Smart Gas Sensor Device

Stox Series
Datasheet

Overview

Easy solution for gas detection

The Stox Smart Gas Sensor Device is an intelligent sensor device, which has a 4-20mA 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 4-20mA 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

☞ 4-20mA 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℃ 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
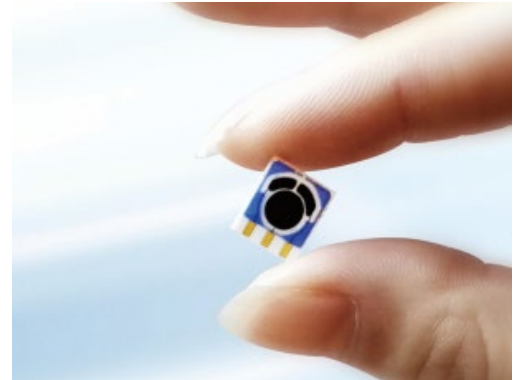
☞ Industrial Gas Safety Monitoring
☞ Industrial Process Gas Monitoring
☞ Air Exchange System and Air Purifier
☞ Food Storage Insecticides Monitoring
☞ Wastewater Treatment, Garbage Disposal, Biogas Safety Monitoring
☞ Medical & Health Care
☞ Semiconductor Gas Purification Monitoring
☞ Transformer Failure and Power Chamber Environment Monitoring
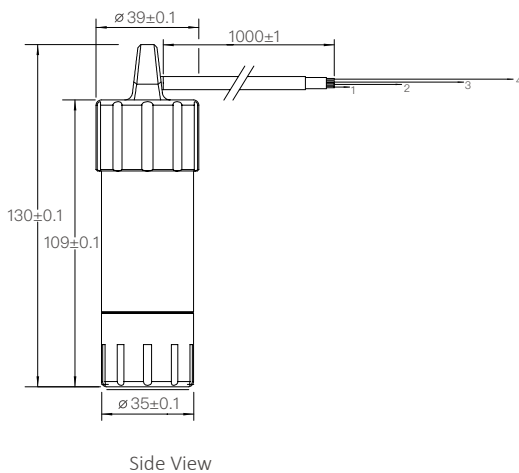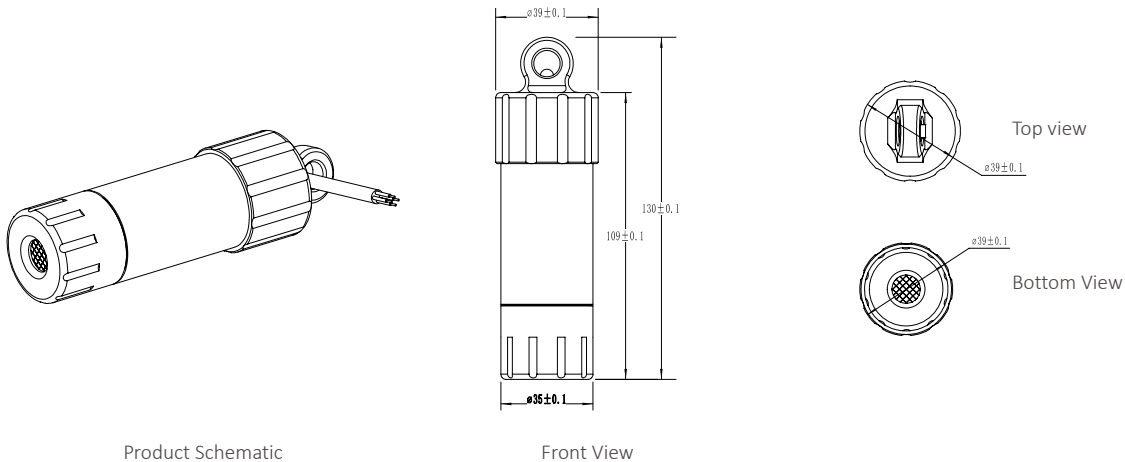☞ Warehouse Logistics Environment Monitoring

▶ Principle

The Stox Sensor Device is a durable product. It converts the original small current signals of the gas sensors into a standard 4-20mA 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

Stox Series Gas Sensor Device Mechanical Drawing

Product Schematic

Front View

Top view

Bottom View

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

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% F.S
Repeatability	< 2%
Linearity	Linear
Long-Term Drift	< 1% / month
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	4-20mA two-wires (Only gas sensor ouput, without temperature and humidity)
	Or RS485 Modbus-RTU (Gas with temperature and humidity sensor signal output)
Fault Output	3.5mA Fault Signal: Sensor signal weak
	3mA 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	< 0.6W
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

EC Sense
Easy Gas Sensors

» Order Information

Product	Gas Formula	Partnumber	Range	Resolution	Response Time
Smart Carbon Monoxide Sensor Device	CO	05-Stox-CO-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 80s)
		05-Stox-CO-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 30s)
		05-Stox-CO-1000-01	0 - 1000 ppm	1 ppm	< 3s (T90 < 30s)
		05-Stox-CO-10000-01	0 - 10000 ppm	10 ppm	< 3s (T90 < 30s)
Smart Organic Volatiles Sensor Device	TVOC	05-Stox-TVOC-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 30s)
		05-Stox-TVOC-200-01	0 - 200 ppm	0.1 ppm	< 3s (T90 < 30s)
		05-Stox-TVOC-2000-01	0 - 2000 ppm	1 ppm	< 3s (T90 < 30s)
		05-Stox-TVOC-10000-01	0 - 10000 ppm	10 ppm	< 3s (T90 < 30s)
Smart Hydrogen Fluoride Sensor Device	HF	05-Stox-HF-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 80s)
Smart Sulfur Hydrogen Sensor Device	H_2S	05-Stox-H_2S-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 30s)
		05-Stox-H_2S-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 30s)
		05-Stox-H_2S-1000-01	0 - 1000 ppm	1 ppm	< 3s (T90 < 30s)
		05-Stox-H_2S-5000-01	0 - 5000 ppm	1 ppm	< 3s (T90 < 30s)
Smart SMELL Sensor Device	SMELL	05-Stox-SMELL-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 30s) ①
		05-Stox-SMELL-200-01	0 - 200 ppm	1 ppm	< 3s (T90 < 30s)
Smart Nitrogen Dioxide Sensor Device	NO_2	05-Stox-NO_2-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
		05-Stox-NO_2-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 30s)
Smart Sulfur Dioxide Sensor Device	SO_2	05-Stox-SO_2-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
		05-Stox-SO_2-100-01	0 - 100 ppm	0.1ppm	< 3s (T90 < 30s)
Smart Chlorine Sensor Device	Cl_2	05-Stox-Cl_2-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 30s) ①
		05-Stox-Cl_2-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 30s)
Smart Ethylene Oxide Sensor Device	ETO	05-Stox-ETO-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 30s) ①
		05-Stox-ETO-200-01	0 - 200 ppm	0.1 ppm	< 3s (T90 < 30s)
		05-Stox-ETO-1000-01	0 - 1000 ppm	1 ppm	< 3s (T90 < 30s)
Smart Phosphine Sensor Device	PH_3	05-Stox-PH_3-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
		05-Stox-PH_3-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 80s)
		05-Stox-PH_3-2000-01	0 - 2000 ppm	1 ppm	< 3s (T90 < 80s)
Smart Formaldehyde Sensor Device	HCHO	05-Stox-HCHO-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
		05-Stox-HCHO-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 60s)
Smart Methyl Mercaptan Sensor Device	CH_4S	05-Stox-CH_4S-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 80s)
		05-Stox-CH_4S-100-01	0 - 100 ppm	0.1 ppm	< 3s (T90 < 80s)
		05-Stox-CH_4S-5000-01	0 - 5000 ppm	10 ppm	< 3s (T90 < 80s)
Smart Ethylene Sensor Device	C_2H_4	05-Stox-C_2H_4-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 80s) ①
		05-Stox-C_2H_4-200-01	0 - 200 ppm	0.1 ppm	< 3s (T90 < 80s)

⟫ Order Information

Product	Gas Formula	Partnumber	Range	Resolution	Response Time
Smart Hydrogen Cyanide Sensor Device	HCN	05-Stox-HCN-50-01	0 - 50 ppm	0.1 ppm	< 3s (T90 < 30s) ①
Smart Arsenide Sensor Device	AsH_3	05-Stox-AsH₃-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
Smart Silane Sensor Device	SiH_4	05-Stox-SiH₄-10-01	0 - 10 ppm	0.01 ppm	< 3s (T90 < 80s) ①
Smart Borane Sensor Device	B_2H_6	05-Stox-B₂H₆-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①
Smart Germane Sensor Device	GeH_4	05-Stox-GeH₄-5-01	0 - 5 ppm	0.01 ppm	< 3s (T90 < 80s) ①

Note: 1) If there is a gas or range not to be found in the above list, please contact us.

2) With①: The T90 Response Time calculates how fast the gas reaches 90% of the sensor volume.

3) With①: Deviation from Linearity < 10% FS, within standard range.

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.

EC Sense
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