



Set up your soil-moisture node

A few-dollar capacitive probe, calibrated on the probe itself in dry air and a glass of water, reporting to a place you own. Up to six probes fit one board.

BEFORE YOU START

Have these on hand:

- A **classic ESP32** board and a **data** USB cable.
- One to six **capacitive soil-moisture probes**, the flat-blade **v2.0** kind that runs from 3.3 V.
- Three wires per probe: **VCC to 3V3** (not 5 V), **GND to GND**, **AOUT to GPIO 35**. More probes go to 34, 32, 33, 36, 39 — the six pins that keep working with Wi-Fi on.
- A **glass of water** for the calibration.
- A computer with **Chrome** or **Edge** (to flash it the first time).
- Your **Wi-Fi name and password** (2.4 GHz only) and where the readings should go — or the **OAT Test Endpoint** below.

FLASH IT (FIRST TIME ONLY)

- 1 Open openagriculturetechnology.com/build/sketches/soil-moisture-node/, plug the board in, press **Connect & Install**. Already flashed? Skip to step 2.

CONNECT TO THE NODE

- 2 **Power the node** with a USB cable (any USB charger or your computer).
- 3 **On your phone or laptop, join its Wi-Fi network** — it appears as **OAT-Setup-XXXXXX** (open, no password). A setup page opens by itself; if not, go to <http://192.168.4.1>.

Setup page address	http://192.168.4.1
Username	admin
Password	oatsetup (change it once the node is online)

FILL IN YOUR SETTINGS

Write yours here first, then type them into the setup page. One card per node.

Device name
e.g. GH2-bench

Farm ID
the same on every node you own

Location
zone the node watches

Wi-Fi name (SSID)
2.4 GHz

Wi-Fi password

Delivery method
Webhook or MQTT

Webhook URL
`https:// ...` (or the Test Endpoint below)

MQTT host / port
if using MQTT · 1883 or 8883 TLS

Probe pins
default 35 · e.g. 35,34 for two

Calibration, probe 1 (pin : dry mV /
wet mV)
from the setup page, e.g. 35:2876/1232

Calibration, probe 2

Calibration, probe 3

Push interval (sec)
default 60 · soil changes slowly; 300 is
plenty

Stream ids (from the setup page)
oat-...:a35 — one per pin, at your
endpoint

NO ENDPOINT YET? USE THE OAT TEST ENDPOINT

A public test endpoint the collective runs. Your node appears under your Farm ID with the probes beneath it.

Delivery method	Webhook
Webhook URL	<code>https://iot-test.openagriculturetechnology.com/ingest</code>
Watch it live	<code>https://iot-test.openagriculturetechnology.com</code>

It keeps roughly the last hour. Prove the chain, then point the node at an endpoint you keep.

USING MQTT INSTEAD (HOME ASSISTANT)

Point the node at the broker Home Assistant uses; each probe appears as a device with voltage and moisture entities by discovery.

MQTT host	the Home Assistant machine
Port	1883 plain · 8883 with TLS ticked
User / password	if your broker requires them
Readings land on	<code>oat/<device name>/<probe>/<measurement></code>

SAVE & CHECK THE DATA IS FLOWING

- 4 Press Save.** The node joins your Wi-Fi while the setup page waits, then shows its **address on your own network** — like `http://192.168.1.37` and `http://oat-yourname.local`. Bookmark one; that's the node's home page from now on.
- 5 Open Live Status** there and press **Send a test reading**. A green “OK” means a reading just reached your endpoint. That's the whole job done.

Updating later: After setup the node lives on your network — open the address it showed when it joined (`http://192.168.x.x` or `http://oat-<name>.local`). **Calibrate each probe there:** hold it in dry air and click *this is dry air*, stand it in a glass of water to

the line and click *this is water*. Until both points exist the probe sends its voltage only, no percentage. Write the pair the page shows into the blanks above.

THE USB CONSOLE

Open the install page, choose **Console**. Every setting is there.

<code>status</code>	Wi-Fi, push counters, and each probe's pin, millivolts, percentage and calibration.
<code>raw 20</code>	live millivolts on every pin, once a second for 20 s: watch a dunk.
<code>set pins 35,34</code>	declare the pins the probes are on (32, 33, 34, 35, 36, 39 only).
<code>set cal 35 dry / set cal 35 wet</code>	record the live reading as that probe's dry or wet point.
<code>set cal 35 2480 1120</code>	type a calibration back in after a reflash.
<code>push</code>	send a test reading now.

IF SOMETHING'S NOT WORKING

It reads wet with the probe in the air	The output wire is off, or the probe is on a pin that is not listed. A pin with nothing on it floats low, which looks wet. Under 150 mV the node says <i>wire off</i> in red. Check 3V3, GND and AOUT, then <code>set pins</code> .
It read fine on the bench and went dead after joining Wi-Fi	The probe is on an ADC2 pin (0, 2, 4, 12–15, 25–27), which stops working with Wi-Fi on. Move it to 32, 33, 34, 35, 36 or 39. The pin field refuses those pins for exactly this reason.
It will not accept the calibration	Dry and wet must be at least 100 mV apart. Shake the probe dry and wait a minute before <i>dry air</i> ; put it in the water up to the line for <i>water</i> . A probe pinned near 0 or 3.3 V that never moves is usually an old v1.2 board that needs 5 V.
It won't join my Wi-Fi	2.4 GHz only. Names with spaces are easier over the console: <code>set ssid ...</code> .
I forgot the setup password	It's <code>oatsetup</code> unless you changed it. Re-flash to reset.

Generated 2026-09-06 · This card and the firmware are open. The full sketch, the supported boards, and the web installer are at openagriculturetechnology.com/build/sketches/soil-moisture-node/.