EC Sense
Easy Gas Sensors

Smart Oxygen Sensor Device
Stox-O$_2$ Series
Datasheet

›› Overview

Easy solution for gas detection

The Stox Smart Oxygen Sensor Device is an intelligent sensor device, which has a 4-20 mA two-wire and a RS485 Modbus RTU output signal. It uses an intelligent microprocessor with high-reliability solid polymer electrochemical gas sensor technology and intelligent algorithm calculation. The Stox Device is a smart solution for industrial safety applications, combining temperature and humidity in one sensing device.

The Smart Gas Sensor Device provides a self-test, which evaluates the sensor performance without a gas measurement. Therefore, it is the excellent solution for smart home and IoT applications. The data is put out through the the output signal or RS485 transmission command, which makes it easy and convenient to identify the right time to perform maintenance and replacement.

Each Stox Sensor Device has been professionally calibrated with the gas. It can be instantly used without prior warm-up time and the calibration information is stored in the flash chip. There is a calibration software from EC Sense in case a recalibration should be performed with the RS485 output or the 4-20 mA output signal should be corrected.

The Stox Gas Sensor Device has a standard 4-20mA two-wire or RS485 Modbus RTU output signal that allows for quick device and system setup or connection to a display, DCS, PLC and other systems.

›› Key Features

☞ 4-20 mA standard two-wire and RS485 Modbus-RTU output, 24V DC. power supply

☞ Detects single gas + temperature and humidity at the same time

☞ With calibration, sensor performance

☞ Fast signal stability time at power on

☞ Suitable for indoor and outdoor environments, sensor can work in -40 ℃ to +55 ℃

☞ Response time is fast and has a stable zero point without drift, anti-electromagnetic interference ability

☞ Long lifetime, anti-poisoning

☞ Integrated safety protection enables use in potentially explosive environments

☞ Electronic circuit boards have a dust and corrosion resistant coating

☞ Small size

☞ RoHS approved

›› Applications

☞ Industrial Gas Safety Monitoring

☞ Industrial Process Gas Monitoring

☞ Leakage Safety Monitoring of Oxygen, Nitrogen or other Inert Gases

☞ Oxygen Leakage Monitoring in the Field of Gas Manufacturing

☞ Biogas Monitoring

☞ Warehouse Logistics Environment Monitoring

☞ Transformer Failure and Power Chamber Environment Monitoring
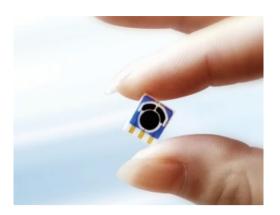
☞ Medical & Health Care

⟫ Principle

The Stox Sensor Device is a durable product. It converts the original small current signals of the gas sensors into a standard 4-20 mA or RS485 Modbus-RTU output through a digital circuit.

The Sensor Device uses the Solid Polymer Electrochemical Sensing Technology. It employs a three-electrode arrangement - the working, the counter and the reference electrodes - in which concentration measurements can be performed continuously and the sensor operates at a fixed potential. The gas of interest (target gas) diffuses through a diffusion barrier, like a capillary, into the cell to the working electrode, where an electrochemical reaction takes place. Oxidation and reduction reactions are happening simultaniously. The current flowing through the cell is direct proportional to the concentration of the target gas. A reference electrode keeps the potential constant together with a potentiostat.
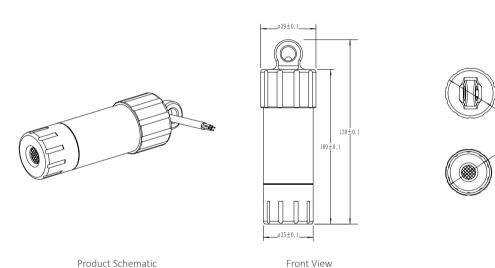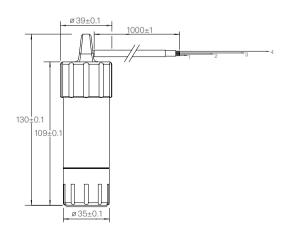
⟫ Mechanical Drawing (Unit: mm)

Stox-O_2 Series Sensor Device Mechanical Drawing

Product Schematic

Front View

Top view

Bottom View

Side View

Pin	Name	Color	Description
1	VCC	Red	Power Supply
2	GND	Black	Power Supply
3	485 A+	Green	RS485 A+
4	485 B-	White	RS485 B-

❯❯ Technology Specifications

Gas Sensor Specifications

Part Number	05-Stox-O_2-25%-01
Detection Gas	Oxygen
Range	0-25% vol.
Resolution	0.01% vol.
Response Time	< 3 s (T90 < 30 s)
Principle	Solid Polymer Electrochemical Sensing Technology
Accuracy	± 5% (Mesurement value)
Repeatability	< 2 %
Linearity	Linear
Long-Term Drift	< 5%/year
Expected Lifetime	> 3 years

Temperature & Relative Humidity Sensor Specification

Parameter	Range	Resolution	Accuracy	Repeatability	Response Time	Long-Term Drift
Temperature	-40 ℃ to +85 ℃	0.01 ℃	± 0.2 ℃	0.1 ℃	< 5s to 30s @ t63%	< 0.02℃ /year
Humidity	0-100% RH	0.01% RH	± 2% RH	0.1% RH	8s @ t63%	< 0.25% RH/year

Electrical Specifications

Optional Output Signal	4-20 mA two-wires (Only gas sensor ouput, without temperature and humidity)
	Or RS485 Modbus-RTU (Gas with temperature and humidity sensor signal output)
Fault Output	3.5 mA Fault Signal: Sensor signal weak
	3 mA Fault Signal: Sensor failure or sensor disconnected
	RS485 Modbus-RTU output with sensor life and performance detection and early sensor failure warning
Supply Voltage	12 to 24V DC
Supply Current	3 to 22 mA
Power Consumption	< 0.6 W
Maximum Loop Resistance	< 500R @ 24V DC

Environment Specifications

Operating Temperature	Sensor can work from -40 ℃ to +55 ℃
Operating Humidity	15-95% RH. Non-condensing
Operating Pressure	Atmospheric pressure ± 10 %
Storage Temperature	0 ℃ to 20 ℃

Mechanical Specifications

Size	39 x 130 mm
Weight	135 g
Power Cable length	1 m
Warranty	12 months
Package Size	185 x 150 x 108 mm

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 devices are designed for use in a variety of environmental conditions. However, due to the principles and characteristics of sensors and to ensure normal use, users must strictly follow this article during storage, assembly and operation of the device. Although our products are highly reliable, we recommend checking the device'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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**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)8178-99992-11
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