



**ENTELECHY**  
*Realising potential.*

T: +61 8 8251 7559  
F: +61 8 8251 5519  
sales@entelechyinternational.com.au

Unit 4 / 8 Aristotle Close  
Golden Grove SA 5125  
AUSTRALIA

# *EnviroPro*<sup>®</sup>

PRECISION SOIL PROBES

## INSTALLATION MANUAL



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At the heart of any serious soil monitoring system are the primary sensors. EnviroPro® Soil Probes are built with multi-function and multi-level sub-surface sensors. Fully encapsulated, reliable and repeatable, EnviroPro® continuously monitors soil Moisture, Temperature and Salinity.

First with salinity-compensated Moisture readings, EnviroPro® soil probes provide accurate data for meaningful irrigation and fertiliser decision-making, year after year.

### Warranty

Entelechy Pty Ltd offers a 5 year, return-to-factory warranty on this product. The warranty applies to hardware and firmware defects only.

The warranty does not cover acts of misuse by the user or third parties, including misuse arising from failure to install or operate a system or its components in accordance with relevant system documentation, or failure to seek advice from Entelechy regarding correct installation or operation of a system or its components. This product is guaranteed against faulty workmanship or defective material for a period of 5 (five) years from date of purchase.

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## Installation

### Required Tools and Equipment

The following quantities and method described below will make enough slurry for the installation of two 80cm EnviroPro® Soil Probes.

- EnviroPro® 36mm Installation Auger Kit
- 900 gm of fine sand (eg Unimin AFS85 grade or fine builders sand)
- 100 gm Bentonite (eg Sibelco TruGel 100 <https://www.sibelco.com/materials/bentonite/>)
- If Bentonite is not available a slurry using local soil (if suitable) could be used. For this, a means of sieving out rocks and organic matter from the soil is required
- 1L clean water
- Small bucket with lid
- Funnel
- Two-litre plastic bottle with lid
- Masking tape/electrical tape or permanent marker

### Which Probe to Use

The choice of probe will be determined by the depth of the root zone or profile depth to be monitored, and the parameters to be measured. All EnviroPro® probes can measure soil moisture and soil temperature. EC equipped models also measure electro conductivity (EC) at each depth.

Model	Moisture Points	Temp	EC	Sensing	Length (cm)
EPI00GL-04	●	●		4	46.5
EPI00GL-08	●	●		8	86.5
EPI00GL-12	●	●		12	126.5
EPI00GL-16	●	●		16	166.5
EPI00G-04	●	●	●	4	46.5
EPI00G-08	●	●	●	8	86.5
EPI00G-12	●	●	●	12	126.5
EPI00G-16	●	●	●	16	166.5

## Installation

**To ensure maximum accuracy, EnviroPro® soil probes must be installed using a slurry.**

There are two major advantages to using the slurry install method.

1. Optimal sensor-to-soil contact  
AND
2. When Bentonite is used, the removal of probes is significantly easier

Accuracy and reliability of the data is paramount. The disruption of soil, and movement of objects in the soil such as roots and rocks, that occurs during the boring process creates voids around an installed probe. Voids skew the probe's readings due to the vast differences between the dielectric properties of the contents of the voids and the surrounding soil. In dry conditions, voids present as air pockets. In wet conditions, preferential flow will fill voids with water. While the presence of rock, roots and other solid matter in the soil cannot be controlled, voids can be eliminated with the use of a slurry.

The two types of slurry are:

- A slurry made of a Bentonite and fine sand (recommended).
- A soil slurry made of soil obtained from the augered hole itself or surroundings (if suitable).

### How to Prepare a Bentonite Slurry

You will need:

- 100g of Bentonite
- 900g fine sand
- 1L clean water
- 2L plastic bottle (or similar)
- A bucket to mix the sand and Bentonite in

Method:

1. Mix 100g of Bentonite with 900g of fine sand together in a bucket. **Ensure they are dry mixed together before adding any water.**
2. Pour the dry mix through a funnel into a two litre plastic bottle (or similar).
3. Pour 1L of clean water into the bottle.
4. Put the lid on and shake until thoroughly mixed.
5. Allow 30 minutes for the Bentonite to swell. The resulting mix should be a 'creamy' consistency.

**Please Note: Always shake the mixture before pouring the slurry as the sand may have settled if not used immediately.**

## Installation

### How to Prepare a Soil Slurry

You will need:

- Approx. 1kg of clean soil to install two 80 cm probes
- Approx. 1L of clean water per kilogram of soil
- A means of sieving out rocks and organic matter from the soil
- A bucket to mix the soil and water together in
- A funnel to pour the mixture down the hole

Method:

1. Pass the soil through a sieve to remove any rocks and organic material.
2. Gradually mix in enough water to form a creamy paste.

## Installation

### How to Install EnviroPro® Soil Probes

#### Method:

1. Measure the length of the probe. Use the tape measure and the adhesive tape to mark the auger 3.5 cm longer than the probe to be installed.
2. Auger a hole 3.5 cm deeper than the probe to be installed. Use the tape measure to check the depth after the auger is extracted to ensure that part of the hole wall has not collapsed and that other material has not fallen into the hole.
3. A useful method to clean out the bottom of the hole is to pour in a small amount of Bentonite Slurry into the bottom of the hole. The loose soil will stick to the Bentonite and the Auger can then be used to retrieve the soil.
4. Pour slurry into the hole until it is half full.
5. Push the probe into the hole until the top is 35 mm (3.5 cm) below the soil surface. Do not apply too much pressure (15kg max) and avoid causing sharp bends in the cable where it enters the probe.
6. The slurry should ooze up around the probe and slightly overflow the hole. If you do not see any slurry, carefully extract the probe, mix up some more slurry and add to the hole.
7. Using the removed soil backfill the hole to cover the probe.
8. Trench the cable in to a depth of 100 mm or deeper to protect it. Leave a loop of cable in the trench to provide 'strain relief' if the cable is snagged by machinery or stretched due to compaction of the ground.

*Please Note: If the probe is very difficult to push in the slurry may be too thick. Add 5% more water, mix and test. If the probe goes in too easily the slurry is too thin. Add 5% more bentonite/sand, mix thoroughly and leave for fifteen minutes before testing. Repeat this procedure until you are satisfied with the consistency.*

### Wiring

Red	+7* to +16VDC
Black	0V
Blue	Data
Yellow	Not connected (reserved for future use)

\*minimum 6VDC under the following conditions: standard EnviroPro® 5m / 16ft cable with single device connected to SDI-12 bus (not tested beyond 25°C). Accuracy of data outside these conditions cannot be guaranteed.

## Extraction

### Required Tools and Equipment

- EnviroPro® Extraction Clamp
- Multi-grip pliers or Vice Grips can be used if an extraction clamp is not available.

### How to Extract EnviroPro® Soil Probes with the EP Extraction Clamp

Method:

1. If the soil is dry, extraction can be made easier by pre-wetting the soil the day before attempting extraction.
2. Use a trowel or small spade to carefully remove the soil around the head of the probe down to a depth of 15cm.
3. Clamp the EP Extraction Clamp to the probe body 10 mm below the cable.
4. Grip the handles of the EP Extraction Clamp. Rotate the probe clockwise and anti-clockwise until you can rotate the probe approximately a quarter-turn. **Make sure the Extraction Clamp does not interfere with the probe cable.**
5. You should now be able to work the probe free of the soil by pulling upward while continuing the rotating motion. **Ensure the probe is removed as vertical as possible. Off-vertical forces may damage the probe.**

### Extraction using Multi-Grip Pliers or Vice Grips

Method

1. To avoid damage to the probe, cushion the jaws of the pliers or vice with heavy duty electrical / duct tape or rubber.
2. If a probe removal tool is not available, multi-grips or vice-grips can be used for extraction. The method and precautions are the same as that for extraction using a probe removal tool (see above).

**Ensure the probe is removed as vertical as possible. Off-vertical forces may damage the probe.**