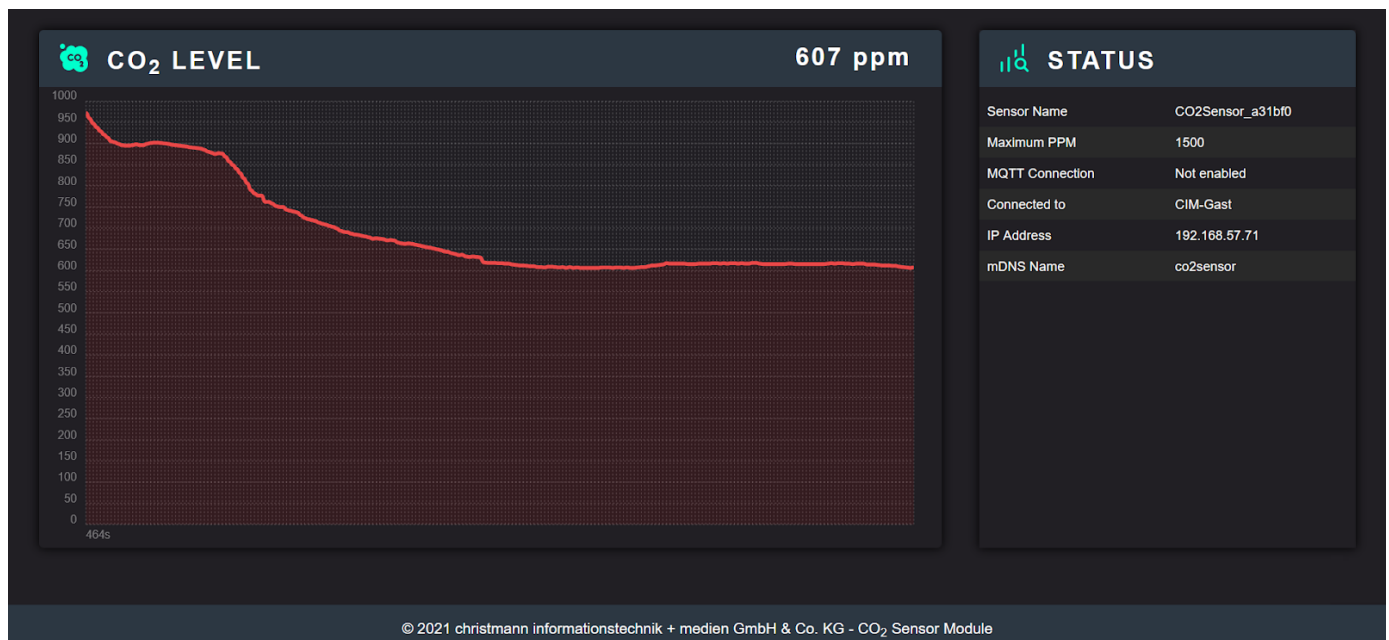


COSIO indicates air quality by measuring the CO<sub>2</sub> concentration present in the room. This allows the User to take action regarding room ventilation, for instance opening windows or regulating climate control. Chances of infection through aerosols and negative effects like drowsiness by high CO<sub>2</sub> levels are lowered by the active air monitoring solution provided. COSIO comes with bright LED lights that indicate the CO<sub>2</sub> concentration in the room. Exact CO<sub>2</sub> ppm values and sensor information like system status can be read from the screen in the front.



## 1. IoT capability

The COSIO sensor is capable of connecting to WiFi networks. Sensor data can be accessed by devices in the network or read remotely via MQTT. Upon connecting the COSIO Sensor to the power supply, a WiFi access point is opened which allows configuration over the sensor's web interface. The sensor can be connected to the local WiFi and is now accessible via the IP address that is shown on the screen.



## 2. Measuring performance

COSIO comes with an NDIR infrared gas module and a measuring range from 0 ~ 5000 ppm. The sensor has a measurement accuracy of  $\pm 50$ ppm and an automatic calibration routine. A manual calibration over the web interface is possible, counteracting over-time measurement drifts.

## 3. Cloud access

Sensor data can be collected in the cloud for a versatile and easy monitoring of CO<sub>2</sub> levels of multiple sensors. COSIO with WiFi comes with an MQTT interface, making easy data collection possible.

## 4. Optical Co2 Indication

The bright RGB LEDs light up to the room's corresponding CO<sub>2</sub> level with green representing good air quality (ppm < 900) and red representing bad air (ppm > 1500). The ppm zones can be adjusted in the sensor's web interface. The OLED screen displays the current CO<sub>2</sub> ppm value read by the sensor module.

## 5. Setup procedure

### 5.1 COSIO Standard

Setting up the standard version just requires a 5 V 1 A power source and a micro USB cable. The sensor is ready-to-use as soon as power is provided.

### 5.2 COSIO WiFi

Setting up the WiFi version requires a 5 V 1 A power source and a micro USB cable. The sensor ships without a network configuration, thus Access Point mode is activated. Configurations can be made by connecting to the sensor's WiFi network and opening the web interface.

Access Point Mode SSID	CO <sub>2</sub> Sensor
Access Point Mode Password	CIMcosio
Sensor Web Interface	<a href="http://192.168.4.1">http://192.168.4.1</a>

## 5.2.1 Settings - connecting to a local WiFi network

Step 1: Scan for Networks

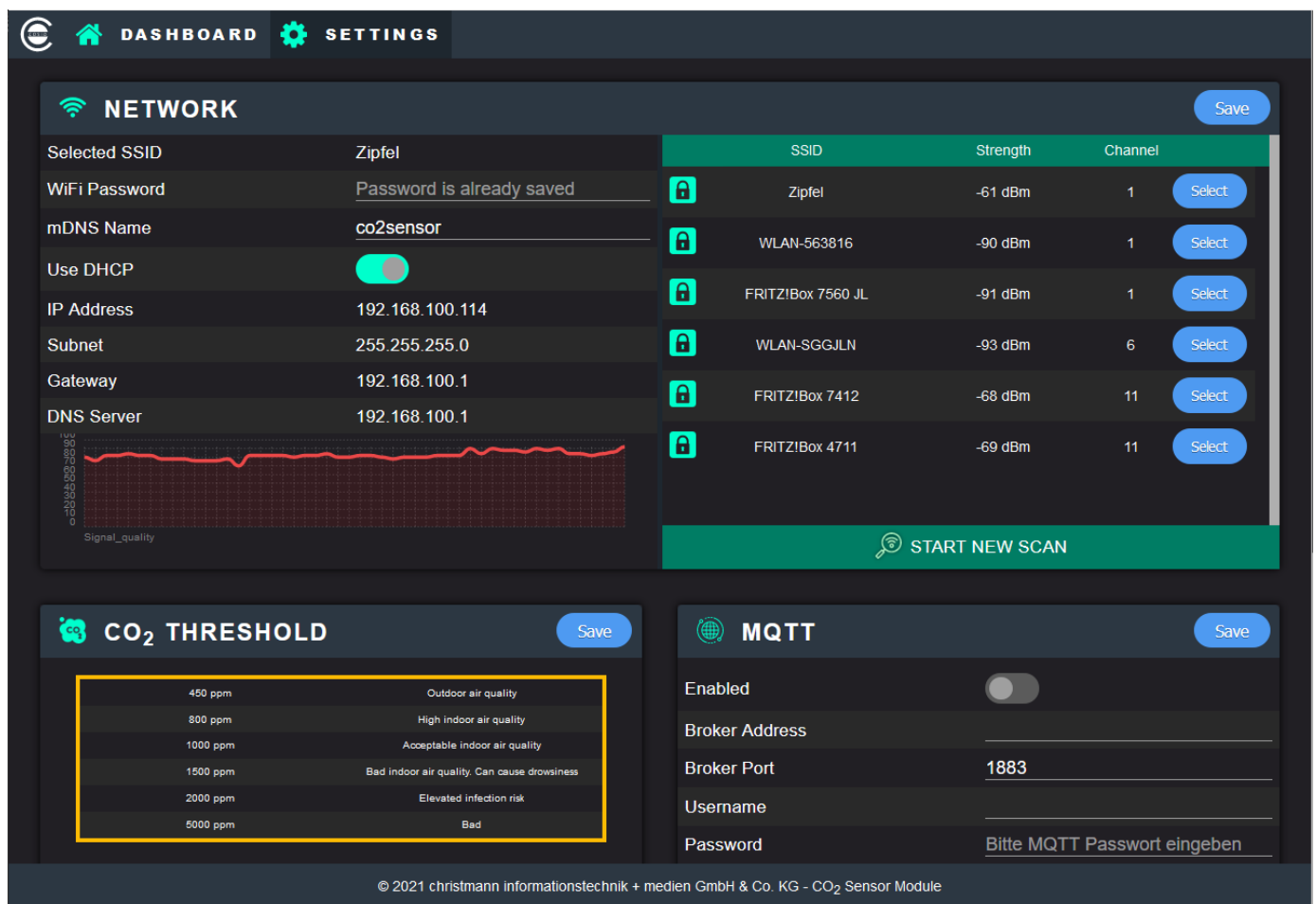
Step 2: Select the local WiFi Network

Step 3: (optional) place the sensor at a location with a good signal strength.

The graph in the bottom left shows the current WiFi signal strength.

Step 4: Enter WiFi Password

Step 5: Save settings and reboot sensor



The screenshot displays the 'SETTINGS' page of the COSIO CO<sub>2</sub> Sensor web interface, specifically the 'NETWORK' section. The interface is dark-themed with green accents.

**NETWORK Section:**

- Selected SSID:** Zipfel
- WiFi Password:** Password is already saved
- mDNS Name:** co2sensor
- Use DHCP:** Enabled (toggle switch)
- IP Address:** 192.168.100.114
- Subnet:** 255.255.255.0
- Gateway:** 192.168.100.1
- DNS Server:** 192.168.100.1

A line graph titled 'Signal\_quality' shows the current WiFi signal strength over time, with values ranging from 0 to 100 dBm.

**Available Networks Table:**

SSID	Strength	Channel	Action
Zipfel	-61 dBm	1	Select
WLAN-563816	-90 dBm	1	Select
FRITZ!Box 7560 JL	-91 dBm	1	Select
WLAN-SGGJLN	-93 dBm	6	Select
FRITZ!Box 7412	-68 dBm	11	Select
FRITZ!Box 4711	-69 dBm	11	Select

**CO<sub>2</sub> THRESHOLD Section:**

Threshold (ppm)	Description
450 ppm	Outdoor air quality
800 ppm	High indoor air quality
1000 ppm	Acceptable indoor air quality
1500 ppm	Bad indoor air quality. Can cause drowsiness
2000 ppm	Elevated infection risk
5000 ppm	Bad

**MQTT Section:**

- Enabled:** Disabled (toggle switch)
- Broker Address:** (empty field)
- Broker Port:** 1883
- Username:** (empty field)
- Password:** Bitte MQTT Passwort eingeben

© 2021 christmann informationstechnik + medien GmbH & Co. KG - CO<sub>2</sub> Sensor Module

The Sensor shows its IP address on the screen upon rebooting. Now the web interface can be accessed inside the local network it was connected to.

## 6. Calibration

The NDIR sensor module requires manual calibration every six months. This compensates sensor measurement drift and is necessary for accurate readings.

The settings tab in the web interface has the option “Manual Calibration” that calibrates the sensor on the next poweron.

Step 1: Switch on “Manual Calibration”

Step 2: Turn off device

Step 3: Expose sensor to fresh air (best if taken outside)

Step 4: Power on the sensor

Step 5: Wait twenty minutes for calibration to complete

We recommend letting the “Automatic Baseline Correction” disabled.

## 7. Technical Data

CO <sub>2</sub> Module	Winsen MH-Z19c
Measurement method	NDIR (non-dispersive infrared measurement)
Measurement range	0 ~ 5000 ppm
Energy supply	< 5 W - 5 V 1 A micro USB
Case measurements	50x 34 x 50 mm (W x D x H)
Working temperature	0 ... 50 °C
Case material	PLA
<b>COSIO WiFi</b>	
WiFi standard	2.4 Ghz 802.11 b/g/n