Wireless CO2 Sensor

Product Datasheet

Description

The Wireless CO2 Sensor periodically measures CO2 (ppm), Temperature (°C/°F), Relative Humidity (% RH) and Barometric Pressue (Pa/bar) in the surrounding air and wirelessly transmits the result to nearby Cloud Connectors (gateways) via the SecureDataShot™ protocol. Cloud Connectors relay sensor data into the DT cloud infrastructure. From here, data can be integrated into other services using our developer APIs, or viewed directly in DT Studio (web application).

Features

- Non-dispersive infrared CO2 sensor technology
- Up to 10-year battery life with 2xAA batteries
- Software self-calibration algorithm
- Peel-and-stick mount for simple installation

Applications

- Building Management Systems (BMS)
- Indoor Air Quality Monitoring (IAQ)
- Demand-Controlled Ventilation (DCV)
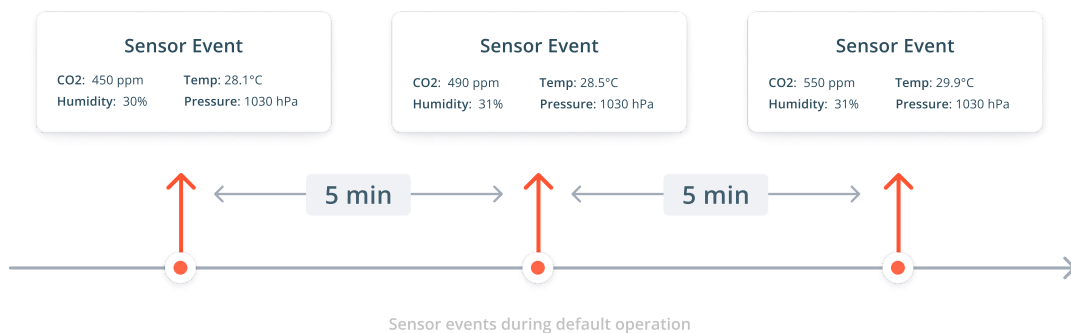
How it works

Default Operation

The Wireless CO2 Sensor measures Carbon Dioxide (ppm), Temperature (°C/°F), Relative Humidity (%RH) and Barometric Pressure (Pa/Bar) in the surrounding air and wirelessly transmits the result.

The radio protocol used is SecureDataShot™ and the data is relayed to DT cloud infrastructure using a SecureDataShot™ enabled gateway, also known as a Cloud Connector. From the cloud the data can be viewed directly in Studio (web application) or sent to external services using webhooks or a REST API.

Measurement Interval

5 minutes (default)

Sensor Event	
CO2: 450 ppm	**Temp:** 28.1°C
Humidity: 30%	**Pressure:** 1030 hPa

Sensor Event	
CO2: 490 ppm	**Temp:** 28.5°C
Humidity: 31%	**Pressure:** 1030 hPa

Sensor Event	
CO2: 550 ppm	**Temp:** 29.9°C
Humidity: 31%	**Pressure:** 1030 hPa

5 min   5 min

Sensor events during default operation

Settling Period & Self-Calibration Routine

Factory Calibration

Every sensor is factory calibrated at 400 ppm.

Settling Period

The sensor needs 7 days of calibration time before the CO2 measurements are accurate.

Calibration Routine

The sensor has a built-in auto calibration feature. In order to function correctly, the sensor must be exposed to typical background levels (400-450 ppm) at least once during a 7 day period. For example, many buildings will drop quickly to background CO2 levels when unoccupied overnight or at weekends.

Altitude & Temperature Compensation

Sensors are factory calibrated at 1013 hPa. Because readings from NDIR CO2 sensors will vary with barometric pressure and temperature, the Wireless CO2 Sensor has a built in altitude and temperature correction algorithm that compensates for changes in both barometric pressure and temperature.

Technical Specification

Carbon Dioxide (CO2)	**Sensor technology:** NDIR	**Range:** 0 to 5000 ppm
	Typical Accuracy: ± (30 ppm, +3% of reading), max ± (45 ppm, +3% of reading)	
Temperature	**Sensor technology:** CMOS	**Range:** 0 to 50°C (32 - 120°F)
	Typical Accuracy: ± 1°C (± 1.8°F)	
Relative Humidity	**Sensor technology:** CMOS	**Range:** 10 to 95% (non condensing)
	Typical Accuracy: ± 3%	
Pressure	**Sensor technology:** CMOS	**Range:** 500 to 1110 hPa (mbar)
	Typical Accuracy: ± 1 hPa (mbar)	

Operating & Storage Conditions

Operating Conditions	**Temperature:** 0 to 50°C (32 - 120°F)	**Pressure:** 500 to 2000 hPa (mbar)
	Humidity: 0 to 95% RH (non condensing)	
Storage Conditions	Cool and dry, near normal room temperature	

Battery Specification

Battery / Lifetime	**Type:** 2x AA	**Lifetime:** Up to 10 years

Wireless Communication

Radio Protocol	SecureDataShot™	
Radio Frequency	**EU:** 868 MHz ISM band	**US:** 915 MHz ISM band
Radio Range[1]	**Indoor:** 100 m (328 ft)	**Free Space:** 2 km (6500 ft)

Certification & Compliance

Certification	**EU:** CE, UKCA	**US/Canada:** FCC, ISED
	Product contains FCC ID: 2ATFX-102540 IC: 25087-102540	

(1): Based on standard ITU-R P.1238 (indoor) and ITU-R P.525 (free-space).

Mechanical Properties

Size	95 x 66 x 25 mm
Weight	116 grams (4.1 oz)
Material	Polycarbonate (PC)
Mounting method	Adhesive or screw

95.0 mm
(3.74 inches)

66.0 mm
(2.60 inches)

25.0 mm
(0.98 inches)

QR Code &
Regulatory Marking
(EU version)
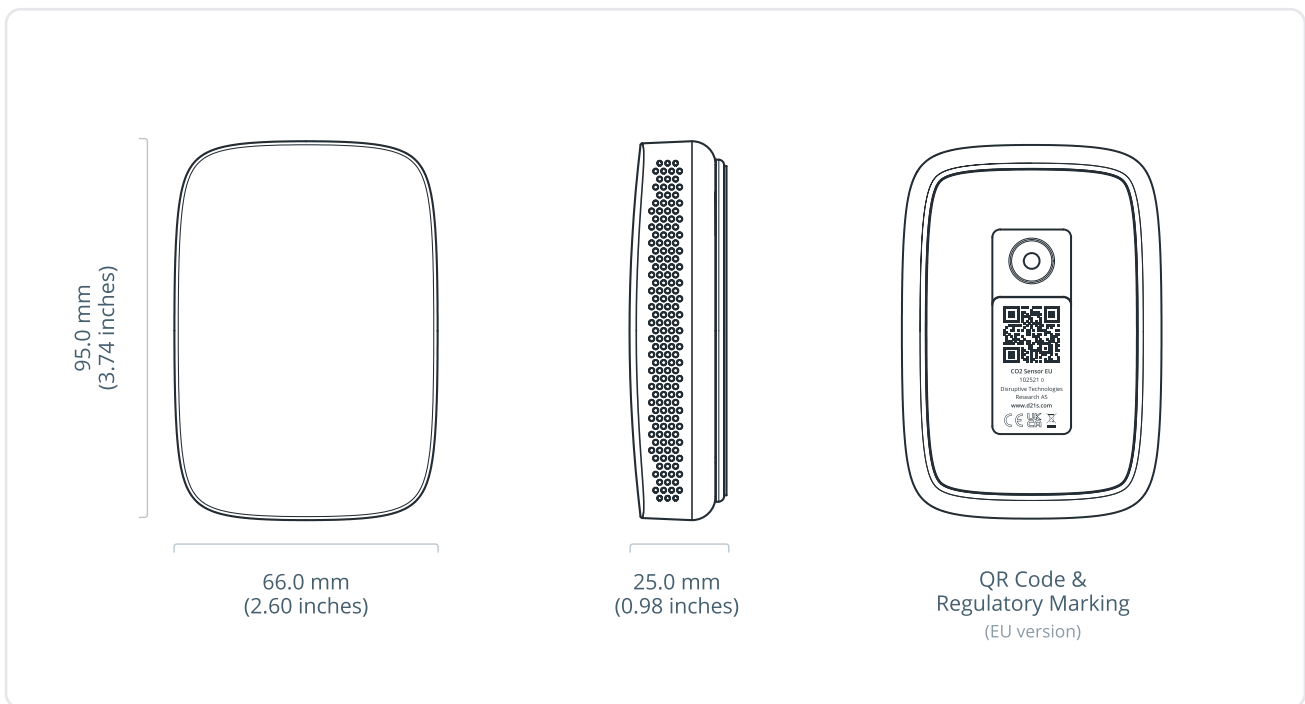
Product Variants

EU Version	**Product number**: 102521	**Region**: Europe
US Version	**Product number**: 102522	**Region**: North America

Installation Guidelines

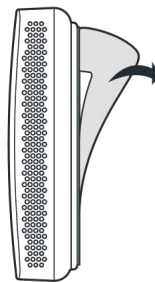|	
Placement	Designed to be wall mounted. Place the device at least 1 m (3 ft) from doors, windows, exterior walls, air vents or any other heating or cooling source.
Installation Height	1-1.8 meters (3 - 6 feet) above the floor (breathing height).

Installation Process
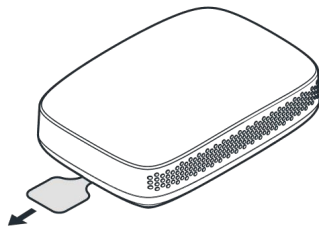
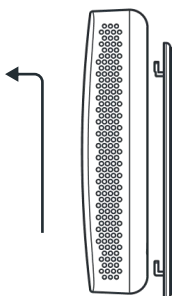Pull the battery tab to activate the sensor

Or

Option 1 – Mount the sensor to the wall using the adhesive. Simply peel and stick.
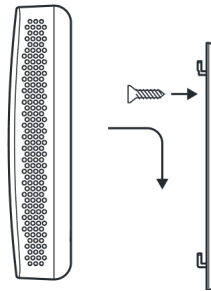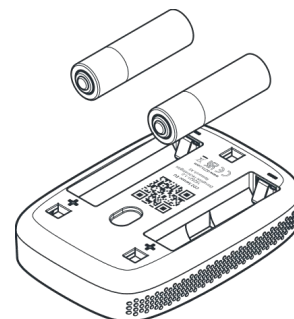
Option 2 – Mount the sensor to the wall using a screw. If neccessary, use the wall anchor.
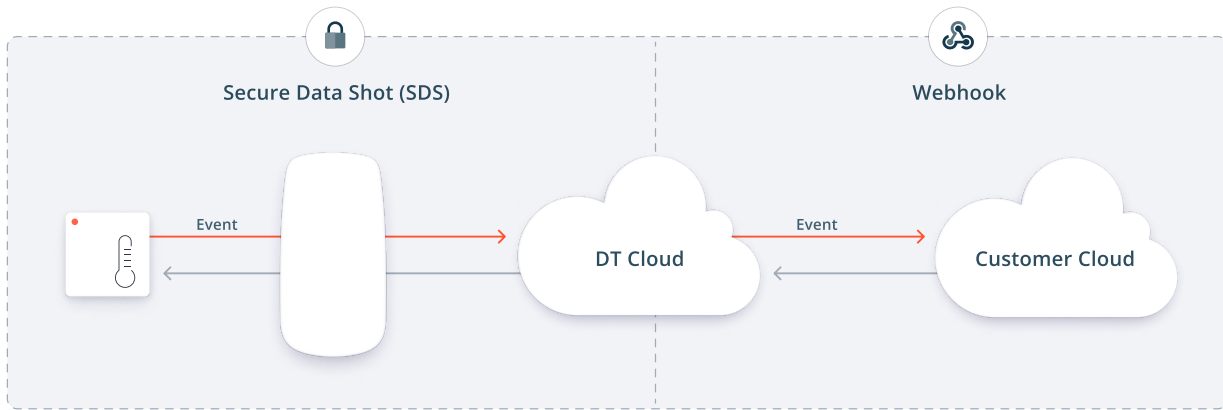
Battery Replacement

Remove the main housing from the bracket by pushing it upwards.

Replace the batteries with two new AA type batteries. Pay attention to the polarity.

System Overview

Secure Data Shot (SDS)   **Webhook**

Event   DT Cloud   Event   Customer Cloud

Wireless Sensors

Wireless sensors instantly connects to the cloud via SecureDataShot™

Cloud Connectors

Cloud Connectors automatically connect to the cloud service when powered

Cloud Service

No servers, databases, or on-prem clients to manage - simply install and use data

Why use a cloud based sensor solution?

Zero-touch Connectivity

No pairing needed, sensors automatically communicate through all Cloud Connectors which results in a quick and easy installation process.

24/7 Monitoring

All Disruptive system components are instrumented and monitored 24 hours per day, 7 days per week. Anomalies trigger alarms and notifies our response team.

Easy to Scale

Cloud Connectors support thousands of sensors and the cloud service automatically scales for users with increasing number of sensors.

Centralized Management

No servers, databases, or on-prem clients to manage. A modern cloud platform enables secure access on any device from anywhere in the world.
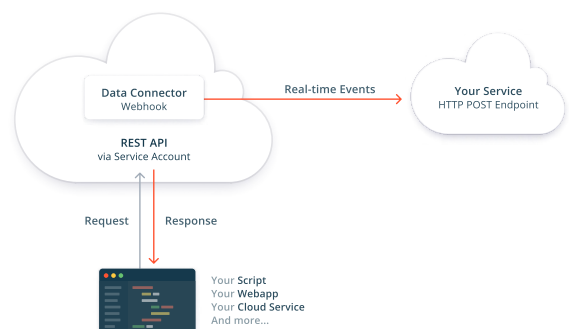
REST API & Webhooks

Easily integrate the sensor data into your own, or a third-party service, using our REST API or webhooks.

Fleet Management with Studio

Device Overview

Sort devices into projects for easy access and get an overview over data, health status and radio coverage

Flexible Dashboards

Get a quick overview of sensors and compare data with easy-to-use drag-and-drop dashboard cards

Access Control

Create role-based user accounts for people and services that need access to sensor data

Notifications

Set up simple rules for sensors and receive automatic sensor triggered notifications

Secure by default with SecureDataShot™

SecureDataShot™ creates a secure communication channel between the sensor and the cloud instead of between the sensor and the gateway. This reduces the potential for a manipulator-in-the-middle attack by exploiting vulnerabilities in the security architecture of gateways.

- Cloud Connectors can forward data to and from sensors but cannot decrypt the sensor data.

- During manufacturing, each sensor is assigned a unique **256 bit assymmetric encryption key**, generated by a tamper-proof 140-2 Level 3 certified hardware security module.

- The public part of the asymmetric key is exchanged with Disruptive's cloud via encrypted channels.

The purpose of the keys is to allow sensors to communicate securely with the cloud. In addition to the keys assigned during manufacturing, the sensor and cloud also hold a unique SecureDataShot™ session key.

- Private keys are used to encrypt data on the sensor before transmitting it over the radio.

- The unique public part of the key is used to decrypt the data on the cloud side.

- Disruptive Cloud Connectors are provisioned with Transport Layer Security (TLS) certificates to establish a secure connection between the Cloud Connector and the cloud.

Revision History

Revision 1.0   **Change**: Initial release.

                                    Date: March 8th, 2022