easy Gas Sensor Module Solutions**
**Easy to Use**

## Overview

The TB600C 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 TB600C 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 $I^2C$ or a UART (TTL 3.3 V) output interface, which can be easily integrated with different devices and systems.




## Key Features

- Excellent accuracy
- Detects gas, temperature and humidity
- Detects with high selectivity a wide variety of gases
- Digital signal UART (TTL 3.3 V) or $I^2C$ output
- Low power consumption and sleep mode (suitable for battery and IoT applications)
- Long lifetime > 5 years
- No-poisoning
- Typical warm-up time in seconds
- Fast response time
- Linear output
- No zero line drift
- Wide temperature range of -20 °C to +55 °C
- No leakage
- RoHS approved

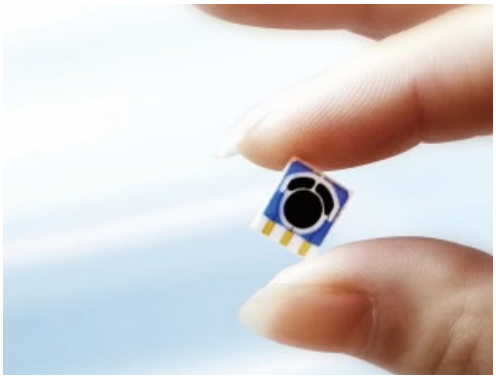
## Applications

- Industrial Safety
- Leakage Detection
- Emission Monitoring
- Outdoor Air Quality

## Principle

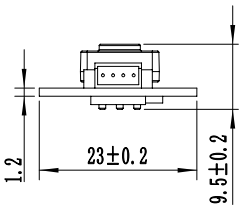
The EC Sense solid polymer electrochemical technology is a revolutionary innovation in the field of electrochemical detection. This technology is based on the principle of electrochemical catalytic reaction, detecting the output signals of the electrochemical reactions of different gases and accurately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

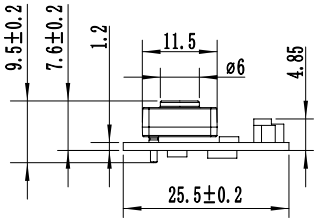


## Mechanical Drawing (Unit: mm)

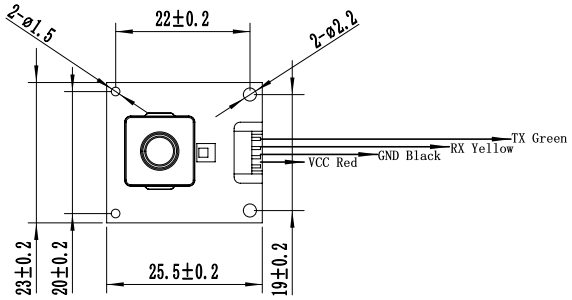
TB600C Dimension diagram




Front View

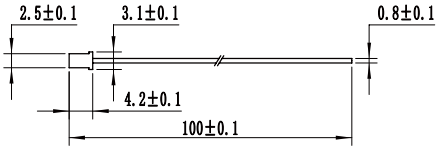


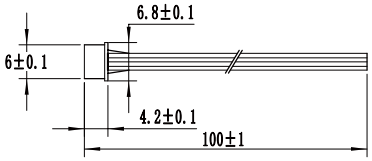

Side View




Top View

4pin Cable Diagram




## Order Information

| Product | Partnumber | Range | Resolution | Response Time | Output |
|---|---|---|---|---|---|
| Formaldehyde Gas Sensor Module | 04-TB600C-HCHO-5-01 | 0-5 ppm | 0.001 ppm | < 3 s (T90 < 80 s) | UART TTL 3.3 V |
| | 04-TB600C-HCHO-100-01 | 0-100 ppm | 0.01 ppm | < 3 s (T90 < 60 s) | UART TTL 3.3 V |
| | 04-TB600C-HCHO-5-I2C-01 | 0-5 ppm | 0.001 ppm | < 3 s (T90 < 80 s) | $I^2C$ |
| | 04-TB600C-HCHO-100-I2C-01 | 0-100 ppm | 0.01 ppm | < 3 s (T90 < 60 s) | $I^2C$ |
| 4Pin Cable | 02-MOD-CABLE-4PIN-01 | | | | |

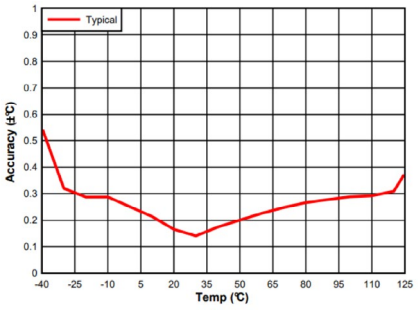
## Technology Specifications

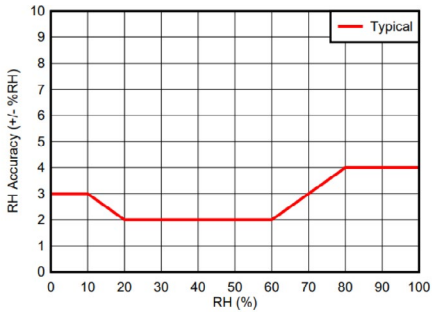
### Gas Sensor Specifications

| | |
|---|---|
| Principle | Solid Polymer Electrochemical Sensing Technology |
| Detection Gas | Formaldehyde Gas |
| Accuracy | ± 5% (Measurement value) |
| Repeatability | 1 % |
| 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 % |

### Mechanical Specifications

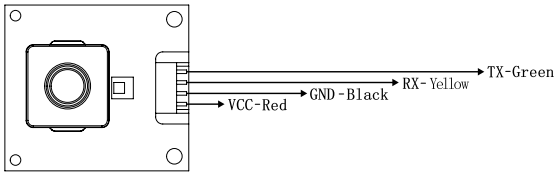
| | |
|---|---|
| Size (Including gas sensor) | 23 x 25.5 x 9.5 mm |
| Size (Without gas sensor) | 23 x 25.5 x 4.85 mm |
| Weight | 3.1 g |
| Warranty | 12 months from the date of shipment |
| Cable Length | 100 mm, special length by request |

## Technology Specifications

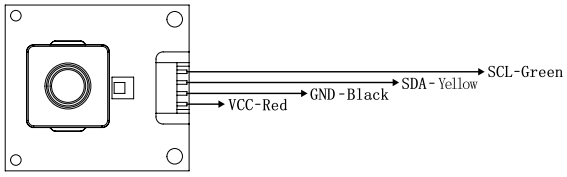
### Electrical Specifications

| | |
|---|---|
| Output Signal | UART (TTL 3.3 V) or I²C 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 |
| | I²C Interface definition: VCC-red, GND-black, SDA-yellow, SCL-green |
| | I²C Frequency: ≦ 20 kHz I²C Signal Voltage: 3.3 V |

UART TTL 3.3V




I²C 3.3V




| | | |
|---|---|---|
| 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: 4.2 mA @ 5V DC | I²C: 6.2 mA @ 5V DC |
| Current (Switch on LED lamp) | UART: 2.9 mA @ 5V DC | I²C: 4.7 mA @ 5V DC |
| Current (Switch off LED lamp) | UART: 1.6 mA @ 5V DC | I²C: 3.4 mA @ 5V DC |
| Sleep Mode Current | UART: 0.8 mA @ 5V DC | I²C: 0.9 mA @ 5V DC |
| Power Consumption | UART: 12.5 mW @ 5V DC | I²C: 23.5 mW @ 5V DC |
| Sleep Mode Power Consumption | UART: 4 mW @ 5V DC | I²C: 4.5 mW @ 5V DC |

### Certifications

RoHS Certification No.A2230090158101001

**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. Avoid cleaning the sensors with alcohol, acetone or other strong solvents. General-purpose PCB circuit board application methods and illegal applications or 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 product's service life, please do not discard any electronics in the domestic waste, instead follow the local governments electronic waste recycling regulations for disposal.

EC Sense
Easy Gas Sensors

**Business Centre**
**Europe and the rest of the world**
EC Sense GmbH
Wangener Weg 3
82069 Hohenschäftlarn, Germany
Tel: +49(0)8178-9999-210 Fax: +49(0)8178-9999-211
Email: office@ecsense.com
www.ecsense.com

**Business Centre**
**Asia**
Ningbo AQSystems Technology Co., Ltd.
6 Building, Zhong Wu Technology Park No.228,
Jin Gu North Road, Yinzhou District NingBo,
Zhejiang Provence, P.R. China Post Code: 315100
Tel: +86(0)574 88097236, 88096372
Email: info@aqs-de.com
www.ecsense.cn

TB600C-HCHO Formaldehyde Gas Sensor Module_Datasheet_V3.0_20250904