MoreSense MS-06 user manual

Wireless CO_2, temperature and humidity sensor
Firmware version 1.0.0

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In the box

MoreSense MS-06

CO_2, temperature & humidity sensor

5V/1A USB adapter (In EU only)

100-240V 50/60 Hz

Stylus pen

In white or black

2 mtr. USB-C cable

Sensor stand

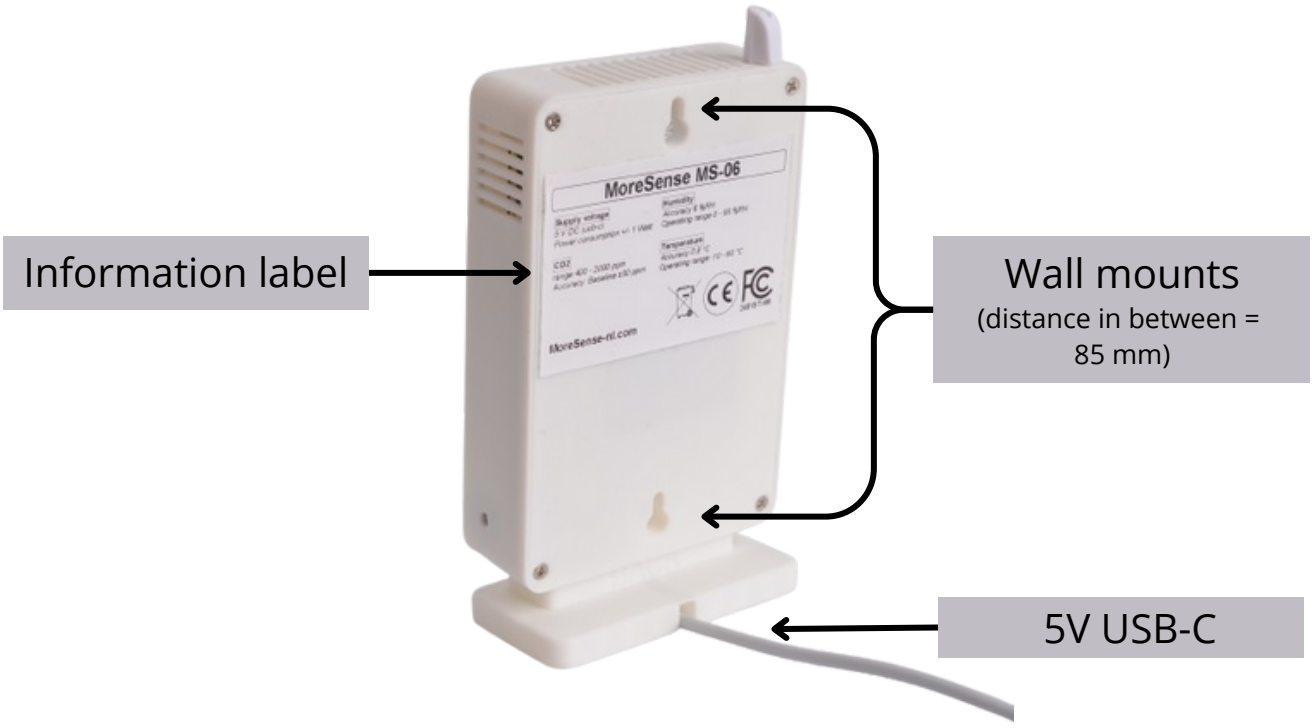
Removable for mounting on the wall

Tweezers

For inserting and removing a micro SD card

Layout

Front view



Back view

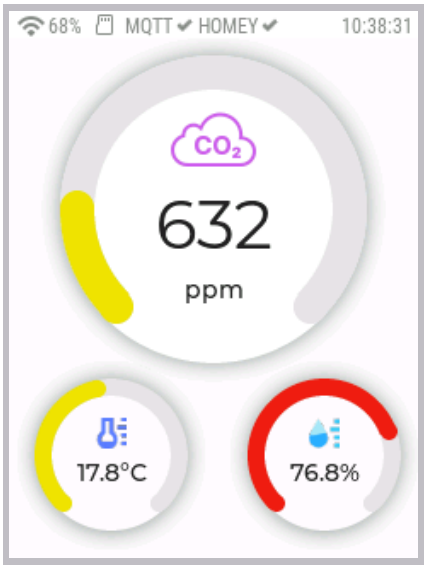
Chapter 1 - General description

The MoreSense MS-06 sensor measures carbon dioxide (CO_2), temperature, and relative humidity. It features a 2.8-inch resistive touch screen for displaying measurements, settings, and additional information. The MS-06 utilizes the Sensirion SCD40/41 sensor, known for its precision and compact size, employing photoacoustic non-dispersive infrared sensing technology. The CO_2 measurement range spans from 400 to 2000 (or 5000 for the SCD41) parts per million (ppm), with a maximum value of 40000 ppm; however, accuracy diminishes above 2000 (or 5000 in case of the SCD41) ppm.

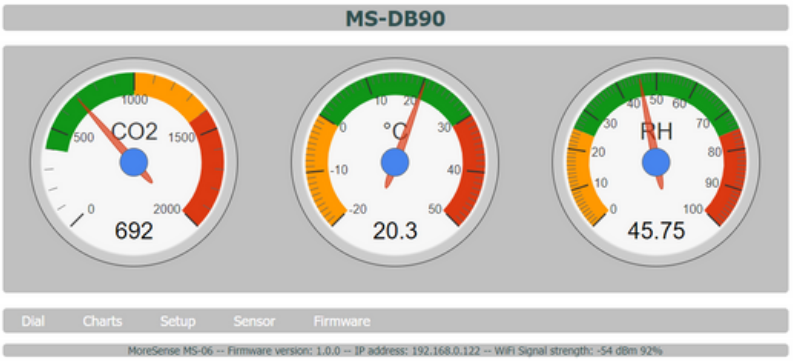
By default, the SCD-4x autonomously recalibrates every 6.5 days; this function can be disabled if desired. Manual CO_2 calibration is also achievable by setting a user-defined reference value. The sensor boasts a minimum lifespan of 10 years.

The MoreSense MS-06 offers connectivity via WiFi compatible with MQTT or REST protocols for integration with various home automation systems such as Home Assistant, Domoticz, and Homey. Additionally, it provides a web interface for real-time readings, historical data visualization, configuration adjustments, and firmware upgrades. Sensor data is stored internally for over a year but can also be archived on a micro SD card with virtually unlimited storage capacity.

An optional rechargeable 2000 mAh LifePo4 battery is also available.



Screen after startup



Web interface

Chapter 2 - Getting started

Power

Please connect the USB cable featuring the "A-type" connector to the power adapter (100-240V - 50/60 Hz) and attach the "USB-C" connector to the sensor. Proceed by inserting the power cable into an electrical outlet. Subsequently, the sensor will commence its initialization sequence, which typically lasts between 10-20 seconds depending on the settings. Various messages will be displayed during this startup process. The sensor may require several minutes to stabilize. It is important to note that initial readings may exhibit significant deviations.

USB adapter connected to the A-type side of the USB cable

Wall mount *With stand*

C-type side of the USB cable connected to the sensor

Location selection

The sensor is intended for indoor usage and should not be exposed to excessively humid, cold (below -10°C), hot (above 50°C), or windy conditions. The device can be utilized in both a stand-up position (by securing the provided stand) or mounted on a wall.

For optimal placement, the CO_2 sensor should be positioned at a specific height above ground level, typically recommended between 1.5 meters and 1.8 meters. It is advisable to select an open, level area and avoid placing it near vents close to entrances, windows, etc., in order to minimize external environmental factors that could impact the accuracy of the sensor readings.

The positioning of the CO_2 sensor could impact measurement precision. Placing the sensor too low may subject it to ground-level air, leading to inaccurate readings. Conversely, installing it too high could expose it to thermal convection, resulting in unstable readings. Hence, selecting an appropriate installation site is vital for obtaining precise CO_2 concentration measurements.

Avoiding direct sunlight is advisable.

CO_2 sensors should not be exposed to direct sunlight, as it can distort sensor readings. Opt for a shaded spot on the sensor surface away from direct sunlight.

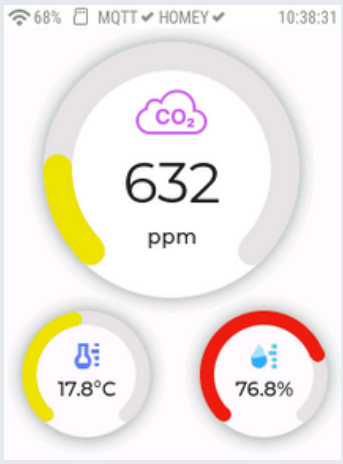
Preventing electromagnetic interference is crucial.

Keep the CO_2 sensor clear of sources of electromagnetic interference, like induction cookers, microwave ovens, and other electrical devices. These appliances emit electromagnetic fields that might disrupt the correct functioning of the sensor.

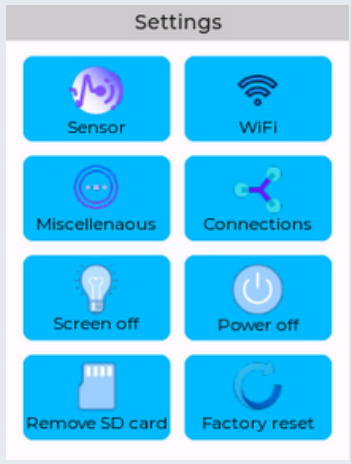
Navigation

The sensor comprises three primary screens (measurements, settings, and information) along with eight additional sub-screens (totaling eleven). The main screens can be accessed by pressing the "A" button, while the sub-screens can be navigated through by pressing the "B" button. The main screens switch horizontally, while the sub-screens switch vertically. Screen navigation operates in a carousel-like manner. When on the final main screen (information) and the "A" button is pressed, it will cycle back to the initial main screen (gauges).

Similarly, for the sub-screens, if on the last sub-screen and the "B" button is pressed, it will return to the first screen within that category (readings, settings, or information). Please refer to the subsequent page for a visual representation of the screens.



Button **A**



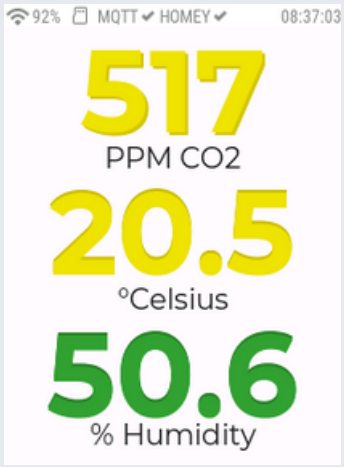
Button **A**

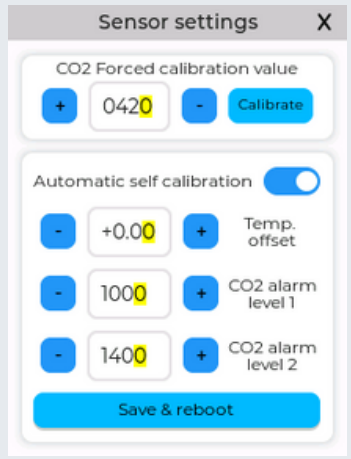
A back to gauges

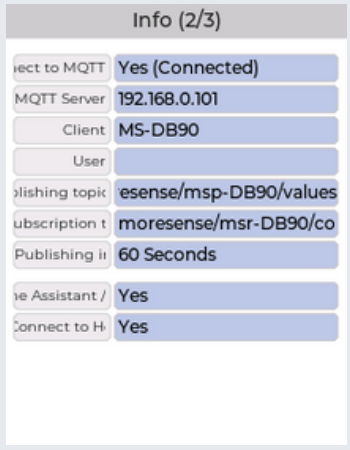
B Button

B Button

B Button



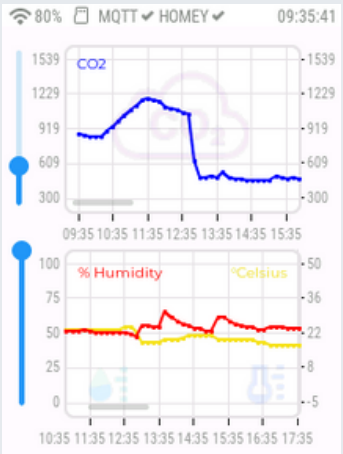


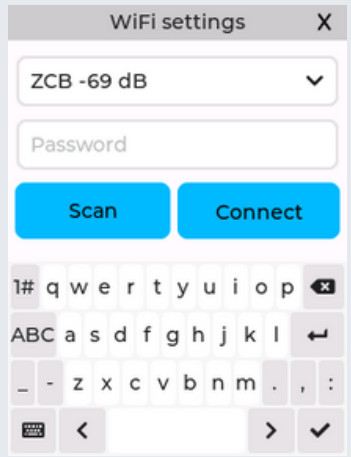


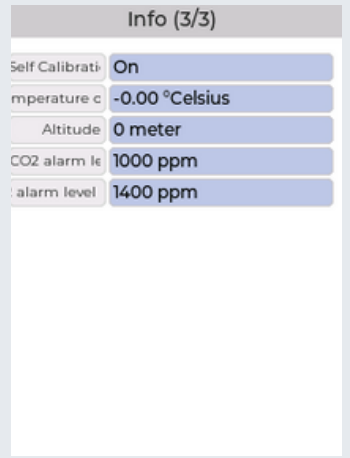
B Button

B Button

B Button





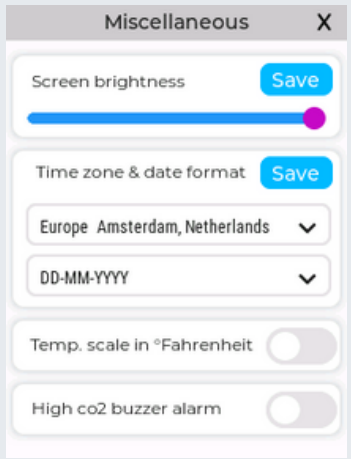


B back to info 1

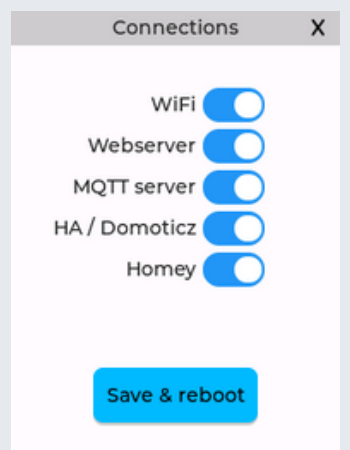
B Button

B back to gauges

B Button



B button



B back to settings menu

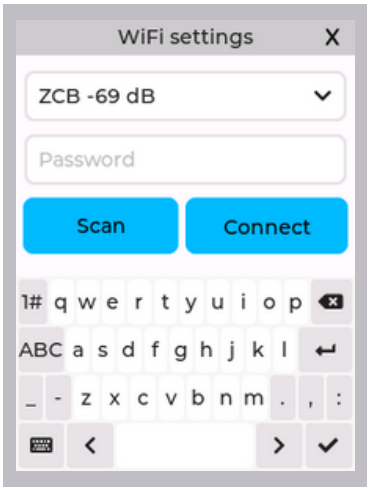
Connecting to a WiFi network

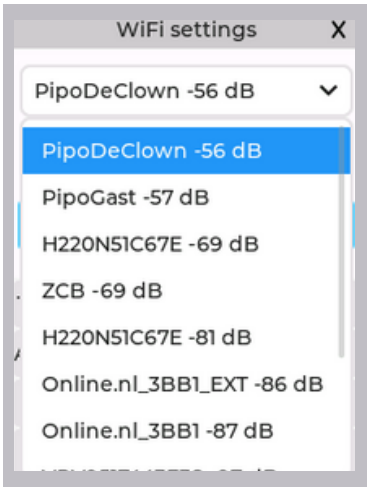
General

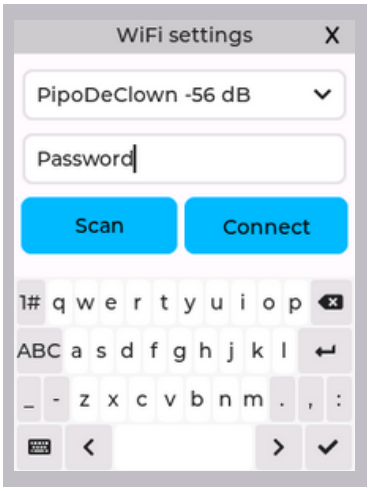
Connecting the sensor to a WiFi network is not mandatory. However, to store date and time information along with the measurements, it is necessary to connect the device to a WiFi network with internet access. The date and time settings are obtained from a so-called NTP (Network Time Protocol) server (pool.ntp.org). Please note that the device only operates on the 2.4 GHz band. It is recommended to use the supplied stylus pen to make adjustments.

Connection Procedure

1. Navigate to the WiFi settings screen
2. Press the scan button to scan all available WiFi networks.
3. Select the desired network from the upper selection box (the strongest networks are displayed first).
4. Enter the password
5. Press connect







If the connection is succesful the credentials are saved. If the sensor was connected to a WiFi network before and the newly selected network cannot be connected to, the old credentials will **not** be overwritten.

Guest Network Limitations

Be aware that due to possible safety limitations of your router, connecting the device to a guest network might cause the built-in web server to become inaccessible.

Dual-band routers

If you are experiencing difficulties connecting to a dual-band router with the same SSID (WiFi network name) for both 2.4 and 5 GHz, temporarily switching off the 5 GHz band on your router may help.

Web server

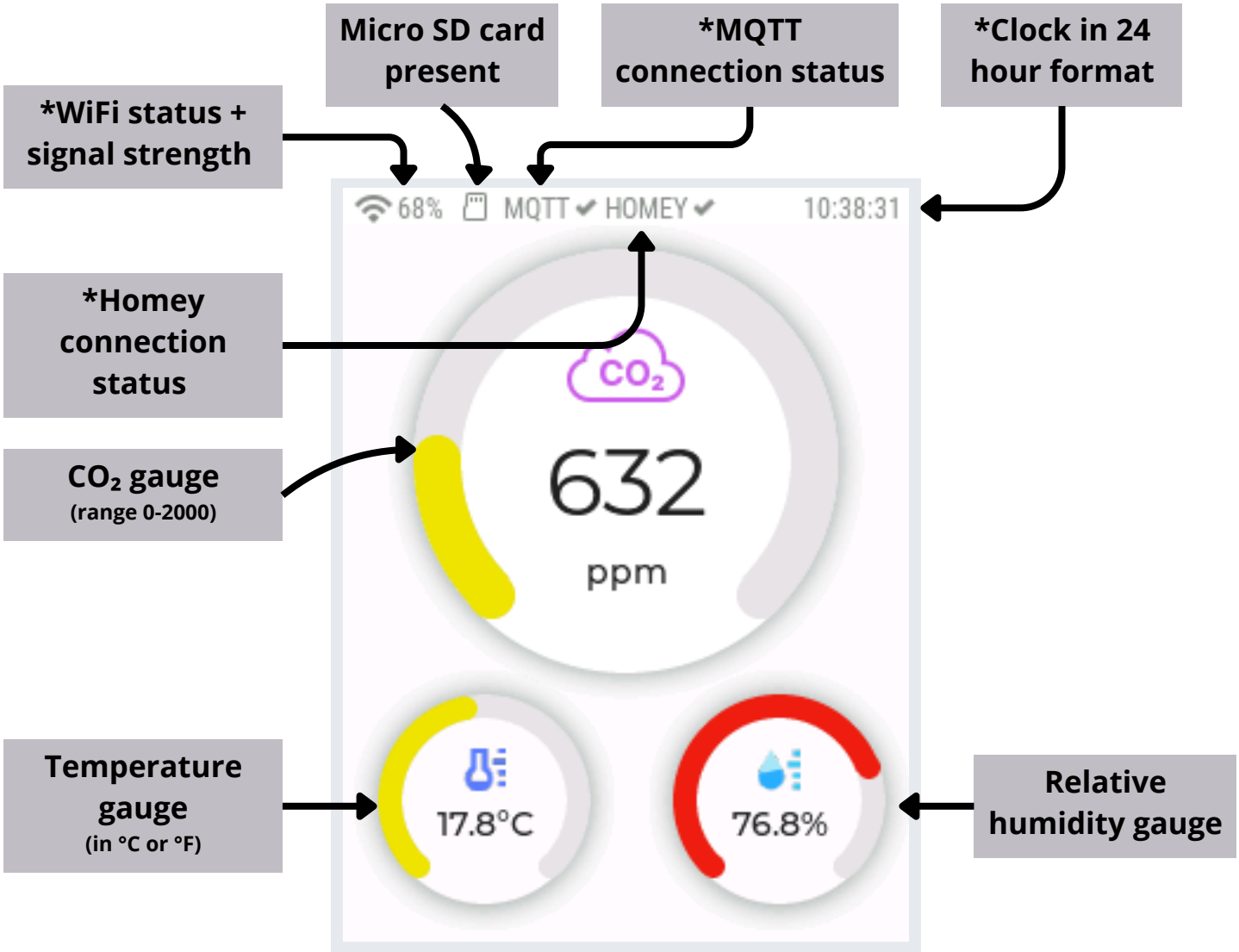
The web interface consists of several web pages with gauges, charts, setup options, and firmware updates. By default, the web server becomes active after a successful WiFi connection. However, you may switch off the web server on the Connections page. The web server can be accessed using either an IP address or a URL (web address). The IP address and the URL can be found on info page 1 of the sensor.

By default, the URL has the following format: "http://ms-xxxx.local". "xxxx" represents the last 4 characters of the MAC address. A MAC address is a unique identifier for devices that can connect to a network. The hostname (URL) is derived from the "Unique device name, which can be modified on the initial setup page of the web server. For instance, if you change the "Unique device name" to "kitchen" the web server can then be accessed via "http://kitchen.local". Make sure to only use ASCII characters. Spaces are not allowed.

Chapter 3 - Main screens (gauges, values and charts)

Gauges and status bar

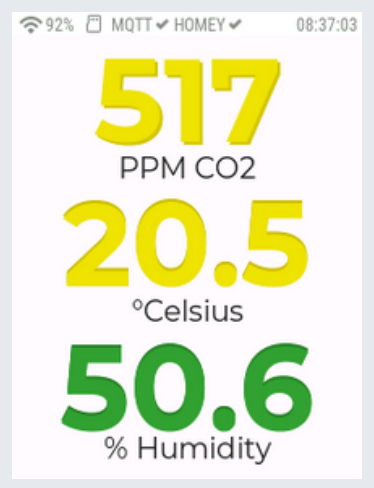
After startup, the main screen displays gauges. At the top of the screen, there is a status bar providing additional information about the device's status (refer to the image below for an explanation of the different elements). The gauges are updated approximately every 5 seconds.



The elements marked with a * are only visible when the sensor is configured for that specific feature. For the clock, the sensor needs to be connected to a WiFi network with internet access to synchronize the date & time with an NTP server.

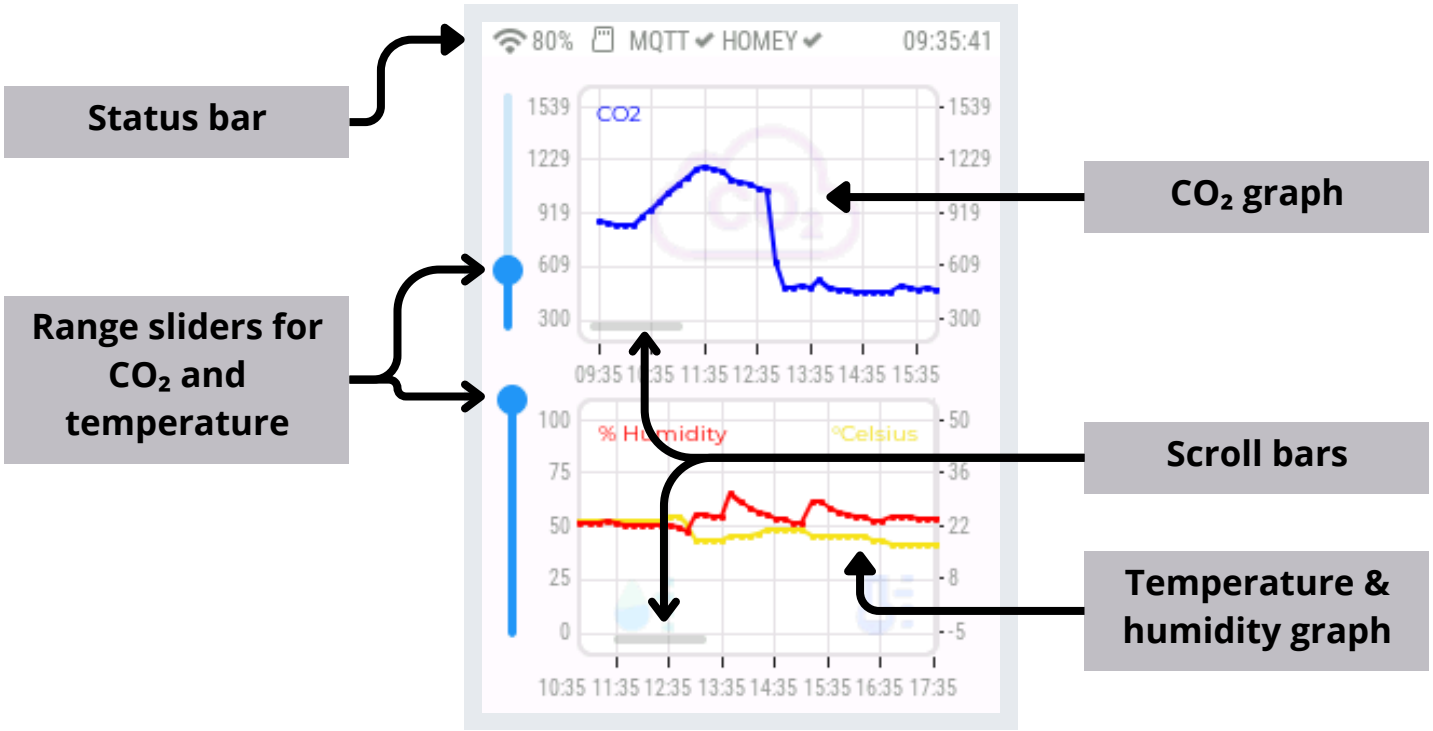
Sensor values expressed in numbers only

The “Numbers” page is designed for reading the sensor values from a greater distance. The screen features the same status bar as on the gauges page.



Charts

The charts page displays two graph areas with 24-hour historical data. The upper area represents the CO_2 values, while the lower area shows the temperature and humidity values. The interval between the readings is 10 minutes, resulting in 144 (24x6) data points per value type. The graph can display a maximum of 4 hours of data at a time. Users can navigate back in time up to 24 hours using scroll bars or by swiping. The MS-06 can store readings on the internal flash drive for over a year. This additional data is accessible only on the "charts" webpage.

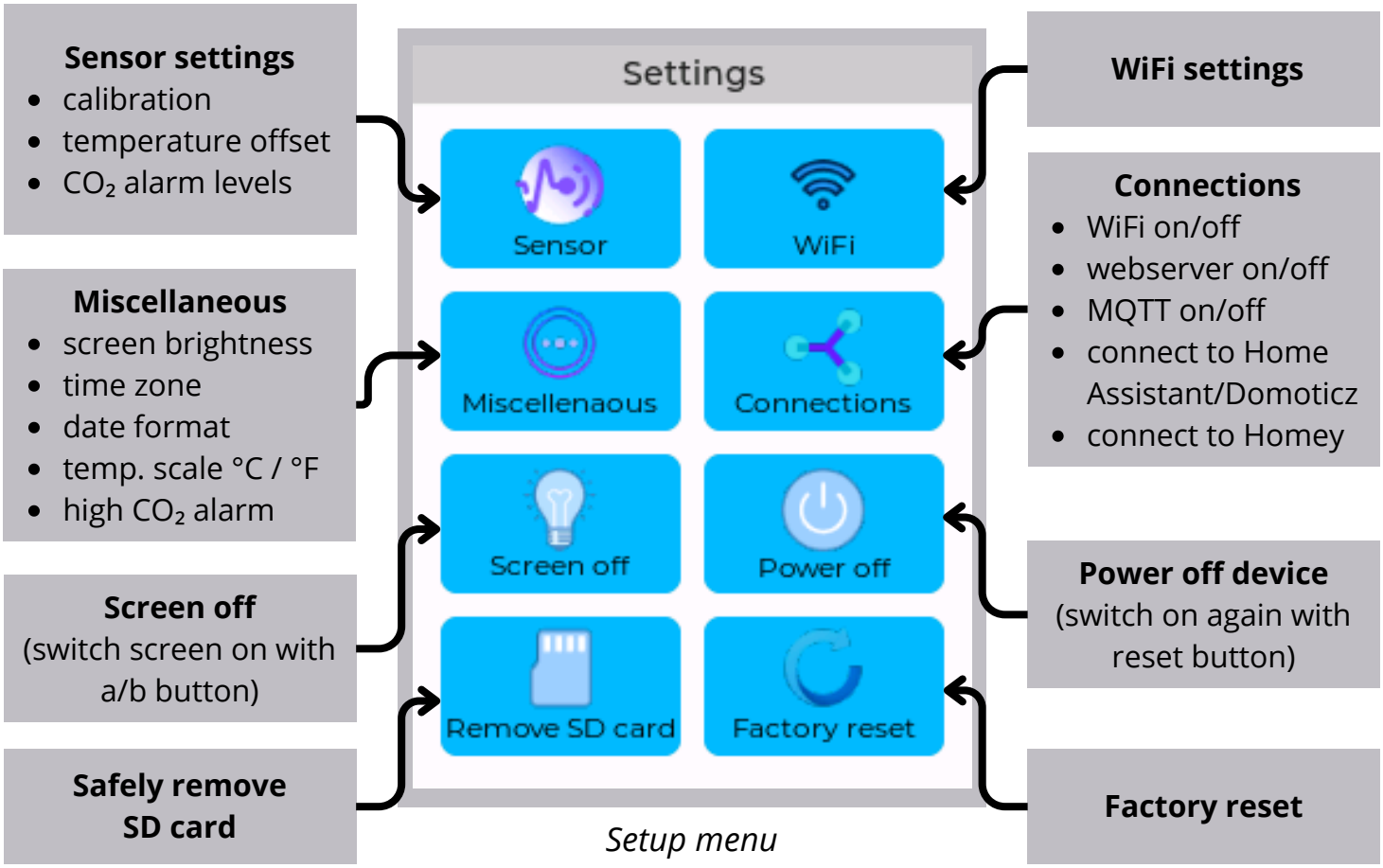


Chapter 4 - Setup screens

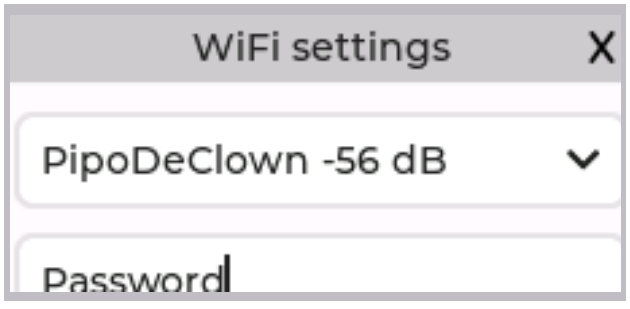
There are various setup screens to make adjustments for WiFi, the Sensirion SCD40 sensor, date format, time zone, home automation connections, and more. Some settings, such as the MQTT settings, can only be changed through the web interface.

Setup menu

The setup menu contains 8 options. The first 4 options (Sensor, WiFi, Miscellaneous, and Connections) will open a subscreen. The last 4 options (Screen off, Power off, Remove SD card, and Factory reset) directly execute the corresponding functions.



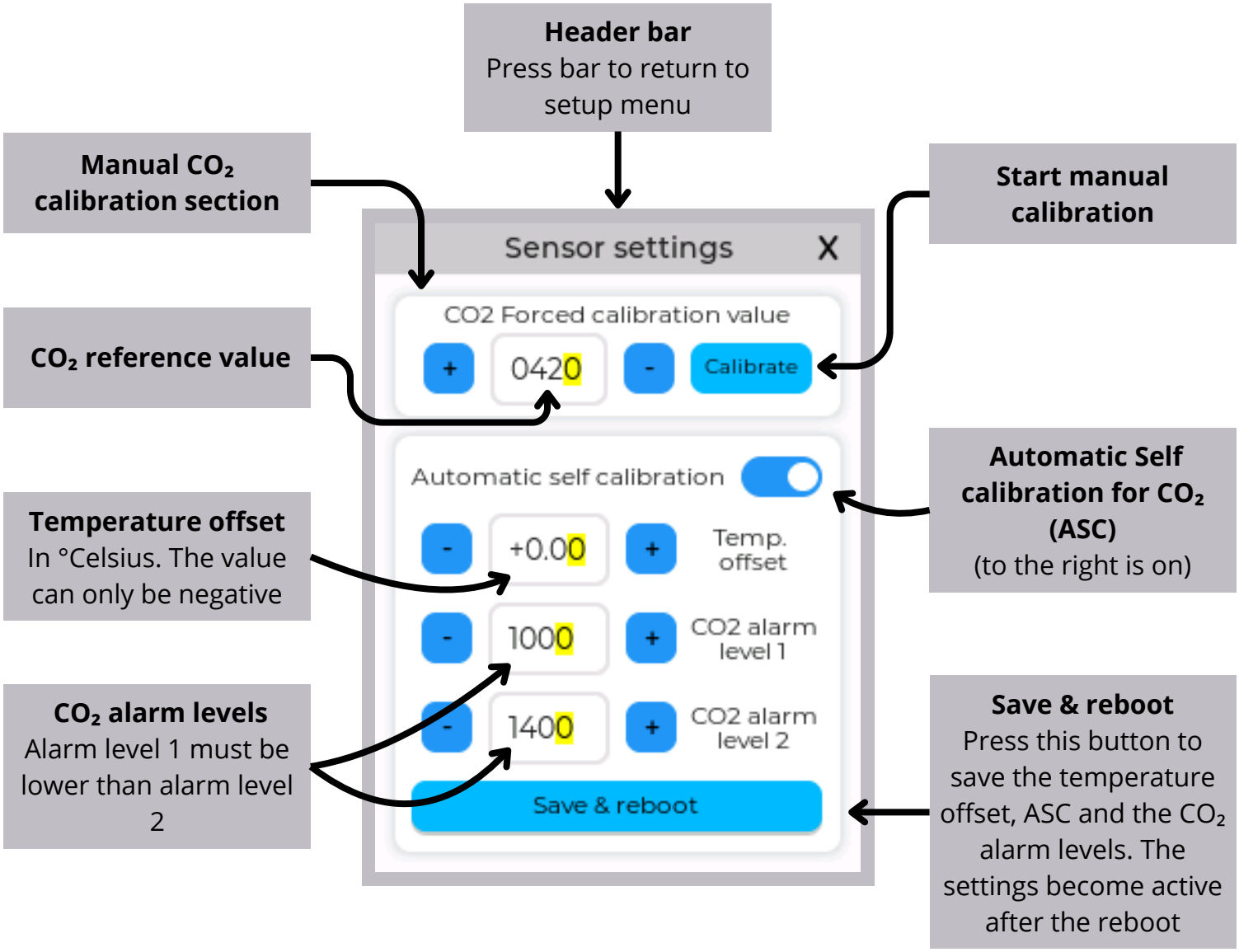
Setup menu



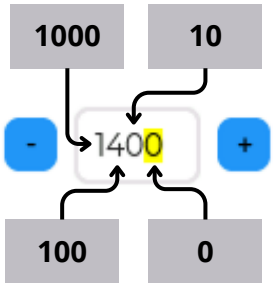
In screens with an "X", by pressing the upper bar you will return to the settings menu

Sensor settings

On the sensor settings page, you can configure options specifically for the Sensirion SCD-40.



For altering values first select either the 1000, 100, 10 or 0 section. Or in case of the temperature the 1, 0.1 or 0.01 section. After the section becomes yellow you can alter the numbers by the plus and minus buttons.



CO_2 Forced calibration value

Normally, when the automatic calibration is activated, it is not necessary to manually calibrate the CO_2 sensor. However, the automatic calibration function assumes the sensor is exposed to fresh air (420 parts per million CO_2) once every 6.5 days. If this does not occur or if there is a significant deviation, there is also the option to manually calibrate the sensor using a reference value. This reference value can be obtained from a reliable source such as another CO_2 sensor or from the outside air, which typically contains about 420 ppm CO_2. It is important to note that in areas with heavy traffic or abundant trees and plants, the CO_2 concentration may vary significantly from the global average of approximately +/-420 ppm (2024). The sensor can be calibrated either directly on the device itself or through the web interface. The recommended method is to calibrate via the web interface to prevent the sensor from being influenced by CO_2 emitted by the user operating the device nearby.

Procedure for manual calibration

1. Set the reference value or leave it at 420 ppm when you calibrate in fresh air.
2. Make sure that before calibration the sensor has been in a stable environment for at least 5 minutes (longer = better). A stable environment is an environment where the CO_2 concentration is constant. The location should not be too windy and direct sunlight must be avoided.
3. Keep a distance of at least one meter from the device during the calibration process (no humans, animals, or plants should be closer to the device during calibration).
4. Press "calibrate".

Automatic self calibration

Over time, the infrared LED in the SCD-40 will emit less light, resulting in lower values than the actual ones. To maintain sensor accuracy, it is essential to periodically adjust the measured values. This correction process, which takes place automatically every 156 hours (6.5 days) as long as there is no power interruption, involves the sensor recording the lowest CO_2 concentration measured during this period and setting this value to be 420 ppm.

By default, the automatic self-calibration (ASC) is activated, but in specific cases, it might be better to switch it off. For instance, if the sensor is used in an environment where the CO_2 concentration consistently exceeds 420 ppm, the lowest saved value will never reach 420 ppm. In such instances, leaving the ASC on will eventually lead to inaccurate measurements. Therefore, it is advisable to disable this feature. If the ASC is turned off, it is recommended to manually calibrate the sensor approximately once a month.

Temperature offset

Both the sensor itself and all other electronic components in the MoreSense MS-06 produce heat. To accurately measure the ambient temperature, it is necessary to compensate for this additional heat. In addition to the internal temperature compensation (which is not visible to the user), an extra value can be set here. By compensating for the temperature, the humidity will also be automatically adjusted.

In case the MS-06 is equipped with a rechargeable LiFePO4 battery, the charging electronics will produce notable heat when charging at full capacity (580 mA / 2.9 Watts). Even though this is totally safe, the temperature readings will be considerably higher than the ambient temperature. The temperature compensation does not correct for these higher temperatures because they fluctuate. After the battery is fully charged, the temperature readings will normalize. CO_2 values are never affected by the temperature.

CO_2 alarm levels

On the MoreSense MS-06 you can set your own CO_2 alarm levels in ppm (parts per million). By default they are:

```
 400 tot 1000 green
1000 tot 1400 orange
       > 1400 red
```

The alarm levels determine the colours of the CO_2 indicators on both the sensor itself as well as on the web interface. The acoustic alarm (if activated) will start as well either when alarm level one (2 beeps per second) or two (5 beeps per second) is exceeded.

Indoor CO2 Levels

Elevated indoor levels of CO2 have unfavourable effects on health. Because of poor ventilation many homes, schools, and offices have relatively high levels of CO2, that can influence cognitive abilities.

CO_2 [ppm]	Air Quality
2100	BAD Heavily contaminated indoor air Ventilation required
2000	
1900	
1800	
1700	
1600	
1500	MEDIOCRE Contaminated indoor air Ventilation recommended
1400	
1300	
1200	
1100	
1000	FAIR
900	
800	GOOD
700	
600	EXCELLENT
500	
400	

Indoor air quality also impacts sleep. Unventilated bedrooms often have high concentrations of carbon dioxide. The more people sleeping in one bedroom, the higher the concentration. Poor air quality can result in restless sleep, which may lead to health issues, especially for children.

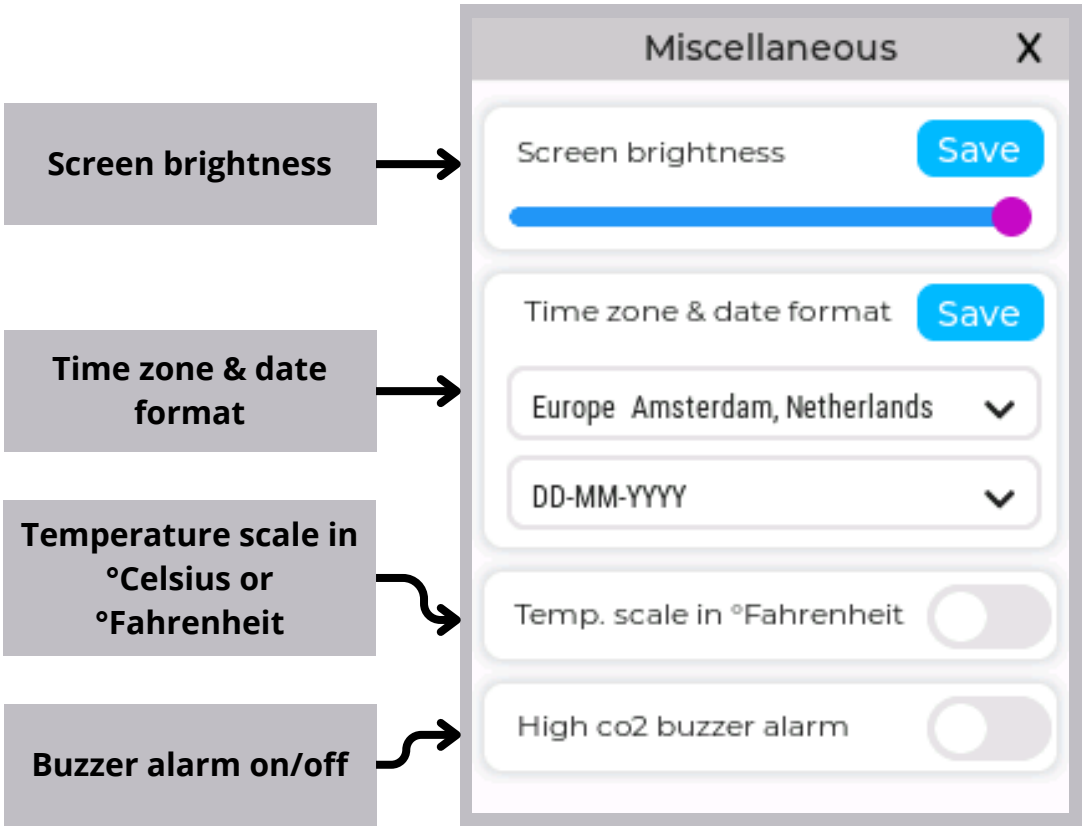
When the air quality is in the mediocre region, people may experience drowsiness. In the bad zone, the effects are more severe. In this region, people may experience a loss of attention, sleepiness, and headaches. Additionally, increased heart rate and nausea can also occur.

WiFi

For WiFi settings please refer to page 11 in the "Getting started" chapter.

Miscellaneous

This page contains the settings for screen brightness, the time zone, date format, temperature scale and the buzzer alarm.



Screen brightness

Set the screen brightness using the slider (use a stylus pen). Press the save button if you want the screen brightness to remain the same after a power cycle. To avoid confusion (as one might forget the setting and assume the device is not functioning), the screen will never become completely dark. If you wish to turn off the screen entirely, use the "Screen off" button in the setup menu. The screen will then turn back on after pressing the “A” or “B” button.

Time zone

Setting the time zone will convert the UTC time (Universal Time Coordinated) obtained from an NTP server to your local time. If applicable, the MS-06 will automatically adjust the time according to your local daylight saving schedule, so there is no need to adjust the time after a daylight saving switch. Press the “save” button to activate and save the time settings.

Date format

The date format used in the log files can vary.

DD-MM-YYYY format represents day, month, year (e.g., 31-12-2024)
MM-DD-YYYY format, representing month, day, year (e.g., 12-31-2024)
YYYY-MM-DD format represents year, month, and day (e.g., 2024-12-31)

Temperature Scale

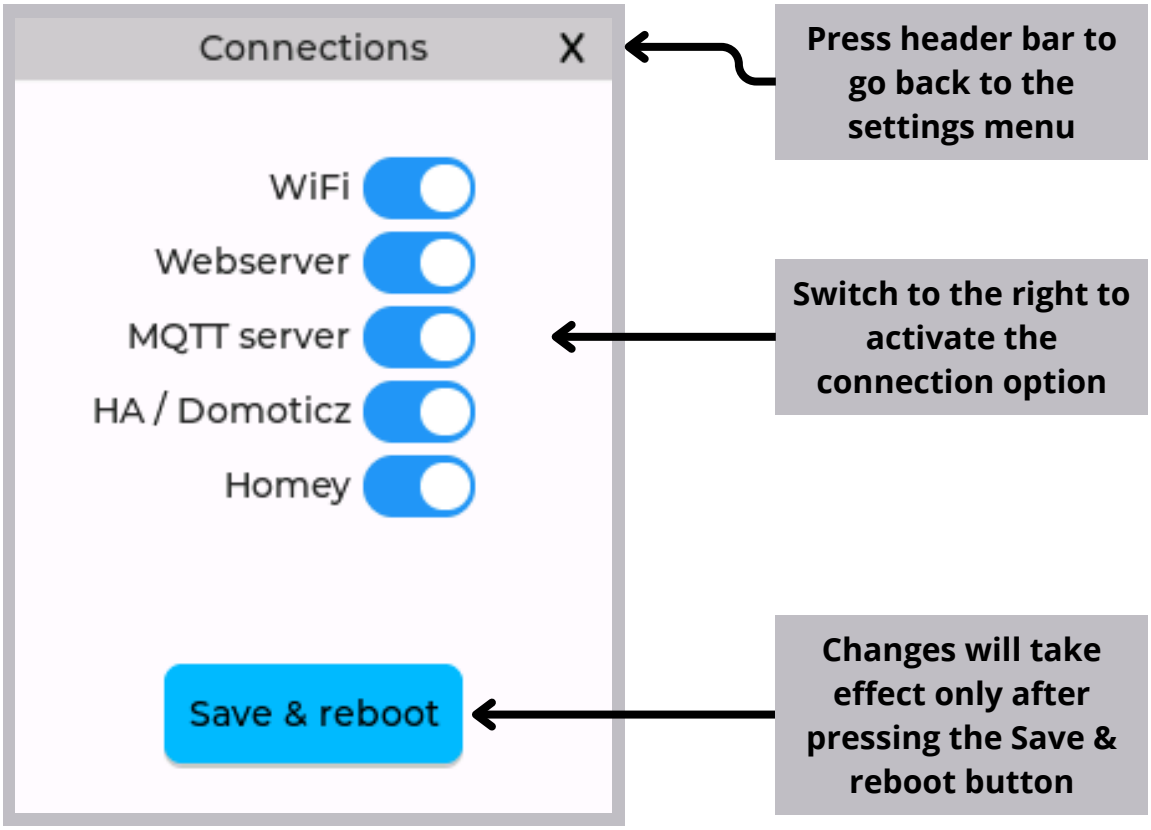
The sensor can display the temperature in either °Celsius or °Fahrenheit. In the log files, both °Celsius and °Fahrenheit will always be stored with each recording.

High CO_2 Buzzer Alarm

When switched on, the buzzer alarm will sound if the CO_2 alarm levels are exceeded. The buzzer will beep twice per second when alarm level one is exceeded and five times per second when alarm level two is exceeded.

Connections

On this page you can set all the connection options.



WiFi

For any connection to work, the MS-06 must first be connected to a WiFi network. If you want to use the device completely standalone, you can switch this option off.

Web server

With this option, you can activate or deactivate the built-in web server.

MQTT server

Many home automation systems have the ability to connect IoT devices via an MQTT server. An MQTT server functions like a post office where messages (letters) are received and distributed. The MQTT server can often be installed on the same hardware as the home automation software.

MQTT server (continued)

The MoreSense MS-06 has MQTT client functionality and can send the measurements to an MQTT server. The sensor can also receive messages from an MQTT server to execute commands, such as turning off the screen. To enable the MQTT server to function, several parameters need to be configured, which can only be done through the web interface. Further details can be found later in this manual.

HA/Domoticz

Turn this option on when you want to connect the sensor to Home Assistant, Domoticz, or both. When activated, the sensor will send a special MQTT message to the so-called “Auto Discovery” topic. This message is used by both Home Assistant and Domoticz to determine which sensors are available and where to find the actual measurements, which are published on another MQTT topic.

Home Assistant can also retrieve the readings using HTTP GET commands (REST). To do this, the Home Assistant YAML configuration file needs to be adjusted, as explained later in this manual.

Homey

Homey is another home automation platform to which the MS-06 can be connected. For this connection, there is no need to activate the MQTT client. However, on Homey, you will need to install the free “Homeyduino” app and add the sensor to the Homey controller.

Screen off button

If desired, in a bedroom, for example, you can switch off the screen entirely. This will also save power, which can be useful when using the device in battery-only mode.

Power off button

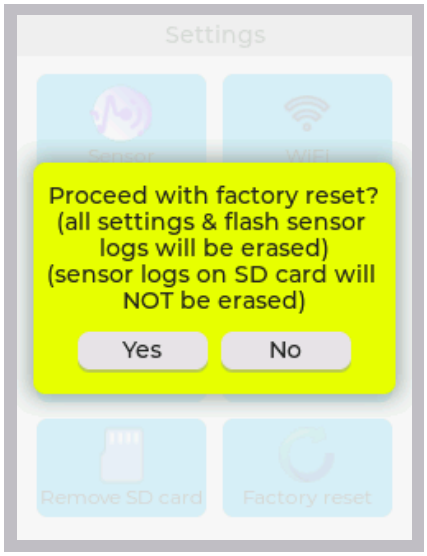
The sensor can be turned off by pressing the designated button. To reactivate the device, press the reset button (or the “B” button in battery only mode) which is located in between the A and B buttons. Even when turned off, the sensor will continue to consume a small amount of power. During battery charging, power consumption can peak at around 3 Watts.

Remove the microSD card

To prevent data corruption on the microSD card, it is best to press the "Remove SD card" button before removing it.

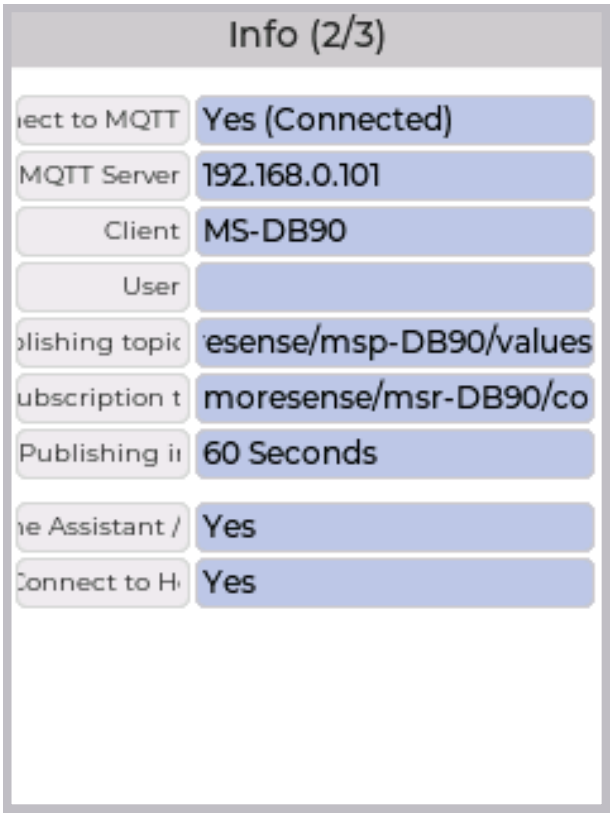
Factory reset

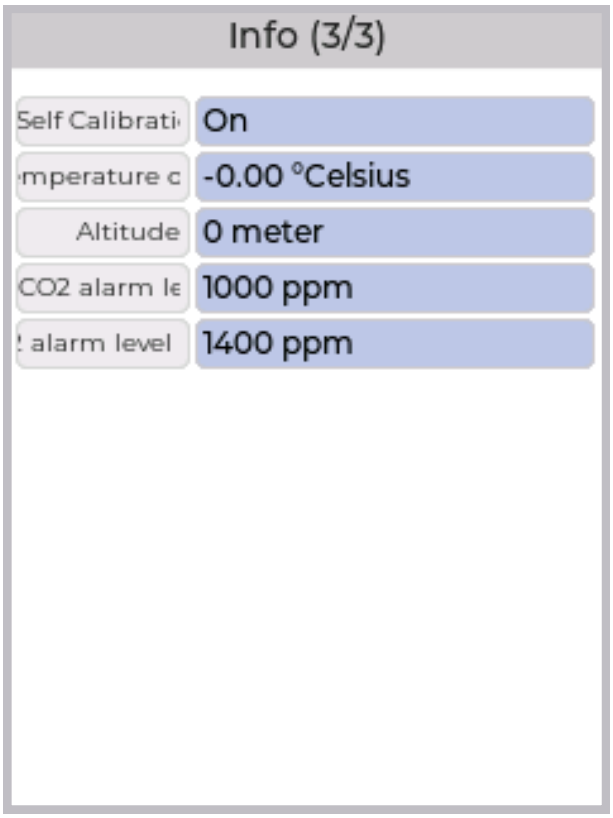
Press this button to perform a factory reset. After confirmation, all settings and internal sensor data will be lost. The data recorded on the micro SD card will remain unaffected.



Chapter 5 - Info screens

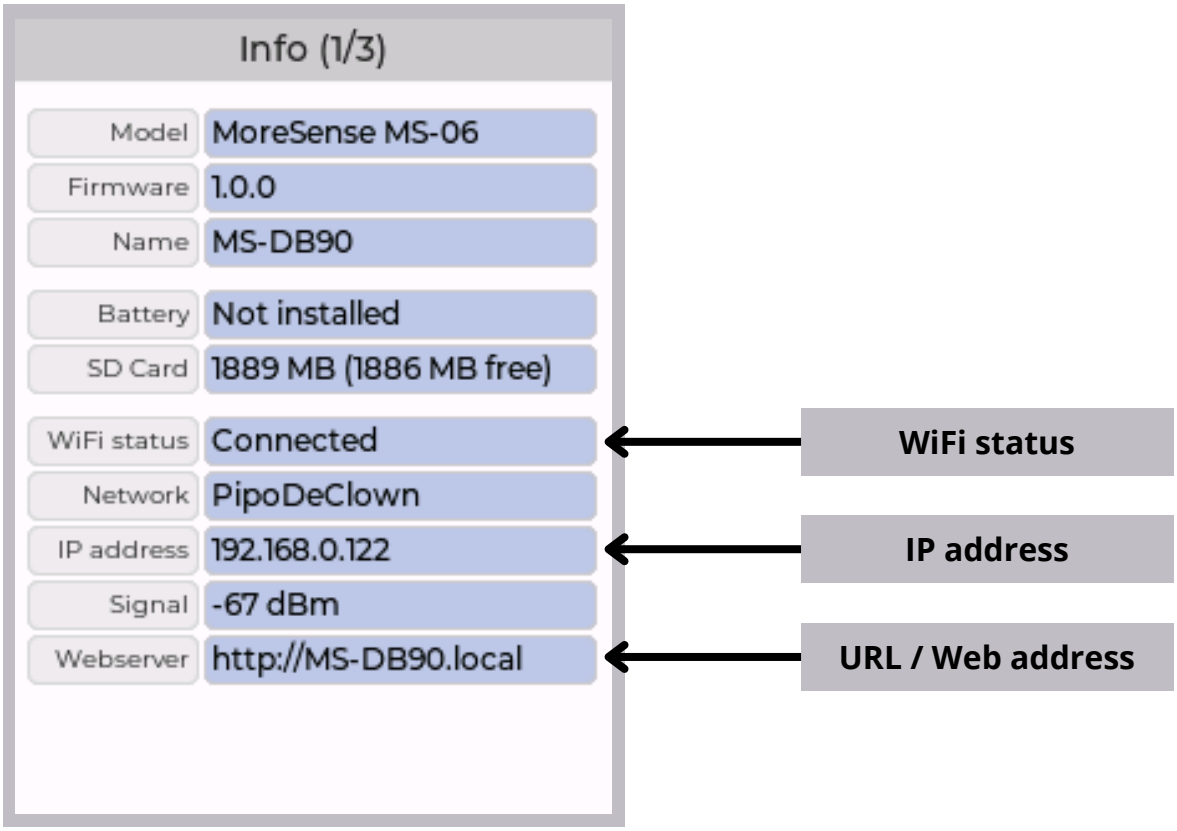
There are 3 information screens. Because they are self explanatory and most items have already been discussed only the screens are shown.





Chapter 6 - Web Interface

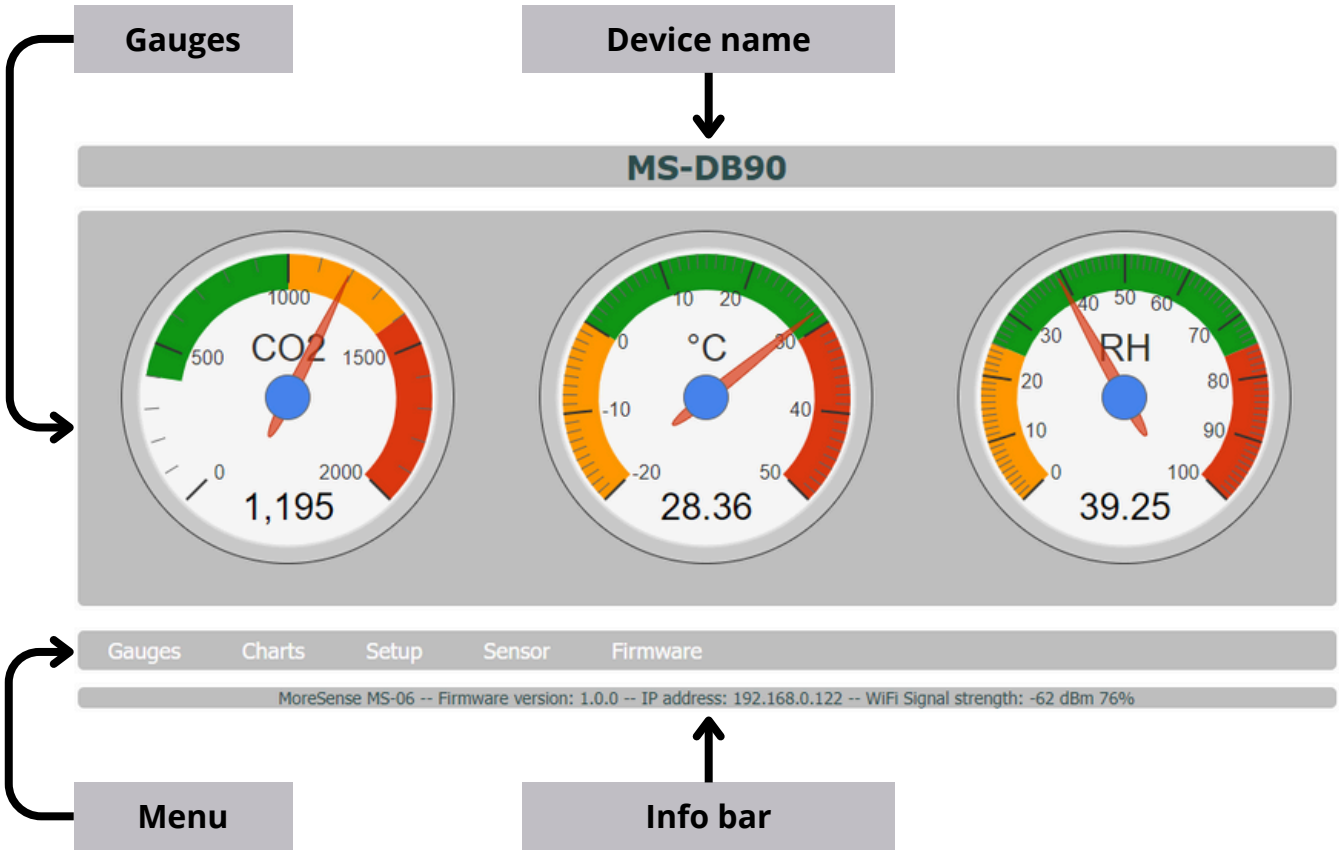
The web interface can be used to read sensor values, consult historical data, adjust settings, and perform firmware updates. The web server becomes active (unless deactivated) after the device has been connected to a WiFi network and can be accessed via a browser using either an IP address or a URL (web address). The website is optimized for viewing on a PC, laptop, or tablet, but it is also accessible on a smartphone. Please note that the device must be connected to the same network as the sensor. Both the IP address and the URL can be found on Info page 1.



When entering the IP address or URL, your browser will probably show a “Not Secure” message. Because the sensor only operates on your local network which is a trusted environment there is no risk for unauthorized access from outside your local network; the "Not secure" warning can be safely ignored.

Gauges page

After entering the URL or IP address in your browser the home page with gauges is shown.

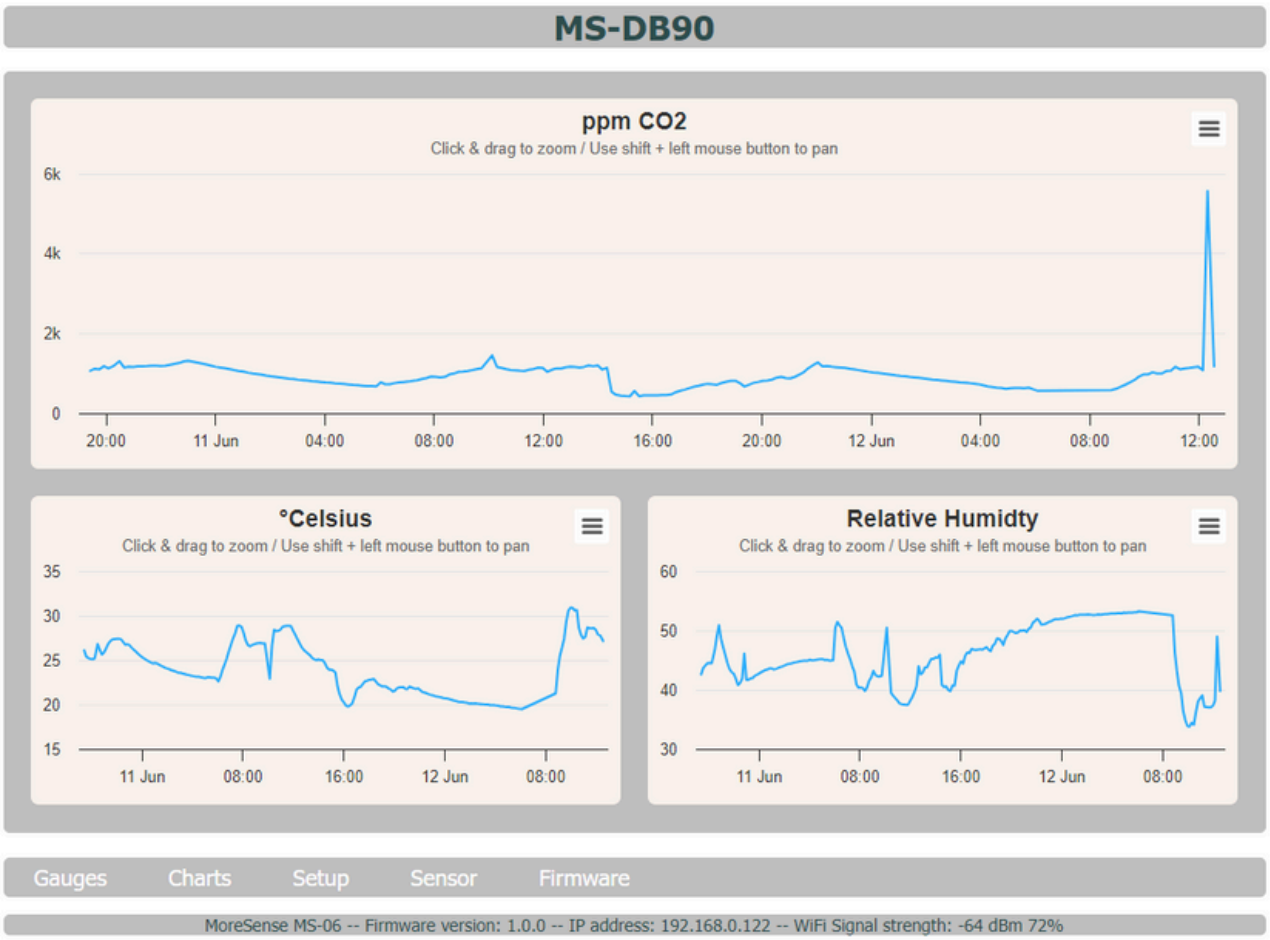


Charts page

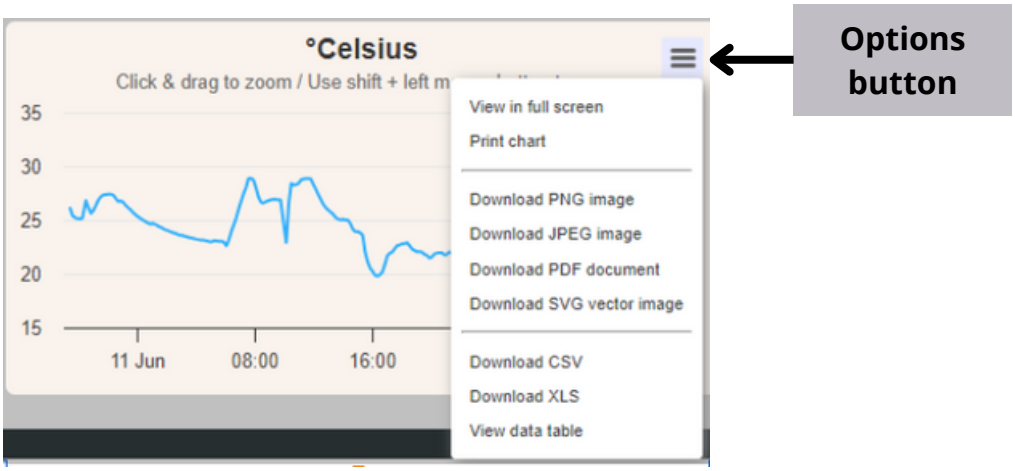
The charts represent all available CO_2, temperature and humidity records stored on the internal flash drive of the MoreSense MS-06. The maximum number of recordings is 56938 which is equivalent to approximately 1 year and 1 month (the interval is 10 minutes). The moment there are more than 56938 records the sensor will delete the oldest records until 53.568 records are left which is equivalent to 1 year and 1 week. If there have been power interruptions during the last 13 months the actual dates could be further back in time. During deleting the MS-06 only looks at the number of records, not **when** they were recorded. You can zoom in on a particular period by clicking and dragging the period with your mouse. Panning with shift + left mouse button is also possible. The more records the longer it will take to load the page.

Charts page (continued)

If you want to see the actual records enter the following address in your browser: http://ms-xxxx.local/moresense.csv (replace ms-xxxx with your specific device name).

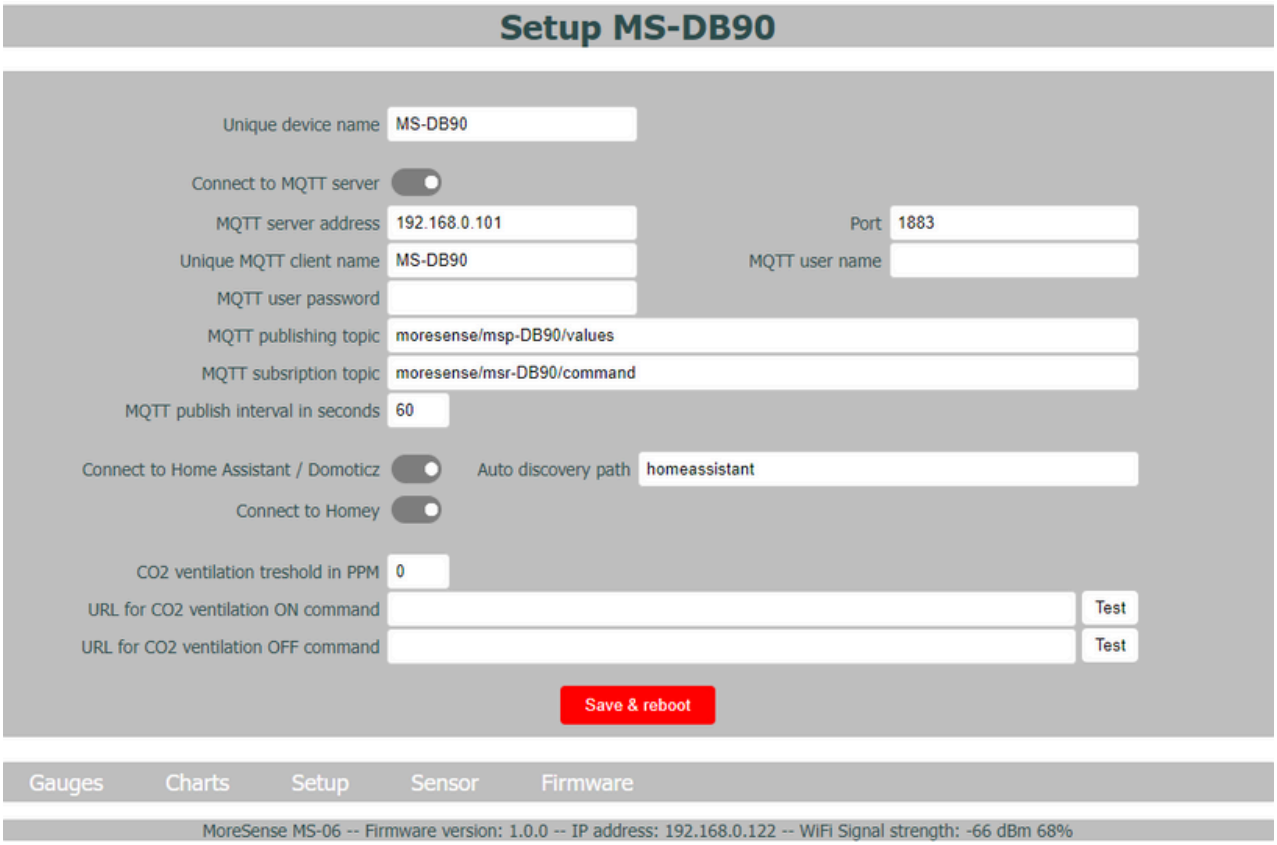


For every graph you can click the options button. This will open a dropdown menu with additional options for viewing and downloading the data in all kinds of formats.



Setup page

On the setup page you can make various settings regarding the device name, MQTT, home automation connections and the control of a smart plug.



Unique device name

By default, the device name is composed of "**MS-**" and the last 4 characters of the MAC address, but this name can be changed to your own wishes. To “**bedroom**” for example. The unique device name will also determine the URL address (this will become **http://bedroom.local**) as well as the name for Homey. If you have already added the sensor to Homey you will have to manually rename the Homey device name too. Do **not** add the extension “.local” and use a maximum of 40 alphabetic and/or numerical characters. Spaces are not allowed.

Connect to MQTT

Switch the button to the right if you want the sensor to connect to a MQTT server (also called MQTT broker). Make sure to also enter all necessary parameters for the MQTT server.

MQTT server address

The MQTT address can be either an IP address (i.e. **192.168.0.101**) or a URL (i.e. **test.mosquitto.org**). Do **not** use any prefixes like MQTT://, HTTP:// or HTTPS://. Do also **not** add the port number to the URL yet.

Port number

The port number for most MQTT servers is 1883. A secure connection with port number 8883 is not possible. Because most sensors are used within a private network (such as your own WiFi network at home), this poses no risks.

Unique MQTT client name

This is the name by which the sensor is known to the MQTT server and is used to distinguish between the different MQTT clients.

MQTT user name and password

These are the username and password with which you may have to log in to the server. It depends on the MQTT server settings whether they are mandatory or not.

MQTT Publishing topic

The publishing topic determines to which topic the measurement data is sent. You can compare the topic with a directory on your computer. Often it is sufficient to only provide the last part of the topic.

MQTT Publishing topic (continued)

The data is sent in a so-called "JSON" format and looks like this:

{ "ClientID": "MS-DB90", "Date": "15-06-2024", "Time": "20:18:42",
"CO2": 823, "TempCelsius": 23.18, "TempFahrenheit": 73.72,
"Humidity": 50.54 }

MQTT Subscription topic

Via the subscription topic the sensor can receive commands. The commands must be in JSON format like: **{ “cmd” : "command" }** or in case a value is required **{ “cmd” : "command", “value” : 100 }** The following commands are available:

{ “cmd” : "setbright", “value” : 100 }	Screen brightness (value 5-255)
{ “cmd” : "screenoff" }	Screen off
{ “cmd” : "screenon" }	Screen on
{ “cmd” : "nextscreen" }	Go to next main screen
{ “cmd” : "nextsubscreen" }	Go to next subscreen

MQTT publish interval in seconds

This is the interval in seconds to send the measurement data to the MQTT server. To avoid overhead, it is advisable to maintain an interval of at least 10 seconds.

Connect to Home Assistant / Domoticz

If this option is switched on, MQTT messages (for each sensor value one) will be published on the “Autodiscovery” topic. It will tell Home Assistant and Domoticz which sensors are available, how to configure them and where the measurement data can be found. Both Home Assistant and Domoticz need to have a MQTT client installed and need to be configured properly. And of course there has to be a MQTT server active. Please note that Home Assistant can also connect via REST. Further on in this manual there is an extensive explanation on how to connect the sensor to Home Assistant and Domoticz.

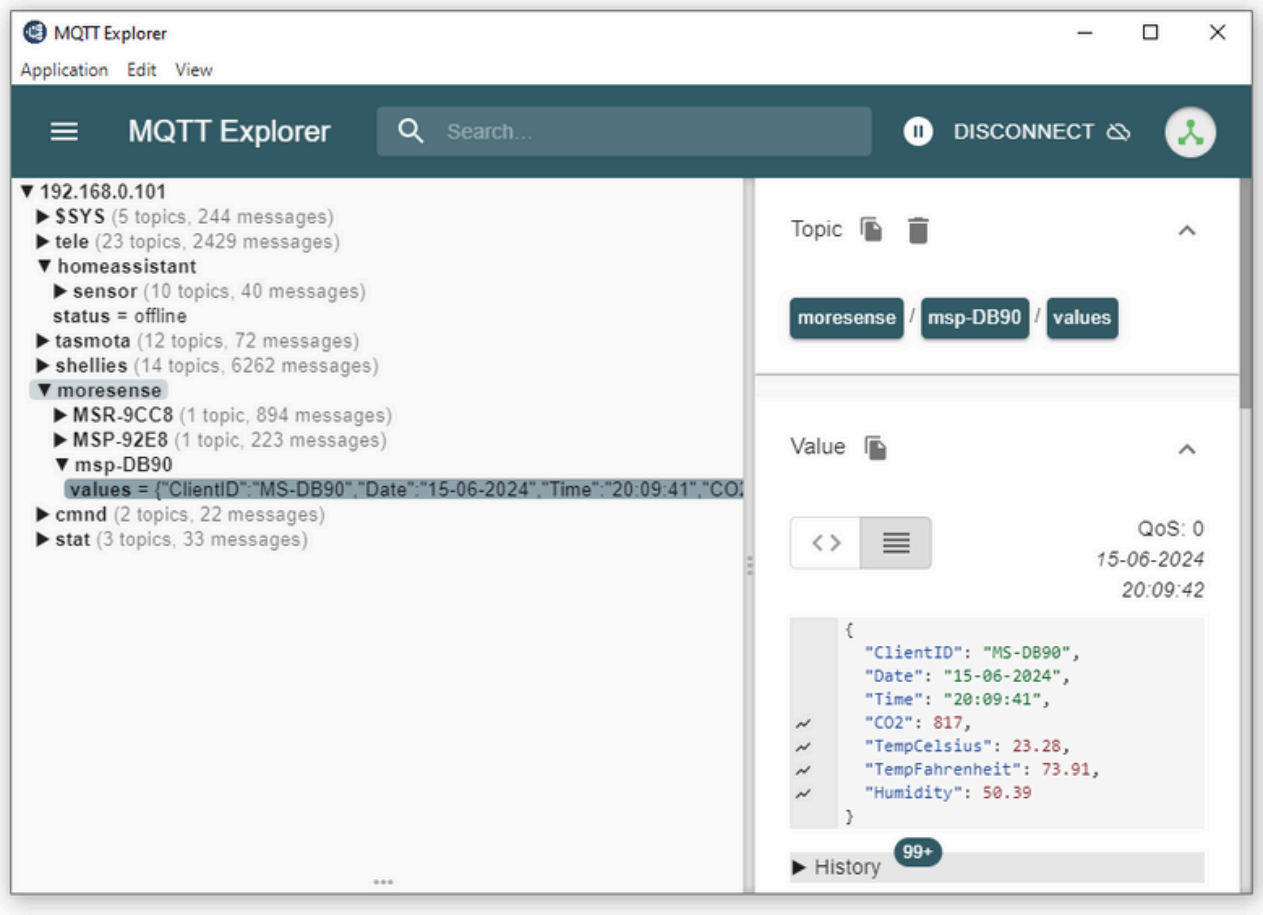
Auto discovery path

This is the topic (or path) where Home Assistant and Domoticz will look for available sensors. The default topic for both Home Assistant and Domoticz is just "**homeassistant**". There is no need to add "**sensor**" to this path.

Testing MQTT client

If you have not installed a MQTT server yourself, you can use a test server on the Internet (i.e. test.mosquitto.org). But please note: all data you send is public.

A useful program for checking MQTT messages is the free-to-use program MQTT explorer (https://mqtt-explorer.com/). This program is available for various platforms including Linux and Windows.



MQTT explorer

Connect to Homey

The MoreSense MS-06 can connect directly to a Homey controller. There is no need for a MQTT server.

Follow the following steps to connect the MoreSense MS-06 to a Homey controller.

1. Make sure both Homey and the sensor are connected to the same network
2. Install the Homeyduino app on your Homey
3. On the MoreSense setup page switch the “Connect to Homey” to **on** and click the “**Save & reboot**” button
4. Add the MoreSense MS-06 sensor to your Homey (select add device, choose the Homeyduino App and follow Homey's instructions)

On the status bar you can check whether the sensor is connected to Homey. After a sensor restart it can take a couple of seconds before the check marker shows up.

If you change the unique device name of the MS-06 you will also have to change the name on your Homey controller.

Homey is updated every 30 seconds.

Homey pro

CO2 ventilation threshold in PPM

If the the measured CO_2 concentration in the air becomes greater than the threshold value the HTTP GET command "**URL for CO2 ventilation ON command"** will be sent. This command could be sent to a so called "smart plug" to switch on a ventilation system. In this way it is possible to only ventilate when it is really necessary. In winter, for example, you can prevent expensive warm air from being extracted outside.

The moment the CO_2 concentration in the air becomes less than the threshold (-100 ppm) the **"URL for CO2 ventilation OFF command"** will be sent. The extra -100 ppm prevents the controlled device from switching too often thereby preventing unnecessary wear.

Any other device that accepts HTTP GET commands may also work. If you do not want to use this functionality you can leave the threshold at 0.

URL for CO2 ventilation ON command

This field concerns the actual HTTP GET command for switching **on** a device when the CO_2 threshold is exceeded. For "Tasmota" controlled devices this command would be: *http://ip-address/cm?cmnd=Power%20On*

URL for CO2 ventilation OFF command

This field concerns the actual HTTP GET command for switching off a device when the CO_2 level becomes less than the threshold value -100. For "Tasmota" controlled devices this command would be: *http://ip-address/cm?cmnd=Power%20Off*

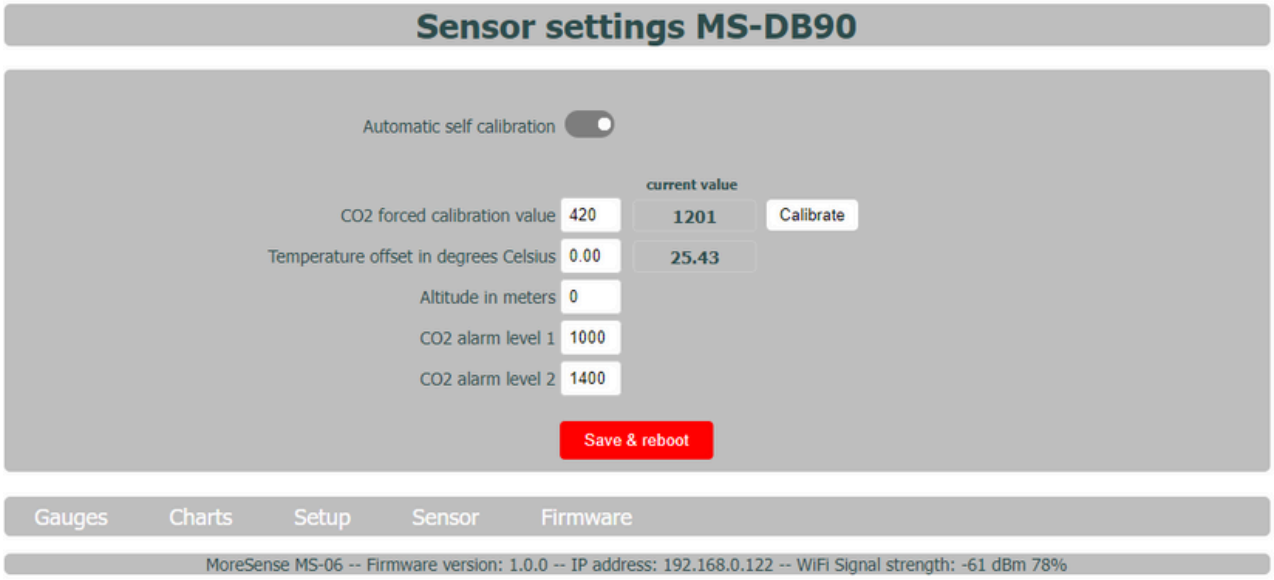
Smart plug with Tasmota firmware

Sensor page

Besides “Altitude in meters” please refer to page 16 for the sensor settings.

Altitude in meters

Altitude makes a difference (due to the barometric pressure) when you are measuring CO_2 levels. CO_2 sensor modules are calibrated at sea level, and are not designed to automatically compensate for higher altitudes. Hence the option to set the altitude in meters above sea level.



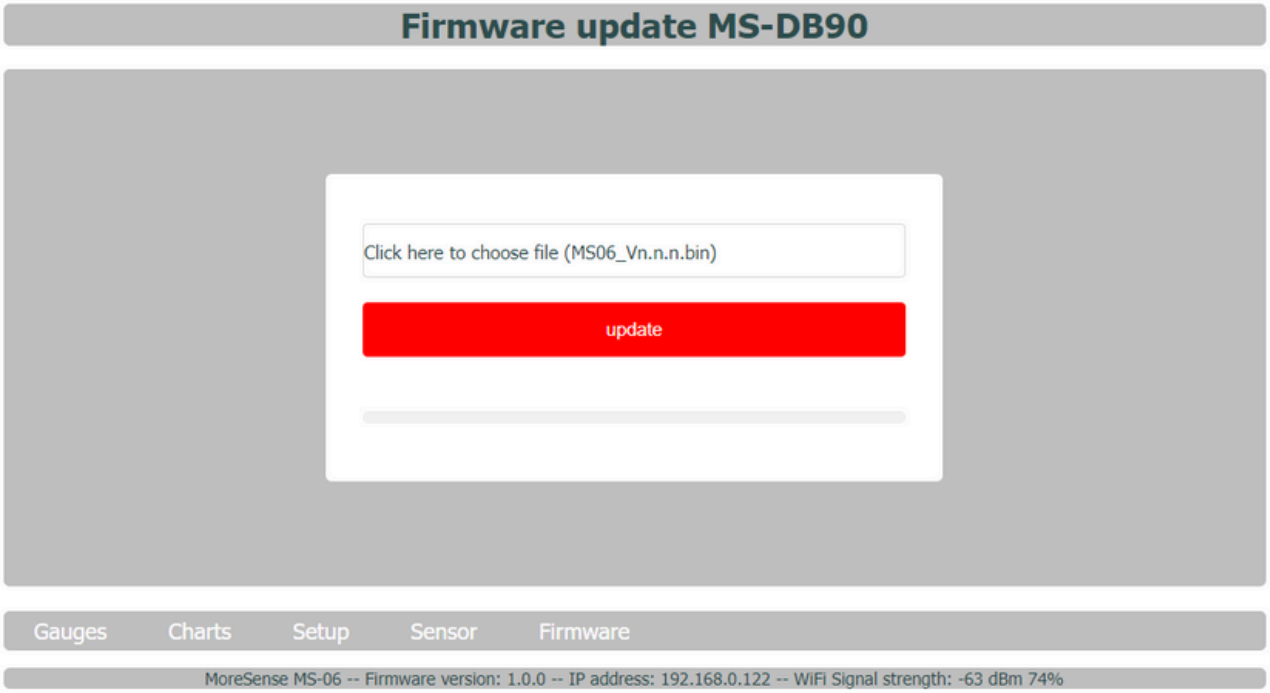
Sensor Setup

Firmware update page

If there is a new firmware release on this page you can perform the firmware update. You can check your current firmware in the footer bar.

The file name should have the following format: **MS06_Vn.n.n.bin** (n.n.n. stands for the firmware version)

Before updating, make sure you have a good WiFi connection. Select the file from your device and click the "**update**" button. While updating a progress bar is shown. After the update has been completed, the sensor will reboot and the browser will be redirected to the gauges page.



Firmware update page

Chapter 7 - Connecting to Home Assistant

The sensor can be connected to Home Assistant (HA) via either a MQTT server or REST (HTTP GET). Both options will be covered.

Connecting HA via a MQTT server

First of all you will need a MQTT server that acts like an intermediate station in between the sensor and HA. Secondly HA needs to have MQTT client software installed. If you do not already have a MQTT server (also called broker) running you can install a MQTT server and client on the same system HA is running. By installing the Mosquitto MQTT broker both the MQTT broker and MQTT client will be installed.

Home Assistant

Installing Mosquitto MQTT broker & client on HA version 2024.6.3

Follow the next steps to install the Mosquitto MQTT broker and client on HA. Please note that on other versions of HA the procedure may be different.

1. From the HA main page click "**Settings**"
2. Select "**Add-ons**"
3. In the lower right corner click on the "**ADD-ON STORE**" button
4. Search for "**Mosquitto**"
5. Select "**Mosquitto broker**"
6. Click "**INSTALL**" and wait for the Mosquitto broker to be installed
7. Make sure the "**Start on boot**" option is switched on
8. Click the **start** button
9. From the HA main page click "**Settings**" again
10. Select "**Devices & Services**"
11. Search for **MQTT**
12. In the "**Discovered**" list select "**MQTT**" and click "**CONFIGURE**"
13. Click the "**SUBMIT**" button in the "MQTT Broker via Home Assistant add-on" pop-up screen
14. A pop-up "**Success**" message should now appear

Connecting the sensor to the MQTT broker on the MoreSense MS-06

1. Open a web browser and go to the MoreSense **setup** page
2. Switch on "**Connect to MQTT server**"
3. Enter the **MQTT server address** (default is homeassistant.local, IP address may also be used)
4. Enter the **user name** and **password** (the same as needed to log in to home assistant)
5. Leave the default settings for the "**MQTT publishing topic**" (moresense/msp-**xxxx**/values) and "**Auto discovery path**" (homeassistant). **xxxx** stands for the last 4 MAC characters
6. Switch on the "**Connect to Home Assistant / Domoticz**" option
7. Click the "**Save & reboot**" button and check whether the sensor can connect to the MQTT server
8. The sensors should now be available in HA.

Installing Mosquitto MQTT client only on HA version 2024.6.3

If you already have a MQTT server running there is no need to install the Mosquitto broker. Just the client is enough (in HA it is called "**MQTT integration**"). The easiest way is to connect the sensor to the MQTT broker first (see previous page) so the sensor will be immediately visible once the MQTT client is installed.

1. From the HA main page click "**Settings**"
2. Select "**Devices & Services**"
3. Search for "MQTT". If found, the MQTT client is already installed. Just make sure it is properly configured
4. If not found, click "**ADD INTEGRATION**" and search again for MQTT. Select just **MQTT** 2 more times until the MQTT configuration screen is shown
5. Enter the MQTT broker address (URL or IP address), the user name and password and press "**SUBMIT**"
6. After a successful connection a "Success!" message will appear showing the MoreSense MS06 sensor

Connection to Home Assistant via "REST"

You can also connect to Home Assistant via REST. In this case you need to adjust the configuration.yaml of Home Assistant. To do this, add the text on the next page to the configuration.yaml file. Replace MS-XXXX.local with the unique device name + the extension .local or the IP address of the sensor. On the sensor both WiFi and the Web server need to be switched on. Make sure all indentations, blank lines etc. are exactly the same as in the text.

After the adjustment and a restart of Home Assistant, the sensor should become visible in the entities of Home Assistant. In the Settings->Devices & Services->Entities section you can assign an area to the entities. If you want more information on how to edit the yaml configuration file please refer to: https://www.home-assistant.io/docs/configuration/

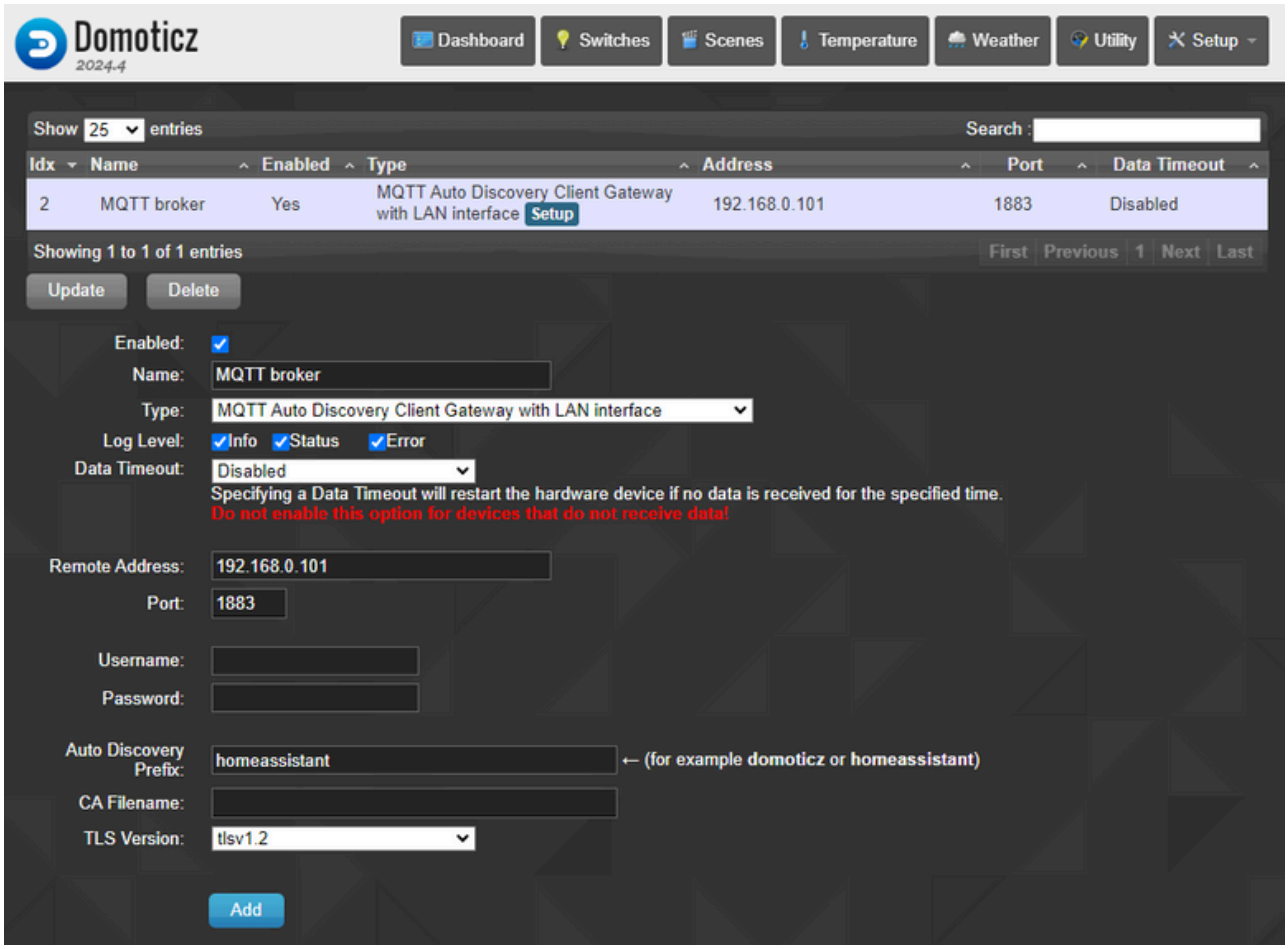
```
rest:
  - resource: "http://MS-XXXX.local/values"
    sensor:

      - name: "MoreSense MS-06 CO2"
        unique_id: "ms06_co2"
        value_template: "{{ value_json.CO2 }}"
        unit_of_measurement: "ppm"
        device_class: "carbon_dioxide"

      - name: "MoreSense MS-06 Temperature Celsius"
        unique_id: "ms06_tempcelsius"
        value_template: "{{ value_json.Temperature }}"
        unit_of_measurement: "°C"
        device_class: "temperature"

      - name: "MoreSense MS-06 Temperature Fahrenheit"
        unique_id: "ms06_tempfahrenheit"
        value_template: "{{ value_json.TempFahrenheit }}"
        unit_of_measurement: "°F"
        device_class: "temperature"

      - name: "MoreSense MS-06 Humidity"
        unique_id: "ms06_humidity"
        value_template:  "{{ value_json.Humidity }}"
        unit_of_measurement: "%"
        device_class: "humidity"
```

Chapter 8 - Connecting to Domoticz

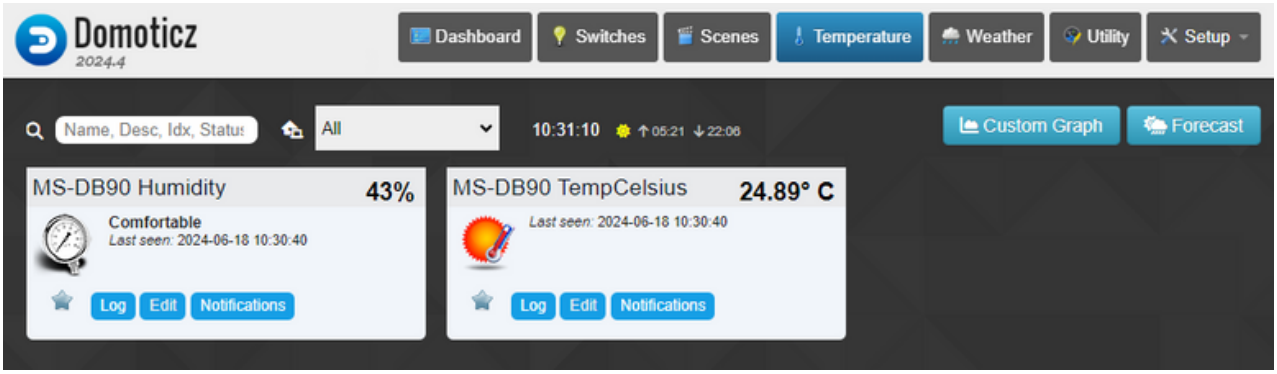
The easiest way to connect the sensor to Domoticz is using a MQTT broker. For installing a MQTT broker on your Domoticz system please refer to **https://www.domoticz.com/wiki/MQTT**

Domoticz also makes use of the so called “Auto discovery” method. This means that Domoticz checks the “Auto discovery” topic on the MQTT broker for available sensors, how to configure them and on which topic to find the actual measurements. This “Auto Discovery” message (generated by the sensor) is exactly the same for both Domoticz and Home Assistant. Follow the next steps to connect the sensor to Domoticz.

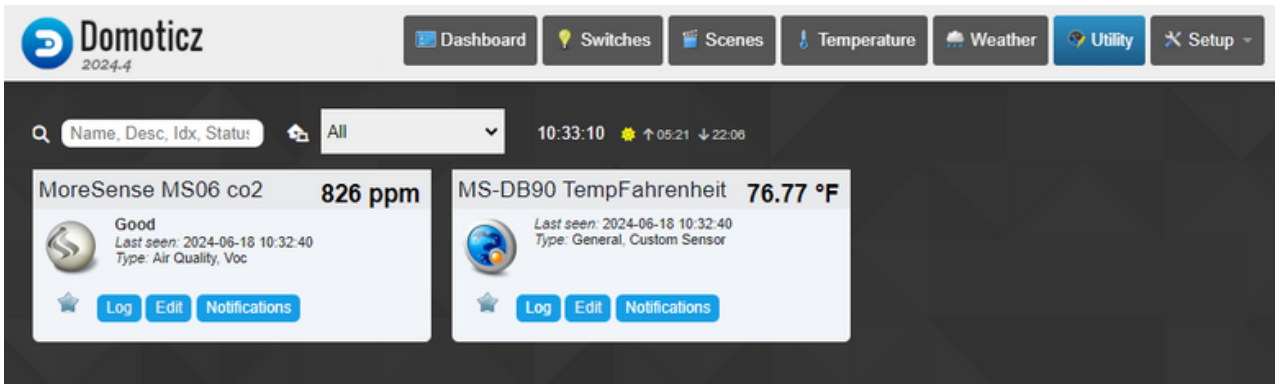
1. First make sure the MQTT broker is up and running
2. Connect the sensor with the MQTT broker (see page 38 under the paragraph “*Connecting the sensor to the MQTT broker on the MoreSense MS-06*”
3. On the Domoticz web page go to “**Setup->Hardware**”
4. In the “**Type**” dropdown menu select “**MQTT Auto Discovery Client Gateway with LAN interface**”
5. Enter a name of your own choosing like “**MQTT broker**”
6. Enter the URL or the IP address of the MQTT broker in the “**Remote address**” field
7. If applicable enter the “**Username**“ and “**Password**“ for logging in to the MQTT broker
8. Leave the “**Auto Discovery Prefix**“ (“**homeassistant**”) unchanged
9. Click the “**add**“ button
10. The sensors (every measurement type will create a separate sensor) should be added automatically
11. Click the “**Temperature**“ and “**Utility**“ buttons to check if the sensors were added properly



Domoticz Hardware setup



Domoticz Temperature



Domoticz Utility

Technical information

Model	MoreSense MS-06	
Power	Input voltage Consumption Consumption when charging	5V USB-C ±1.5 Watt / ± 300 mA ± 3 Watt / ± 900 mA
CO_2	Range SCD40 Range SCD41 Accuracy (Baseline) Accuracy (Linearity) Response time (τ63%)	400 - 2000 ppm 400 - 5000 ppm ±50 ppm ±5.0%MV ppm 60s
Humidity	Typ. relative humidity accuracy Operating relative humidity range Response time (τ63%)	6%RH 0 - 95 %RH 90 s
Temperature	Typ. temperature accuracy Operating temperature range Response time (τ63%)	0.8 °C -10 - 60 °C 120 s

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. this device may not cause harmful interference 2. this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

For more information see: https://fcc.report/FCC-ID/2ASYE-T-HMI