C.A 1510

Measurement of indoor air quality
- **CO₂**
- **Ambient temperature**
- **Relative humidity**

Thank you for purchasing a **C.A 1510 indoor air quality meter.**

For best results from your instrument:
- **read** this user manual carefully,
- **comply** with the precautions for use.

⚠	WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.
♳	The product has been declared recyclable after analysis of its life cycle in accordance with the ISO14040 standard.
Eco Conception ♺	Chauvin Arnoux has adopted an Eco-Design approach in order to design this appliance. Analysis of the complete lifecycle has enabled us to control and optimize the effects of the product on the environment. In particular this appliance exceeds regulation requirements with respect to recycling and reuse.
ℹ	Useful information or tip.
❗	Important instruction.
CE	The CE marking indicates conformity with European directives, in particular LVD and EMC.
🗑	The rubbish bin with a line through it indicates that, in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2002/96/EC. This equipment must not be treated as household waste.

Definition of measurement categories

- Measurement category IV corresponds to measurements taken at the source of low-voltage installations.
  Example: power feeders, counters and protection devices.

- Measurement category III corresponds to measurements on building installations.
  Example: distribution panel, circuit-breakers, machines or fixed industrial devices.

- Measurement category II corresponds to measurements taken on circuits directly connected to low-voltage installations.
  Example: power supply to domestic electrical appliances and portable tools.

PRECAUTIONS FOR USE

This instrument complies with safety standard IEC 61010-1 for voltages of 50V in category II.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use.

- Do not use the instrument if it seems to be damaged, incomplete, or poorly closed.

- Before each use, check the condition of the housing. Any item of which the insulation is deteriorated (even partially) must be set aside for repair or scrapping.

- Never make measurements in atmospheres contaminated by solvents, which could damage the sensor.

- All troubleshooting and metrological checks must be performed by competent and accredited personnel.

CONTENTS

1. PRESENTATION

1.1 INTRODUCTION

Carbon dioxide is a colourless and odourless gas. It is not toxic, but at high concentrations can interfere with mental concentration and cause headaches. Outdoor air contains approximately 0.04% (400 ppm) CO_2. In an indoor environment, human activity (breathing) can rapidly increase this concentration to values in excess of 1000 ppm (for example in meeting rooms or school classrooms). It is for this reason that the level of CO_2 is an excellent indicator of the efficacy of the renewal of indoor air.

The ambient temperature and relative humidity are two more important quantities in the monitoring of indoor air quality. Beyond certain values, they can cause discomfort and favour the propagation of moulds that release allergenic or irritant substances into the air.

The **C.A 1510** is an instrument for measuring physical quantities that combines the following functions:

- Measurement of the concentration of carbon dioxide in the air (CO_2);
- Measurement of the ambient temperature;
- Measurement of the relative humidity;

It works out air quality criteria based either on the level of CO_2 or on a combination of the three physical quantities measured.

The device is a response to decree no. 2012-14 of 5 January 2012 concerning the evaluation of means of ventilation and the measurement of pollutants in the context of measurements of CO_2.

1.2 SIDE VIEW

Temperature and humidity sensors

CO_2 sensor

LCD display unit

- Short press: Back-lighting
- Long press: Energy-saving function

- Short press: **1D** and **3D** modes
- Long press: Change of unit of temperature

Long press: Manual recording

Buzzer

- Short press: Display hold
- Long press: Bluetooth

On/Off

- Short press: Enter the MIN MAX function and view the various extreme values
- Long press: exit from the MIN function MAX

On the keys, the function written above the line is invoked by a short press, the function written below the line by a long press.

1.3 SIDE AND BACK VIEWS

Notch for hanging up the device

Non-skid pads

Magnet for attachment to a metallic surface

Chauvin Arnoux
www.chauvin-arnoux.com
MADE IN FRANCE
2 X IEC LR6 (AA)

Battery compartment cover

Micro - USB connector

1.4   THE DISPLAY UNIT

Display of the level of CO₂

Display of the temperature

Display of the relative humidity

Indicates blinking
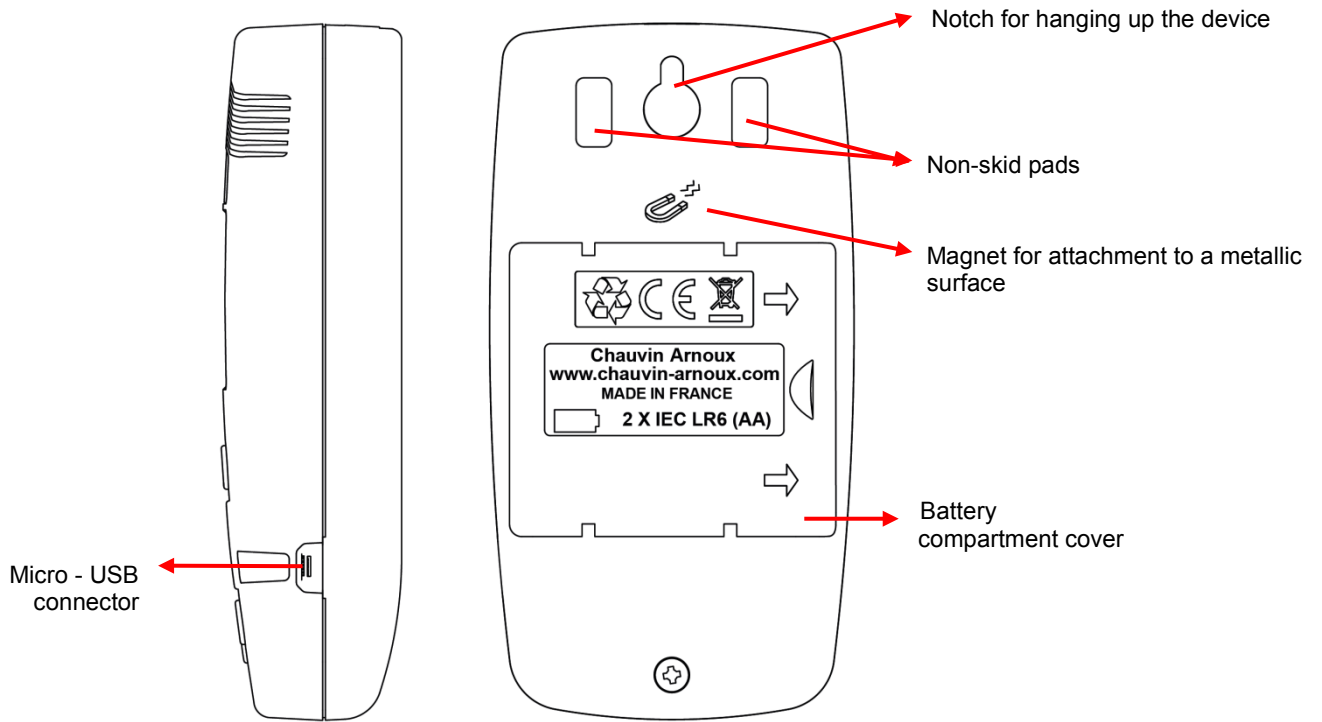
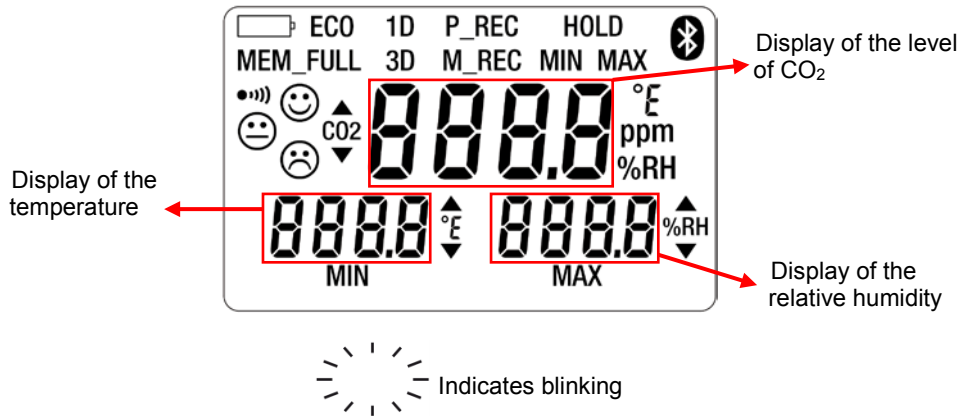| Symbols	Designation	
MEM_FULL	Memory full	
1D	Surveillance of the level of CO_2	
3D	Surveillance of crossing of CO_2, temperature, and humidity comfort zone thresholds	
MAX	Maximum value	
MIN	Minimum value	
ECO	Energy-saving operating mode	
P_REC	Programmed recording	Blinking: waiting to start recording Steady: recording
M_REC	Manual recording	
HOLD	Hold of the display	
MIN MAX	MIN MAX function: detection of minimum and maximum values	
ppm	Unit of concentration of CO_2 in the air in parts per million	
●)))	Buzzer active	
ⓑ	Bluetooth	Blinking: waiting for connection Steady: connected
▭	Blinking: Batteries low Steady: Indicator of external power supply by connection of the mains adapter or of the USB connection.	
▲	Overshoot of high threshold	
▼	Overshoot of low threshold	
☺ ☺ ☹	Indication of air quality and of the temperature/humidity zone of comfort	

2. USE

2.1 INSTALLING THE BATTERIES

See §5.2.

2.2 SWITCHING THE DEVICE ON

2.3 SWITCHING THE DEVICE OFF

2.3.1 Manual switching off
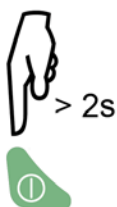
Manual switching off is blocked if a programmed recording session (P_REC) is in progress.

2.3.2 Automatic switching off

In the portable mode, the device switches itself off automatically after 15 minutes of inactivity.

Automatic switching off is de-activated in the other modes (**1D or 3D**, **ECO**, **P_REC**), and in the **MIN MAX** and **M_REC** functions, if the Bluetooth or USB link is active or if the device is connected via the USB mains adapter.

2.4 MAKING A MEASUREMENT

When the device is switched on, **CO2** is displayed during the wait for the first measured of CO_2 value; access to the keys is disabled until this first value is displayed on screen. The measurements are then displayed automatically on screen.

If the device is exposed to large variations of temperature, after the temperature stabilizes, wait 20 minutes before starting the measurements.

The device has 4 operating modes:

- The portable mode,
- The **1D** and **3D** modes
- The **ECO** mode
- The **P_REC** mode

It also has several functions that can be used in the various modes:

- The **MIN MAX** function
- The **HOLD** function
- The **M_REC** function
- The backlighting function

2.5   PORTABLE MODE

The portable mode is the mode the device starts up in. It is in this mode that the device makes the most measurements: one every 15 seconds. It is therefore highly responsive to changes in air quality.

This mode is used to inspect several rooms one after another. Install the device in a room and wait for the CO_2 measurement to stabilize (approximately 10 minutes).

2.6   1D AND 3D SURVEILLANCE MODES

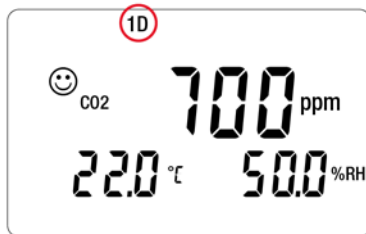**1D** mode: surveillance of the level of CO_2.
3D mode: surveillance of 3 parameters: level of CO_2 and hygrothermal comfort zone.

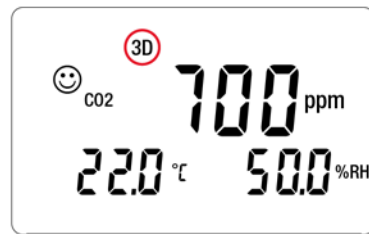The audible and/or visual warnings alert you to overshoots.
The level of CO_2 is measured every minute.

2.6.1   Activation of the 1D and 3D modes

Activation of the **1D** mode

Activation of the **3D** mode
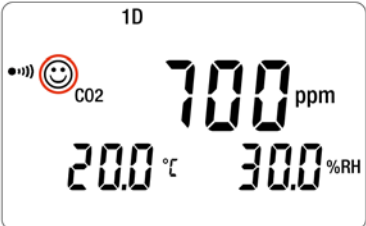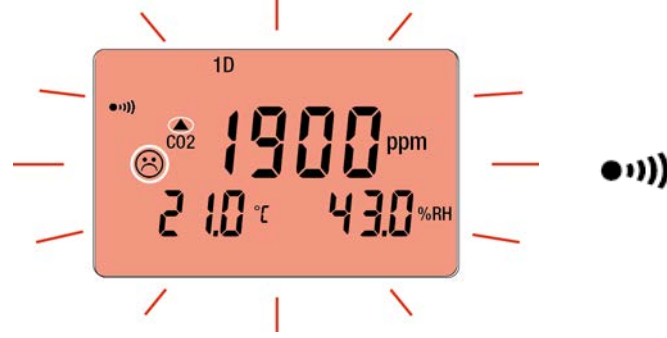
Deactivation of the **3D** mode
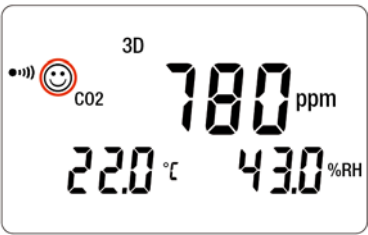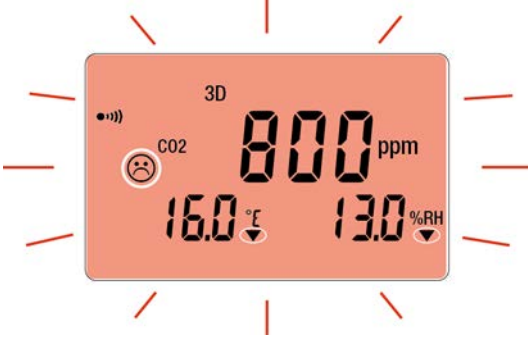
2.6.2   Operation of the visible and audible warnings

1D mode: Activation of the visual (and, if activated, audible) warnings during overshoots of the CO_2 thresholds.

S1 = Low threshold = 1000 ppm
S2 = High threshold = 1700 ppm

Level of CO_2 < S1	 ■ Back-lighting off ■ Air quality indicator: good
S1 < Level of CO_2 < S2	 ■ Blinking orange back-lighting ■ Arrow indicating overshoot of the CO_2 threshold ■ Air quality indicator: average **i** The back-lighting is off in ECO mode
Level of CO_2 > S2	 ■ Blinking red back-lighting ■ Arrow indicating overshoot of the CO_2 threshold ■ Air quality indicator: poor **i** The back-lighting is off in ECO mode

3D mode: Activation of the visual (and, if activated, audible) warnings during overshoots of the temperature, humidity, and/or CO_2 comfort zones.

Example of display with no overshoot of the CO_2, temperature, and humidity comfort zones	 **3D** $CO2$ **780** ppm **22.0** °C **43.0** %RH ■ Back-lighting off ■ Optimum comfort zone indicator: ☺
Example of display with overshoot of the temperature and humidity thresholds	 **3D** $CO2$ **800** ppm **16.0** °C **13.0** %RH ●))) ■ Blinking red back-lighting ■ Arrow in the direction of the overshoot for each quantity outside the comfort zone. ■ "Outside optimum comfort zone" indicator: ☹ ℹ️ The back-lighting is off in ECO mode

ℹ️ For the **1D** and **3D** modes, if the buzzer is active, it will sound intermittently upon the appearance of the ☹ symbol.

The Porcher diagram defines the hygrothermal comfort zones:

Relative humidity (%RH)

Absolute humidity (g/kg)

Optimum comfort zone

Dry-bulb temperature (°C)

2.7 ECO MODE (ENERGY SAVING)

The **ECO** mode is used when the device is left to measure the air quality in a room over a longer period.
The backlighting and the buzzer are deactivated, and CO_2 is measured only once every 10 minutes. This saves the batteries.

In addition, the device sets itself to sleep mode at night, from 4:30 p.m. to 8:30 a.m. These times can be programmed using the AQR software provided with the device (see § 3).

To stop the function
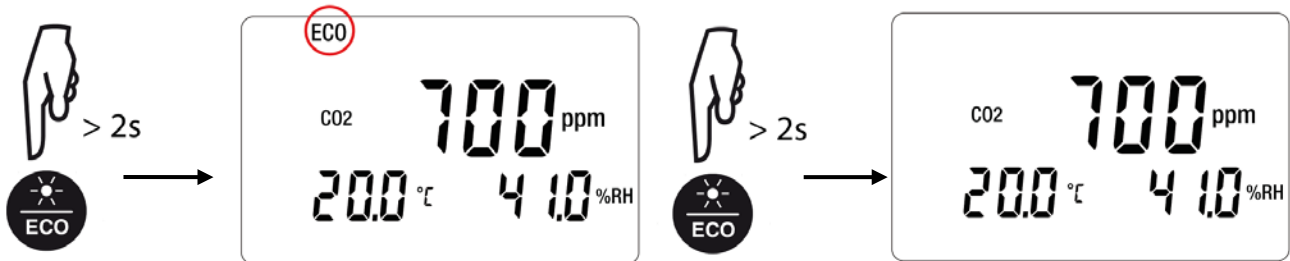
ℹ In the **ECO** mode, the measurement is more sensitive to instantaneous variations of CO_2. For example, if the user breathes near the device, it may throw off the measurement. It will be necessary to wait for the next measurement to recover the true concentration of CO_2 in the room.

2.8 P_REC MODE (PROGRAMMED RECORDING)

When the device is connected to a PC, you can program a recording session (see §3). There are two types of programmed recording sessions:

- Locked recording, in which the device displays nothing except the P_REC symbol (blinking before recording starts, then steady while recording) and the keys are inactive.

  At the end of recording, the device switches itself off.

- Unlocked recording, in which the device displays the measurements. The P_REC symbol is displayed, blinking before recording starts, then steady while recording. The device operates normally. It is not possible to change the mode, but the **MIN MAX**, **HOLD** and backlighting functions can be used.

ℹ Pressing the ⏻ button has no effect.

2.9   MIN MAX FUNCTION

This function displays the maximum and minimum measured values in addition to the current value: the device compares each new measurement to those displayed. If the new measurement is greater than the former MAX value or less than the former MIN value, it replaces them in the display.

ℹ The **MIN MAX** function cannot be used in the **1D** and **3D** modes.

Entering the **MIN MAX** function

Display of **MIN MAX** CO_2

Display of **MIN MAX** in humidity

Display of **MIN MAX** in temperature
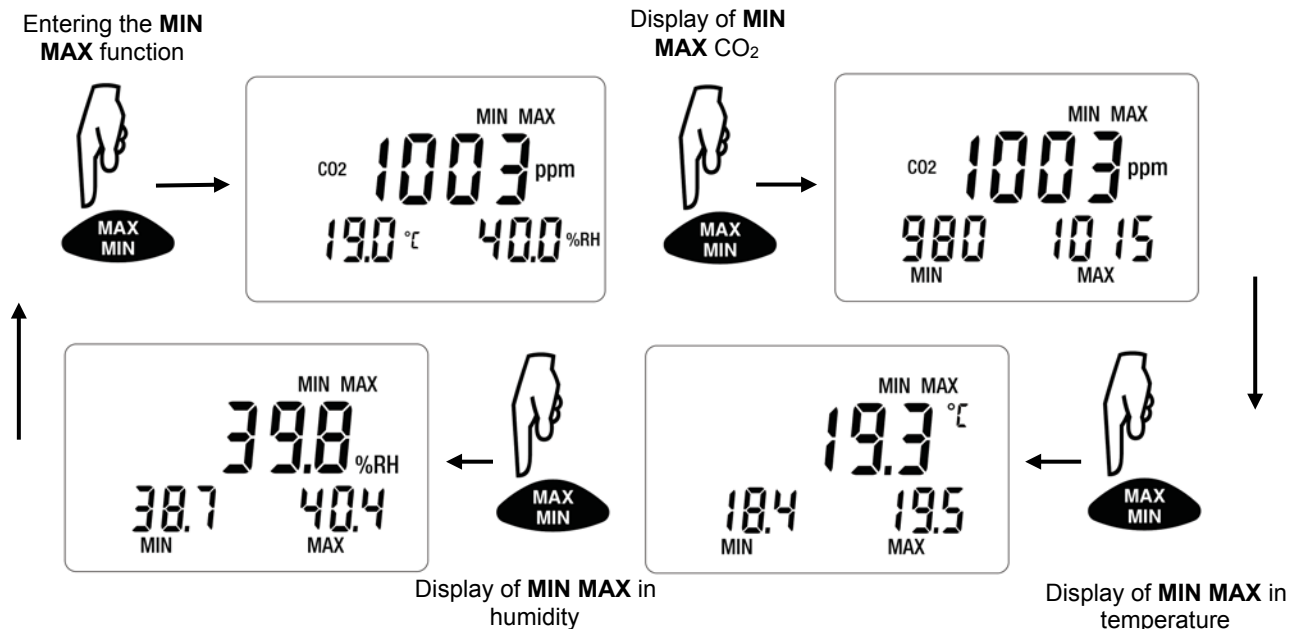
When the **MIN MAX** function is activated, recording of the minimum and of the maximum starts but the display of the three quantities measured makes it possible to continue using the device normally.

> 2s

To stop the **MIN MAX** function.

2.10 HOLD FUNCTION (HOLDING THE MEASUREMENT)

Pressing **HOLD** freezes the digital display on the last measurement displayed. Activating the function does not entail interruption of recording or of the current mode, but access to the other functions of the device is disabled.

To stop the function
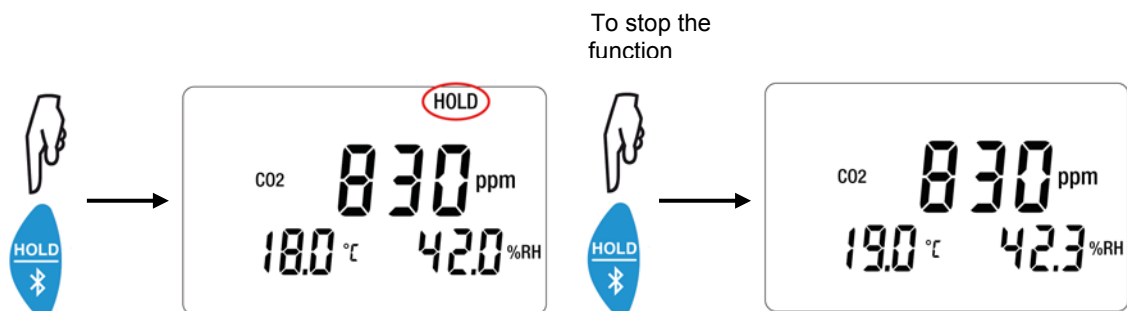
2.11 M_REC FUNCTION (MANUAL RECORDING)

You can start recording manually and all data measured are recorded in the device at the rate determined by the mode in progress (see the table in § 4.3).

[i] It is possible to record manually whatever mode is in progress (except **P_REC**). But once recording is in progress, it is no longer possible to change modes.

To stop recording
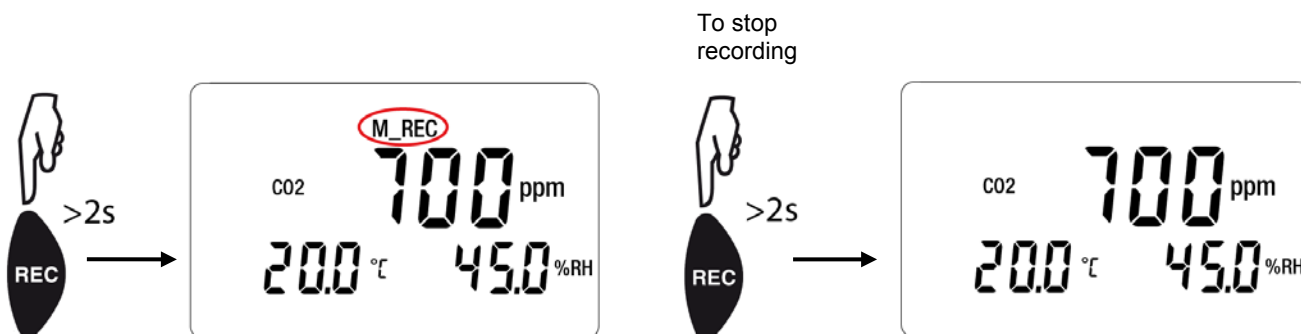
2.12 BACK-LIGHTING FUNCTION

To activate and de-activate back-lighting.

[i] The back-lighting switches itself off automatically after 10 seconds.

[i] It is impossible to activate the back-lighting in the **ECO** mode.

2.13 ACTIVATION OF THE AUDIBLE WARNING (BUZZER)

Activation ●))))   Deactivation ●))))
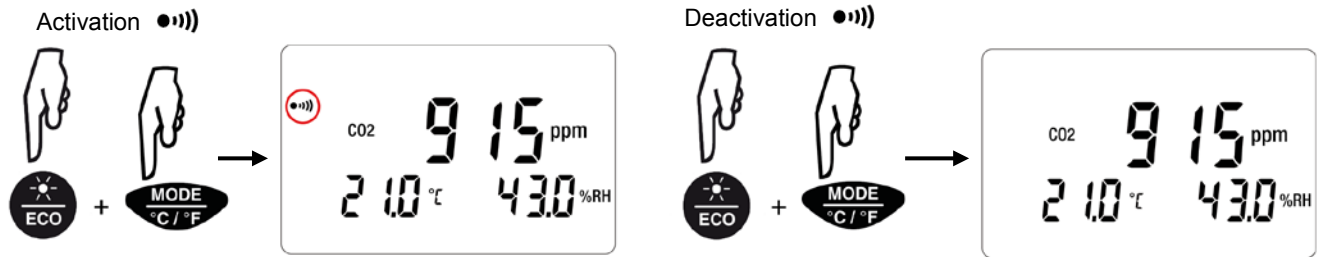
First press the **ECO** key, then, while keeping it pressed, press the **MODE** key.

Repeat the operation.

ℹ️ There is no buzzer if the **ECO** mode is active.

2.14 CHANGE OF UNIT OF TEMPERATURE

The choice of unit of temperature is preserved when the device is switched off.

2.15 DISPLAY OF ERRORS AND ANOMALIES OF OPERATION

2.15.1 OL symbol

The **OL** symbol appears on screen when the measurement leaves the range covered by the device. In other words when:

- CO_2 > 5,000 ppm
- -10 °C < T < 60°C
- 5%< RH < 95%

2.15.2 Err symbol

If an error of the Err type is displayed, switch the device off and back on. If the error persists, the device must be sent in for repair (see § 5.4).

2.15.3 MEM_FULL Symbol

When the memory is full, the **MEM_FULL** symbol appears on screen.

Any recording in progress is then stopped, and it is impossible to restart recording before emptying the memory.

3. AQR SOFTWARE

AQR (Air Quality Report) software for the use of the C.A 1510 is provided with the device.

3.1   MINIMUM CONFIGURATION

To install the AQR software, you must have a PC running Windows$^®$ XP, Windows$^®$ 7 or Windows$^®$ 8.

3.2   COMMUNICATION

The device has 2 communication modes:

- A Bluetooth wireless link
- A USB link via the cable provided

i   When the device is connected to the PC, it is seen as a USB key and it is then possible to make copies of files.

3.2.1   Pairing the device

- To pair the device and the PC, you must start by activating Bluetooth on your PC. If your PC does not have a Bluetooth link, you can add a board to it or connect a Bluetooth adapter to a USB port (see § 7.1).
- Then power up the device and activate the Bluetooth link by a long press on the 🅱 key.
- In the Windows bar, look for the Bluetooth logo, right-click on it, and choose **Add a peripheral**. If the Bluetooth logo is not present, go to **Peripherals and printers** in the Windows menu. Then choose **Add a peripheral**.
- The PC searches its environment for Bluetooth-compatible devices. When the C.A 1510 is detected, select it and click on **Next**.
- Choose **Associate without using a code**, click **Next** to accept the connection, then **Close.** If a coupling code is requested, enter 1111.

3.3   FUNCTIONS OF THE SOFTWARE

The AQR software can be used to:

- Configure the time ranges of the **ECO** mode**.**
- Configure programmed recording sessions (**P_REC** mode).
- Recover recorded data.
- Display records in the form of curves or tables.
- Calculate the air stuffiness index.
- Generate a summary report in pdf format.
- Export recorded data in spreadsheet, text, or image format.
- View the measurements made by the device in real time.

3.4   INSTALLATION

Insert the mini-CD provided with the device in your PC. Go to the **AQR** directory and run **setup.exe.**
Then follow the installation instructions.

To use the AQR software, refer to Help.

4. SPECIFICATIONS

4.1 REFERENCE CONDITIONS

Influence quantities	Reference conditions
Supply voltage	3 ± 0.5V
Air pollution	no pollution (CO, solvents, etc.)

4.2 MEASUREMENT CHARACTERISTICS

4.2.1 CO_2 measurements

Type of sensor	Dual-beam infrared cell
Measuring principle	Non-dispersive infrared (NDIR) technology
Measurement range	0 to 5.000ppm
Intrinsic uncertainty	±3% ±50 ppm at 25°C and 1013 mbar; in ECO mode, ±3% ±80 ppm at 25°C and 1013 mbar
Response time at 63%	195 seconds
Resolution (R)	1ppm

4.2.2 Influences on the measurements of CO_2.

The influence of the temperature is 1 ppm/°C from -10 to +45°C.
The influence of the atmospheric pressure is:

$$CO_{2\ real} = CO_{2\ measured} \times \left(1 + (1013-P) \times 0,0014\right) \quad \text{avec P= pressure in mbar.}$$

4.2.3 Temperature measurements

Type of sensor	CMOS
Measurement range	-10 to +60°C
Intrinsic uncertainty	±0.5°C at 50% RH
Influence of relative humidity	±0.5°C ±R from 10 to 40% RH Outside of the range stated above, ±0,032 x (T-25°C) ± R
Resolution (R)	0.1°C or 0.1°F

4.2.4 Humidity measurement

Type of sensor	Capacitive
Measurement range	5 to 95 %RH
Intrinsic uncertainty	± 2 %RH ± R from 10 to 90 % RH ± 3 %RH ± R outside of the range stated above.
Resolution (R)	0.1 %RH
Measurement hysteresis	± 1 %RH **Note:** Prolonged exposure to values outside the 10% to 80% range may lead to a measurement bias of as much as ± 3 %RH. This bias disappears after 5 days at between 20 and 30°C and 40 and 75% RH.
Rate of increase of intrinsic uncertainty	< 0.5 %RH/year.

4.2.5 Influence of the temperature on the relative humidity measurement

Relative humidity (%)

RH (%) \ Temp (°C)	0	5	10	15	20	25	30	35	40	45	50	55	60	65
~95	±5	±5	±5	±4	±4	±3	±4	±4	±4	±4	±4	±4	±4	±5
90	±5	±5	±4	±3	±2	±2	±2	±3	±3	±3	±3	±4	±4	±4
	±5	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±4	±4	±4
80	±4	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±3	±3	±4
	±4	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±3	±3	±3
70	±4	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±3	±3	±3
	±4	±4	±3	±3	±2	±2	±2	±2	±3	±3	±3	±3	±3	±3
60	±4	±3	±3	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
	±4	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
50	±4	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
	±4	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
40	±4	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
	±4	±3	±3	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
30	±4	±3	±3	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
	±4	±4	±3	±2	±2	±2	±2	±2	±2	±2	±2	±2	±2	±3
20	±4	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±3	±3	±3
	±5	±4	±4	±3	±2	±2	±2	±3	±3	±3	±3	±3	±4	±4
10	±8	±5	±5	±4	±3	±2	±3	±4	±4	±4	±4	±4	±4	±4
	±8	±8	±8	±6	±5	±3	±5	±5	±5	±5	±5	±5	±5	±5

Temperature (°C)

4.3 MEASUREMENT MODES

Measurement modes	Displayed value	Rate of display of CO_2 values	Rate of polling of the temperature and relative humidity sensors
Portable	Mean of 11 successive measurements	Every 15 seconds	Every 2 seconds
1D and 3D	Mean	Every minute	Every 2 seconds
ECO	Instantaneous, not averaged	Every 10 minutes	Every 5 seconds
P_REC	Mean	User-programmable	User-programmable

4.4 POWER SUPPLY

Batteries: 2x1.5V AA/LR6

Mean battery life (without backlighting and Bluetooth):

- In portable mode: 15 days
- In **1D 3D** mode: 45 days
- In **ECO** mode: approximately 1 year
- In **P_REC** 10 minutes mode: 45 days

It is possible to use rechargeable storage batteries but the life between charges will be shorter.

Connected to mains using the mains--micro USB adapter provided. The batteries are not used while the device is connected to mains.

4.5   RECORDING

Memory: 1,000,000 measurements (8 MB)
FAT12 Format

4.6   ENVIRONMENTAL CONDITIONS

Use indoors
Operating range   -10 to +60°C and 5 to 95%RH
Range in storage (without battery)   -20 à +60°C
Altitude   <2.000m

4.7   MECHANICAL CHARACTERISTICS

Dimensions (L x W x H)   125 x 65.5 x 32 mm
Weight   approximately 190 g

Protection class   IP 40 per IEC60529.
                          IK 04 per IEC50102

Free fall test   Per IEC61010-1

4.8   COMPLIANCE WITH INTERNATIONAL STANDARDS

Compliant with IEC61010-1 safety standard for voltages of 50V in category II.

4.9   ELECTROMAGNETIC COMPATIBILITY

Emissions and immunity in an industrial setting compliant with IEC 61326-1.

5. MAINTENANCE

⚠ Except for the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an "equivalent" may gravely impair safety.

5.1   CLEANING

Disconnect the instrument completely and switch it OFF.

Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth.

Take care to keep the sensor intakes perfectly clean.
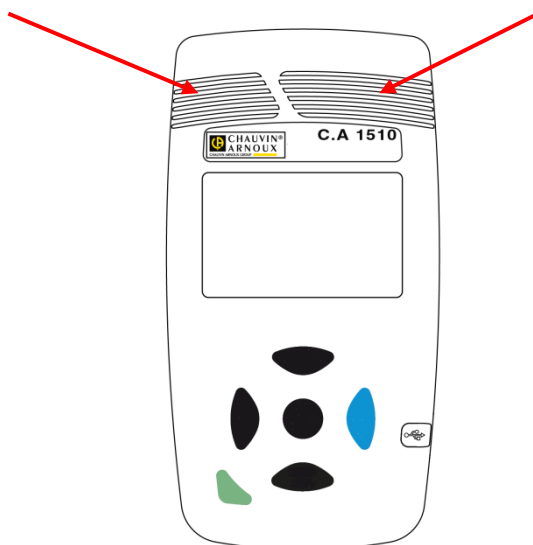
5.2   REPLACEMENT OF THE BATTERIES

The ⟋ symbol indicates that the batteries are spent and must be changed.

To replace the batteries, proceed as follows:

- Switch the device off.
- Slide the battery compartment cover off.

- Remove the old batteries.

Spent batteries must not be treated as ordinary household waste. Take them to the appropriate recycling collection point.

- Insert the new batteries with the correct polarity.
- Close the battery compartment cover: make sure that it is completely and correctly closed.

6. WARRANTY

Except as otherwise stated, our warranty is valid for **twelve months** starting from the date on which the equipment was sold. Extract from our General Conditions of Sale provided on request.
The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment;
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff;
- Work done on the device by a person not approved by the manufacturer;
- Adaptation to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual;
- Damage caused by shocks, falls, or floods.

7. TO ORDER

C.A 1510 indoor air quality meter

The device is anthracite grey. It is delivered in a compact metal carrying case with:

- 2 LR6 batteries
- One mains-USB adapter
- One USB - micro USB cord 1.80 m long
- One getting started guide
- One mini CD containing the AQR software and user's manuals (1 file per language)
- One verification certificate
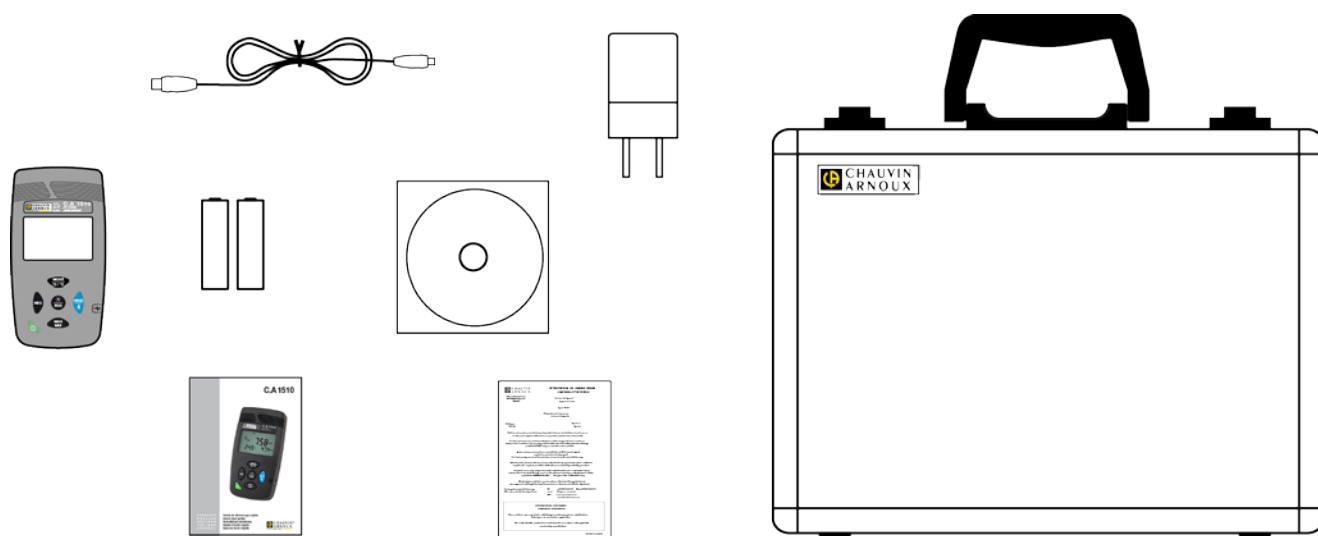

C.A 1510W indoor air quality meter

Delivered in a cardboard box with:

- 2 LR6 batteries
- One mains-USB adapter
- One USB - micro USB cord 1.80 m long
- One desktop support
- One getting started guide
- One mini CD containing the AQR software and user's manuals (1 file per language)
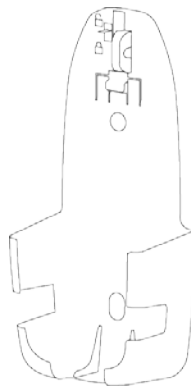- One verification certificate
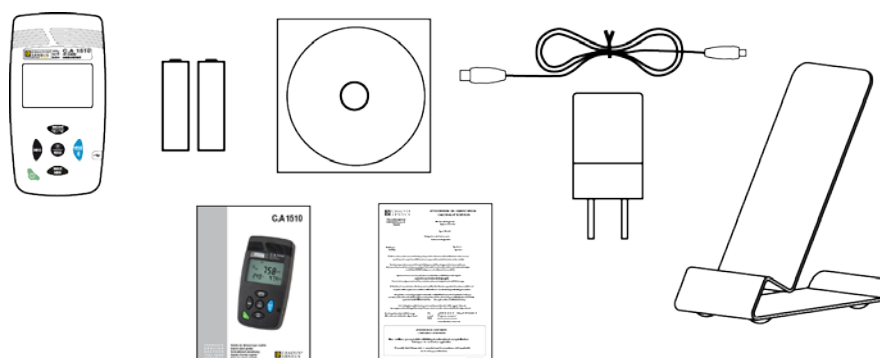
7.1   ACCESSORIES AND REPLACEMENT PARTS

- Field calibration kit

- Carrying case

- Desktop support
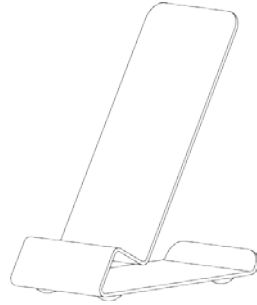
- Wall mount

It is attached to the wall. It can be used to protect the device against theft by adding a padlock.

Mains adapter with USB cable

USB-Bluetooth adapter

For accessories and replacement parts, visit our website:
http://www.chauvin-arnoux.com