

Description

The CARBONLESS is advanced technology indoor sensor applied for the full sensing of the CO₂ magnitude, temperature and humidity. CARBONLESS is enclosed in a room sensor box and is designed to be wall mounted. CARBONLESS is completely wireless and powered by 3.6V AA lithium batteries. The integrated advanced intelligent (AI) computational algorithm enables reliable capability of the measurement the magnitude of the CO₂, temperature and humidity. The data transmitted from the sensor is based on Class A LoRaWAN® wireless network.



Applications

- Indoor environment measuring
- Smart buildings
- Government buildings
- Public buildings
- Banks
- Industrial facilities

Product features

- LoRaWAN communication
- Computational AI algorithm
- Indoor CO₂ sensor
- Indoor temperature sensor
- Indoor humidity sensor
- Configuration over the air
- Robust enclosure
- Auto self-calibration



Sensing characteristics

Temperature	-10 to 70 °C
Temperature Accuracy	Max '+/-0.4°C@ -10°C—70°C
Humidity	0 to 100 % RH (non-condensing)
Humidity Accuracy	"±4%RH @20°C, >80% "±7%RH @20°C
CO ₂ Measurement range	400 – 5000 ppm, extended range 10,000 ppm
CO ₂ Accuracy	±30 ppm ±3% of reading, (extended range ±10% of reading)

Mechanical specification

Weight	80 g without battery
Dimensions	86 x 86 x 25,5 mm
Enclosure	Plastic ABS UL94-V0
Storage Temperature	-10 to 70 °C

Sensor Power Supply

Battery Type and voltage	2x3.6 V AA Lithium Battery ER14505 AA lithium batteries (3.6V2400mAh/section)
Expected Battery Life	<10 years (Depending on configurations and environment)

Sensor logging Function

Sampling Interval	Configurable via downlink, NFC configuration is optional
Data Upload Interval	Configurable via downlink, NFC configuration is optional

Radio / Wireless specification

Wireless Technology	LoRaWAN® 1.0.3
Wireless Security	LoRaWAN® End-to-End encryption (AES)
LoRaWAN Device Type	Class A End-device
Supported LoRaWAN® features	OTAA, ABP, ADR, Adaptive Channel Setup
Supported LoRaWAN® regions	EU863 – 870 Optional: US902 – 928, EU863 – 870, AU915 – 928, EU433, RU864, IN865
Link Budget	137 dB (SF7) to 151 dB (SF12)
TX Power	14dBm±1dBm (Region specific)
Rx Sensitivity	132 dBm (LoRa, Spreading Factor=12, Bit Rate=293bps) -118 dBm (FSK, Frequency deviation=5kHz, Bit Rate=1.2kbps)
Communication range	10 km (line-of-sight, actual transmission distance depends on the environment)

Data sizes

Measurement	Data size	Elaboration
Temperature	2	MSB byte -128 to +128 C, LSB byte, value after decimal point 0 to 100
Humidity	1	One byte integer value (0 to 100%)
Battery	2	MSB byte represent Volts before decimal point , LSB byte represents two digits after decimal point expressed as unsigned 2 byte value, first byte – integer Volts, second byte – Volts (two digits after decimal point)
CO2	2	0 - 65535 BIN (Actual value 400 – 5000 ppm)

Sensor dimensions:



H: 25,5 mm
W: 86 mm
L: 86 mm

