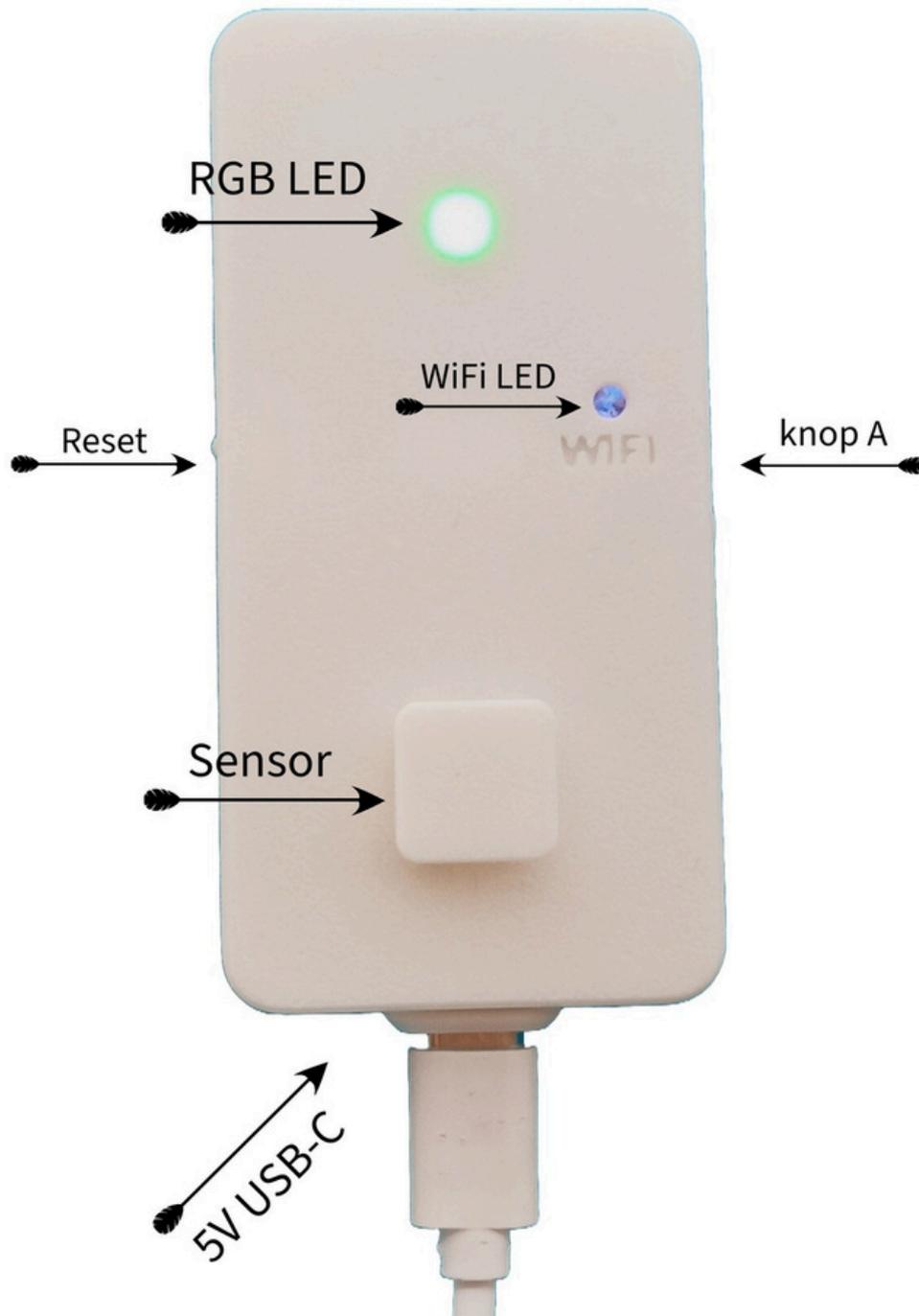




# **User Manual for MoreSense MS-05 CO2 Sensor**

**Firmware version 2.0.0**

## External attributes



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# Chapter 1

## General

The MoreSense MS-05 multi-sensor accurately measures carbon dioxide (CO<sub>2</sub>), temperature, and humidity. It is equipped with a Sensirion SCD40 sensor, which operates on photo-acoustic NDIR technology, yielding precise measurement data. CO<sub>2</sub> levels are determined using infrared light, which is absorbed by CO<sub>2</sub> molecules. The extent of this absorption generates a specific sound, which is captured by a microphone and converted into a quantifiable measure of CO<sub>2</sub> particles. This technique offers the advantage of compact sensors with low power consumption. The MS-05 features an RGB (Red, Green, Blue) LED that visually represents CO<sub>2</sub> values through color coding. The following colors and corresponding values are utilized.

**400 to 1000 green**  
**1000 to 1500 orange**  
**> 1500 red**

The MS-05 can connect to a WiFi network, although this is not a requirement. When connected, the measured values can be accessed through the integrated web server. Additionally, various parameters can be configured, and firmware updates can be executed.

The sensor is equipped with an MQTT client, enabling integration with various home automation systems, including Domoticz and Home Assistant. Additionally, it can be directly connected to a "Homey" home automation controller. These connections offer numerous automation possibilities, such as managing a ventilation system. Furthermore, the sensor can be linked to a smart plug, allowing for the operation of devices like an air extractor that activates when CO<sub>2</sub> levels exceed a certain threshold.

If the sensor is connected to the internet through WiFi, the time will also be monitored.

## **Commissioning**

The sensor operates using a 5-volt adapter. Once the power is connected, the sensor will commence operation. If you prefer not to connect the sensor to a WiFi network, no further action is required. The CO2 status LED will activate after a few seconds, illuminating green, orange, or red based on the CO2 level. If the sensor has not previously been connected to a WiFi network, the separate blue WiFi LED will blink. While this LED is flashing, you can connect directly to the sensor via WiFi to specify the network to which the sensor should connect. This procedure is detailed in a subsequent chapter.

## **Dimming and turning off LEDs**

Both the RGB and WiFi LEDs can be deactivated by briefly pressing the "A" button once. By holding the "A" button, the LEDs will initially brighten before resetting to the lowest setting.

## **Stabilization**

The integrated Sensirion SCD40 requires several minutes to stabilize following each power interruption or reset. Initial readings may vary significantly.

## **Placement**

It is advisable to position the sensor on the wall with the USB connection oriented downwards. This configuration enables the heat produced by the electronics to rise, thereby minimizing the impact of this heat on the temperature measurement.

The sensor comprises precision measuring instruments that are sensitive to shock, dust, and moisture. To prevent damage to the device, avoid impacts and drops. For accurate measurement data, position the sensor indoors in a draft-free area away from direct sunlight.

## Chapter 2 Establishing a WiFi Connection

To establish the connection, you must supply the sensor with the name and password of your WiFi network. The sensor features a WiFi access point to which you must first connect directly. This can be accomplished using a smartphone, tablet, or laptop, for instance. Please follow the four steps outlined below to configure the WiFi connection.

### **STEP 1 (Power the device off and then on)**

Upon powering on the device, if a WiFi connection has not been previously established or if the previously configured WiFi network is unavailable, the blue WiFi status LED will begin to flash. If you do not wish to connect to a WiFi network, no further action is required. After two minutes, the WiFi LED will turn off. Should you desire to connect to a different WiFi network than the one previously set, you may initiate a factory reset. This can be accomplished by pressing and holding the "A" button while simultaneously pressing the reset button. After the reset, continue to hold the "A" button until the WiFi LED starts to flash. Please be aware that a factory reset will result in the loss of all other settings.

### **STEP 2 (Establish a direct connection to the sensor)**

While the blue LED is flashing (2 minutes), you can connect directly to the sensor. Choose the MoreSense\_MS05 WiFi network on your smartphone, tablet, or PC (refer to fig. 1). It may take some time (10-30 seconds) for the MoreSense-MS05 network to appear on your device. Please note that some devices have the tendency to switch back to a WiFi network with an internet connection (The MS-05 cannot connect to the internet in access-point mode). Switching off the "connect automatically" option to a previously configured WiFi network may help to keep your device connected to the MS-05 access point.

# **Common issues with connecting the MS-05**

## **Connection Fails**

*If the connection does not succeed immediately, try again. Often, the connection will succeed if you try a few times. Make sure that the distance between your smartphone, tablet, or PC and the MS-05 is not too large (maximum 5 meters). Don't forget to restart the sensor in between (temporarily turn off the power), so you have another 2 minutes to connect.*

## **Smartphone / Tablet / PC Switches Back to WiFi Network with Internet**

*Once you have established a direct connection with the MS-05, it may happen that your smartphone, tablet, or PC automatically switches back to a prior WiFi network with internet without notifying you. It will seem like you are connected to the MS-05 WiFi manager, but the page does not respond. In this case, disable the automatic connection on your device and reconnect to the MS-05. You can also use another device to connect to the sensor.*

## **Routers with Identical Network Name for Both 2.4 and 5 GHz**

*If your router has the same WiFi network name (SSID) for both 2.4 and 5 GHz, the sensor may fail to connect. The MS-05 only works on 2.4 GHz. In this case, temporarily disable the 5 GHz option on your router. Once the sensor is connected, you can re-enable the 5 GHz option on your router. After restarting the sensor, the connection should now work.*

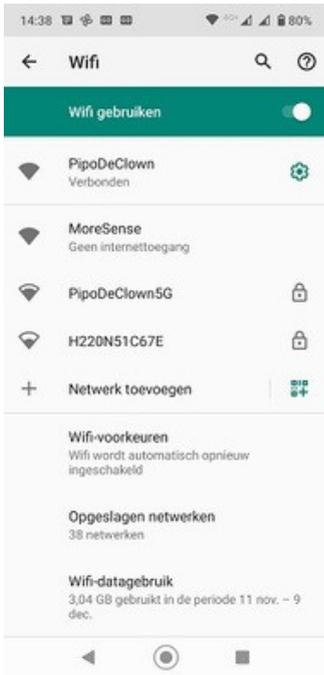


Image 1

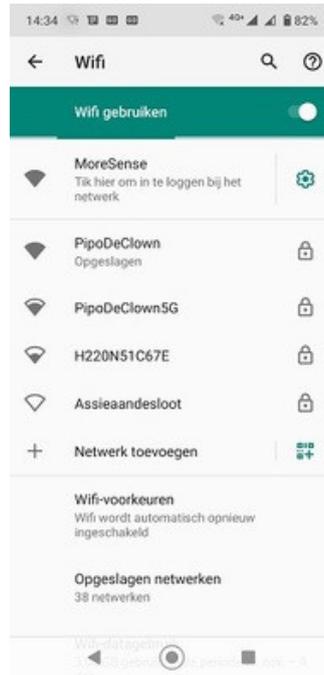


Image 2

Once connected to the MoreSense MS-05 WiFi access point, you may have the option to log in directly to the MoreSense sensor (refer to image 2). However, this is not always guaranteed. If the direct login option is available, you will be redirected to the WiFimanager page. If the direct login option is not presented, open a browser and enter the following text in the address bar: `http://192.168.4.1`. Please note: this is not the IP address you will use later to connect to the built-in web server.

## Determine Hostname

By initially selecting the Info option, you can locate the hostname. This hostname allows you to access the built-in web server once the sensor is connected to your WiFi network. Remember to append `.local` to the URL. For example: `http://ms-1c34.local/`

## STEP 3 (choose WiFi network and input password)

In the WiFi manager, select the "Configure WiFi" option (refer to fig. 3) and then choose your WiFi network from the list. Enter the password for your WiFi network and click "Save" (fig. 4). Please note: it is advisable to avoid selecting a "guest network," as there are often restrictions on the use of web servers, which may prevent access to the sensor later. For dual-band routers that automatically select between 2.4 and 5GHz, it may be necessary to temporarily disable the 5GHz option. After booting, the blue LED should remain continuously lit. Remember to reconnect your smartphone, tablet, or laptop to your WiFi network.



Image 3

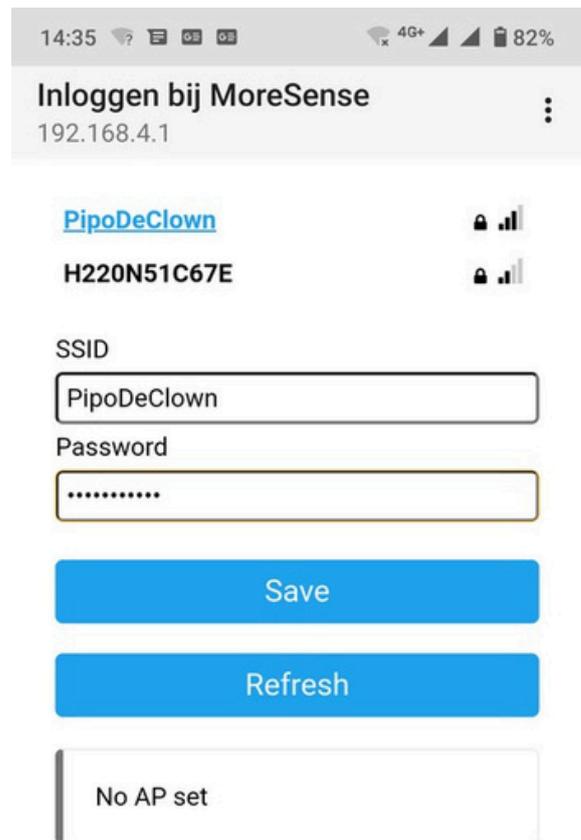


Image 4

#### **STEP 4 (establish a connection to the web server)**

The integrated web server allows you to view measurement data, modify settings, and update the firmware. The MoreSense sensor features mDNS functionality. Your router converts IP addresses into a web address, so knowing the IP address is not strictly necessary. The MoreSense web address is composed of the characters "http://ms-", followed by the last four characters of the WiFi MAC address (for instance, "F6BC"), and concludes with the extension ".local". Consequently, the complete web address would be "http://ms-F6BC.local". You can obtain the specific address information for your sensor using the INFO option (HOST) when selecting your WiFi network. If desired, you may later change the device name, which will also be reflected in the web address (for example, http://huiskamer.local).

By entering the web address in the browser's address bar, you will be directed to the home page of the MoreSense web server (see fig. 5). Ensure that your PC, laptop, smartphone, or tablet is connected to the same network as the MoreSense sensor.

In addition to a name, you may also designate the IP address in the browser (e.g. 192.168.0.34). This IP address can be located by referring to your router. Please consult the manufacturer's instructions for guidance. The blue WiFi LED indicates the status of the WiFi connection. The statuses are as follows

### WIFI LED STATUS

Off	No WiFi connection
On	Connected to a WiFi network
Fast Blinking	WiFi access point active
Slow Blinking	WiFi connection lost (the sensor will continue to attempt to re-establish the WiFi connection)

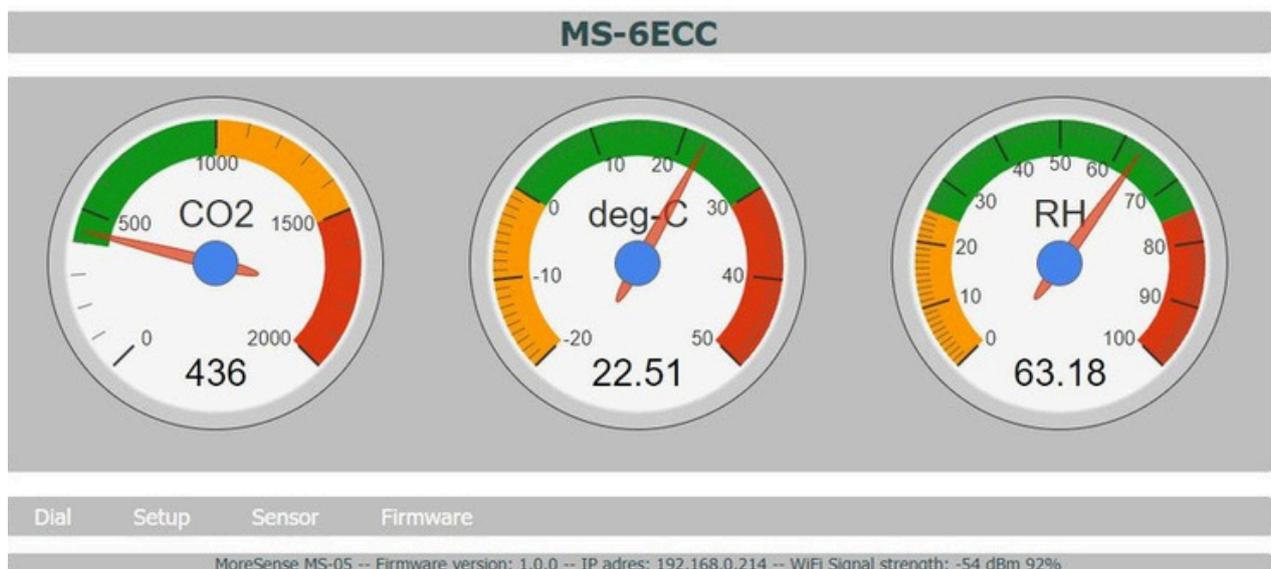


Image 5. Homepage of the MoreSense web server

# Chapter 3

## Measured values

CO<sub>2</sub>

The Moresense MS-05 features a Sensirion SCD40 self-calibrating CO<sub>2</sub> sensor, developed in Switzerland. Sensirion is renowned for its precise and dependable sensors, which also boast an extended service life. The measured CO<sub>2</sub> concentration is represented in "Parts Per Million" (PPM). The SCD40 can measure levels up to 2000 ppm and is expected to last over 10 years. In outdoor air, there are approximately 400 CO<sub>2</sub> particles per million air particles (0.04 vol.-%). The composition of air primarily consists of nitrogen (78 vol.-%) and oxygen (21 vol.-%).

### Automatic calibration

The sensor will automatically calibrate itself (unless configured otherwise) once a week. It must have been continuously operational for a minimum of one week. The automatic calibration relies on the lowest measured value during that week. This feature can be disabled in the browser through the setup screen if the CO<sub>2</sub> value does not reach +/- 400 ppm.

### Manual calibration utilizing the "A" button

The sensor can also be calibrated manually based on external air conditions. To achieve this, the sensor should be positioned in an environment where the CO<sub>2</sub> concentration is approximately 420 ppm (such as outdoors or in a shed). It is crucial to ensure minimal airflow and to avoid direct sunlight exposure on the sensor. By pressing the "A" button three times in quick succession, the calibration process will commence. The CO<sub>2</sub> LED will then begin to flash blue. To complete the calibration, you must press the "A" button once more while it is flashing. During the calibration, the button will flash more rapidly and emit a magenta hue. If the button is not pressed again, the procedure will automatically terminate after a certain period.

## **Temperature**

The temperature is presented in degrees Celsius or Fahrenheit. Minor discrepancies may arise between sensors, even when they are of the same brand and model. Consequently, and due to the MS-05's own heat generation, the temperature must always be calibrated. This adjustment can be configured in the browser. By default, this calibration is set to approximately minus 3 degrees Celsius, which is accurate in most instances. If the temperature reading is inaccurate, you can modify the correction value in the setup menu.

## **Relative humidity**

Relative humidity measures the amount of moisture present in the air. At 100% humidity, the air cannot accommodate any additional moisture. Humidity is intrinsically linked to temperature; as temperature increases, the air's capacity to hold moisture also rises. The optimal indoor humidity level ranges from 40% to 60%. Both excessively humid and excessively dry conditions can be uncomfortable at specific temperatures and may contribute to health issues.

## **Date and Time**

If the sensor is connected to a WiFi network with internet access, the date and time will be transmitted through MQTT messages. The date and time are sourced from a Network Time Protocol (NTP) server ([pool.ntp.org](http://pool.ntp.org)). The internal clock of the MoreSense sensor is compared to that of the NTP server every hour and synchronized as needed. The time is automatically adjusted for daylight saving time, ensuring consistency throughout the year.

# Chapter 4

## MoreSense Web Server

### Homepage

Through the integrated web server, you can access measurement data, modify settings, or execute a firmware update. Naturally, the sensor must be connected to your WiFi network. Refer to the instructions in Chapter 2. The process for locating the web address or IP address is detailed in Chapter 2, Step 4.

On the home page, the sensor values are displayed prominently. Beneath these values is the menu, which allows you to configure the sensor or execute a firmware update. The bottom bar indicates the firmware version, IP address, and WiFi signal strength. This page refreshes automatically every 30 seconds. As the sensor is read every 5 seconds, the displayed values may vary slightly from those transmitted to your home automation system.

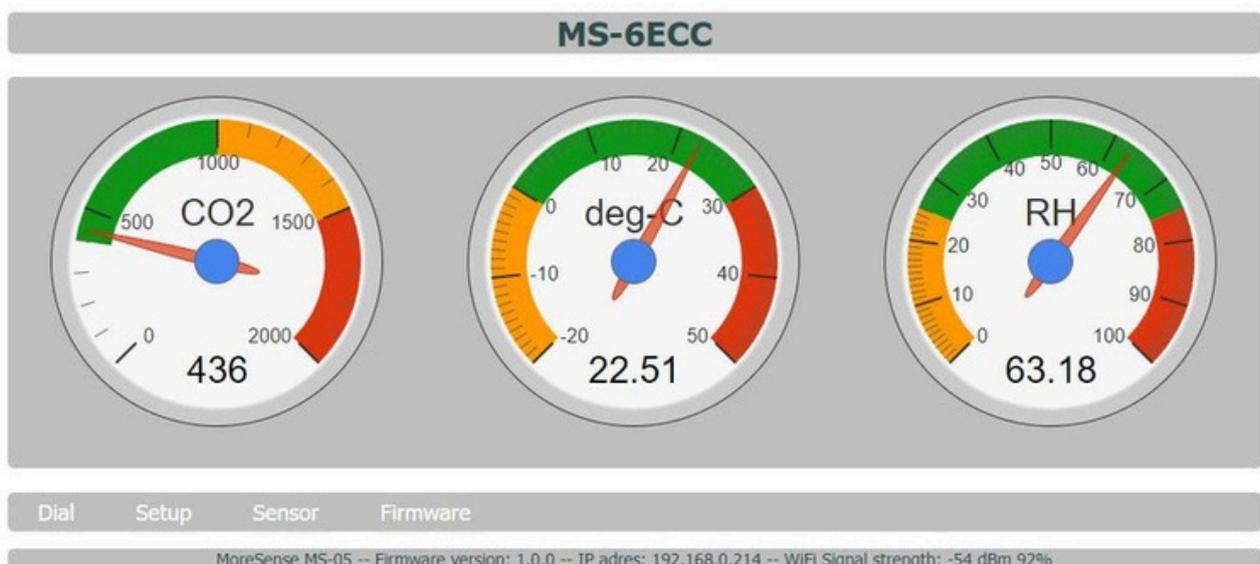


Image 8. Homepage of the MoreSense web server

## Setup page

On this page (see Fig. 9), various sensor settings can be adjusted. All available options are detailed in the subsequent pages. After making changes, ensure to save them by clicking the "Save & Reboot" button. The modifications will only take effect once the sensor has been restarted.

**Setup MS-5228**

Unique device name: MS-5228  
Time Zone: Europe/Amsterdam  
Date format: YYYY-MM-DD 2024-12-31  
Temperature scale: °Celsius

Connect to MQTT server:   
MQTT server address: 192.168.0.101  
Port: 1883  
Unique MQTT client name: MS-5228  
MQTT user password:   
MQTT user name:   
MQTT publishing topic: moresense/msp-5228/values  
MQTT subscription topic: moresense/msr-5228/command  
MQTT publish interval in seconds: 60

Connect to Home Assistant / Domoticz:  Auto discovery path: homeassistant  
Connect to Homey:

CO2 ventilation threshold in PPM: 0  
URL for CO2 ventilation ON command:  Test  
URL for CO2 ventilation OFF command:  Test

**Save & reboot**

Dial Setup **Sensor** Firmware

MoreSense MS-05 -- Firmware version: 2.0.0 -- IP address: 192.168.0.189 -- WiFi Signal strength: -53 dBm 94%

Image 9. Configuration page

## Unique device name

The "Unique device name" specifies the designation of the device. By default, it is configured as "MS-" followed by the last four characters of the MAC address. You have the option to assign a name of your choice (for instance, "Kitchen") to the sensor, provided it does not exceed 40 characters. Only ASCII characters are permitted for this name, and characters that are not valid in a URL should be avoided. Spaces are also prohibited. This name will determine both the URL address and the sensor's designation in Homey. If you modify this name and have a connection with a Homey home automation controller, you must also update this name in Homey.

## **Time zone**

Here you can select your timezone. The internal clock will automatically adjust to daylight saving time and standard time.

## **Date format**

In this drop-down menu, you can select the date format.

## **Temperature scale**

Select either °Celsius or °Fahrenheit.

## **MQTT configurations**

### **Connect to MQTT server**

By "sliding" this button to the right, the MQTT client will be activated. Naturally, the other MQTT data must also be completed for this to function.

### **MQTT broker**

Here, you can specify the web address (e.g., test.mosquitto.org) or the IP address (e.g., 192.168.0.100) of the MQTT server, commonly referred to as the "MQTT broker." Avoid using a prefix such as "MQTT://." Please refrain from entering the port number at this stage, as it will be required in the subsequent field. For local servers don't use the ".local" extension. Use the IP address instead.

### **Port**

Enter the MQTT server's port number here. Typically, this is 1883. Currently, a secure connection cannot be established using port number 8883. Since most sensors operate within a private network (such as your home WiFi), this does not present any risks.

## **MQTT Client**

This is the designation by which the sensor is recognized by the MQTT server. It is not the username required for login and serves to differentiate among the various MQTT clients.

## **MQTT Username / Password**

These are the username and password required for logging into the server. Their specification is not always necessary, as it depends on the settings of the MQTT server.

## **MQTT Publishing Topic**

The publishing topic specifies the topic to which the measurement data is transmitted. This can be likened to a directory on your computer. Frequently, it is adequate to specify only the final segment of the topic. The data is transmitted in a format known as "JSON," which appears as follows:

```
{  
  "ClientID": "MS-6ECC",  
  "Date": "September 4, 2023",  
  "Time": "15:52:10",  
  "CO2": 429,  
  "Temperature": 23.82,  
  "Humidity": 56.6  
}
```

## **MQTT Subscription Topic**

The subscription topic pertains to the subject through which the sensor can receive messages. Consequently, commands can be issued to the sensor, such as turning off the LEDs. This functionality is not yet available at the time of this manual's publication.

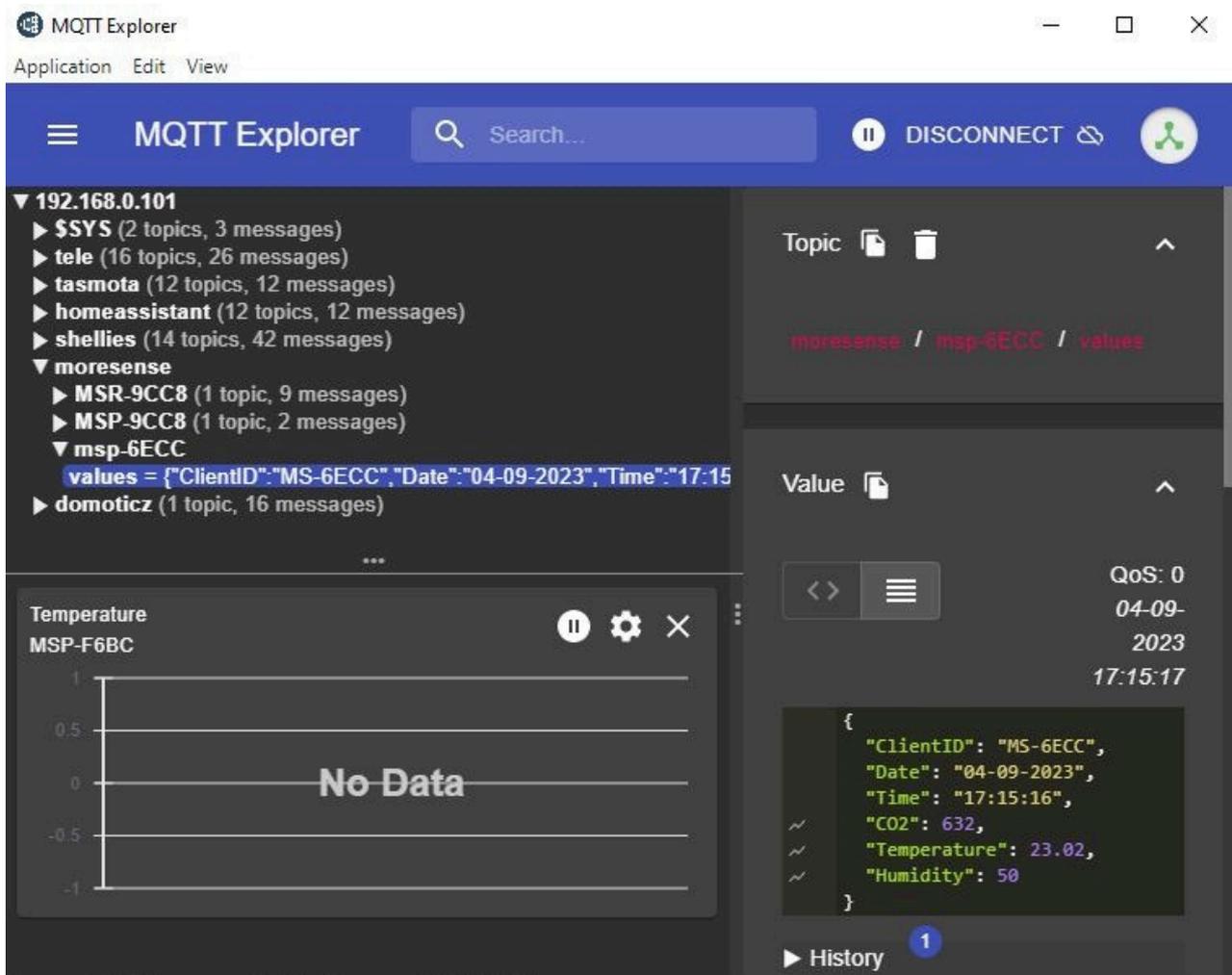
## **MQTT publication interval in seconds**

Here, you can specify the interval, in seconds, for sending measurement data to the MQTT server. To minimize overhead, it is recommended to maintain an interval of no less than 10 seconds.

## Evaluating the MQTT client

If you do not have an MQTT server installed, you may utilize a test server available on the internet. Numerous options exist, including [test.mosquitto.org](https://test.mosquitto.org). However, exercise caution: all data transmitted is, in principle, public.

A valuable tool for monitoring MQTT messages is the complimentary application MQTT Explorer (<https://mqtt-explorer.com/>). This software is compatible with multiple platforms, including Linux and Windows.



## **Integrating Home Automation Systems**

Pairing with Home Assistant and/or Domoticz necessitates the utilization of an MQTT server. Typically, the server software can be installed on the same system as the home automation platform. Both Home Assistant and Domoticz operate using the "Auto discovery" method. The sensor transmits the sensor data (excluding the measurements) to the autodiscovery path/topic, which is accessed by the home automation controller.

Consequently, Home Assistant or Domoticz identifies which sensors to incorporate (such as CO2, temperature, and humidity in this instance) and the topic where the actual measurement data is located.

### **Connect to Home Assistant / Domoticz**

Sliding the button to the right will prompt the sensor to transmit the sensor data to the autodiscovery topic of the MQTT server.

### **Domoticz**

Pairing the sensor with a Domoticz system is a straightforward process, facilitated by the "Autodiscovery" feature. To initiate this, navigate to the Domoticz web page, select "Setup," and then choose "Hardware."

Select the MQTT Auto Discovery Client with LAN Interface under the Type category. Additionally, complete the fields for Name, Remote Address (which refers to the IP address or URL of the MQTT server), Port (default is 1883), and, if applicable, Username and Password. The Auto Discovery Prefix field is set to homeassistant by default. This "topic" must correspond with the Auto Discovery path established on the sensor. By default, this is also set to homeassistant, so if you have not modified it, there is no need to adjust this field. Once the MQTT Auto Discovery Client with LAN interface is added, Domoticz will automatically incorporate the sensors (CO2, temperature, and humidity). Typically, this process should occur within approximately one minute.

**Domoticz** 2023.2 (build 15457)

Dashboard Switches Scenes Temperature Weather Utility Setup

Show 25 entries Search

Idx	Name	Enabled	Type	Address	Port	Data Timeout
2	test	Yes	MQTT Auto Discovery Client Gateway with LAN interface <a href="#">Setup</a>	192.168.0.101	1883	Disabled

Showing 1 to 1 of 1 entries First Previous 1 Next Last

Update Delete

Enabled:

Name: MoreSense MS-05

Type: MQTT Auto Discovery Client Gateway with LAN interface

Log Level:  Info  Status  Error

Data Timeout: Disabled  
 Specifying a Data Timeout will restart the hardware device if no data is received for the specified time.  
 Do not enable this option for devices that do not receive data!

Remote Address: 192.168.0.101  
 Port: 1883

Username:   
 Password:

Auto Discovery Prefix: homeassistant ← (for example domoticz or homeassistant)  
 CA Filename:   
 TLS Version: tlsv1.2

Add

**Domoticz** 2023.2 (build 15457)

Dashboard Switches Scenes Temperature Weather Utility Setup

Name, Desc, Idx, Status All

Custom Graph Forecast

**MS-6ECC Humidity** 60%

Comfortable  
Last Seen: 2023-09-05 09:47:19

Log Edit Notifications

**MS-6ECC Temperature** 21.81° C

Last Seen: 2023-09-05 09:47:19

Log Edit Notifications

**RGB-Panel Humidity** 61%

Wet  
Last Seen: 2023-09-05 09:47:28

Log Edit Notifications

**RGB-Panel Temperature** 23.06° C

Last Seen: 2023-09-05 09:47:28

Log Edit Notifications

## **Establish a connection to Home Assistant using MQTT.**

To connect to Home Assistant via MQTT, the sensor must be linked to an MQTT server (this can also be accomplished through REST without an MQTT server, as detailed later in this manual). Slide the button labeled "Connect to Home Assistant / Domoticz" to the right.

### **Automatic discovery pathway**

The sensor will transmit an "Auto Discovery" message to the topic `homeassistant/sensor/config` for each sensor value upon startup. For Home Assistant, it is sufficient to specify the beginning of the path/topic, which by default is simply `homeassistant`. The actual sensor values are dispatched to the topic indicated in the "MQTT Publishing topic" field.

In Home Assistant, navigate to "Settings -> Devices & Services" and click on the link "n Devices" within the "MQTT" section to integrate the sensor into HA. If the sensor is not displayed, verify the MQTT server (for instance, using "MQTT Explorer") to ensure that messages are being transmitted. Occasionally, a restart of HA may also be required.

### **Connection to Home Assistant through "REST"**

You can also connect to Home Assistant using REST. In this instance, it is necessary to modify the `configuration.yaml` file of Home Assistant. To accomplish this, add the text provided on the following page. Replace `MS-XXXX.local` with the unique device name followed by the `.local` extension or the sensor's IP address.

Following the adjustment and a restart of Home Assistant, the sensor should appear in the Home Assistant overview.

rest:

- resource: "http://MS-XXXX.local/values"  
sensor:
  - name: "MoreSense MS-05 CO2"  
unique\_id: "ms05\_co2"  
value\_template: "{{ value\_json.CO2 }}"  
unit\_of\_measurement: "ppm"  
device\_class: "carbon\_dioxide"
  - name: "MoreSense MS-05 Temperature"  
unique\_id: "ms05\_temperature"  
value\_template: "{{ value\_json.Temperature }}"  
unit\_of\_measurement: "°C"  
device\_class: "temperature"
  - name: "MoreSense MS-05 Humidity"  
unique\_id: "ms05\_humidity"  
value\_template: "{{ value\_json.Humidity }}"  
unit\_of\_measurement: "%"  
device\_class: "humidity"

## Connect to Homey.

Slide the button to the right to establish a connection with the Homey controller. Following a restart, the sensor will become detectable by Homey. To facilitate this, the Homeyduino application must be installed on the Homey controller, after which the sensor can be added. With Homey, numerous possibilities arise, including the control of a ventilation system or the transmission of notifications to your phone (push messages) when specific thresholds are exceeded. Additionally, Homey retains the data, allowing for later visualization in clear graphs. When modifying the Unique Device Name, it is essential to also update the name of the Homey sensor.

## **Smart plug control**

The MoreSense MS-05 possesses the capability to regulate Smart Plugs according to CO2 levels. These devices are inserted into wall sockets, allowing for the connection of various plugs. The smart plugs must support control via WiFi using HTTP GET commands. For instance, it is feasible to manage an extraction system that activates solely when CO2 levels exceed acceptable thresholds. This functionality can help prevent the unnecessary expulsion of costly heated air during colder months.

## **CO2 ventilation threshold in PPM**

This represents the threshold value of the CO2 level at which the "on" command is activated. If you prefer not to utilize this functionality, you may leave the value at "0." The "off" command is triggered when the threshold value decreases by 100 PPM. This reduction of 100 PPM helps to prevent the switch from toggling too frequently, thereby minimizing unnecessary wear.

## **URL for CO2 Ventilation Activation Command**

Enter the URL here to activate the device. This varies for each device. For a device operating on Tasmota, the command is `http://ip-address/cm?cmd=Power%20On`.

## **URL for CO2 ventilation deactivation command**

Same as above, but to deactivate the device.

## Sensor page

On this page, you can adjust various settings of the sensor. Always ensure to save the changes by clicking the "Save & Reboot" button. The modifications, with the exception of forced calibration, will only take effect upon rebooting the sensor.

The screenshot shows the 'Sensor settings MS-6ECC' web interface. At the top, there is a header bar with the title. Below it, a toggle switch for 'Automatic self calibration' is shown in the 'off' position. The main settings area contains three input fields: 'CO2 forced calibration value' with a value of 420, 'Temperature offset in degrees Celsius' with a value of 3, and 'Altitude in meters' with a value of 1. To the right of the CO2 input field is a 'current value' label and a 'Calibrate' button. At the bottom of the settings area is a red 'Save & reboot' button. Below the settings area is a navigation bar with tabs for 'Dial', 'Setup', 'Sensor', and 'Firmware'. At the very bottom, a status bar displays system information: 'MoreSense MS-05 -- Firmware version: 1.0.0 -- IP adres: 192.168.0.214 -- WiFi Signal strength: -53 dBm 94%'.

### Automatic self-calibration

The Sensirion SCD40 features automatic calibration, which is enabled by default. The sensor presumes exposure to fresh air with a CO<sub>2</sub> concentration of 400 PPM at least once a week. If the lowest recorded value deviates from 400 PPM, the sensor will self-correct, adjusting the lowest measured value to 400 PPM. Regular adjustments are essential, as the infrared light emitted by the integrated IR LED may diminish over time, leading to inaccurate readings. It is advisable to keep the "automatic self-calibration" feature activated. However, in scenarios where the CO<sub>2</sub> concentration is unlikely to reach 400 PPM, such as in a greenhouse, this option may be disabled. In such cases, manual calibration should be performed approximately once a month.

## **CO2 forced calibration value**

The sensor can also be calibrated based on a reference value, for example, from another sensor known to have (relatively) reliable values. Enter the value and click "Calibrate" to do this. Keep in mind that the sensor needs to be in a stable environment for some time. Avoid strong airflows and direct sunlight. After moving the sensor, give it at least 3 minutes to stabilize. Although the SCD40 is considered a reliable sensor, values can always vary slightly compared to other CO2 sensors. For forced calibration, it is not necessary to save the changes or restart.

## **Temperature offset in degrees Celsius**

Because both the sensor itself and the other electronics generate heat, the sensor must always be corrected with a negative value. Normally, a correction of around 3 degrees is sufficient. However, do not enter a negative sign in this field. The sensor only accepts positive correction values, which are then subtracted from the measured values.

## **Altitude in meters**

The CO2 value in the air decreases as altitude increases. This is about 3% per 300 meters. In this field, the altitude of the sensor in meters can be specified so that the CO2 measurements can be adjusted accordingly.

## Firmware Update

On this page, you can perform a firmware update. Firmware updates for the MoreSense sensors are regularly released with bug fixes and additional functionality. If you are subscribed to the MoreSense newsletter, you will be notified of new updates. You can also check [moresense-nl.com](http://moresense-nl.com) and download updates from there.

Firmware updates consist of binary files. The name of firmware files looks like this: MS05\_Vn.n.n.bin, where n.n.n represents the version, for example, 1.0.0.

### Firmware update MS-6ECC

Click here to choose file (MS05\_Vn.n.n.bin)

update

Dial   Setup   Sensor   Firmware

MoreSense MS-05 -- Firmware version: 1.0.0 -- IP adres: 192.168.0.214 -- WiFi Signal strength: -54 dBm 92%

## Use of the Buttons

The table below provides an overview of the use of the buttons.

Action	"A" BUTTON	RESET BUTTON
Restart sensor		1 x short
Lower or increase the brightness of the RGB status LED	Press and hold. Initially, brightness will increase, but once the LED is at its brightest, it will return to the lowest level	
Factory reset	Keep pressed	1 x short
Start manual CO2 calibration (see instructions on page 11)	3 x short	
Turn off LEDs	1 x short	