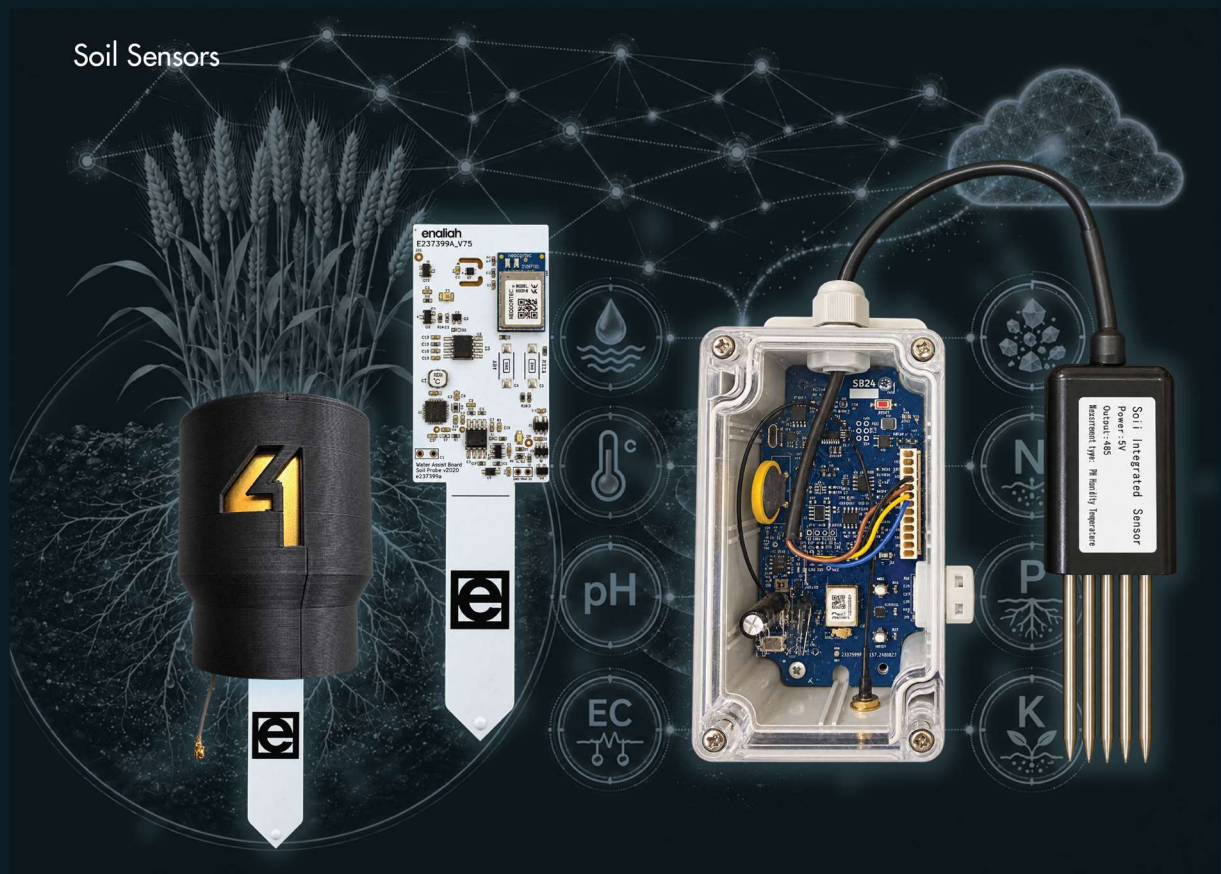




Soil Sensors

E-IOT soil-monitoring solutions combine soil probes, wireless sensor nodes and cloud connectivity to provide visibility into growing conditions. Compact integrated probes and external RS485 sensors support different installation requirements, enabling measurements from distributed locations to be collected through NeoMesh and forwarded to the E-IOT Cloud.

Products shown

- **Compact wireless soil probe** — The device on the left combines an insertion probe with a special sub-GHz antenna to be used near the ground surface, providing a compact format and rigid radio link for monitoring individual growing locations.
- **Integrated NeoMesh soil-sensor board** — The exposed PCB shows the soil-probe construction, local electronics and NeoCortec radio module used to connect measurements to the wireless network.
- **Enclosed sensor interface node** — The transparent housing contains the electronics connecting an external soil sensor to NeoMesh, with cable entries and an antenna connection.

- **External RS485 soil sensor** — The multi-prong probe on the right is labelled for a 5 V supply and RS485 output, with pH, moisture and temperature measurements indicated.
- **Illustrated measurement options** — The background highlights moisture, temperature, pH, electrical conductivity and nutrient-related parameters. The available measurements depend on the selected probe; these symbols do not imply that every illustrated device measures all parameters.

Product features and operation

Monitoring conditions in the root zone

Soil measurements provide information about the conditions surrounding plant roots. Measurements taken at representative locations and depths can help operators observe drying, irrigation response and changes in the growing environment.

The E-IOT concept supports both compact probes with integrated wireless electronics and separate sensors connected to a nearby interface node. This allows the sensing arrangement to be adapted to pots, growing beds, greenhouses and outdoor installations.

Soil moisture and temperature

Soil-moisture readings help indicate when the monitored area is becoming dry and how it responds to watering. Historical measurements can show whether irrigation reaches the sensor depth and how quickly moisture levels subsequently decline.

Temperature measurements provide additional context for interpreting growing conditions and seasonal changes. Used together, moisture and temperature trends support more informed irrigation decisions.

Measurement interpretation depends on the probe technology, soil or substrate characteristics and installation quality. Calibration or application-specific thresholds may be needed for different growing media.

pH and electrical conductivity

Compatible probes can extend monitoring to soil pH and electrical conductivity. pH indicates acidity or alkalinity, while conductivity provides information related to dissolved ions and salinity.

These measurements can help identify changes requiring attention, particularly where irrigation water and fertilizer application influence root-zone conditions. Conductivity should not be treated as a direct measurement of an individual nutrient.

Where nutrient-reporting probes are selected, their measurement method, calibration and suitability for the intended soil must be established. Nutrient-related readings should be interpreted according to the sensor manufacturer's specifications and validated against appropriate reference measurements.

RS485 sensor integration

The external probe connects to the interface node through RS485. Where the sensor uses Modbus RTU, the node requests the relevant registers and interprets their values according to the sensor's register map.

This arrangement separates the sensing element from the wireless electronics. The probe can be positioned in the soil while the enclosure and antenna remain above ground in a location suitable for radio communication and maintenance.

Compatible sensors can share an RS485 bus where addressing, power capacity and wiring permit. This provides an option for collecting measurements from several nearby points through one wireless node.

NeoMesh communication

The interface node or integrated wireless probe sends measurements through the NeoMesh network to a compatible gateway. Intermediate nodes can relay messages, allowing monitoring points to be distributed across the installation.

A shared gateway forwards the readings to a local application or the E-IOT Cloud. With a cellular uplink, the system can operate independently of an existing site Wi-Fi or wired Internet connection.

Radio coverage depends on terrain, vegetation, antenna placement and network layout. Keeping the radio and antenna above ground helps avoid the attenuation associated with buried installation.

Cloud visualization and irrigation support

The E-IOT Cloud can display current readings and retain historical data from individual monitoring points. Comparing trends helps operators evaluate watering schedules, identify unusually dry areas and observe differences between planting zones.

Configured thresholds can generate notifications when reported values leave the desired operating range. Where an irrigation-control system is integrated, these measurements can also serve as inputs to application-specific control logic.

The soil-monitoring system supplies the measurements; automatic valve or pump operation requires compatible actuators and a defined control strategy.

Power management and installation

Measurement and reporting intervals can be selected according to how quickly conditions change and how much energy is available. Where supported, the interface node can power the external sensor only during acquisition, allowing sufficient stabilization time before taking a reading.

Reliable installation requires good contact between the sensing elements and the soil, representative placement and protection of the above-ground electronics. Sensor range, enclosure protection and power arrangements must match the intended environment.

Typical applications

- Irrigation monitoring in greenhouses and growing beds.
- Soil-moisture observation in orchards and plantations.
- Monitoring individual pots and nursery plants.
- Root-zone monitoring in substrate-based vertical farming.
- Comparing growing conditions across agricultural zones.
- Monitoring pH and conductivity with compatible probes.
- Remote agricultural demonstrations and customized E-IOT installations.