Growbud
elemental insight

Dro Sensor

Substrate moisture, EC, temperature, air RH, LoRaWAN, and Bluetooth LE

POCKET MANUAL

DOCUMENT DRO-PM-100
REVISION 1.0 · July 2026
TRIM 4.25 x 5.5 in
PAGES 20

1 Safety Information

WARNING: BATTERY

Install only a correctly polarized 9 V battery. Do not short the terminals or service the battery compartment with wet hands.

CAUTION: PROBES

Do not force, bend, cut, or hammer the probes. Remove the battery before cleaning. Strong cleaners may damage the housing or ceramic coating.

PLACEMENT

Keep the complete active region - polished bottom 2 in (51 mm) - surrounded by uniform media. Return the sensor to the same position after service.

Intended use. The Dro Sensor monitors horticultural substrates and surrounding air. Follow local battery-disposal rules and site safety procedures.

§ Contents

PRINT FORMAT

Finished size: 4.25 x 5.5 in. The 20-page count is suitable for saddle-stitch booklet production.

2 Product Overview

The Dro Sensor combines high-frequency substrate sensing, protected air sensing, on-board storage, and two wireless links in a battery-powered device.

SUBSTRATE

VWC + pwEC

Selectable media profiles

ENVIRONMENT

Temperature + RH

App-calculated VPD

LOCAL

Bluetooth 5.0 LE

Pairing, Spot Check, sync

LONG RANGE

LoRaWAN

Automatic gateway sync

2.1 Specifications

PARAMETER	VALUE
Battery	9 V alkaline or rechargeable Li-ion in 9 V format
Typical battery life	Approximately 3 months; use and conditions affect life
Storage	8 MB flash; approximately 3 months of history
Bluetooth	Bluetooth 5.0 LE; up to 300 ft (100 m), conditions permitting
LoRaWAN	US915 or AS923; up to 2 mi (3 km), conditions permitting
Electronics	Potted for outdoor-ready deployment
Cleaning	At least every 3 months and between crops

RANGE NOTE

Walls, foliage, metal structures, terrain, and interference can reduce practical wireless range.

3 Unbox & Power

3.1 Inspect

- Confirm the Dro Sensor and one 9 V battery are included.
- Inspect the housing, battery cover, and probes for transit damage.
- Do not install a device with bent probes, a cracked housing, or damaged battery contacts.

3.2 Install the Battery

1. Remove the back cover.
2. Connect the battery with correct polarity and place it securely in the compartment.
3. Replace the cover.
4. Touch the green center button with an ungloved finger. A blue blink confirms power.

3.3 Choose the Location

Place the active region near the wettest part of the container. With drip irrigation this is often lower in the root zone; with hand watering it may be nearer the top.

For Repeatable Trends

- Use the same depth and orientation across comparable plants.
- Avoid isolated dry pockets and direct emitter contact.
- Keep the probes away from air gaps, container edges, and large roots.
- Record the position before removing a sensor for service.

> **PLACEMENT PRINCIPLE**
> Measure the part of the root zone where the plant is actively taking up water and nutrients, then keep that position consistent.

3.4 Insert the Sensor

Insert the full probe length. The polished bottom 2 in (51 mm) of each needle is the active sensing region.

- Press straight into the media.
- Keep the active region completely surrounded by uniform grow media.
- If installed from the side, support the housing so the probes cannot loosen.
- Allow one significant irrigation event before judging trends.

DO NOT FORCE

If the media resists insertion, choose a nearby location. Do not use the housing as a lever or hammer the probes.

4 Get the Growbud App

Search for “growbud” in the Apple App Store or Google Play Store, or open **www.growbud.app** in a browser.

1. Create an account to save configuration and sensor data.
2. Enable Bluetooth on the phone or tablet.
3. Keep the device near the sensor during pairing.

4.1 Pair & Verify

1. In the app choose Add Device or the pairing option.
2. Touch the green center button with an ungloved finger. No pressure is required.
3. Select the discovered Dro Sensor.
4. Name it and assign its grow location.

CHECK	EXPECTED
Touch button	Blue LED blink
Run Spot Check	Current reading appears
Review values	Substrate and air data appear
Bluetooth sync	Stored history transfers

5 Spot Check & Sync

Spot Check

After one-time pairing, the button does not need to be touched for a Spot Check. Keep the phone near the sensor and use the app to request a current reading.

Bluetooth History Sync

Keep the app open and the device nearby until stored history finishes transferring.

Automatic LoRaWAN Sync

Pair the sensor with a Growbud gateway for unattended synchronization.

> **TREND FIRST**
> Use Spot Check to verify operation, then evaluate readings after the sensor has remained in place through one significant irrigation event.

6 Cleaning

1. Remove the battery.
2. Dampen a soft cloth or cotton swab with 70% or higher isopropyl alcohol.
3. Gently remove soil and residue from the probes.
4. Allow the device to dry completely.
5. Return it to the documented depth and orientation.

Clean at least every 3 months, between crops, or sooner when residue is visible or readings become inconsistent.

STRONG CLEANERS
Bleach and other high-strength cleaners may degrade the housing and ceramic coating. Damage from harsh cleaners may not be covered by warranty.

6.1 Battery & Inspection

Battery Replacement

1. Replace approximately every 3 months or when the app reports low battery.
2. Inspect the connector for contamination or damage.
3. Install a fresh 9 V battery with correct polarity.
4. Confirm the blue LED blink.
5. Recycle or dispose of the old battery locally.

CHECK	ACCEPTABLE CONDITION
Probes	Clean, straight, and firmly seated
Placement	Documented depth and orientation
Battery	No low-battery alert
Housing	No cracks or trapped debris

7 Measurement Reference

MEASUREMENT	MEANING
VWC	Volumetric water content: fraction of media volume occupied by water
pwEC	Pore-water electrical conductivity: estimated salinity of water held by the media
Substrate temperature	Temperature at the sensing probes
Air temperature	Ambient temperature at the protected air sensor
Relative humidity	Ambient moisture in the air
VPD	Vapor pressure deficit calculated from air temperature and humidity

USE TRENDS

Track dryback, saturation, nutrient concentration, and zone consistency over time rather than judging one isolated reading.

7.1 Profiles & Data

Substrate Profiles

Select the profile that most closely matches the installed media. Use one consistent profile when comparing devices or historical periods.

On-Board Storage

CAPACITY	HISTORY
8 MB	**~3 months**
Persistent flash	At the configured interval

Synchronize regularly so recent history is available in the app and long periods between visits do not leave data only on the sensor.

8 Bluetooth LE

CAPABILITY	USE
Pairing	One-time setup and location assignment
Spot Check	Nearby current reading
History sync	Transfer on-board data to the app
Reference range	Up to 300 ft (100 m), conditions permitting

Connection Tips

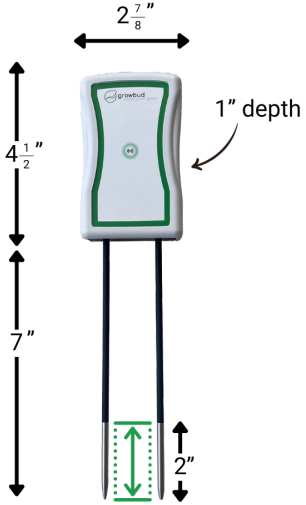
- Stay near the sensor during setup.
- Enable Bluetooth and keep the app open.
- Check battery status if reads are unreliable.
- Structures, foliage, and interference reduce range.

8.1 LoRaWAN

ITEM	VALUE
Frequency plan	US915 or AS923
Gateway	Growbud gateway
Reference range	Up to 2 mi (3 km), conditions permitting
Scale	At least 100 sensors per gateway; multiple gateways supported

REGION
Use only the LoRaWAN frequency plan approved for the installation location.

9 Mechanical Reference



PARAMETER	VALUE
Body	2 7/8 in W x 4 1/2 in H x 1 in D
Housing	Robust ABS plastic
Probes	7 in (178 mm) total; bottom 2 in (51 mm) active
Probe material	3/16 in stainless steel with plant-safe ceramic coating

10 Troubleshooting

SYMPTOM	ACTION
No blue blink	Reconnect or replace the battery; verify polarity
Not found during pairing	Move closer, enable Bluetooth, and touch the center button
Spot Check fails	Stay nearby, keep the app open, check the battery, and retry
Unexpected VWC or pwEC	Check depth, air gaps, residue, and substrate profile
Readings changed after service	Restore the documented position and allow one irrigation event
Gateway misses data	Verify gateway status, coverage, and LoRaWAN region

11 Warranty & Support

1-Year Limited Warranty

Covers manufacturing defects and component failures under normal operating conditions from the date of purchase.

Misuse, unauthorized repair, impact damage, bent probes, incorrect battery installation, or improper cleaning may void coverage.

90-Day Return Policy

Products may be returned in original condition within 90 days, subject to applicable Growbud return terms.

> **GROWBUD SUPPORT**
> support@growbud.io
> www.growbud.io
> Monday-Friday · 9 AM-5 PM

Include purchase details, device name and location, battery age, screenshots, and a clear description of the issue.