EC Sense
Easy Gas Sensors

CDS10-EC4
Smart Gas Sensor Module
Datasheet

❯❯ Overview

Easy solution for gas detection

The CDS10 Gas Sensor Module is an intelligent gas sensor module from EC Sense with a two wire 4-20 mA and RS485 Modbus-RTU output signal, where one of the two signals can be selected. The module utilizes a smart microprocessor with high-reliability Electrochemical Gas Sensing Technology and intelligent algorithm calculation. The CDS10 is a smart solution that combines temperature and humidity in one sensor module for industrial safety applications.

The CDS10 Gas Sensor Module is suitable for indoor and outdoor environments. It detects gas, temperature and humidity and easily receives all data simultaneously. The changing state of gas is closely related to temperature and humidity, for which this combination of the CDS10 Gas Sensor Module provides a professional solution with a RS485 and temperature and humidity signal output.

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

Each CDS10 Sensor Module 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 with the RS485 output is required or the 4-20 mA output signal needs to be corrected.

The CDS10 Gas Sensor Module has the standard 4-20 mA two-wire or RS485 Modbus-RTU output signal that allows for quick instrument and system setup or connection to 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 ℃ to +55 ℃
- ☞ Long lifetime, anti-poisoning

- ☞ Response time is fast and has a stable zero point without drift, anti-electromagnetic interference ability
- ☞ Integrated safety protection enables use in potentially explosive environments
- ☞ Electronic circuit boards have a dust and corrosion resistant coating
- ☞ CE EN61326-1:2013, EMI, 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 Monitoring
- ☞ Transformer Failure and Power Chamber Environment Monitoring
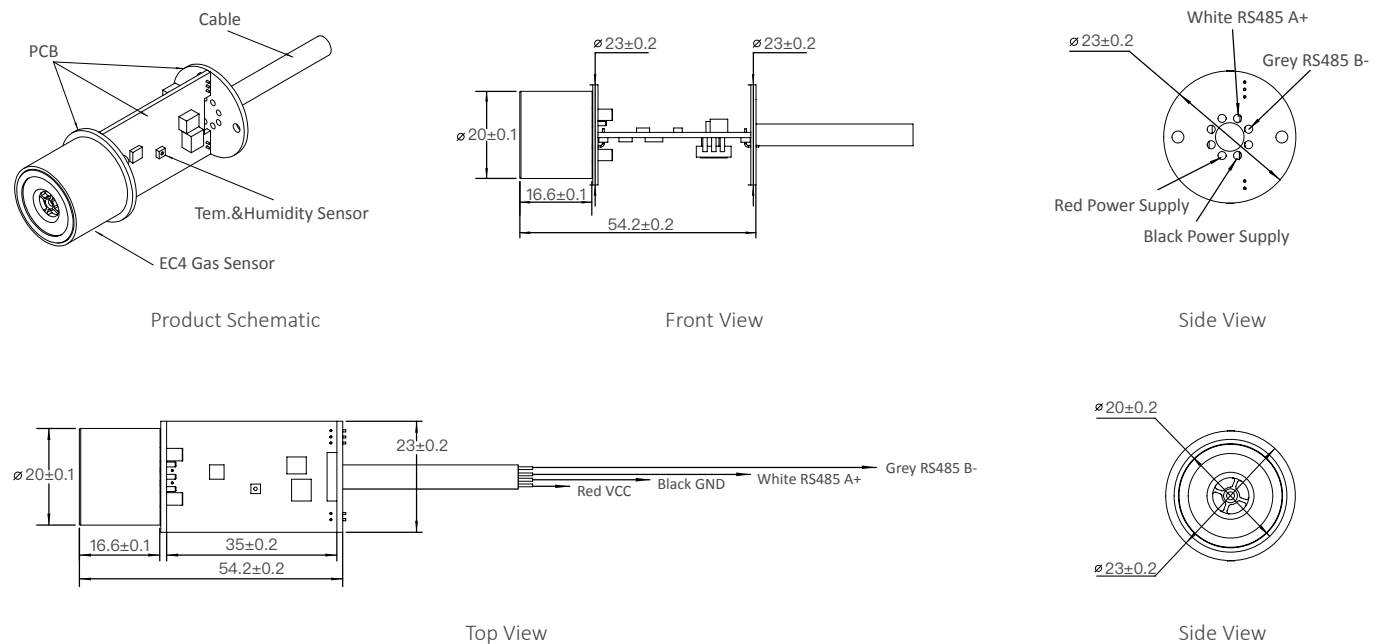- ☞ Warehouse Logistics Environment Monitoring

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≫ Principle

The CDS10 Sensor Module 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 Module uses the 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. There are oxidation and reduction reactions. 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 Diagram

CDS10-EC4 Smart Gas Module Mechanical Diagram   unit: mm

Cable
PCB
Tem.&Humidity Sensor
EC4 Gas Sensor

Product Schematic

$\varnothing 23\pm0.2$ $\varnothing 23\pm0.2$
$\varnothing 20\pm0.1$
16.6±0.1
54.2±0.2

Front View

White RS485 A+
$\varnothing 23\pm0.2$
Grey RS485 B-
Red Power Supply
Black Power Supply

Side View

$\varnothing 20\pm0.1$
23±0.2
Red VCC   Black GND   White RS485 A+   Grey RS485 B-
16.6±0.1   35±0.2
54.2±0.2

Top View

$\varnothing 20\pm0.2$
$\varnothing 23\pm0.2$

Side View

≫ Technology Specifications

Gas Sensor Specifications

Principle	Electrochemical Sensing Technology
Accuracy	± 5% (Mesurement value)
Repeatability	< 2 %
Long-Term Drift	< 5%/year
Sensor Life Expectancy	> 3 years
Warranty	12 months

Temperature & Relative Humidity Sensor Specification (Inside housing)

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

Note: This parameter cannot be obtained when the 4-20 mA output is selected. It is only applicable to the RS485 output.

Electrical Parameters

Output Signal Interface	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 is weak
	3 mA Fault Signal: Sensor failure or sensor disconnection
	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

Environmental Parameters

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

Mechanical Parameters

Size	542 x 23 mm
Power Cable Length	1 m
	Red: VCC Black: GND White: RS485 A+ Grey: RS485 B-
Weight	37.99 g
Warranty	12 months

Certification

Ex ia IIC Ga Intrinsic safety (certificated Temperature T6 -40 ℃ to + 55 ℃)
CE Certificated EN61326-1:2013, EMC, 2014/30/EU

≫ Order Information

Product	Gas Formula	Partnumber	Range	Resolution	Response Time
Smart Bromine Sensor Module	Br_2	04-CDS10-EC4-Br_2-1-01	0-1 ppm	0.001 ppm	T90 < 60 s
Smart Chorine Sensor Module	Cl_2	04-CDS10-EC4-Cl_2-5-01	0-5 ppm	0.001 ppm	T90 < 60 s
		04-CDS10-EC4-Cl_2-50-01	0-50 ppm	0.01 ppm	T90 < 60 s
Smart Chlorine Dioxide Sensor Module	ClO_2	04-CDS10-EC4-ClO_2-5-01	0-5 ppm	0.001 ppm	T90 < 60 s
Smart Fluoride Sensor Module	F_2	04-CDS10-EC4-F_2-5-01	0-5 ppm	0.001 ppm	T90 < 60 s
Smart Hydrogen Chloride Sensor Module	HCl	04-CDS10-EC4-HCl-30-01	0-30 ppm	0.001 ppm	T90 < 60 s
Smart Hydrogen Fluoride Sensor Module	HF	04-CDS10-EC4-HF-10-01	0-10 ppm	0.001 ppm	T90 < 60 s
Smart Ammonia Sensor Module	NH_3	04-CDS10-EC4-NH_3-100-01	0-100 ppm	0.01 ppm	T90 < 60 s
		04-CDS10-EC4-NH_3-500-01	0-500 ppm	0.1 ppm	T90 < 60 s
		04-CDS10-EC4-NH_3-1000-01	0-1000 ppm	0.1 ppm	T90 < 60 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.

⚠️ **Warning**

EC Sense sensors are designed for use in a variety of environmental conditions. However, due to the principles and characteristics of 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 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 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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