

# MPkit - Soil Moisture Probe Kit



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The MPKit-406B / MPkit-306B is a portable soil moisture kit that enables rapid sampling of Volumetric Soil Water Content (VSW%). The Moisture Probe (MP406 / MP306) is inserted to the required depth of measurement by pushing the needles of the sensor into the soil surface or the soil profile in an augered hole.

The MPkit Bluetooth Interface provides the power to the Moisture Probe for the reading and transmits the moisture content via Bluetooth. The measurement is read out on the display of the MPkit App. All measurements are displayed directly in both raw mV and calibrated Volumetric Soil Water Content (VSW%). The readings are also stored for later recall or to download to a computer.

## Irrigation Scheduling

A series of holes are augered to the top (20cm), middle (40cm) and bottom (60cm) of the root zone. The augered holes have a 50mm PVC tube inserted. This enables routine measurement of soil moisture at the same location and depth for irrigation scheduling. The MPKit, when used in this manner has the same application as the Neutron Probe.

The MPKit can measure to any depth down an augered hole.



*The MPKit Measuring Surface Volumetric Moisture Content for Managing Turf Grass*

## The MPkit consists of:

- 1x Either MP406 or MP306 Moisture Probe sensor
- 1x Bluetooth Interface
- 1x Android Phone with ICT MPKit app pre-loaded
- 1x 35cm Moisture Probe Extension Rod and 1x 35cm Extension rod with a T-Handle
- 1x Carry Case

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## Sensor Theory of Operation

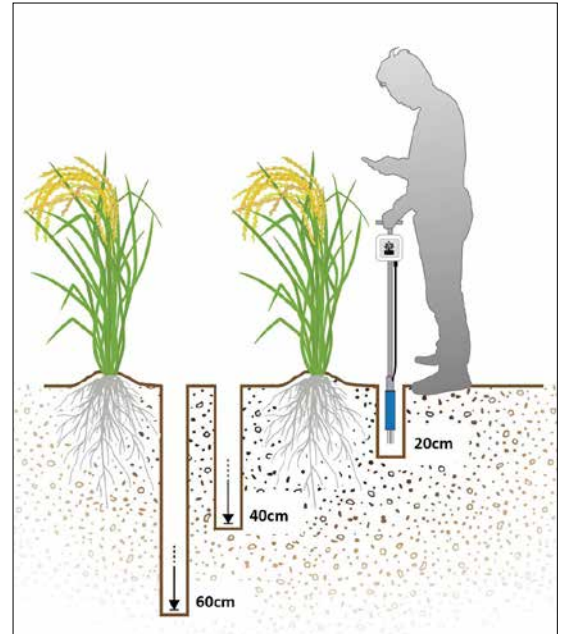
The MP306 / MP406 sensor has a high frequency moisture detector, which uses the Standing Wave or Amplitude Domain Reflectometry (ADR) principle to indicate the ratio of two or more substances forming a body of material, each substance having a different dielectric constant ( $K_a$ ). The moisture measurement of the material is based upon the fact that in a water:soil:air matrix, the dielectric constant is dominated by the amount of water present. Then the soil water content can be measured exactly because changes in water content of the soil result in changes in the dielectric constant of the soil.

Environmental, agriculture & engineering applications requiring assessment of the changes of soil moisture **in absolute mm and the exact volumetric soil moisture often use ADR technologies**. ADR sensors that have been buried permanently in landfills are still functioning after 15+ years.

## MPKit Recommended System Specifications

The MPKit Bluetooth interface works with any Android mobile phone with the following system specifications:

Operating System	Android 6.0 or above
RAM	1 GB or above
Available Storage	At least 200 MB



MPKit Bluetooth Interface



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## MP406 / MP306 Soil Moisture Probe

The MP406 / MP306 Moisture Probe can be used to measure the soil moisture for scientific research or irrigation management, or the moisture content in many roadway and building construction materials. In either situation it can:

- Rapidly measure soil moisture by pushing the needles of the sensor into the soil surface or soil profile. (MPKit)
- Make measurements over time by permanently burying the MP406 / MP306 and connecting it to a data logger (SNiP-MP3 / SNiP-MP4).
- Control irrigation by permanently burying the MP406 and connecting it into an irrigation controller with industry standard 4-20mA interface. (MP406C)
- The MPKit is a very suitable substitute for the Neutron Probe for irrigation scheduling.

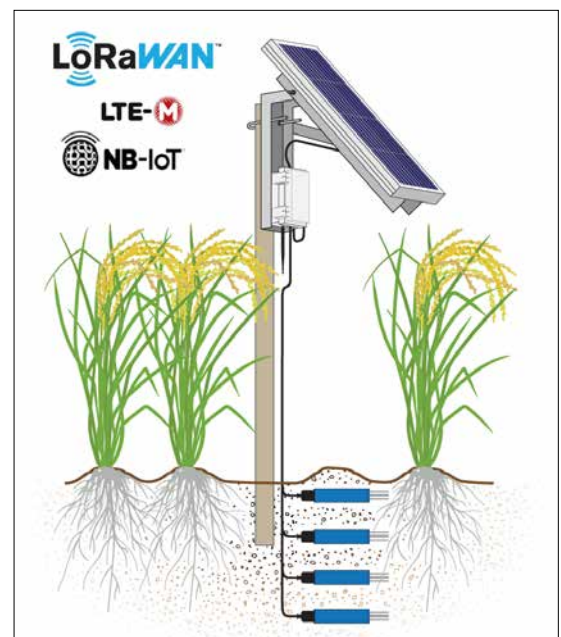
## MPKit Details

**MPkit Extension Rod** consists of a pair of chrome extension rods. Each rod is 35 cm long enabling measurement of soil moisture to 70 cm depth in the soil profile. One rod connects to the MP406 and the other has a "T" handle. Additional 35cm extension rods are available upon request.

**MPkit Case** carries the MPkit. The MP Auger Set (optional) consists of a spiral drill bit and T handle. The auger set drills a 50 mm diameter hole enabling the MP406 to be easily pushed to the depth required for measurement.



*Permanent In-Situ Installation Being Set Up*



*The SNiP-MP4 is a 'Sensor Node Integrated Package' for LoRa, LoRaWAN, or CAT-M1 communication of real-time accurate soil moisture measurements for continuous soil monitoring. The base SNiP-MP4 integrates 1x MFR-NODE and 1x MP406 soil moisture probe to a site's unique network, communication and power requirements. An added 3x MP406 soil moisture probes can monitor soil moisture at multiple depths.*

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<b>Measurement Range</b>	0-100 VSW%
<b>Accuracy</b>	2 VSW% after calibration to a specific soil type, or 5 VSW% using the supplied soil calibration
<b>Environment</b>	Environmentally sealed, can be permanently buried in the soil
<b>Needles</b>	Stainless Steel
<b>Exterior</b>	ABS Plastic
<b>Cable</b>	4.5m Standard
<b>Interface</b>	<p><b>Power requirements:</b> 3 x AAA Batteries</p> <p><b>Power consumption:</b> MPKit-306B : 14 mA typical, 16 mA max MPKit-406B : 24 mA typical, 30 mA max</p> <p><b>Output signal:</b> 0-1000 mV for 0-50 VSW% 1106 mV maximum</p>
<b>Response Time</b>	Less than 0.5 seconds
<b>Stabilisation Time</b>	3 seconds
<b>Mechanical</b>	Total length 215 mm. Diameter 40 mm Needle length 60 mm. Needle Diameter 4mm
<b>MP306B</b>	Needle spacing 10 mm
<b>MP406B</b>	Needle spacing 14 mm

