



CCL ELECTRONICS LTD

## WIRELESS PM2.5/PM10 AIR QUALITY SENSOR

Model: C3123A

### User Manual

#### FCC 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

" FCC RF Radiation Exposure Statement

Caution: To maintain compliance with the FCC's RF exposure guidelines, place the unit at least 20cm from nearby persons."

Thank you for purchasing the Wireless PM2.5/PM10 Air Quality Sensor. Please read the instructions carefully according to the version you purchased and keep the manual well for future reference.



#### IMPORTANT NOTE

- Read and keep these instructions.
- Do not cover the ventilation holes with any items such as newspapers, curtains etc.
- Do not clean the unit with abrasive or corrosive materials.
- Do not tamper with the unit's internal components. This invalidates the warranty.
- Only use fresh batteries. Do not mix new and old batteries.
- Do not dispose old batteries as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.
- Attention! Please dispose of used unit or batteries in an ecologically safe manner.
- Technical specifications and user manual contents for this product are subject to change without notice.
- CAUTION: Risk of explosion if the battery is replaced by an incorrect type.
- High or low extreme temperatures that a battery cannot be subjected to during use, storage or transportation and low air pressure at high altitude.
- Replacement of a battery with an incorrect type that can defeat a safeguard.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion.
- Leaving battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.
- The sensor is intended for use only with the rechargeable Ni-MH batteries provided:  
Manufacturer: BPI  
Model: BPI-50AA2000EHmAh (with marking 50AA2000mAh)
- This device is only suitable for mounting at height < 2m.



## INTRODUCTION

### Why PM2.5?

PM2.5 (particles less than 2.5 micrometers in diameter) can penetrate deeply into the lungs, irritate and corrode the alveolar wall, and consequently impair lungs function, thus triggering asthma attack or contributing to cardiovascular disease. Example of PM2.5 are fine dust from vehicle exhaust, wildfire, power plant emissions, other combustion activities.

### Why PM10?

PM10 (particles less than 10 micrometers in diameter) can irritate exposed mucous such as the eyes and throat. Thus high levels of PM10 could easily make people cough, nose run and eyes sting. PM10 includes dust from construction sites, highways, roadways, landfills and agriculture, wind fires and bush/waste burning, industrial source; wind-blown dust from open lands, pollen, mold spores, and fragments of bacteria.

### Swiss sensor technology with MCERTS certification

The device comes with Swiss made SENSIRION Particulate Matter Sensor SPS series designed for indoor and outdoor air quality application. Its measurement principle is based on laser scattering and innovative contamination-resistance technology, which enables precise measurements from the device's first operation and throughout its lifetime of usage.

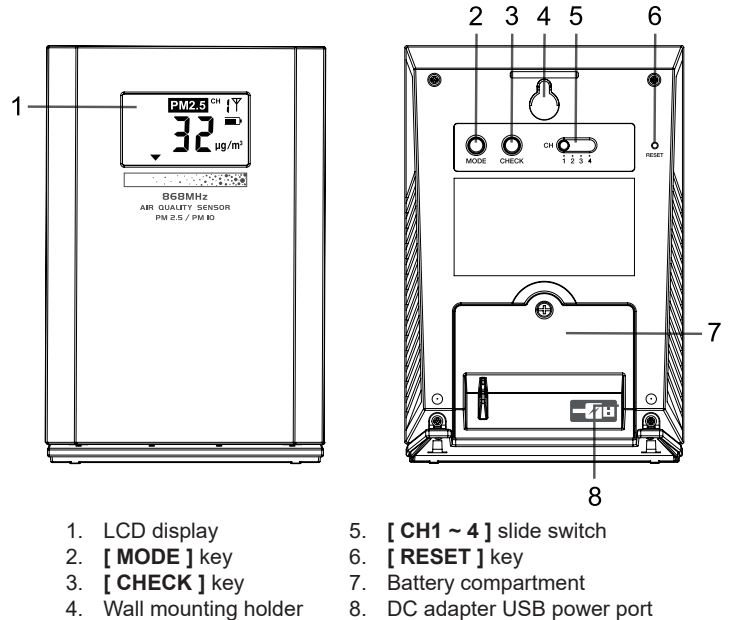
### Multi-zone feature

Through our multi-zone technologies, each device has a unique device code with a user selectable channel number. Up to 4 separate air quality sensors can be placed in an open proximity covering an area across 100m radius from its main display unit (to be purchased separately).

### Low maintenance

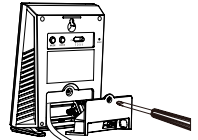
The Swiss sensor is expected to have a lifetime of over 10 years while operating continuously for 24 hours/day. With its contamination-resistance material, there is no need for cleaning and/or maintenance, thus avoiding problems related to sensor drift or malfunction.

## OVERVIEW

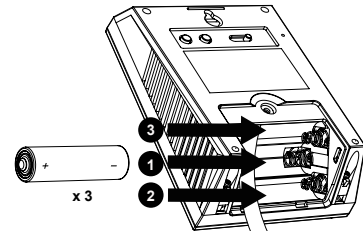


## BATTERY INSERTION

1. Unscrew and remove the battery door of sensor with a screwdriver.



2. Insert the 3 rechargeable batteries (included) into the battery compartment in the following order:



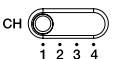
3. Screw the battery door compartment on tightly.
4. After inserting batteries, all LCD segment will be shown for 1 second.

#### Note:

- Please prepare a screwdriver for removing and close the battery door.

## GETTING STARTED

1. Slide [ CHANNEL ] to set the channel number for your sensor(s).
2. Use a pin to press [ RESET ] key for run the channel number.

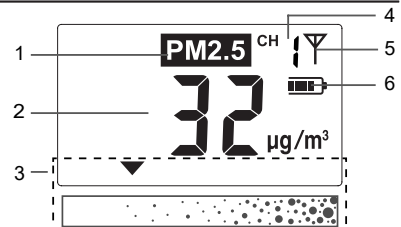


#### Note:

- If there are more than one sensor in use, ensure to assign different channels number for each sensor to enable the measurement to displayed correctly on the console (purchase of separately).

## LCD DISPLAY

1. PM2.5 / PM10 display mode
2. PM2.5 / PM10 concentration value
3. PM2.5 / PM10 concentration level
4. Sensor Wireless channel number
5. Transmission signal
6. Battery power indicator



## DISPLAY MODE

Press [ MODE ] to toggle the display mode between PM10 and PM2.5.

## MEASUREMENT INTERVAL

### Powered by DC adapter

The device measures PM2.5 or PM10 concentration every minute automatically when powered with a DC adapter.

### Manual detection

User can press [ CHECK ] button anytime to get an updated measurement of PM2.5 or PM10 concentration readings. (It takes approximate 10-12s to detect, the readings indicated by blinking PM2.5/PM10 icon.)

### Operated by batteries

When powered by batteries, it's detecting every 10 minutes by default. To maximize the battery life, user can also change the detection interval from 10 minutes to 20 or 30 minutes.

### Setting default measurement interval

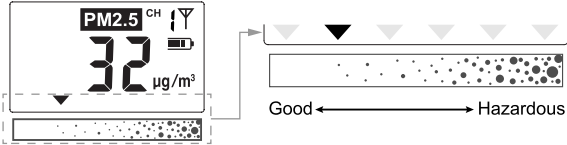
1. Press and hold [ CHECK ] for 2 seconds until the display is flashing
2. Press [ MODE ] to choose which interval time.
3. The setting sequence: 10m → 20m → 30m

4. Press [ CHECK ] to finish the setting and back to normal display.

Detection interval (Minute)	Description
1(when connected to adapter)	The sensor will detect the PM value every 1 minute
10 (default)	The sensor will detect the PM value every 10 minutes
20	The sensor will detect the PM value every 20 minutes
30	The sensor will detect the PM value every 30 minutes

PM2.5/PM10 CONCENTRATION

For easy visualization of air quality, the device spreads the concentration readings over 6 level scale.



The following provides some gives health guidelines on activities between good and hazardous air quality\*:

PM2.5	PM10	Health persons	Elderly, Children, Pregnant women	Persons with chronic disease or heart disease
0-35	0-50	Continue with normal activities	Continue with normal activities	Continue with normal activities
36-53	51-75	Continue with normal activities	Continue with normal activities	Continue with normal activities
54-70	76-100	Reduce prolonged or strenuous outdoor physical exertion	Minimize prolonged or strenuous outdoor physical exertion	Minimize prolonged or strenuous outdoor physical exertion
71-150	101-350	Avoid prolonged or strenuous outdoor physical exertion	Minimize outdoor activity	Avoid outdoor activity
151-250	351-420	Minimize outdoor activity	Avoid outdoor activity	Avoid outdoor activity
251+	420+	Avoid outdoor activity	Avoid outdoor activity	Avoid outdoor activity

\*Always consult/check with your doctors for any medical advices concerning the air quality and your health.

Note:

This 6 level scale of PM2.5 / PM10 concentration is not the same as Air Quality Index (AQI).

BATTERY POWER STATUS

The device is powered by rechargeable batteries, and comes with battery power indicator. The battery life of the device from fully charged batteries is determined by the number of detections it performed, either through set intervals or manually activated by user.



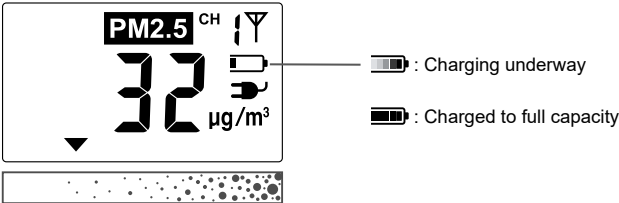
When battery power fails to below 20%, user should recharge the batteries by connecting to a USB port using the cable provided.

Note:

When the wireless PM2.5/PM10 air quality sensor's battery power is below 20%, its detection function will temporary suspension.

CHARGING BATTERY

You can use the micro USB cable to charge the wireless PM2.5/PM10 sensor if the battery states show in "Low battery". When Micro USB port plug in the micro USB cable for charging, the LCD will display and flashing battery icon.



Note:

- Charged to full capacity from <20% battery power status require 24 hours.

REPLACE THE RECHARGEABLE BATTERIES

Over time, the batteries may degrade in terms of holding the highest capacity for which it was designed for. If you find the device's battery power is not lasting as it used to be, it's probably a good time to change them.

- Unscrew and remove the battery door of sensor with a screwdriver.
- Pull the black ribbon lying under the batteries. All batteries can be removed together.
- Insert new 3 x AA size rechargeable batteries into the battery compartment according to the polarity mark inside battery compartment.
- Screw the battery door compartment on tightly.
- After inserting batteries, all LCD segment will be shown for 1 second.

Note:

Please prepare a screwdriver for removing and close the battery door.

PAIRING WIRELESS SENSORS TO CONSOLE DISPLAY

This Wireless PM2.5/PM10 Air Quality Sensor can connect to the Air Quality Display console.

- After power up the wireless air quality sensor, it will automatically enter registration mode for 10 minutes until which it can be paired by the display console.
- Once the connection is successful, the signal strength indication and PM2.5/PM10 information will appear on the display console.



Note:

- If you need to re-assign the sensor channel, slide the channel slide switch to the new channel position, then use a pin to press [ RESET ] key to restart the sensor.
- To avoid the sensor(s) and console pairing failure during new channel number assigned and setup, please power up the sensor(s) first, and then press [ SENSOR ] key on the main unit.
- After connected to the console display, the reading will transmit every 12 seconds in the first 5 minutes. Every reading transmission, the symbol of signal transmission , will flash 0.5 seconds at once.

VIEW DATA ON CONSOLE

You can view the readings of your PM2.5/PM10 sensor(s) on the console receiver to which the sensor(s) is linked to. Readings can then be analyzed into averages of past 24 hours or maximums of past 1 hour, 24 hours, or since its last reset.

DATA TRANSMISSION

The device transmits its updated reading at fixed interval of 60 seconds to the paired console receiver.

RESET THE SENSOR

In case of malfunction, use a pin to press [ RESET ] button to reset the sensor.

SENSOR INSTALLATION

The sensor is designed for desktop or wall mount for easy viewing. Follow the guidelines below for the sensor placement.

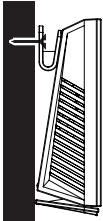
- Choose an open area away from any emissions source of pollutants, heat source, or with air flow greater than 1m/s.
- Place the wireless PM2.5/PM10 sensor at least 1.5m to 2m above the ground to better illustrate the detection of air quality in the human breathing zone.
- Do not expose the sensor to direct sunlight.

Wall mounting

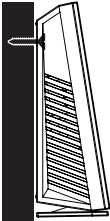
Sensor can be mounted on the wall at different angle, either at slant angle or vertically with the mounting adapter (included).



Place a screw on the wall where you wish to hang for sensor. Hang the sensor on to the screw with or without the mounting adaptor.



Vertical angle



Slant angle



Note:

- Higher siting may also be appropriate if the sensor is representative of a large area.

SPECIFICATIONS

WIRELESS PM2.5/PM10 AIR QUALITY SENSOR	
Dimensions (W x H x D)	82 x 120.5 x 41mm (3.2 x 4.7 x 1.6 in)
Main power	3 x AA size 1.2V NiMH rechargeable batteries USB charging (5V500mA) 1m/1.2m USB charging cable included
Operating temperature range	-10°C to 40°C ( -14°F to 140°F )
Operating humidity range	RH 1% to 90 %
PM2.5/pm10 Unit	ug/m³
RF frequency	915MHz
RF transmission range	100 meters (300 feet) line of sight
Number of channels	4 (CH1~4)
Detection interval	1 minute, 10 minutes (default), 20 minutes, 30 minutes
Transmission interval	60 seconds
Mass concentration precision	PM2.5: ±15 µg/m³ @ 0 to 100 µg/m³ (at 25°C) ±15% @ 100 to 1000 µg/m³ (at 25°C ±5°C )  PM10: ±30 µg/m³ @ 0 to 100 µg/m³ (at 25°C) ±30% @ 100 to 1000 µg/m³ (at 25°C ±5°C )
Mass concentration range	1 to 1000 µg/m³
Mass concentration resolution	1 µg/m³
Particle detection size range	Mass concentration: PM2.5 and PM10 Number concentration: PM2.5 and PM10
Lower limit of detection	0.3 µm