MONITORING
SOLUTIONS

HydroTerra

Environmental Monitoring Specialists

SOIL MOISTURE MONITORING

Solutions from HydroTerra

hydroterra.com.au

Why do we measure soil moisture?

We measure soil moisture to optimise irrigation, improve crop yields, conserve water, support construction management and predict drought, flood and wildfire risks. It's critical for plant health, ecosystem function and effective resource management because it reveals both water availability and the soil's capacity to retain moisture. By measuring we can prevent both underwatering (plant stress, low yield) and overwatering (nutrient loss, runoff).

In Agriculture & Horticulture:

- Optimise Irrigation: Schedule watering precisely to meet plant needs, saving water and energy.
- Boost Yields: Ensure plants get water during critical growth stages, preventing wilting and stunted growth.
- Prevent Water Stress: Determine how hard plants must work to extract water.
- Nutrient Management: Monitor leaching of nutrients into groundwater from overwatering.

Environmental Monitoring & Management:

- Drought/Flood Prediction: Early warning for natural disasters by tracking soil saturation.
- Wildfire Risk: Assess fuel moisture, indicating fire potential.
- Ecosystem Health: Understand water availability, a key driver of ecosystem productivity.

Construction & Engineering:

- Foundation Stability: Design effective drainage and select appropriate materials for construction sites.

Research & Science:

- Ground-Truthing Satellite Data: Verify remote sensing data for broader accuracy.
- Hydrological Studies: Understand water movement and storage in the soil.

Given the numerous applications,
what solutions can HydroTerra offer our customers?

1.SoluSAMPLER for collecting soil pore water for analysis.

The Sentek SoluSAMPLER™ is a permanently installed suction lysimeter that uses a vacuum to extract soil pore water from the root zone through an inert ceramic cup. A syringe pulls moisture into the collection tube by creating suction. This can take anywhere from a few minutes to overnight, depending on the soil. The collected water can be analysed in the field or sent to a lab, enabling monitoring of salinity and nutrient movement to help manage fertilisation and prevent salt build-up or nitrate leaching.

2.Hydrasense II Handheld Meter

The HydroSense II (HS2) is a portable, handheld device for quickly and easily measuring soil volumetric water content in the field. It is a highly accurate tool used in various applications, including agriculture, turf management for golf courses, and environmental research.

Soil consists of three main constituents – mineral particles (sand, loam, or clay), water and air. Air and water occupy the spaces or pores formed between the mineral particles. In agricultural soils, these pore spaces typically make up approximately 50% of the soil by volume, with water and air together making up the remaining 50%. As a result, water content normally ranges from 0% to 50%.

The HydroSense II presents two distinct data sets. One data set includes volumetric water content expressed as percent (%) and period (µs). The second data set includes an estimate of relative water content relative to pre-measured wet and dry references, and water deficit. Water deficit provides an estimate of applied water required (in mm) to return the soil to the wet water content.
Two different ruggedized sensor probe lengths are available, the CS659 with 12 cm rods and the CS658 with 20 cm rods, for use in various soil types and conditions.

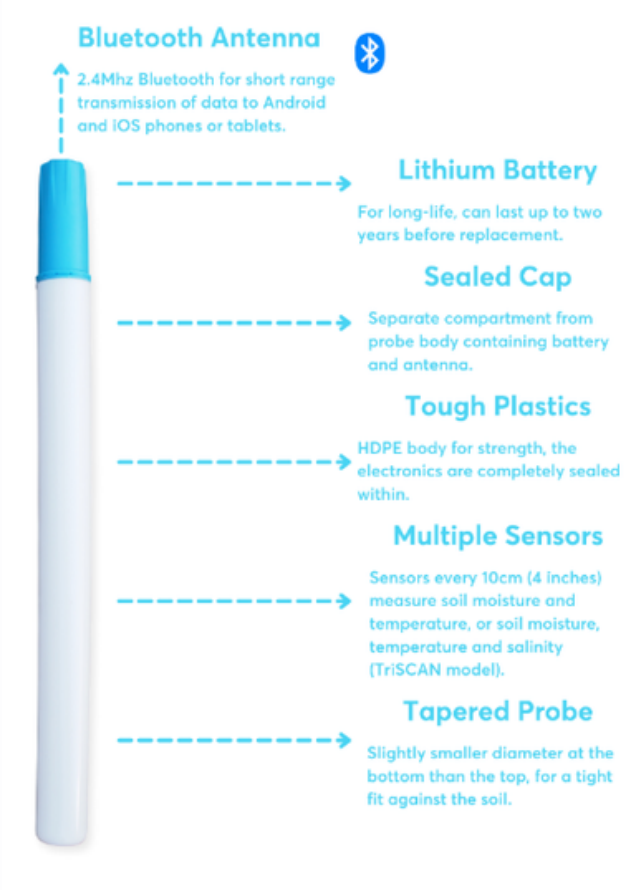
3.BlueTooth Drill and Drop Soil Moisture Probes.

The Sentek Bluetooth Drill & Drop probe works by embedding moisture, salinity, and temperature sensors in a rod, which is installed in the ground. It uses an internal battery and Bluetooth to communicate wirelessly with a smartphone app, eliminating cables. Users collect data in the field and then upload it to the cloud (IrriMAX Live) for analysis when internet is available, offering a simple, cable-free way to monitor soil conditions.

Key benefits include:

- Cable Free
- Battery powered
- Easy to install
- Reliable

Available with moisture, salinity (optional) and temperature sensors at every 10 cm (4") depth. The BlueTooth Drill and Drop probes are available in 5 lengths as shown below:



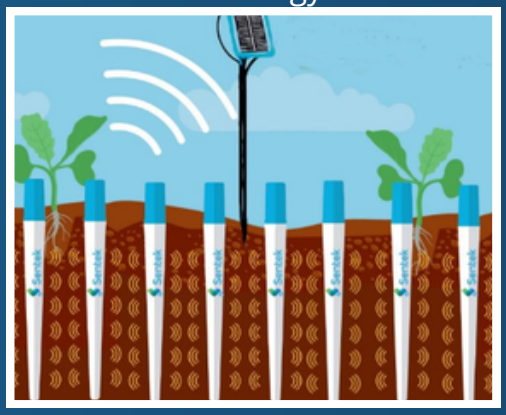
Probe Length	10 cm/4"	30 cm/12"	60 cm/24"	90 cm/36"	120 cm/48"
Number of Sensors	1	3	6	9	12

3a Telemetry options for BlueTooth Drill and Drop Probes.

As standard, the BlueTooth Drill and Drop probes support data collection on your mobile phone using the Sentek Connect App. From there, data is transferred to the IrriMAX Live platform for display and analysis.

Nexus Blue

The Sentek Nexus Blue is an efficient, low-cost 4G Data Transmission Unit (DTU) which connects with multiple Drill & Drop Bluetooth® probes to upload to Sentek's IrriMAX Live cloud platform using the latest low-power cellular technology. The Nexus Blue can be installed quickly with data available immediately. It supports downloading/uploading from an unlimited number of Bluetooth® probes within 10m of the DTU. If probe is underground, then BlueTooth connectivity can be as close as 1m.

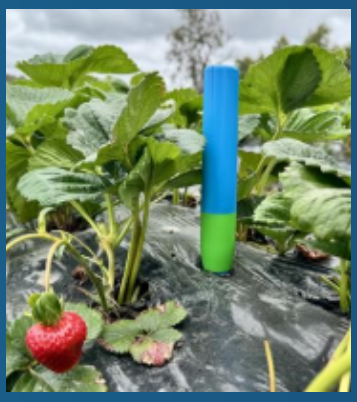


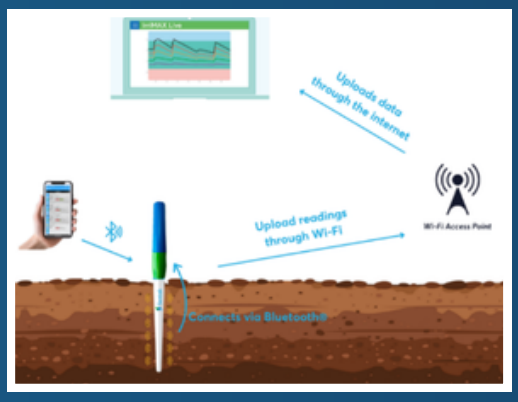
Sentek Wi-Fi Link

Sentek's Wi-Fi Link™ is a Data Transmission Unit that pairs with a Sentek Drill & Drop™ Bluetooth® Probe. This supports connection of the Drill & Drop™ Bluetooth® Probe over an existing Wi-Fi network. The DTU can either be placed directly on top of the probe or on a pole within a 10 m distance in the case of canopies.

The Wi-Fi Link™ downloads from one paired probe and uploads to IrriMAX Live™ using a compatible Wi-Fi Access Point. Use Drill & Drop™ Connect Application (Android and iOS) V1.2.1 or higher to configure Wi-Fi Access Point and pair Bluetooth wireless technology probe.

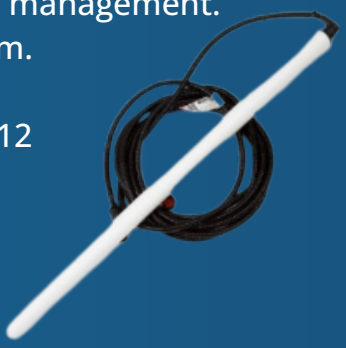
Many sites now have Wi-Fi available on the site. For example, glasshouses, small properties (hobby farms) and horticultural applications.





4.Drill and Drop Soil Moisture Probes

Drill & Drop™ probes accurately measure soil moisture, temperature and salinity (optional). The probe is fully encapsulated, easy to install and can be completely buried to reduce the risk of machinery damage.
Drill & Drop™ can be used for vegetable crops, fruit and nut trees, vines, berries, research projects and landscape management.
Sphere of influence is about 10cm.
The probe can be connected to telemetry via RS232, RS485, SDI-12 and Modbus.



Available with moisture, salinity (optional) and temperature sensors at every 10 cm (4") depth. The Drill and Drop probes are available in 5 lengths as shown below:

Probe Length	10 cm/4"	30 cm/12"	60 cm/24"	90 cm/36"	120 cm/48"
Number of Sensors	1	3	6	9	12

4a Telemetry Options for Drill & Drop Probes

A number of telemetry options are available for the Sentek Drill & Drop probes. Telemetry devices connect to the Drill & Drop™ probe with 14-pin connector (includes protective dustcover).

Sentek IoT DTU

The Sentek IoT DTU is a low-cost, reliable telemetry solution suitable for most applications. It connects Sentek Drill & Drop™ probes to the IrriMAX™Live cloud using low-power cellular technology and features an integrated solar panel and long-life battery (6–7 years). The unit has a rugged IP68 waterproof housing, flexible pole-mounting options and an external 7 dB antenna for improved connectivity.

Plus Compact

There are some applications where the Plus Compact might be a more suitable option. For example, vineyards and orchards. The compact can be located right next to the base of the vine or tree. It is low height and is then protected from harvesters / grass cutting, etc.

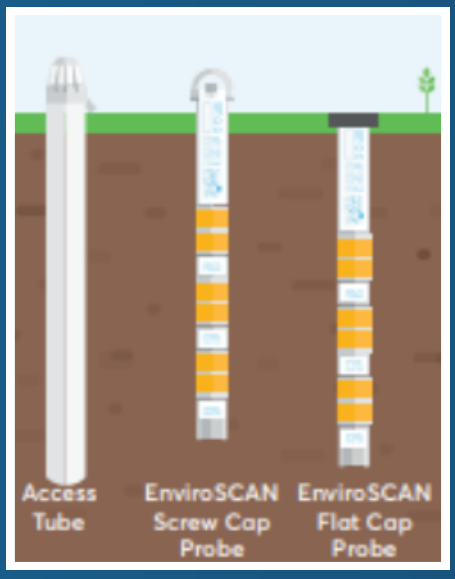
Recommended 2 x rechargeable lithium battery packs with the Compact. Battery charge will last about 6 months – then swap over. The batteries are good for 400 recharge cycles.

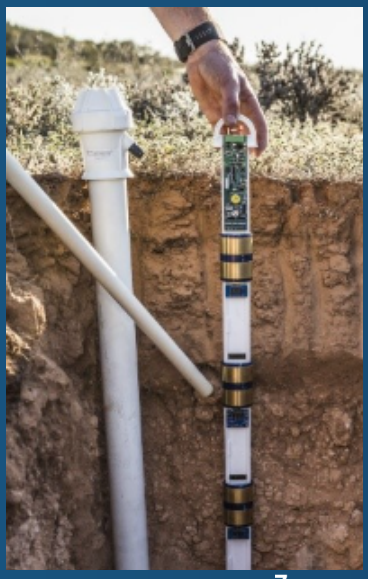
5.EnviroSCAN Probes

Sentek EnviroSCAN is a multi-depth soil profiling probe for continuous soil moisture monitoring, with optional EC, temperature, and access tube humidity. It uses capacitance sensors mounted along a rigid probe inside a protective access tube, enabling reliable long-term measurements without direct soil contact.

Each probe supports up to 16 sensors, typically at 10 cm spacing, and can be installed from shallow depths to deep profiles of up to 25m. Sensor placement is configurable, probes are field-serviceable, and the sensor sphere of influence is approximately 17 cm.

The EnviroSCAN probe offers two cap configurations to suit different site requirements:





Flat Cap Design

- Reduces risk of damage from machinery or site traffic, making it ideal for agricultural or high-traffic areas

Screw Cap Design

- Cap protrudes above the soil surface for easy identification.

5a Telemetry and communication options:

Sentek SOLO (Manual download only – no telemetry)

The SoloPORTER with a Solo Head Unit provides a simple way to retrieve probe data from Sentek SOLO logging probes in the field without the need for a laptop computer. Readily available USB flash drives are used as a storage mechanism, providing the SoloPORTER with a virtually unlimited capacity for downloading data.

Sentek PLUS Compact

The Sentek Compact PLUS is a battery-powered data transmission unit (DTU) designed to provide remote telemetry for EnviroSCAN probes. It enables automatic upload of soil moisture, salinity, and temperature data to cloud or desktop platforms without the need for on-site data collection.

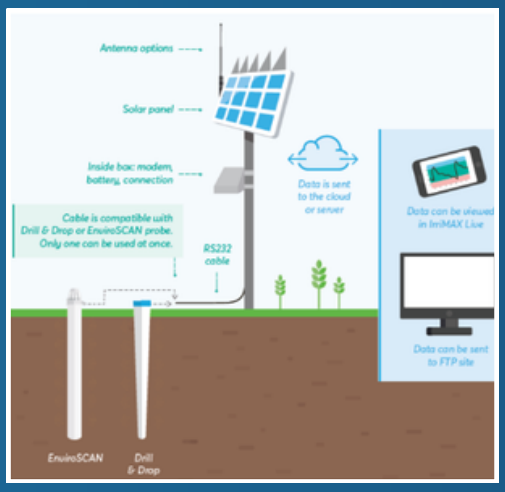
The Compact PLUS screws onto the top of the EnviroSCAN probe. Ideal for use in orchards or vineyards as the unit can be mounted next to the vine leg and not get harvested.

Powered by a long-life lithium battery or rechargeable lithium battery. Battery life for rechargeable is approximately 6 months and 400 recharges.

Sentek PLUS Standard

Sentek PLUS Standard is a solar-powered, cellular/satellite telemetry system that automatically uploads EnviroSCAN probe data to IrriMAX, providing reliable remote monitoring without routine site visits.

Power is through a 12-volt battery system with solar panel, providing low-maintenance, self-charging operation for long-term field deployment.
The telemetry unit is installed close to the probe (typically within 5 m), reducing signal loss and simplifying installation.



Sentek MULTI

The Sentek MULTI is a flexible, multi-input logging and telemetry platform designed to collect and transmit a complete picture of soil, climate, and irrigation-related parameters from a single site.
Telemetry is through 4G cellular or satellite.
The MULTI system supports a customisable combination of inputs, including:

- Up to two cabled EnviroSCAN Sentek soil probes (200m of cable)
- Pulse inputs (up to two) for devices such as rain gauges or flow meters
- Temperature sensor inputs

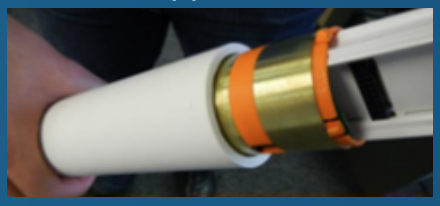
Other communication options:
The EnviroSCAN also supports Modbus RS232/485 and SDI-12 outputs to connect directly to 3rd party dataloggers. Also, the EnviroSCAN can be connected to the IoT DTU unit but needs some configuration changes in the DTU unit. This is managed by the supplier.

6.EnviroSCAN Deep Install Probes (to 25m)

The EnviroSCAN Deep Installation probe is designed to support deep soil profile monitoring, making it ideal for applications beyond the standard 4m depth. Flexible design allows installation at any depth up to 25m, with customisable sensor spacing. For installations greater than 4 m, strengthened access tubes and modified (orange) sensors are used.

Key Considerations

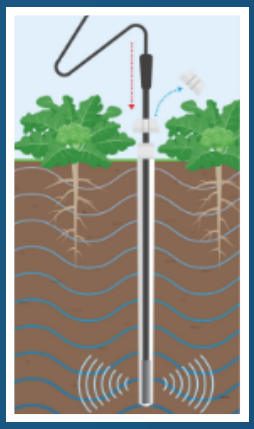
- Typical applications include mine site rehabilitation, tailings management and landfill and contaminated site monitoring.
- Slurry instals are always needed due to depth.
- Standard telemetry option is the Sentek MULTI as this can support up to 2 probes (32 sensors can be supported in the deep install probe at adjustable depths).



7.Diviner 2000 Probe

The Diviner 2000 is a portable, hand-held soil moisture monitoring system designed for spot measurements across multiple sites rather than continuous logging. It measures volumetric soil water content down the soil profile using a capacitance sensor housed within the probe. Measurements are taken at 10 cm depth intervals throughout the soil profile. Automatic depth sensing allows readings at up to 16 depths in a single insertion.

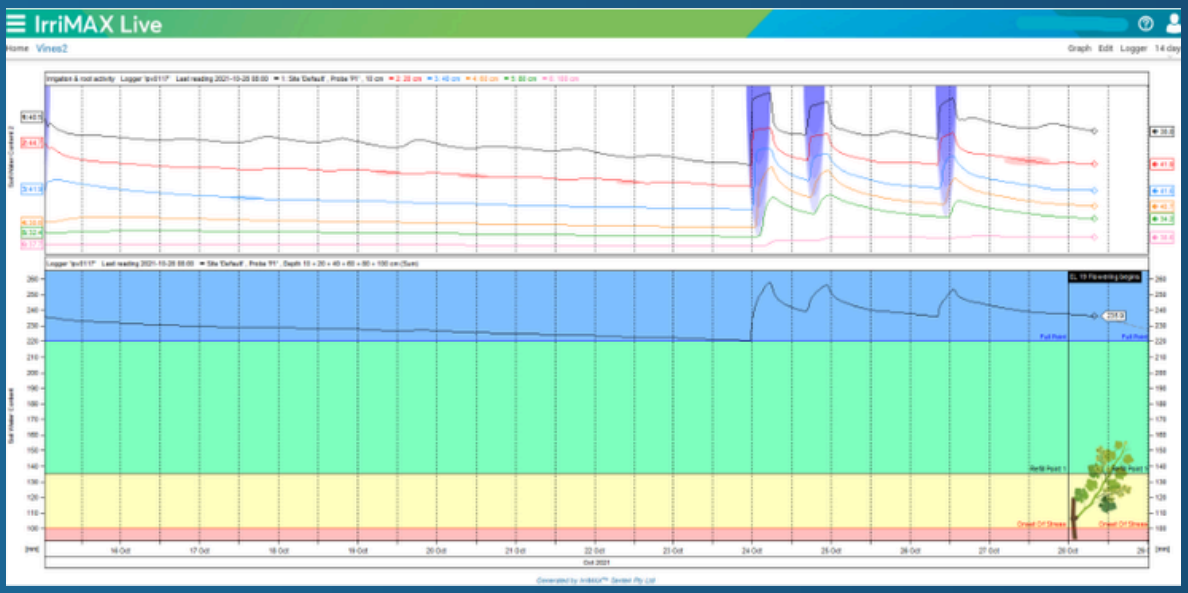
The probe is used with permanently installed access tubes that are compatible with Sentek EnviroSCAN probes, allowing sites to be upgraded to continuous monitoring later without re-installation.



This product is primarily used for vineyards, irrigated and dryland cropping, tree crops, research projects as well as environmental and landscape management.

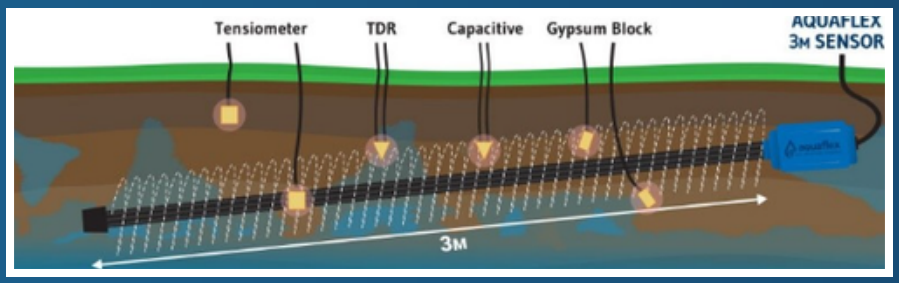
8.IrriMAX Live Software

IrriMAX™ Live is Sentek's cloud-based, subscription software platform for real-time visualisation, analysis and decision-making using soil moisture, salinity and temperature data. it is typically used alongside Sentek EnviroSCAN and Drill & Drop telemetered systems.



9. Aquaflex Soil Moisture

Aquaflex is a volumetric soil moisture (and temperature) sensor that uses a 3 m long flexible capacitance strip to measure soil moisture over a large representative soil volume, rather than a single point. It measures the dielectric permittivity of the soil, which correlates strongly to volumetric water content (VWC). The sensor averages moisture along its entire 3 m length, sampling approximately: 6 litres of soil (≈ 370 in^3).



HydroTerra Service Offerings

HydroTerra

Marketplace & Rental

Product Sales
Most suitable equipment and consumables for customer applications

Rental Services
Short-term monitoring equipment supply

Workshop, Support & Training

Workshop
Scheduled maintenance, calibration services and repairs in HydroTerra's Workshop.

Webinars and Training
held regularly to facilitate education

Field Services

Site Collection

Undertaking field measurements and analysing collected samples in a lab

Site Data Management

Generating publishable quality coded data files of known provenance

Site Reporting

Reporting on the sites operational and environmental compliance

Monitoring Systems

DataStream™

System Design

Developing monitoring plan and monitoring system design

System Specification

Specifying measurement points, equipment choices and data reporting

System Supply

Sourcing best software, hardware, hosting and telco options

Configure and Test

On selected systems design, calibration and alarm setup

System Install

Building and installing monitoring and sampling systems onsite.

System Oversight

Overseeing the monitoring system to ensure measurements are being captured and reported.

System Maintenance

Implementing the maintenance programs scheduled and unscheduled needs.

System Training

Deliver training programs to site operators enabling in-house maintenance and reporting.