



Smart Gas Sensor Device Stox Series Datasheet



Overview

Easy solution for gas detection

The Stox Smart Gas Sensor Device is an intelligent sensor device from EC Sense, 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 4-20 mA 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 and life-testing output
- Fast signal stability time at power on
- Suitable for indoor and outdoor environments, sensor can work in -40 °C to +55 °C
- 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
- Air Exchange System and Air Purifier
- Food Storage Insecticides Monitoring
- Wastewater Treatment, Garbage Disposal, Biogas Safety Monitoring
- Medical & Health Care
- Semiconductor Gas Purification Monitoring
- Transformer Failure and Power Chamber Environment Monitoring

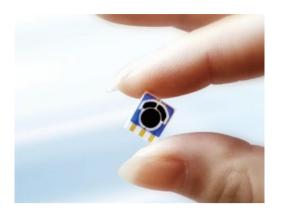




Principle

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.

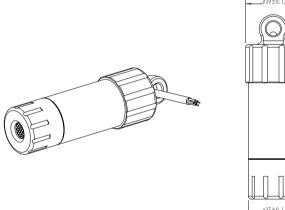


Top view

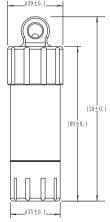
Bottom View

Mechanical Drawing (Unit: mm)

Stox Series Gas Sensor Device Mechanical Drawing







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

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Side View



>>> Technology Specifications

Gas Sensor Specifications

Detection Gas	Please choose from "Order Information"
Range	Please choose from "Order Information"
Resolution	Please see the "Order Information"
Response Time	Please see the "Order Information"
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 °C to +85 °C	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

Ontional Output Signal	4-20 mA two-wires (Only gas sensor ouput, without temperature and humidity)				
Optional Output Signal	Or RS485 Modbus-RTU (Gas with temperature and humidity sensor signal output)				
	3.5 mA Fault Signal: Sensor signal weak				
Fault Output	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 $^{\circ}\mathrm{C}$ to +55 $^{\circ}\mathrm{C}$
Operating Humidity	15-95% RH. Non-condensing
Operating Pressure	Atmospheric pressure ± 10 %
Storage Temperature	0 °C to 20 °C

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



>> Order Information

Product	Gas Formula	Partnumber	Range	Resolution	Response Time
Smart Arsine Sensor Device	AsH ₃	05-Stox-AsH ₃ -1-01	0-1 ppm	0.001 ppm	< 3 s (T90 < 80 s)
Smart Diborane Sensor Device	B_2H_6	05-Stox-B ₂ H ₆ -1-01	0-1 ppm	0.001 ppm	< 3 s (T90 < 80 s)
Smart Bromine Sensor Device	Br ₂	05-Stox-Br ₂ -1-01	0-1 ppm	0.001 ppm	T90 < 60 s
		05-Stox-CH ₄ S-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 80 s)
Smart Methyl Mercaptan Sensor Device	CH ₄ S	05-Stox-CH ₄ S-100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 80 s)
		05-Stox-CH ₄ S-5000-01	0-5000 ppm	0.1 ppm	< 3 s (T90 < 80 s)
		05-Stox-Cl ₂ -5-01	0-5 ppm	0.001 ppm	T90 < 60 s
Smart Chlorine Sensor Device	Cl ₂	05-Stox-Cl ₂ -50-01	0-50 ppm	0.01 ppm	T90 < 60 s
		05-Stox-Cl ₂ -100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s)
Smart Chlorine Dioxide Sensor Device	CIO ₂	05-Stox-ClO ₂ -5-01	0-5 ppm	0.001 ppm	T90 < 60 s
		05-Stox-CO-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 80 s)
	60	05-Stox-CO-100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s)
Smart Carbon Monoxide Sensor Device	CO	05-Stox-CO-1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s)
		05-Stox-CO-2%-01	0-2% vol.	0.001% vol.	< 3 s (T90 < 30 s)
	ETO (C ₂ H ₄ O)	05-Stox-ETO-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 30 s
Smart Ethylene Oxide Sensor Device		05-Stox-ETO-200-01	0-200 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-ETO-1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s)
Smart Fluorine Sensor Device	F ₂	05-Stox-F ₂ -5-01	0-5 ppm	0.001 ppm	T90 < 60 s
Smart Germane Sensor Device	GeH₄	05-Stox-GeH ₄ -5-01	0-5 ppm	0.01 ppm	< 3 s (T90 < 80 s
		05-Stox-H ₂ -1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s)
Smart Hydrogen Sensor Device	H_2	05-Stox-H ₂ -5000-01	0-5000 ppm	0.1 ppm	< 3 s (T90 < 30 s)
		05-Stox-H ₂ -5%-01	0-5% vol.	0.001% vol.	< 35 s (T90 < 90
		05-Stox-H ₂ S-5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 30 s
		05-Stox-H ₂ S-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 30 s
Smart Hydrogen Sulfide Sensor Device	H ₂ S	05-Stox-H ₂ S-100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s)
		05-Stox-H ₂ S-1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-H ₂ S-5000-01	0-5000 ppm	0.1 ppm	< 3 s (T90 < 30 s
	НСНО	05-Stox-HCHO-5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 80 s
Smart Formaldehyde Sensor Device		05-Stox-HCHO-100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 60 s)
Smart Hydrogen Chloride Sensor Device	HCl	05-Stox-HCl-30-01	0-30 ppm	0.001 ppm	T90 < 60 s
Smart Hydrogen Cyanide Sensor Device	HCN	05-Stox-HCN-50-01	0-50 ppm	0.01 ppm	< 3 s (T90 < 30 s)
Smart Hydrogen Fluoride Sensor Device	HF	05-Stox-HF-10-01	0-10 ppm	0.001 ppm	T90 < 60 s
	NH ₃	05-Stox-NH ₃ -10-01	0-10 ppm	0.001 ppm	< 3 s, no T90
Ammonia (Long lifetime)		05-Stox-NH ₃ -100-01	0-100 ppm	0.01 ppm	< 3 s, no T90



>> Order Information

Product	Gas Formula	Partnumber	Range	Resolution	Response Time
		05-Stox-NH ₃ 100-01	0-100 ppm	0.01 ppm	T90 < 60 s
Ammonia (Fast response)	NH_3	05-Stox-NH ₃ -500-01	0-500 ppm	0.1 ppm	T90 < 60 s
		05-Stox-NH ₃ -1000-01	0-1000 ppm	0.1 ppm	T90 < 60 s
	NO ₂	05-Stox-NO ₂ -5-02	0-5 ppm	0.001 ppm	< 3 s (T90 < 80 s
		05-Stox-NO ₂ -50-01	0-50 ppm	0.01 ppm	< 3 s (T90 < 30 s
Nitrogen Dioxide		05-Stox-NO ₂ -100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s
		05-Stox-NO ₂ -1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-NO ₂ -2000-01	0-2000 ppm	0.1 ppm	< 3 s (T90 < 30 s
Oxygen	O ₂	05-Stox-O ₂ -25%-01	0-25% vol.	0.01% vol.	< 3 s (T90 < 30 s
		05-Stox-O ₃ -5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 80 s
Ozone	O ₃	05-Stox-O ₃ -50-01	0-50 ppm	0.01 ppm	< 3 s (T90 < 30 s
		05-Stox-O ₃ -100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s
	PH_3	05-Stox-PH ₃ -5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 80 s
Dh h i		05-Stox-PH ₃ -20-01	0-20 ppm	0.01 ppm	< 3 s (T90 < 80 s
Phosphine		05-Stox-PH ₃ -100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 80 s
		05-Stox-PH ₃ -2000-01	0-2000 ppm	0.1 ppm	< 3 s (T90 < 80 s
Silane	SiH ₄	05-Stox-SiH ₄ -10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 80 s
		05-Stox-SMELL-5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 30 s
0-1	SMELL	05-Stox-SMELL-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 30 s
Odor		05-Stox-SMELL-200-01	0-200 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-SMELL-500-01	0-500 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-SO ₂ -5-01	0-5 ppm	0.001 ppm	< 3 s (T90 < 30 s
	SO_2	05-Stox-SO ₂ -50-01	0-50 ppm	0.01 ppm	< 3 s (T90 < 30 s
Sulfur Dioxide		05-Stox-SO ₂ -100-01	0-100 ppm	0.01 ppm	< 3 s (T90 < 30 s
		05-Stox-SO ₂ -1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-SO ₂ -2000-01	0-2000 ppm	0.1 ppm	< 3 s (T90 < 30 s
	TVOC	05-Stox-TVOC-10-01	0-10 ppm	0.001 ppm	< 3 s (T90 < 30 s
Volatile Organic Compounds		05-Stox-TVOC-200-01	0-200 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-TVOC-1000-01	0-1000 ppm	0.1 ppm	< 3 s (T90 < 30 s
		05-Stox-TVOC-2000-01	0-2000 ppm	0.1 ppm	< 3 s (T90 < 30 s



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.

Marning

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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