

# Digital Soil EC Meter Instruction Manual

(Item Code 72758)

Thank you for purchasing the Shinwa Digital Soil EC Meter. Before using the product, please read the instructions contained in this manual to ensure correct use. After having read this manual, always keep it with you or in a safe place.

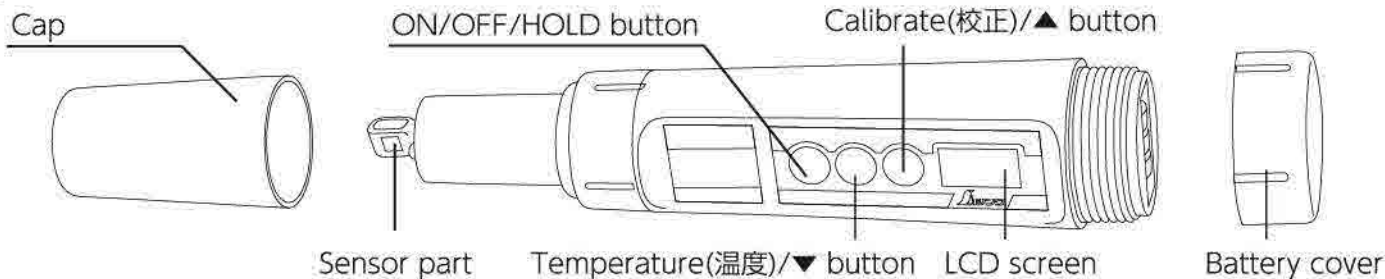
## ■ Use

- For soil conditioning in gardening or agricultural works

## ■ Features

- Compact size convenient for carrying
- Waterproof construction (IPX5 rating)
- Auto Power Off function that automatically turns off the device after approximately 5 minutes pass without operation
- Hold function (only for Soil EC Measurement Mode)
- Temperature measurement function
- Storage case

## ■ Part Names



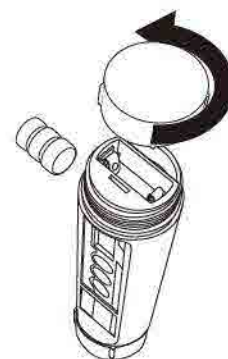
## ■ Specifications

Measuring Range	Soil conductivity 0 - 1,999 $\mu\text{S}/\text{cm}$ Temperature 0 - 80°C
Accuracy	Soil conductivity $\pm 1\%$ (full-scale) Temperature $\pm 1^\circ\text{C}$
Resolution	1 $\mu\text{S}/\text{cm}$
Waterproof	IPX5
Power Source	3x Silver oxide or alkaline batteries LR44 (Batteries included are for trial use only and may not last as long)
Auto Power Off	Approx. 5 minutes
Material	Body: ABS resin
Body Size	$\phi 37 \times 180 \text{ mm}$
Weight	83 g (including batteries)

## ■ Replacing the Batteries

1. Turn the battery cover counter-clockwise, and remove the old batteries.
2. Prepare new LR44 batteries, and replace taking care not to mix up + and -.
3. Replace the battery cover in the opposite order.

- \*Fasten the battery cover securely.
- \*Insert the batteries with the correct orientation.



## ■ What is EC?

- EC refers to Electric Conductivity.
- Tap water is typically 100  $\mu\text{S}/\text{cm}$ . By mixing the water and soil, you can see to what extent nitrates or sulfates, which are representative components of fertilizer, are dissolved in the soil. If the EC value is too high (1,500  $\mu\text{S}/\text{cm}$  or greater), nutrients cannot be absorbed well and this can have an impact on crop cultivation.

## ⚠ Caution

- Do not use other than as intended.
- Do not bump, drop, or handle this device roughly.
- Do not use or store in a place with high temperature.
- Take care that iron powder, dirt, dust, water, etc. do not penetrate inside the device.
- Do not take apart the device under any circumstances.
- If the device is dirty, wipe with a cloth soaked in water and a neutral detergent. Do not use benzine or thinner, etc.
- Each time the device is used, please try several counts in advance and check that there is no problem.
- Keep out of the reach of children.
- Remove the batteries when the device will not be used for a long time.

## ■ Err Display Causes and Remedies

- The calibration method is described on the reverse (P. 2).

Cause		Remedy
When calibrating	Not immersed in calibration solution	▶ Immerse the sensor part thoroughly in the calibration solution
	The numerical value entered and the calibration reference value do not match	▶ Check whether the calibration reference value matches the set value
	The calibration solution cannot be accurately calibrated due to discoloration, etc.	▶ Confirm again with new calibration solution
Outside measurement range temperature		▶ Use within the measurement range temperature



## How to Use

Before using...

\*Please remove the insulation tape before using.

When using for the first time or when using after some time has passed, turn the device on after first immersing the sensor part in tap water for approximately 10 minutes.

### Soil EC Measurement Mode

1. The ratio of soil to water in the container should be 1:5 and the solution should be mixed well.
2. Wait until the soil has settled.
3. Press the ON/OFF/HOLD button to turn on, and immerse the sensor part in the supernatant.
4. Press the ON/OFF/HOLD button again and the measurement value being displayed will remain fixed. (Pressing once again will cancel this)
5. Pressing the Temperature(温度)/▼ button will change to Temperature Measurement Mode.

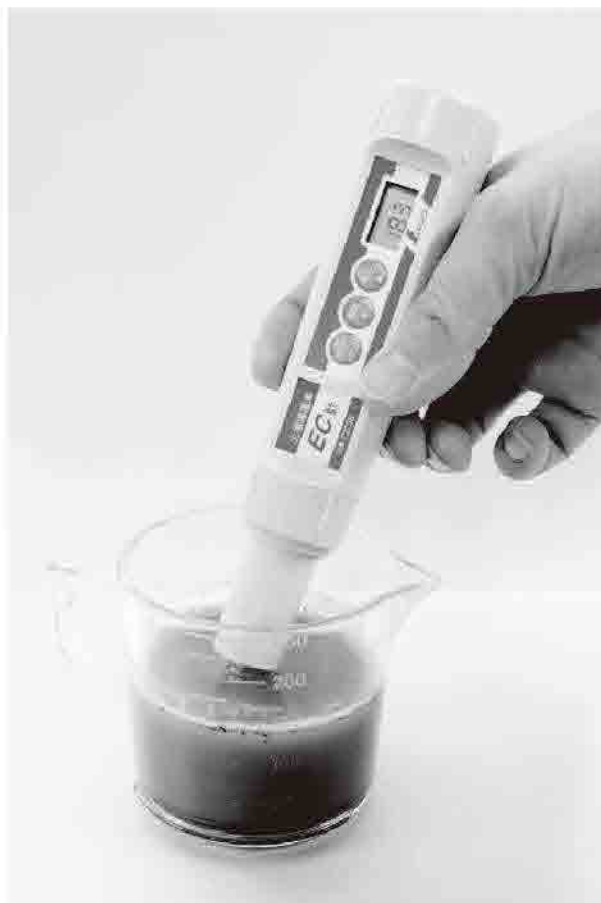
\*With Automatic Temperature Compensation function

### Temperature Measurement Mode

1. Press the ON/OFF/HOLD button to turn on the device.
2. Immerse the sensor part in liquid, press the Temperature(温度)/▼ button, and the device will measure temperature.
3. Press the ON/OFF/HOLD button once again and the device will return to Soil EC Measurement Mode.

\*Air temperature cannot be measured.

\*The HOLD function cannot be operated in Temperature Measurement Mode.



## Sensor Part Maintenance

After use run water over the sensor part, then after drying place the attached cap on and store in its case.

## Calibration

- The device has been calibrated before shipment, but we recommend calibrating periodically. Be sure to calibrate again when using after a long period of storage.

1. Press the ON/OFF/HOLD button and turn on the device.
2. Press and hold the Calibrate(校正)/▲ button for 3 seconds, and CAL --- will be displayed.
3. Press the Temperature(温度)/▼ button and the Calibrate(校正)/▲ button, and set the calibration reference value.

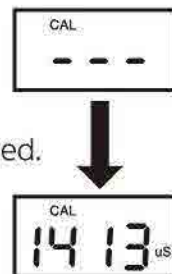
Match this reference value to the value of the calibration solution.

We recommend an EC calibration solution of 1413  $\mu\text{S}/\text{cm}$ .

Press and hold the Temperature(温度)/▼ button and the Calibrate(校正)/▲ button will change the value in increments of 10  $\mu\text{S}/\text{cm}$ .

4. Immerse the sensor part in calibration solution, press the ON/OFF/HOLD button and it will begin calibration.
5. Calibration is complete when the number blinks three times.
6. Press and hold the ON/OFF/HOLD button once again and the device will return to Soil EC Measurement Mode.

\*The device cannot be changed to Calibration Mode while in Temperature Measurement Mode.



## Salinity Tolerance by Crop Type

Salinity tolerance	EC(1:5) ( $\mu\text{S}/\text{cm}$ )	Common crops	Vegetables	Fruit trees	Other
Strong	More than 1,500	Barley	Spinach, Chinese cabbage, asparagus, Japanese radish		Italian ryegrass, rapeseed
Moderate	800 - 1,500	Paddy rice, wheat, rye, soybean	Cabbage, cauliflower, broccoli, green onion, carrot, potato, sweet potato, tomato, Japanese squash, sweet corn, eggplant, red pepper	Grape, fig, pomegranate, olive	Sweet clover, alfalfa, sudangrass, orchard grass, corn, sorghum
Slightly weak	400 - 800		Strawberry, onion, lettuce	Apple, Asian pear, peach, orange, lemon, plum, apricot	Tobacco, rush, ladino clover, red clover
Weak	Less than 400		Cucumber, broad bean, green bean		

Quote from 財団法人 日本土壤協会 / 平成22年「土壌診断によるバランスのとれた土づくり」