Version 2021-05-06

SoilQuality

User Manual

1. Safety Instructions

We do not assume liability for any resulting damages to property or personal injury, if SoilQuality has been misused and or damaged by improper use or failure to observe these operating instructions.

SoilQuality should be kept out of reach of children, do not:

- Subject SoilQuality to excessive force, shock, or dust
- Submerge in water.

2. Caution

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to instructions.

3. Warning

To reduce risk of interference with other electrical equipment:

- Consult your doctor or device manufacturer if you have a pacemaker or other implanted electrical device.

4. Trademark

iBebot™ is a trademark of Tektos Ltd., registered in Hong Kong and other countries.

5. EU Declaration of Conformity

Hereby, iBebot Limited, declares that the provided Soil Moisture and Nutrient Sensor (Model: SOILM) is in conformity with the requirements of Directive 201/53/EU.

A copy of the signed and dated Declaration of Conformity is available upon request.

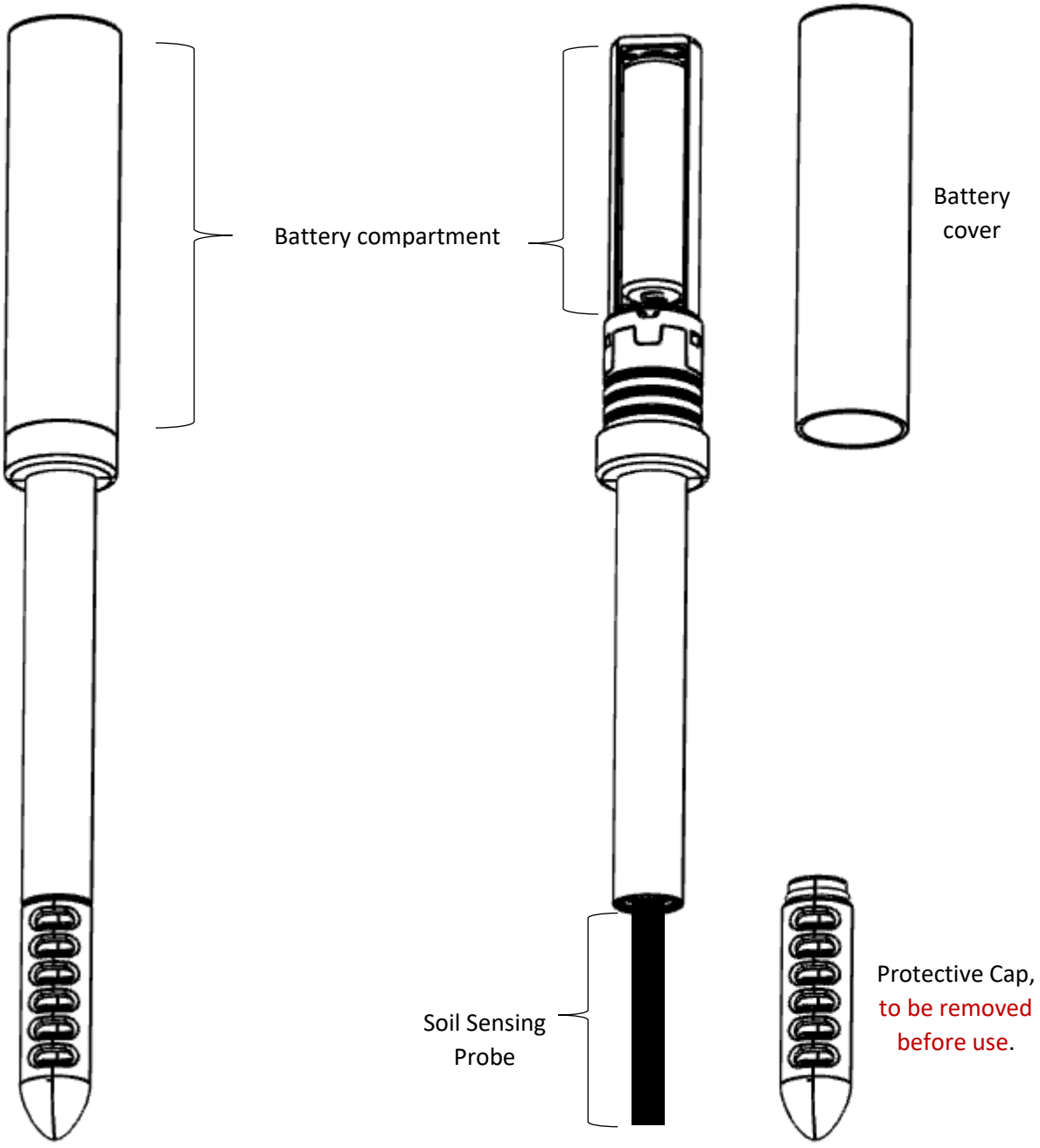
6. Environmentally Friendly Disposal

Old electrical appliances must not be disposed of together with residential waste. Encouraging you to dispose of separately and sensibly.

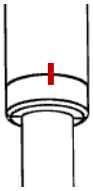
7. Specifications

Dimensions & Weight	• 220mm x 20mm x 20mm • Net Weight: 35g
Water resistance	• IPX5
Moisture Sensor Sensing soil moisture	• Range: 0% to 70% Absolute Volume Ratio (AVR) • Resolution: 0.1% • Moisture level measuring with capacitive sensing technology
Soil EC* Sensor Measure soil nutrient *EC : Electrical conductivity	• Range: 0 – 10mS/cm • Resolution: 0.001mS/cm
Data storage	• Up to 25,000 sensing records are stored locally inside SoilQuality
Sensing periodicity	• Adjustable recording period: 5, 10, 15, 20, 25, 30 and 40 minutes
Firmware Upgradable	• Firmware upgradable via iBebot Sensor Upgrader
BLE Connectivity	• BLE 4.0, 30 meters FREE field view
Power source	• 1 x AAA battery, Alkaline 1.5V
Battery life	• 1.5 years (based on 20 minutes recording periodicity)
Mobile App	• Android & iOS

8. Getting started



8.1 Battery installation



- Remove battery cover
- Place 1x AAA battery into SoilQuality
- Replace cover to matching position marks between main body and cap

After changing the battery, you must synchronise SoilQuality with our mobile APP, performing this updates SoilQuality's internal date & time registry and allows log recording.

8.2 Inserting the sensor on soil

- Remove protective cap
- Gently clean with disinfectant alcohol front and back of the 'Soil Sensing Probe'
- Insert SoilQuality's into soil until the 'Soil Sensing Probe' is completely buried inside soil

8.3 Connect to Phone

SoilQuality operate with our mobile application AirComfort. The mobile application is free and available on both Android and iOS.

- App installation, use this QR code or browse to www.tektosdesign.com/air-comfort-app.php
- Turn on 'wireless communication' in your phone
- Enable 'Location' permission in your phone
- Launch Application
- Tap Menu
- Tap 'Add / Remove Sensors'
- Select your SoilQuality, TAP it (right circle will show as "green")
- Tap '✓' icon to start using SoilQuality
- Once download is complete, SoilQuality will be visible on the 'Sensor' Home page.

8.4 iBebot Connect

"iBebot Connect" is a Web platform available on www.ibebot.com that provides a desktop interface with complementary features to the mobile application for SoilQuality and AirComfort. The platform offers:

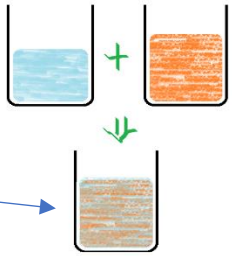
1. **Chart,** to plot all sensors with unlimited history and data record backup.
2. **VPD** (Vapour-Pressure Deficit) computation and graphing
3. **Mold risk** probability
4. Grow room **Mapping**
5. Export to **CSV** (excel)
6. **THI** (Temperature Heat Index) computation and graphing

**Current print run items 2 – 6 require a paid subscription*

9. Soil Moisture measurement

SoilQuality moisture measurement is given in Absolute Volume Ratio (AVR), which is the ratio between the volume of water divided by total volume of Soil + Water after mixing both.

$$AVR\ Moiture\ (\%) = \frac{Vw}{Vtotal}$$



At 70% AVR moisture the soil becomes extremely close to a liquid and not adequate for plant growing in soil. Therefore, SoilQuality has been designed with full scale at 70% and provides AVR Soil Moisture measurement between 0 to 70%; above 70%, the reading with remain at 70%.

'Soil Sensing Probe' should be gently cleaned with disinfectant alcohol if moisture reading doesn't reach 70% in water.

10. EC Measurement and Soil Nutrients

10.1 SoilQuality measures the Electrical Conductivity (EC) of soil.

10.2 On moist soil, at a given temperature, the EC of soil is relative to the amount of nutrients in the soil: an increase of the nutrient produces an increase in Soil Electrical Conductivity.

10.3 To capture nutrients in the soil, a plant needs water so minerals can be dissolved in water and be available as nutrients to the plant. In dry soil a plant will not be able to grow and capture any nutrients. Soil EC is also affected by the soil moisture: when the soil is dry, the EC greatly drops even if there's minerals in the soil. Therefore, the **Soil EC gives a good relative indication of the available nutrients to the plant**.

10.4 Temperature is also a factor that will affect the soil's EC level. Most EC agricultural standards are given at 25°C. The higher the temperature the higher the EC. As a rule of thumb, the EC of water increases by 2 to 3% for each increase of 1°C.

10.5 Comparison of Nutrient level in time or between different soil samples should be done based on the same moisture level and temperature.

10.6 When mixing a soil with a water solution, it is important to note that the resulted EC of the soil will be according on the EC level of the water solution combined with the mineral level of the soil and the moisture level of the mix of both.

10.7 Although SoilQuality has not been designed to measure EC level of water or buffer solution, it is possible to measure the EC in those liquid, however:

10.7.1 Protective cap should be removed.
10.7.2 During measurement, the moisture level will be saturated at 70%, this is normal, please see Part 9 for more information
10.7.3 The 'Soil Sensing Probe' should be fully immerged; half immerged 'Soil Sensing Probe' will result in a half reading
10.7.4 Measured EC value should be compared with reference EC value of the water solution or buffer solution given as the current temperature of the liquid measured
10.7.5 The 'Soil Sensing Probe' should be gently cleaned with disinfectant alcohol if EC reading doesn't match with expected value

11 Support & FAQ

- Support information and FAQ's can be found on our Website **www.ibebot.com**
- Users can also contact our support team at support@ibebot.com

FCC Statement

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

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

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.