

Introduction

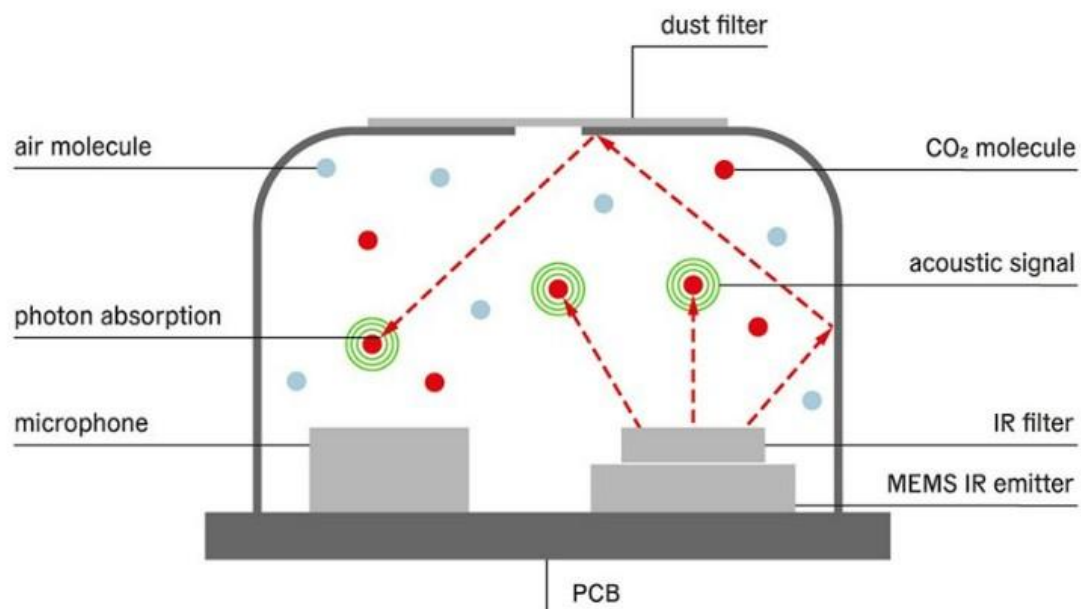
CO₂ is a key factor for indoor air quality as high levels compromise human cognitive performance and well-being.

This Gravity: SCD41 CO₂ sensor is based on the SCD41 miniature CO₂ sensor from Sensirion. SCD41 builds on the photoacoustic NDIR sensing principle and Sensirion's patented PAsens® and CMOSens® technology to offer high accuracy at an unmatched price and the smallest form factor. On-chip signal compensation is realized with the built-in temperature and humidity sensor, while temperature and humidity data outputs are also available.




SCD41 sensor detects the amount of energy that is absorbed by CO₂ molecules. When pulsing the infrared emitter, CO₂ molecules absorb infrared light periodically. This causes additional molecular vibration resulting in a pressure wave inside the measurement chamber. The higher the CO₂ concentration, the more light is absorbed, and thus the greater the amplitude of this acoustic wave becomes. A microphone inside the gas chamber measures this, from which the CO₂ concentration can then be calculated.

Click to learn more about [PAsens® technology](#).

Click to learn more about [NDIR sensors](#).



Selection Guide

CO2 Sensor Selection Guide				
Product Name	Gravity: Analog Electrochemical Carbon Dioxide / CO2 Sensor (0-10000 ppm)	Gravity: UART Infrared Carbon Dioxide / CO2 Sensor (0-50000 ppm)	Gravity: PWM Infrared Carbon Dioxide / CO2 Sensor (400-5000 ppm)	Gravity: I2C SCD41 Infrared Carbon Dioxide / CO2 Sensor (400 - 5000 ppm)
Figure				
SKU	SEN0159	SEN0220	SEN0219	SEN0536
Operation Voltage	3.7~5V	4.5~5.5V	4.5~5.5V	3.3V~5V
Output	Gravity: Analog (Analog 2.7~4.1V) + 3P Header Digital Output (Alarm): 0~VCC Level	Gravity: Analog (Analog Output 0.4~2V)	Gravity: UART (0~3.3V Level)	Gravity: I2C
Measurement Principle	Electrochemistry (Solid electrolyte battery principle)	NDIR (non-dispersive infrared)	NDIR (non-dispersive infrared)	photoacoustic NDIR
Measurement Range	0~10000 ppm	0-50000 ppm	400-5000 ppm	400~5000 ppm
Accuracy	±100ppm@400ppm	±(100ppm + 6% readings)	±(100ppm + 6% readings)	±(40 ppm + 5% MV)
Response Time	< 20s	< 90s	< 30s	60s
Average Power	< 1W	< 430mW@5V	< 430mW@5V	< 30mW@5V
Operation Temperature	-20°C~50°C	0°C~50°C	0°C~50°C	-10°C~60°C
Operation Humidity	0~95% RH (No condensation)	0~95% RH (No condensation)	0~95% RH (No condensation)	0~95% RH (No condensation)
Lifespan	>1 year	>5 year	>5 year	>10 year
Dimension (PCB)	32*42 mm	37*69 mm	21*27.1 mm	32*27*8mm
Features	1. Large Range 2. Adjustable Alarm Threshold 3. Fast Response 4. Analog Output	1. High Accuracy 2. Long Lifespan 3. Auto Temperature Compensation 4. Water Vapor Interference Resistance 5. Analog Output	1. High Accuracy 2. Large Range 3. Long Lifespan 4. Auto Temperature Compensation 5. Water Vapor Interference Resistance 6. 3.3V UART Output	1. CO2, temperature, and humidity, three in one 2. Small size of 32*27*8mm 3. Low power, average current < 4mA

Features

CO2, temperature, and humidity, three in one

Small size of 32*27*8mm

Low power, average current < 4mA

Applications

Indoor CO2 concentration monitoring

Ambient monitoring in greenhouse

Smart ventilation systems

Specification

Power Supply: 3.3V to 5V

Average Operating Current: < 4mA

I2C Address: 0x62

Product Size: 32*27*8mm/1.26×1.06×0.31"

CO2

Accuracy: $\pm(40 \text{ ppm} + 5\% \text{ MV})$

Measuring Range: 400 - 5000 ppm

Response Time: 60s

Humidity

Typical Relative Humidity Accuracy: 6%RH

Relative Humidity Measuring Range: 0 to 95%RH

Response Time: 120s

Temperature

Typical Temperature Accuracy: 0.8°C

Temperature Measuring Range: -10 to 60°C

Response Time: 120s

Documents

[Product wiki](#)

[Schematics](#)

[Dimensions](#)

[Design-in guide](#)

Shipping List

Gravity: SCD41 Infrared CO2 Sensor x1

Gravity-4P I2C/UART Sensor Cable x1