Gravity: Factory Calibrated Electrochemical Sensor

Overview

The gas sensor series is designed to detect various flammable, combustible, and toxic gases in the environment. With pre-calibrated sensors, it can measure the concentration of specific gases quickly and accurately. Supporting multiple output modes, including Analog, I2C, UART, and digital alarm signals, it offers flexibility in different applications. The probes in this series use electrochemical principles, providing strong stability and sensitivity with a lifespan of up to two years.

Using the simple and user-friendly Gravity interface, you can easily build various gas concentration detectors. This sensor series has widespread applications in safety production, industrial manufacturing, and environmental protection, making it the ideal choice for settings such as coal mines, chemical industries, chemical laboratories, and environmental management.

This datasheet is for CO, O2, NH3, H2S, NO2, HCL, H2, PH3, SO2, O3, CL2, HF Gas Sensor.

Order Code

Order Code	Brand	Description
E34007-001	DFRobot	Gravity: Factory Calibrated Electrochemical CO Sensor

Gravity: Factory Calibrated Electrochemical Sensor

Features

- Factory calibrated, accurate measurement
- High sensitivity, low power consumption
- Excellent stability and anti-interference
- Three output modes: I2C, UART and analog
- Long service life(2 years)
- Compatible with 3.3~5.5V main controllers
- 32 modifiable I2C addresses
- Reverse connection protection
- Temperature compensation
- Threshold alarm

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Specification

- Detection Gas: CO, O2, NH3, H2S, NO2, HCL, H2, PH3, SO2, O3, CL2, HF(Need to change different probe)
- Working Voltage: 3.3 ~ 5.5V DC
- Working Current: <5mA
- Output Signal: I2C, UART output (0~3V), analog voltage (see the characteristic parameters of specific probe)
- Detection error: ±10% of output value or ±5% of full scale (whichever is greater)
- Working Temperature: -20 ~ 50℃
- Working Humidity: 15 ~ 90%RH (non-condensing)
- Storage Temperature: -20 ~ 50℃
- Storage Humidity: 15 ~ 90%RH (non-condensing)
- Lifespan: >2 years (in the air)
- Adapter Plate Size: 37×32mm
- Operating Pressure Range: 0.5~2.0 bar
- (Using in an environment that is not in the operating pressure range may result in inaccurate measurement readings.)

Precautions for use

- The white waterproof and breathable membrane of the sensor on the module is strictly forbidden to open, otherwise it is regarded as artificial damage.
- It is forbidden to plug or unplug the probe with power on.
- It is forbidden to directly solder the pins of the module, but the sockets of the pins can be soldered.
- The module should avoid contact with organic solvents (including silica gel and other adhesives), paints, pharmaceuticals, oils and high-concentration gases.
- The module must not be subjected to excessive shock or vibration.
- The module needs to be warmed up for more than 5 minutes when powered on for the first time. It is recommended to warm up for more than 24 hours if it has not been used for a long time.
- Do not apply this module to systems involving personal safety.
- Do not install the module in environment with strong air convection.
- Do not leave the module in high-concentration organic gas for a long time.
- The data returned by the serial port of the module is the real-time concentration value in the current environment. If there is no standard gas, please do not try the calibration command. This command will clear the calibrated data, and the data returned by the serial port will be inaccurate.
- To judge whether the module communication is normal, it is recommended to use a USB to TTL tool (communication level 3V) to observe and judge according to the communication protocol through the serial debugging assistant software.

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Characteristic Parameters

Type	O2	CO	H2S	Cl2	NH3	SO2
Detection Range	(0-25)%Vol	(0-1000)ppm	(0-100)ppm	(0-20)ppm	(0-100)ppm	(0-20)ppm
Resolution	0.1%Vol	1ppm	1ppm	0.1ppm	1ppm	0.1ppm
V0 Voltage output range	(1.5-0)V	(0.6-3)V	(0.6-3)V	(2-0)V	(0.6-3)V	(0.6-2.4)V
Vout1	1.0V@10%vol	0.9V@200ppm	1.5V@50ppm	1.3V@10ppm	1.4V@50ppm	1.5V@10ppm
Response Time （T90)	≤15S	≤30S	≤30S	≤60S	≤150S	≤30S

Type	NO2	O3	H2	HCL	HF	PH3
Detection Range	(0-20)ppm	(0-10)ppm	(0-1000)ppm	(0-10)ppm	(0-10)ppm	(0-1000)ppm
Resolution	0.1ppm	0.1ppm	1ppm	0.1ppm	0.1ppm	0.1ppm
V0 Voltage output range	(2-0)V	(2-0.7)V	(0.6-3)V	(2-0.7)V	(2-0.5)V	(0.6-3)V
Vout1	1.2V@10ppm	1.3V@5ppm	1.3V@500ppm	1.4V@5ppm	1.3V@5ppm	0.7V@50ppm
Response Time （T90)	≤30S	≤120S	≤120S	≤60S	≤60S	≤30S

Characteristic Parameters

Explanation of VO use:

VO: It means original voltage (linear) after amplifying circuit, rather than concentration value of current environment.

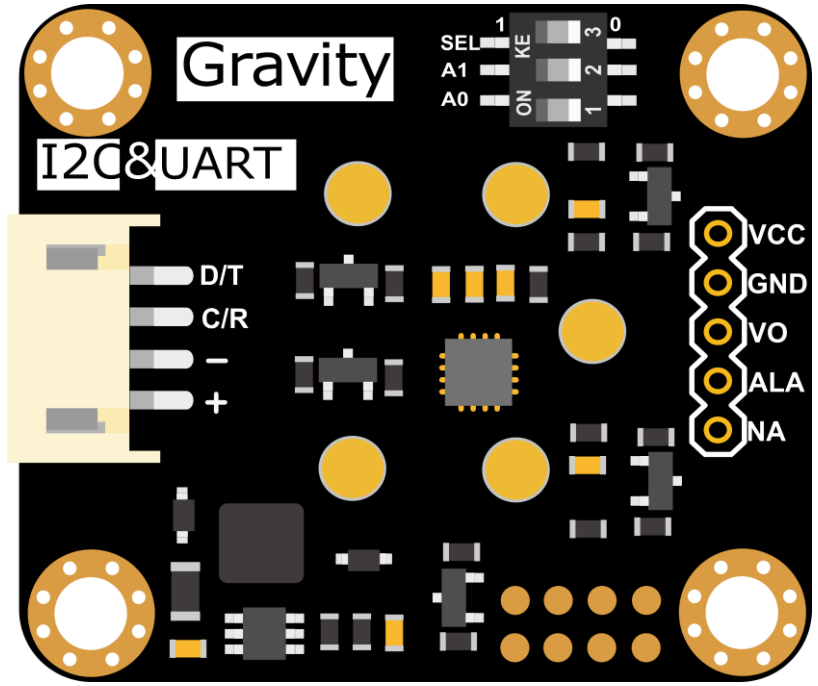
Calculation method: concentration in the current environment N= 200/(Vout1-Vout0)*(Voutx-Vout0)

Where Vout1 corresponds to Vout1 in the table and Vout0 corresponds to the voltage value of the gas at 0 ppm in the table. Take CO as an example: zero point voltage Vout0 = 0.6V, Vout1 = 0.9V, the current voltage of VO Voutx = 1.2V, then the current concentration in the environment N = 400ppm

Note: The analog output is the original uncalibrated voltage of the probe, the UART/I2C data is factory calibrated, if there is no special requirement, it is recommended to use the calibrated UART/I2C data.

Board overview

Label	Name	Function description
1	D/T	I2C data line SDA / UART data transmitting-TX
2	C/R	I2C clock line SCL / UART data receiving-RX
3	-	GND -
4	+	Power supply + (3.3-5V compatible)



Label	Name	Function description
1	VCC	Positive power supply (3.3-5V compatible)
2	GND	GND negative power supply
3	V0	The raw voltage output of the gas probe. You can develop your own conversion algorithm based on the original output.
4	ALA	Threshold alarm function, the threshold can be set through API, when exceeding this value, the pin will output high level.
5	NA	Reserve custom pins, you can contact us for custom functions.

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Documents and Files

- DFRobot Electrochemical Gas Module

Revision History

Date	Revision	Change description
30/10/2025	1.0	Initial release