



# ExplorIR<sup>®</sup>-M CO2 Sensor

📈 Measurement range: 0-5%; 0-20%; 0-100%

🔋 Battery applications ⚡ Low power

🔗 Robust 📏 Miniature



## Overview

ExplorIR®-M is a robust, low power, CO2 sensor in miniature format. Its compact design enables easy integration into gas monitoring and detection systems.

The sensor is built to reliably measure CO2 levels in harsh environments, up to 100% concentration. This includes applications exposed to varying degrees of pressure, and high vibration conditions.

Its low power requirement also makes it ideal for battery powered systems, including portable, wearable and self-powered applications.

ExplorIR®-M is built on our unique patented LED technology platform and optical designs. It's this solid-state technology that enables best-in-class power consumption, lifetime and durability.

## Applications

ExplorIR®-M is available in measurement ranges from 0-5%, 0-20%, and 0-100% concentration. The sensor is suitable for a range of process control, and similar demanding applications.

It can be used for battery applications, where low power consumption is required. This includes IoT applications, such as wearables.

Examples of markets where ExplorIR CO2 sensors are being successfully used:

- Agriculture
- Diving
- Aerospace
- Incubators
- Healthcare
- Safety
- Food packaging
- Food storage/ transportation

## Benefits

- Reliable in harsh, volatile environments
- Fits neatly inside compact instruments
- Ideal for low power and battery applications
- Up to 50X lower power than typical NDIR CO2 sensors
- Low maintenance
- Suitable for wireless, portable, wearable and self-powered systems
- Integrates with wireless IoT networks such as ZigBee, Wifi, LoRa, Bluetooth, SigFox and EnOcean

## Features

- Low power/energy consumption - 3.5mW
- Measures up to 100% CO2 concentration
- >15 years lifetime
- Miniature format
- Solid-state - no moving parts, no heated filaments
- Vibration and shock resistant
- Non-heating
- Digital (UART) output
- RoHS compliant
- Manufactured in the UK



## General performance

<b>Start-up time<sup>1</sup></b>	1.2 secs
<b>Operating conditions- Temperature</b>	0°C to 50°C (standard) -25°C to 55°C (extended range)
<b>Operating conditions- Humidity<sup>2</sup></b>	0 to 95% RH, non-condensing
<b>Recommended storage</b>	-30°C to +70°C

## CO<sub>2</sub> measurement

<b>Sensing method</b>	Solid-state Non-Dispersive InfraRed (NDIR) absorption Patented solid-state LED and detector Patented gold-plated optics
<b>Sample method</b>	Diffusion
<b>Measurement range</b>	0-5% 0-20% 0-100%
<b>Accuracy<sup>3</sup></b>	± (70ppm+5% of reading) (100% range ± (300ppm+5% of reading))
<b>Pressure dependence<sup>5</sup></b>	0.15% of reading per mbar in normal atmospheric conditions
<b>Operating pressure range<sup>6</sup></b>	500mbar – 10 bar
<b>Response time, T90<sup>7</sup></b>	10 secs - 2 mins

## Electrical

<b>Power input<sup>8</sup></b>	3.25 to 5.5V. (3.3V recommended) Peak Current 33mA Average Current <1.5mA
<b>Power consumption<sup>8</sup></b>	3.5mW
<b>Connector</b>	4 x 0.5mm sq pins (see drawings)
<b>Communication</b>	UART (standard)

## Warranty

<b>Sensor warranty<sup>9</sup></b>	1 year
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**1** Time to a valid reading is determined by digital filter setting. Typically 4-8 seconds.

**2** For extended operation in high temperature and humidity environments, contact GSS

**3** All measurements are at NTP unless stated otherwise.

**4** For correct operation, the sensor must experience CO<sub>2</sub> concentrations close to fresh air at some time in an 8 day period. For further details, please contact us to request our application note on Autocalibration.

**5** Calibrated for 1013mbar. GSS can supply advanced pressure correction advice when operating outside normal atmospheric conditions.

**6** External pressure calibration required.

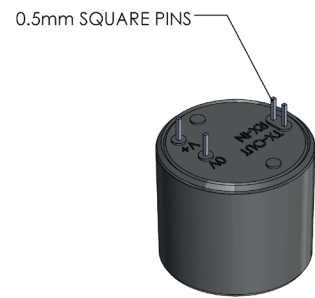
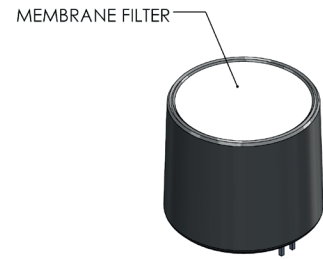
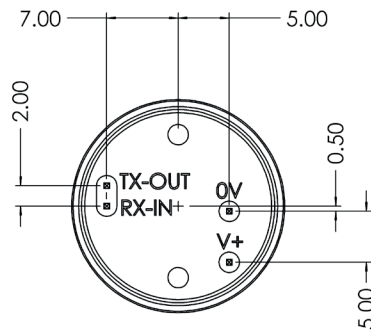
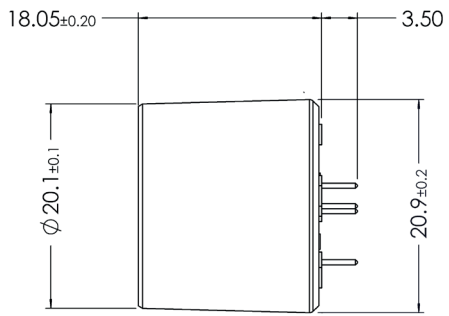
**7** Response time to a step change in gas level is dependent on application/filter/flow rate/diffusion.

**8** Power measurements for standard CO<sub>2</sub> sensor with 2 readings per second. Temperature and RH% measurements increase power consumption.

**9** Gas Sensing Solutions Ltd (GSS Ltd) offers a limited one (1) year manufacturer's warranty on its products commencing from the date of original purchase. The warranty is limited to defects in materials and workmanship and does not cover damage or abnormal wear and tear resulting from abuse, misuse, or accidental damage. The warranty excludes operational damage due to exposure to blasts or other threats such as excessive abrasion or flames. Unauthorized repairs or alterations void the product warranty. GSS Ltd cannot and does not assume liability for defective products not manufactured or supplied by it even though such be used in conjunction with products manufactured by GSS Ltd.

# Technical drawings

CONNECTION	DESCRIPTION	COMMENTS
0V	GND CONNECTION	0V
V+	POSITIVE POWER SUPPLY	3V3 TO 5V
Tx-OUT	UART Tx FROM SENSOR	Voh WILL BE 3V. SENSOR OUTPUT.
Rx-IN	UART Rx TO SENSOR	USED FOR CONFIGURATION



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## Put it to the test

Our evaluation kit contains everything you need to test the sensor for your project requirements. The USB cable allows you to easily connect the ExplorIR®-M sensor to your PC, for real-time CO2 readings.

- CO2 sensor (including adapter if specified)
- USB connecting cable
- Evaluation guide on USB stick

Please visit our website to [request a quote](#) for an evaluation kit.

## Technical support

The GSS team are specialists in CO2 sensor design, manufacture and customisation. We can advise how best to integrate our award-winning sensors into your product or process. Whether it's a fixed unit, portable instrument, wearable device, or energy harvester, our engineering team have the experience to help bring your project to life.

For more information about GSS and our technology, please visit our [About](#) page.

## Custom sensors

If you need the sensor to be altered to your specific requirements, our engineering team can develop a custom solution for you. Please [contact us](#) to discuss your project requirements with our engineering department.

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