

ScienceCube



Wireless Fine Particles(Dust) (WL115PM) User Guide



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This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.

 **KOREADIGITAL**

The Science Cube wireless fine particles sensor can measure the concentration of particles in the air.

The wireless fine particles(dust) sensor is measures the concentration of fine dust in the air. Measures fine dust (PM10) and ultrafine dust (PM2.5) simultaneously.

Fine dust concentration can be measured more accurately by using a light scattering method that uses a signal that scatters the physical properties of light through a laser light source. The fine dust concentration measured in this way is expressed as $\mu\text{g}/\text{m}^3$, which means the weight of fine dust (μg , meaning 1/1 millionth of a gram) contained in 1 m^3 of air.

Additionally, the sensor has a display window so you can immediately check the measured values. You can measure by remotely connecting to a smart device or PC wirelessly or wired.

Suggested experiments

- Measurement of indoor fine dust concentration
- Observe changes in fine dust throughout the year in the measurement area
- Fine dust reduction experiment using an air purifier

Composition

The ScienceCube wireless fine particles sensor consists of the following.

- Wireless fine particles sensor(WL115PM)
- USB-A/C cable
- Booklet

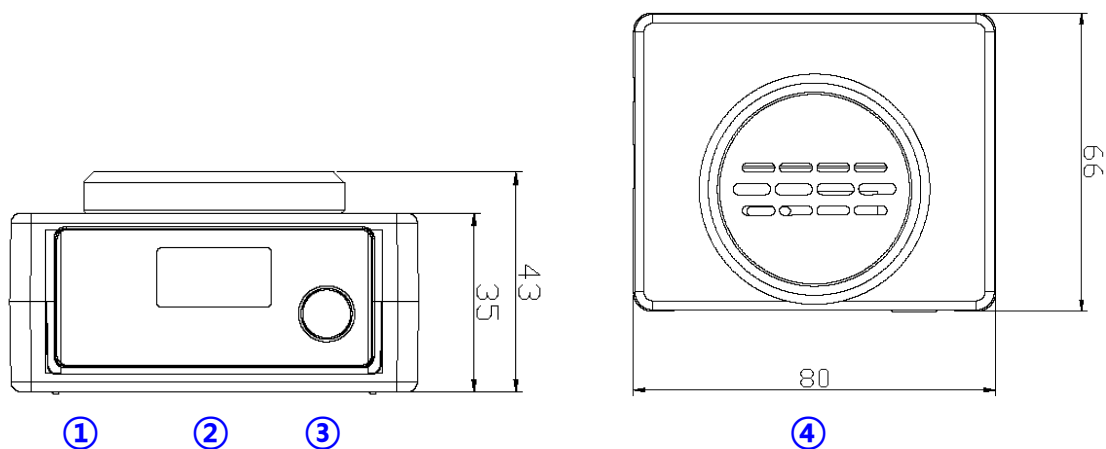
Feature

- Up to four Science Cube wireless sensors can be connected to a PC or smart device at the same time.
- It supports dual-mode Bluetooth, allowing you to connect not only smart devices but also desktop and laptop PCs to conduct experiments using the **Science#** application.
- It can be connected to a PC through a USB port and experiments can be performed using the **Science#** program.

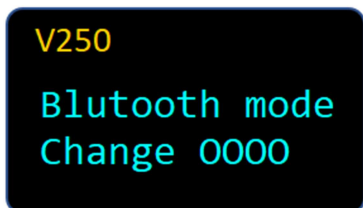


Function of wireless sensor

Structure



Mode change



When you press and hold the power button and turn it on, the Bluetooth connection mode changes to **Mobile** or **PC** with the following message.

Measurement screen



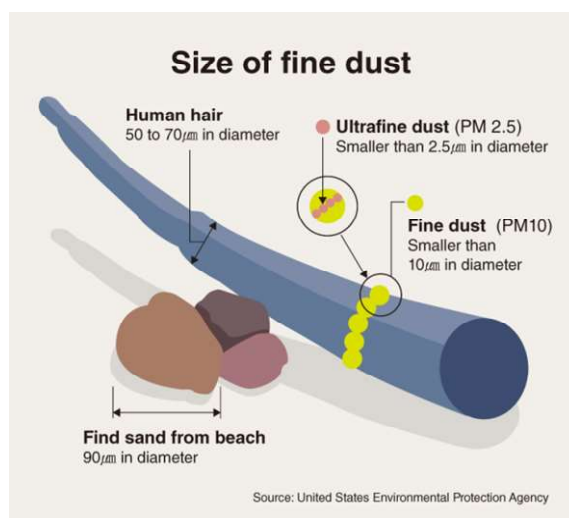
① Connection mode	Mobile : Connecting Android or iOS. PC : Connecting to Windows PC ※ A long press changes the mode and turns on the sensor.
② Sensor-ID	This is the sensor's unique number and is displayed along with the sensor name in the device name when connected via Bluetooth.
③ Battery	Check the battery status, and when charging via USB, the display will change to charging.
④ Value	1) Displays sensor measurement values and units in real time. 3) For sensors with multiple ranges , the current range is displayed.

How it Works

What is dust?

It refers to particulate matter that floats or scatters in the air. Depending on the size of the particles, they are classified into total dust (TSP, Total Suspended Particles) of 50µm or less and very small fine dust (PM, Particulate Matter).

Fine dust is further divided into fine dust with a diameter of 10 µm or less (PM10) and



fine dust with a diameter of 2.5 µm or less (PM2.5). PM10 is about 1/5 to 1/7 smaller than the thickness of a human hair (50 to 70 µm), while PM2.5 is very small, about 1/20 to 1/30 of the thickness of a human hair.

Each country's environmental standards are determined by considering the pollution status, impact on the human body, target substances and concentration, etc.

Each country sets its own fine dust standards by referring to the standards recommended by the World Health Organization (WHO).

Table 0.1. Recommended AQG levels and interim targets

Pollutant	Averaging time	Interim target				AQG level
		1	2	3	4	
PM _{2.5} , µg/m ³	Annual	35	25	15	10	5
	24-hour ^a	75	50	37.5	25	15
PM ₁₀ , µg/m ³	Annual	70	50	30	20	15
	24-hour ^a	150	100	75	50	45
O ₃ , µg/m ³	Peak season ^b	100	70	-	-	60
	8-hour ^a	160	120	-	-	100
NO ₂ , µg/m ³	Annual	40	30	20	-	10
	24-hour ^a	120	50	-	-	25
SO ₂ , µg/m ³	24-hour ^a	125	50	-	-	40
CO, mg/m ³	24-hour ^a	7	-	-	-	4

^a 99th percentile (i.e. 3-4 exceedance days per year).

^b Average of daily maximum 8-hour mean O₃ concentration in the six consecutive months with the highest six-month running-average O₃ concentration.

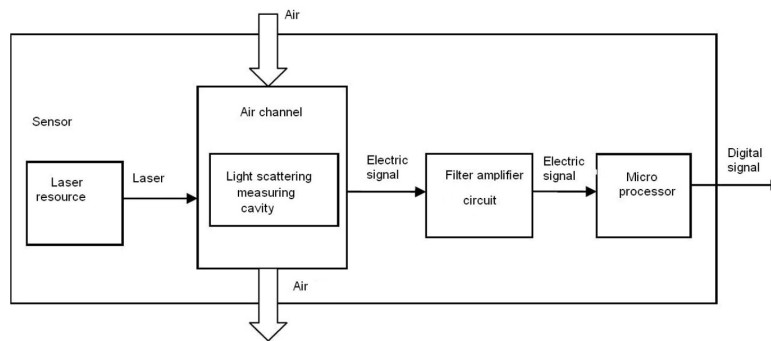
Measurement principle

Fine dust concentration can be measured more accurately by using a light scattering method that uses a signal that scatters the physical properties of light through a laser light source.

The fine dust concentration measured in this way is expressed as µg/m³, which means the weight of fine dust (µg, meaning 1/1 millionth of a gram) contained in 1 m³ of air.

The fine dust sensor sucks in air and dust through the intake port and discharges it

through the exhaust port. In this process, a laser light source is used to irradiate the air, the light is scattered by dust particles, and this signal is detected optically.



The detected signal is converted to concentration through electronic circuitry and a digital signal source.

Specifications

Item	Description
Range	PM2.5 : 0 ~ 500 ug/m ³ PM10 : 0 ~ 500 ug/m ³
Resolution	1 ug/m ³
Sampling Time	Max. 100Hz (0.01 sec.), (Typical 1Hz)
Condition	10 ~ 40°C, ~85%RH
Wireless Connection	Bluetooth 5.0 or Classic 2.1
Wired Connection	USB-C
Battery	700mAh Li-Polymer rechargeable
Charging Time	within 2 hours
Operating Time	Approximately 6 hours after full charge (depending on usage conditions)
EMC	CE : EN 61326-1, EN 55011, EN 55032, EN 301

CAUTION: Do not use the instrument beyond the measurement range or in conditions that exceed the short-term exposure limits. Prolonged exposure beyond the maximum permissible range can cause serious damage to the sensor.

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