

ScienceCube



# Wireless Drop Counter (WL130DC) User Guide



Rev. WL130DC-12-2023

**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 Drop Counter measures the number of drops of fluid dispensed.*

**The wireless Drop Counter** measures the number of drops of fluid dispensed. It is used to perform accurate, automatic titrations. The Drop Counter can be mounted on a burette stand. It is equipped with two integrated probe holders.

This digital sensor can be used in conjunction with a pH Sensor (or other sensor) to accurately record drops of titrant added (or mL of titrant, with calibration of drop size) during a titration.

The Drop Counter can also be used for conductimetric or potentiometric titrations using our Conductivity Probe or Ion-selective Electrodes.

You can measure by remotely connecting to a smart device or PC wirelessly or wired.

## Suggested experiments

- Collect pH vs. volume data in a typical acid-base titration.
- Collect conductivity vs. volume data using a Conductivity Probe and the Drop Counter (conductometric titration).
- Collect mV vs. volume data using a ORP or ISE with the Electrode Amplifier and the Drop Counter.
- Collect temperature vs. volume data using a Stainless Steel Temperature Probe (or monitor temperature simultaneously with pH).

## Composition

*The ScienceCube wireless Drop Counter consists of the following.*

- Wireless Drop Counter (WL130DC)

- Star knobs bolt
- 100ml Plastic syringe
- 3way stopcock valve \* 2EA
- 1.6mm Tubing nozzle
- USB-A/C cable
- Booklet

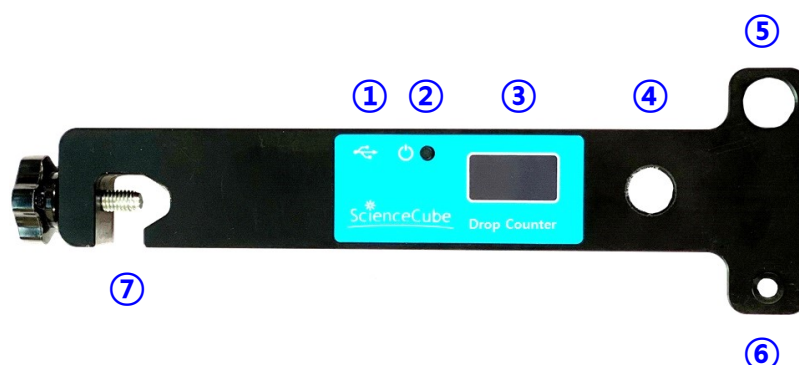
## Feature

- 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



- ① USB port : Connect the sensor to a PC and use it for experiments or charging.
- ② Power/Function Button : It has functions such as power ON/OFF, measurement sensor change and calibration, etc.
- ③ OLED Display : Displays measured sensor values, sensor type, sensor ID, and remaining battery level.
- ④ Sensing hole : When a water droplet passes through this hole, a sensor counts it.
- ⑤ Electrode hole: Possible to experiment by inserting pH, conductivity, ISE electrodes, etc.
- ⑥ Temperature hole: Insert the temperature sensor into the hole.
- ⑦ Stand guide: Secures the sensor to the stand.

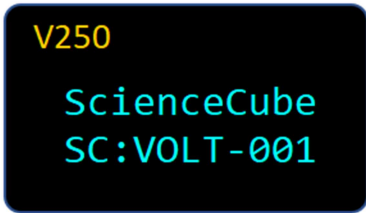
**Caution** : Do not use the sensor near fire or explosive gases. High concentrations of contaminants can permanently damage the sensor.

### Power/Function Button

| Status                | Turn       | Action     | Description  |
|-----------------------|------------|------------|--|
| When the power is off | Click once | ■          | A short press turns the sensor on.                     |
|                       | Long click | ■■■■■■■■■■ | A long press changes the mode and turns on the sensor. |
| When it's on          | Click once | ■          | Zero point setting (For sensors with                   |

|  |            |            |                      |
|--|------------|------------|----------------------|
|  |            |            | zero point function) |
|  | Long click | ██████████ | Turns off.           |

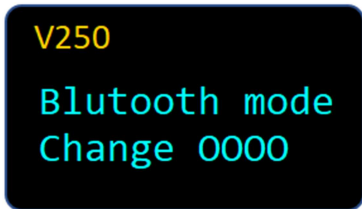
### Start screen



V250 : Displays the sensor's firmware version.

SC:OOOO-001 : When you search for a Bluetooth device, the device name will be displayed. (Sensor name and 3-digit serial number)

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

## How it Works

The wireless drop counter has an infrared emitter and a receiver separated by a 12 mm air gap.

When the infrared beam between the light source and detector is blocked by a drop of titrant, a digital signal is sent to the sensor to record the droplet. You can use the logging program's calibration function to convert drops to volume units (milliliter).

When a droplet or bubble passes through the infrared beam, the number increases by 1.

## Using the Sensor

The wireless drop counter can measure the number of droplets and output the amount of solution injected.

1. Open the Science# logging program on your smart device.
2. Connect the sensor via Bluetooth or USB.
3. Press Start to start measuring.
4. Measure the calculated number of drops.
5. When you press the calibration button (power button), it starts again from "0".

## How to control falling speed

Connect two 3-way stopcock valves in series. Set both open and adjust the first valve to allow the drops to fall at the desired rate. Once the desired speed is reached, close the second valve and wait for the experiment. Once the experiment begins, open the second valve and let the water drop.



## How to calculate the volume of 1 drop

Add 10ml of solution to the syringe and count the number of drops. Divide 10 ml by the number of drops measured.

$$\text{Amount per drop(ml)} = \text{Total amount of solution(ml)} / \text{Total number of drops(N)}$$

## Specifications

| Item                | Description  |
|---------------------|--|
| Range               | 0 ~ 10 drop / second   |
| Resolution          | 1 drop   |
| Sampling Time       | Max. 100Hz (0.01 sec.), (Typical 1Hz)                                      |
| Detection Hole Size | ID 11.5 mm   |
| Electrode Hole Size | Electrode ID 13mm<br>Temperature ID 4 mm                                   |
| Condition           | 0 ~ 60°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 7 hours after full charge<br>(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.**

Rev. WL130DC-12-2023

- ScienceCube® is a registered trademark of Korea Digital. Science# is a trademark of Korea Digital. All other trademarks are the property of their respective owners.
- The copyright of all products (hardware, software, content) related to Science Cube belongs to Korea Digital Co., Ltd.
- The contents of this manual are provided for informational purposes only, and product specifications and functions may be changed without prior notice to improve performance.
- This product is designed for science education. No warranty is provided and no liability is assumed for errors in industrial testing or manufacturing process controls, medical analysis or controls, or commercial design applications.

**Contact us**

**TEL : +82-2-2109-8839**

**FAX : +82-2-2109-8881**

**[www.sciencecube.com](http://www.sciencecube.com)**

**Korea Digital Co., Ltd.**

#804 Ace Twin Tower 273 Digital-ro Guro-gu Seoul 08381 Korea

[www.koreadigital.com](http://www.koreadigital.com)