Click the button and download
our free wBox app:

Download on the App Store

GET IT ON Google Play

User Manual

CO_2 co2sensor MINIATURE CO_2 CONCENTRATION SENSOR AND VENTILATION EFFICIENCY INDICATOR

SAFETY RULES

Connect only in accordance with the diagram presented in the manual. Improper connections may be dangerous, it can damage the controller, and loss of the warranty.

DANGER! Risk of electric shock! Even with the device turned off, the outputs may be live. All assembly work should be ALWAYS performed with the disconnected power circuit.

The installation of the device to a power mains that does not meet the quality requirements defined by EN 50081-1, EN 50082-1, UL508, EN 60950, will result in the loss of the warranty.

1 INSTALLATION - BASICS

- The device measures CO_2 concentration and assesses ventilation efficiency in the room where it is installed. The assessment results are presented on a 7-point scale, including a detailed description of the current CO_2 concentration level and information on possible side effects. For each level, the device also displays recommendations for actions to improve air quality.
- **Mounting Recommendations:**

  - The device should be mounted in a location protected from adverse environmental conditions, particularly moisture and direct sunlight. Avoid mounting near loudspeakers, ultrasonic devices, and other electronic devices.

  - The device should be mounted securely and remain stationary. Avoid locations subject to vibration. Metal objects near the device, such as cables, facade elements, window sills, or brackets, may negatively impact the radio range.

  - Pay particular attention to the diaphragm visible through the opening at the top of the device. Its position is indicated by horizontal lines and nearby warning markings. The diaphragm should not be touched, cleaned, or covered.

  Failure to follow these recommendations may lead to incorrect readings.

Installation recommendations can be found at the end of the manual

- Connect the USB-C (5V) power cable to the connector on the top of the device.
- After connecting the device to a power source, the sensor's operation is indicated by a blue, flashing light located at the controller's power connector.
- The status LED on the front of the device glows blue while initializing measurements. When the sensor is operating correctly, its color changes from green to purple, then through shades of yellow, orange, and red. The LED's color indicates the current ventilation efficiency rating, based on the measured CO_2 concentration. This rating is also displayed in the wBox app.

LED Colour	CO_2 Concentration	Ventilation Efficiency
Dark Green	Less than 450 ppm	Excellent
Green	450–949 ppm	Good
Light Green	950–1199 ppm	Acceptable
Yellow	1200–1749 ppm	Moderate
Orange	1750–2499 ppm	Poor
Red	2500–4999 ppm	Insufficient
Purple	Over 5000 ppm	Critical

- A measurement error is indicated by a flashing red status LED. An appropriate error message is also displayed in the wBox app.

2 FIRST START-UP

- Download the free wBox app. If you have an Android device, you can find the app on the Play Store. For iOS devices, the app is available on the App Store.
- Using your mobile phone or tablet, connect directly to the device's access point. Follow these steps:

  - Disable mobile data: To avoid communication issues, temporarily turn off cellular data in your device settings.

  - Connect to the device: Go to the Wi-Fi settings on your smartphone or computer, then find and connect to the network named ""co2sensor-xxxxxxxxxx" (where "xxxxxxxxxx" is the unique serial number of your device).

  - Maintain WiFi connection: Your operating system (Android/iOS) may notify you that the network provides no Internet access. In this case, select "Keep connection", "Use anyway", or "Stay connected". This is essential to proceed with the device configuration.

- Open the wBox app. The device will be visible on the main screen. To add it to your account in the app, select "Add device to account." If you are an installer and do not want to assign the device to your account, choose "Use once only".

3 WIFI CONNECTION AND SERVICE (AP) SETTINGS

QUICK INSTALLATION GUIDE
first configuration of the BleBox controller

Scan the QR code or click the link below to access the quick installation guide.

https://blebox.eu/start

- Go to the WiFi settings ("gear" icon in the top right corner of the screen, under the "Connection" section), where you can connect the device to your home WiFi network to control the controller locally or from anywhere in the world. To do this, select the network name from the list of available networks and tap "Connect". If required, enter the WiFi password. While the device is connecting to the home network, your phone or tablet may temporarily disconnect from the device's network.

- You can also configure the network settings using a web browser. After connecting to the controller's wireless network, open a browser and go to www.blebox.eu.

- After reconnecting your phone to the controller's WiFi network, check the "WiFi Client Status" and "Remote Access Status" fields. The controller is equipped with a network connection monitoring system, which will report any issues with the WiFi or Internet connection and their possible causes. If the network is functioning correctly, both fields will display "Connected".

- To communicate with the device from outside your local WiFi network, from anywhere in the world, via the wBox app, the device automatically connects by default to the BleBox cloud service The remote access system is fully encrypted and secure, with data transmitted through European servers of reputable companies. It is possible to disable remote access – click the "Configure" button and toggle the switch for "Remote Access". Note that disabling "Remote Access" will prevent using the controller outside the local network and will also result in loss of access to historical data (including charts) and push notifications to your smartphone. We recommend keeping this feature enabled (it is the default setting).

- Enabling the "Event Log" option allows for the automatic recording of device activity in the BleBox cloud. The system logs events such as notifications defined in the "Actions" section, as well as the history of the controller's connections and disconnections from the network. This feature provides access to the full operational history of the device at any time, even when the controller is currently offline.

- After completing the WiFi network configuration, you can disconnect from the device's network and connect your phone or tablet directly to your home WiFi network. Control via the wBox app will work the same as when your phone or tablet is connected to the device's network. If you leave the local network, for example by leaving home or switching your phone to mobile data, the wBox app will indicate this as "Remote Mode". In this case, you will have access to the device's data, but for security reasons, the settings options will be unavailable.

- In the "Service Connection (AP)" section you can change the name and set a password for the WiFi network broadcast by the device. Keep in mind that changing the network name or password may cause an immediate disconnection from the device after clicking the "Save" button, so you will need to reconnect to the WiFi network.

- It is also possible to completely disable the access point broadcast by the device. To do this, move the "Access Point" slider to the off position and confirm your choice by clicking the "Save" button.

- Warning! If the controller does not have a stable connection to the WiFi network ("WiFi Client Status: CONNECTED", with no error warnings), it will not be possible to re-enable the access point – in this case, the only solution is to reset the controller to factory settings. Disabling the access point is recommended only after the controller has been fully configured and you have confirmed that the entire system is functioning correctly.

4 DEVICE SETTINGS

- On the main control screen, which displays imported, exported, and instantaneous active power measurements, go to the device settings (click the "gear" icon in the upper right corner).

- In the "Name and Icon" section, you can change the default device name displayed in the wBox app. This allows you to assign your own, more readable name, for example: "CO_2 concentration in the living room", "Ventilation in the bedroom", "Air quality". You can also set a different icon for the sensor. This allows you to better tailor the user interface to a specific application.

- In the "Device settings" section, in addition to the option to disable the LED indicators, the "CO_2 sensor" tab provides the "CO_2 value correction" function. It allows the CO_2 concentration reading to be adjusted by a fixed value within the range of -300 to +300 ppm. The correction can be set by moving the slider, using the "plus" and "minus" buttons, or entering a numerical value after clicking the pencil icon. This function is useful in cases where the sensor is installed in an unusual location or manner and its readings are lower or higher than the actual CO_2 concentration. Default correction value: 0 ppm.

5 MEASUREMENT DATA AND CHARTS

- The controller's main screen displays the current CO_2 concentration reading in the unit (ppm) and an infographic with a description of ventilation efficiency. In the center of the screen is the "Show Details" button. Expanding it displays the following information:

  - "Detailed Description" - a detailed description of the current CO_2 concentration level and information about possible side effects.

  - "Recommendations" - tips on actions to take to ensure a more comfortable indoor environment.

  - "Legend" - explanations of each infographic along with the CO_2 concentration ranges for which they apply."

- Charts and historical measurement data are accessible by clicking the chart icon in the upper right corner of the screen. The "History" section displays a chart for a selected time range, which can be freely modified. Additionally, users can choose the "Chart type" (bar, point, line, or line with points) and the "Interval" (from 5 minutes up to 1 hour). Please note that the availability of intervals depends on the selected time range.

- The bar colours correspond to those used in the 7-level legend. This allows the bar graph to simultaneously represent the CO_2 concentration value and the corresponding ventilation efficiency level.

- Measurement data is stored on the BleBox server and is available only when the "Remote access" option is set to "Yes". Data is accessible for 12 months with 1-hour aggregation, while results from the last 7 days feature a detailed 5-minute aggregation.

- Historical measurement data can be exported for further processing, comparison, and archiving in external systems and analytical tools. To do this, click the "three dots" icon in the upper right corner of the screen and then select the "Export" option. You can choose between the ".csv" and ".xlsx" (Excel) formats.

6 CONTROLLING OTHER DEVICES

- The controller allows you to send control commands to other BleBox devices via Wi-Fi, using the local API. Actions are triggered based on specific trigger types, such as "CO_2 concentration (ppm) is higher/lower than" or "Ventilation efficiency level is equal to or worse/better than." This allows you to create practical automation scenarios, such as increasing mechanical ventilation speeds when a specific CO_2 level is exceeded.

- Go to settings by clicking the gear icon in the top right corner, then select the "Actions" tab. This section is initially empty - to add a new function, click the "Add your first action" button.

- When adding an action in the "When" tab, select "Trigger type" as e.g. "CO_2 concentration (ppm) is greater than" or "CO_2 concentration (ppm) lower than". In the "Sensor" field, the CO_2 sensor responsible for triggering the action is selected by default. Finally, fill in the "Value" field, specifying the CO_2 concentration level at which the action should be triggered.

- In the "Execute" tab, select "Control another device" in the "Result" field, and then confirm your selection. Then click the "Select device" button. The controller will scan the network for compatible devices and display them in a list. Select the device you want to control. If the device does not appear in the list, use the general API control method described below or update the firmware in the target controller.

  Note: All controllers must be on the same local network, and the "Wireless client isolation" option must be disabled in the AP/router settings.

- Next, in the "Call API" field, enter the API command that will trigger the controller.

- The most popular /s/ API control commands for the switchBoxT PRO, switchBox and shuterBox controllers are listed below:

  Turning on the fan via switchBox: 1

  Fan off via switchBox: 0

  Turning on fan speed 1 via switchBoxT PRO: 0/1

  Turning on the 2nd fan speed via switchBoxT PRO: 1/1

  Opening the roof window via shutterBox: u

  Closing the roof window via shutterBox: d

- By default, the configured action is executed once when the set threshold is exceeded. In order for it to be triggered again, the value must first drop below the defined limit. There is also an option for cyclic execution of the action after exceeding the threshold, which enables monitoring of a specific state in another controller and prevents the state from changing as long as the value remains above the threshold. In this case, the appropriate repeat option must be selected and a time interval defined.

- If the device was not on the list of discovered compatible devices or you want to control another device on the network, select “Call URL” as the “Action Type”.
- In the “URL” field, enter the API command preceded by the http protocol prefix and the IP address of the controller you want to control. The IP address can be found in the settings of the respective device.

  Warning! All controllers must be on the same local network, and the “Wireless Client Isolation” option in the AP/router must be disabled.
- Below are the most commonly used API commands for the switchBox controller. It is assumed that the IP address of the remote controller is: 192.168.1.123

  Caution! In the router settings (DHCP), a static IP address must be assigned to the controller.

  Switching on the fan via switchBox: http://192.168.1.123/s/1

  Switching off the fan via switchBox: http://192.168.1.123/s/0
- The “Send URL” action can also be used to transmit measurements to an external server. While creating the action, the “Action Symbols” button is available. It displays a list of available placeholders along with short descriptions. To add a action placeholder, click the “plus button”.
- The most suitable trigger type for this kind of application is the “cyclical” trigger. It allows sending information at various time intervals (minimum every 15 seconds). Below are examples using placeholders, also called action symbols:
- Sending the meter’s current reading to an external server:

  http://177.120.11.5/state/{co2_ppm.0}
- Sending the current meter measurement to an external server using the “query string”:

  http://177.120.11.5/miernik?meter_reading={co2_ppm.0}
- In the “Summary” tab, name the action, check its correctness, and confirm by clicking the “Save” button.
- A detailed description of control and examples of integrating other controllers using the local, open API can be found on our website https://blebox.eu in the FAQ section, while the complete technical API documentation for BleBox devices is available at: https://technical.blebox.eu
- The added action will appear in the list. Expanding its details allows you to view, among other things, the status of its last execution.

7 NOTIFICATIONS

- The controller allows displaying a system notification on a phone with the wBox app installed, triggered by a specific type of trigger, e.g., “Power greater than”.
- Notifications work only when the controller has a stable Internet connection and the “Remote Access” option is enabled (default setting).
- Notifications are added in a similar way to “Actions” - fill in the form fields, and in the “Do” tab, select “Notification” as the “Result.” Confirm by clicking the “Save” button.
- Additionally, you can create “Custom notifications” with your own message text.
- While creating a “Custom Notification” action, the “Action Symbols” button is available. It displays a list of available placeholders along with short descriptions. To add a placeholder, click the “plus” button.
- **Examples of custom notification text:**

  - “Attention! Ventilate the bedroom!”
  - “Open a window or window vent - air quality has deteriorated”
  - “Increase heat recovery efficiency - CO2 concentration has exceeded 1000 ppm”
  - “Attention! Alert! CO2 concentration exceeded: 5000 ppm”
  - “Air quality based on CO2 concentration is good”
  - “Ventilation efficiency has been insufficient for over 6 hours”
- Custom notification text with the current meter reading:

  The CO2 concentration in Krystyna’s room is: {co2_ppm.0}
- To have a notification appear on your phone, you must allow notifications from the specific BleBox device. This can be done in two ways:

  1. Go to the controller settings, select the “Notifications” tab, and check the option “Action Notifications.”

  2. On the wBox app home screen, open the menu (by tapping the “three lines” icon in the top left corner), then select “Notifications.” Go to the notification settings, find the controller in the device list, and from the dropdown next to it, select “Action Notifications.”

  In both cases, you can also enable other types of notifications. Confirm the changes by tapping the “Save” button in the top right corner of the screen.
- If notifications do not appear despite being configured, check your phone’s system settings (Android/iOS) to ensure that the wBox app has permission to display system notifications.

8 DEVICE TIME AND LOCATION

- Go to the settings, to the “Time and Location” section. In the “Device Time” tab, select your region and location from the list and confirm the changes by clicking “Save.” The device will synchronize its time with an NTP server (if the controller is on a WiFi network with Internet access) or retrieve the time from your phone/tablet. Since the controller does not have battery backup for its clock, the time resets when the power is disconnected. Therefore, it is recommended to keep the controller connected to a WiFi network with Internet access so it can automatically synchronize its clock. This is especially important for controllers that use scheduled operations.
- You can set the controller’s location using your smartphone or tablet. In the “Device Location” tab, click the “Set Location” button. The app will ask if you want to share your location – allow it. The “Coordinates” field should display approximate coordinates of your location. If the “Set Location” button flashes red with the message “Error,” or if the “Coordinates” field does not change from “Not set” to numerical values, the location could not be retrieved. In this case, make sure your phone/tablet has a GPS module and that location sharing is enabled for the wBox app. Setting the location is especially important for controllers that use schedules based on sunrise and sunset times.

TECHNICAL SPECIFICATIONS

power supply	5V by USB-C connector
energy consumption	< 1W
measured parameter	CO_2 concentration
ventilation effectiveness indicator	assessment determined based on the measured CO_2 concentration and presented as an indicator, a descriptive rating, and recommendations for improving ventilation
typical CO_2 measurement accuracy	400 - 1000 ppm: ±(50 ppm + 2.5% of measured value) 1001 - 2000 ppm: ±(50 ppm + 3% of measured value) 2001 - 5000 ppm: ±(40 ppm + 5% of measured value)
measurement range	400 - 40 000 ppm

resolution	1 ppm
dimensions	30 x 45 x 15 mm
housing	high quality ABS plastic
Ingress Protection rating of the device	IP20 according to PN-EN 60529
controller operating temperature	from -10°C to +50°C
operating humidity	0% to 95% **RH (non-condensing)**
API	open https://technical.blebox.eu/
communication standard	µWiFi, compatible with WiFi, 802.11g
transmission type	bidirectional, encrypted
radio frequency	2.4 GHz
mode	direct connection (as Access Point), Wi-Fi connection via a standard router, connection with access from any location in the world (re- quires only access to the Internet)
encryption	WPA2-PSK and authenticated encryption with associated data (AEAD)
compatible devices and systems	iOS (e.g. iPhone, iPad), Android, macOS (ARM processors labeled M1 or newer)

ADDITIONAL INFORMATION

FIRMWARE UPDATE

To update the controller's firmware, connect it to your home WiFi network (see the "WiFi Connection Settings" section) with Internet access. Then go to the settings, to the "Details, Update, and Help" section, and click the "Check for Update" button. If a newer version is available, the button will change to "Download New Firmware." Click it and wait approximately 1 minute, without closing the interface or performing any other actions. The device will download the latest firmware and then restart. The device ID, hardware version, and firmware version can be viewed in the device details.

HELP

The latest versions of manuals, additional information, and product materials are available on our website: blebox.eu

General inquiries: info@blebox.eu
Service and technical support: support@blebox.eu

Before contacting our support, if possible, prepare the "Service Key" of the controller, available in its settings under the "Details, Update, and Help" tab. By clicking the icon, the key will be copied to your phone's clipboard. Also prepare the "Installation Key" of the wBox app, available in the app's main menu under the "Settings" tab.

The instructions for restoring the controller to factory settings are available at: http://blebox.eu/start/reset

The instructions for reconfiguring the controller are available at: http://blebox.eu/start

Warning! Restoring factory settings resets the controller's configuration but does not remove it from the user accounts it is assigned to. Removing the controller by the owner (the first user who added the device to their account) will also remove it from all other users.

To remove the controller from an account, open the wBox app, go to the main menu and the "Manage Devices" tab, select the controller, and click "Remove Device." Alternatively, you can log in to https://portal.blebox.eu, go to the "Devices" tab, select the controller, and in the "Actions" menu (top right corner), click "Remove Device."

for more information visit our website

www.blebox.eu

or send us an email to: info@blebox.eu

support is available at support@blebox.eu

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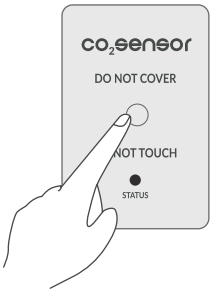
PROPER USE AND INSTALLATION

Follow these requirements to ensure accurate measurements and long-term reliable operation of the device.

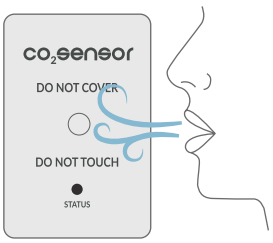
1

DO NOT touch the membrane



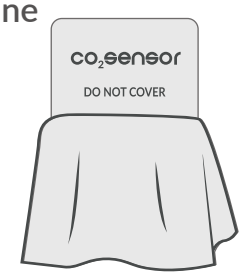
2

DO NOT blow. AVOID exhaling onto the membrane



3

DO NOT cover the membrane



4

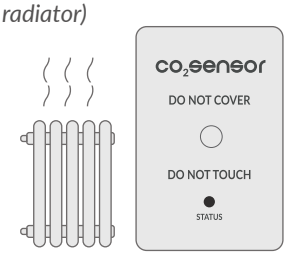
DO NOT clean or wet the membrane



5

DO NOT place the device near heat sources

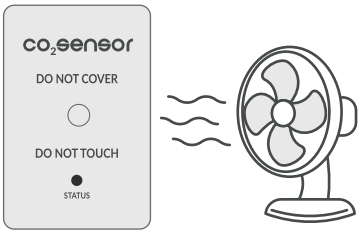
(e.g. above a radiator)



6

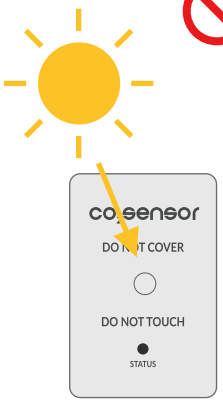
DO NOT expose the membrane to moving air

(e.g. from fans or air conditioners)



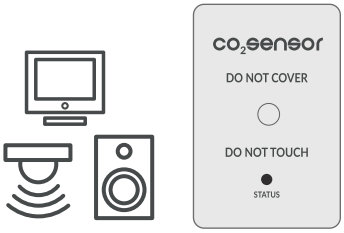
7

DO NOT expose the device to direct sunlight



8

DO NOT place the device near other electronic devices



9

DO NOT expose the device to vibrations. Stable installation is required

