Wireless Drop Counter

(P4530-DC)

User manual

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.

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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).

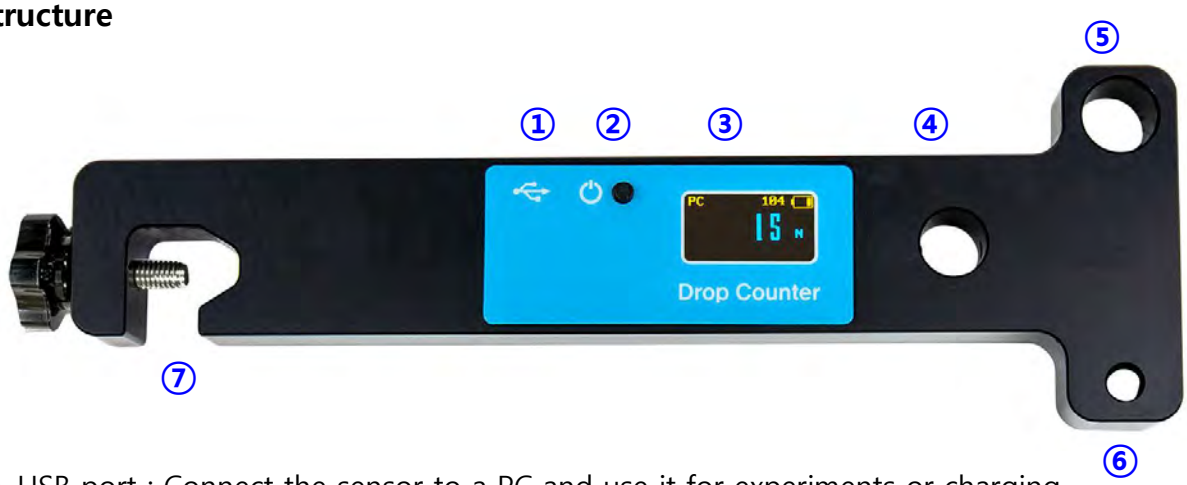
Composition

The wireless Drop Counter consists of the following.

- Wireless Drop Counter (P4530-DC)
- Star knobs bolt
- 100ml Plastic syringe
- 3way stopcock valve * 2EA
- 1.6mm Tubing nozzle
- USB-A/C cable
- Booklet

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.

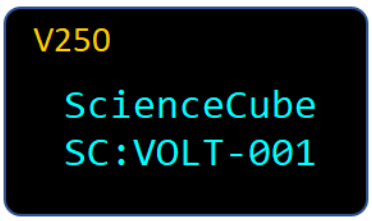
⑦ Stand guide: Secures the sensor to the stand.

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.

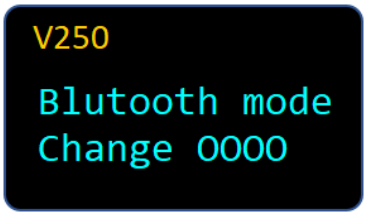
Start screen



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.
See last page for more information.

Measurement screen

①Connection mode	**Mobile** : Connecting Android or iOS **PC** : Connecting to Windows PC : Connected via **USB** cable ※ A long press changes the mode and turns on the sensor.
②Sensor-ID	This is the sensor's unique number and is displayed along with the sensor name in the device name when connected via Bluetooth.
③Battery	Check the battery status, and when charging via USB, the display will change to charging.
④Value	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.

Amount per drop(ml) = Total amount of solution(ml) / 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 Temperature ID 4 mm
Condition	0 ~ 60℃, ~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 (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.

How to install Science#

- **Install Windows PC version**

Online installation file (approximately 39MB)
http://www.koreadigital.com/url/updates/sciencesharppc/setup.exe
* Internet connection is required during installation

Offline installation file (approximately 340MB)
http://www.koreadigital.com/url/updates/sciencesharppc/setup_full.exe
* Installation does not require an Internet connection, but contains large content

- **Install from a mobile smart device (Smartphone or Tablet PC)**

1. Download Science# to your smart device (Refer to QR codes below)
2. Connect using Bluetooth (See Science# documentation or refer to next page)
3. Run Science#
4. When you connect the sensor, the measurement is displayed on the Science# screen

GET IN ON Google Play

Download on the App Store

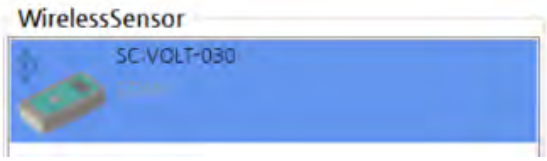
Features

- Up to four 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.

How to connect Wireless Sensor to Science# program

- **Windows PC**

1. Install and run Science# (Refer to previous page for installation method)
2. Power on the sensor
3. Click the  [Connect] icon and select [Bluetooth Interface] from [Select Interface]
4. [Add Bluetooth or other device] → [Bluetooth] → Add sensor number after checking the number on the backside of sensor
5. When you see like the picture, click on Wireless Sensor and connect



- **Android or iOS (Smartphone or Tablet PC)**

1. Install and run Science# (Refer to previous page for installation method)
2. Power on the sensor
3. Click the  [Connect] icon and select [Bluetooth Interface]
4. After selecting the device search, check the sensor number on the backside and connect

If you experience any connection issues, check Bluetooth mode on the sensor. Please refer to the next page for instructions on how to change it.

How to switch to Bluetooth mode for Android and iOS

For mobile devices (Android, iOS) Bluetooth Low Energy technology is used for wireless communication. For these devices do not pair the sensor just use it directly in the software.

Turn off the sensor. Then press and hold the power button until the text 'Bluetooth mode Change Mobile' is shown, then release the button. The mode is set to 'Mobile', meaning that Bluetooth Low Energy is used.

How to switch to Bluetooth mode for Windows

For Windows computers, Bluetooth Classic technology is used for wireless communication. Before you start to use the sensor for measurement you have to pair it. If you are asked for a PIN, enter either "1234" or "0000".

Turn off the sensor. Then press and hold the power button until the text 'Bluetooth mode Change PC' is shown, then release the button. The mode is set to 'PC', meaning Bluetooth Classic is used.

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