Ceres CS1
Soil Sensor

TENETICS, LLC

Advanced Wireless for Agriculture

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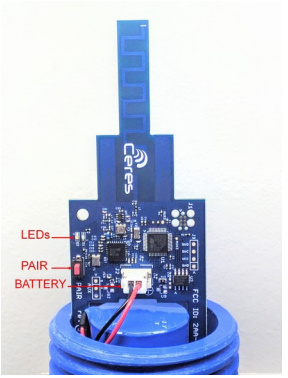
Getting Started

Congratulations on selecting Ceres for your precision agriculture needs. This manual will help you get your CS1 Soil Sensor installed and running in less than 5 minutes.

Overview

The CS1 Soil Sensor measures soil moisture and temperature levels every 15 minutes and transmits them to a Ceres Gateway using proprietary long-range wireless technology. Ceres Gateways forward your data to secure online storage which can be accessed any time using your smart-phone or computer.

Controls



Unscrew the top (cap) to access the sensor controls.

- LEDs show the sensor status
- PAIR button is used to activate the sensor and pair it with a gateway
- The white BATTERY connector is used to connect the battery or disconnect it for shipping/storage

Avoid exposing the electronic controls to water or static shock.

Adding (Pairing) a new sensor: as easy as 1,2,3

Bring your new sensor to your installed Ceres gateway and:

1. Plug the sensor's battery into the connector as shown in the Controls section. Make sure the red wire is by the + symbol.
2. Press and release the PAIR button on your Ceres gateway to enter pairing mode; the blue light will start blinking.
3. Press and release the PAIR button on your Ceres CS1; the LEDs on the CS1 will blink several times to indicate successful paring and the blue light on the gateway will stop blinking.
4. Repeat step 3 if needed.

Screw the cap on tightly and you're ready to deploy your sensor.

Location and Deployment

Your CS1 should be located in soil with the same drainage and exposure as the crops to be monitored. Prepare the soil exactly as you would for a seedling: augur the soil to create a planting hole, remove rocks and sticks, insert the probes fully into the soil until the base of the sensor is flush with the ground. Pack soil back into the hole to eliminate large air pockets.

For accurate moisture readings, the soil around the sensor must hold water in the same way as the soil around your crops and soil must fill the space between the probes.

Pro Tips:

- For tall crops, place a fiberglass marker next to the sensor.
- Remove the sensor before cultivating or harvesting.
- **Do not** hammer or force the sensor into the ground

Advanced Installation

Use the Ceres app for Android for easier management of your paired CS1 sensors. The app helps you name your sensors as you install them and automatically tracks their GPS location on the map display.

- Launch the Ceres App
- Select Equipment->Sensors->Install
- Scan the QR or bar code on your sensor
- Give your sensor a name (e.g. Cabbage Patch)
- Press Install and deploy your sensor.

Wireless Link Test

Press and release the PAIR button on your already paired CS1. The CS1 will transmit a message to the gateway and the LEDs will blink 1-5 times to indicate the strength of the wireless link.

Storage

At the end of the season, you may remove and store your sensor. Carefully remove the sensor from the ground, loosening the soil first if it has become compacted. You may also disconnect the battery to save power. Clean the sensor with running water before opening it and replace the cap before storing.

Un-Pairing

To permanently un-pair a sensor from a gateway, bring the sensor near the gateway and press and hold the PAIR button on the sensor for 5-10 seconds. The LED will blink twice to show that un-pairing is complete.

Specifications

Power

- A lithium primary battery supplies power for years of reliable operation and will exceed the life of the sensor.

Physical

- 12.5” x 2.5” and 250g
- -40 to +85C operating temperature range
- IP67 rated for outdoor use

Wireless

- Long range sub-GHz frequency band
- Secure frequency hopping spread spectrum (FHSS)
- Advanced filtering resists cellular and pager interference

Sensing

- Non-contact VHF soil moisture sensing for >5% accuracy.
- Soil temperature sensing at 2” and 4” depths. +/-1C accuracy.

Processor

- 32-bit microprocessor with 4Mb flash storage
- Digital encryption and authentication

FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Who we are

Tenetics is committed to bringing precision agriculture to small and medium-sized farms. Our Ceres wireless products help you monitor and manage your farm from your computer or smart-phone.

Ceres is designed for agriculture:

- Easy installation
- Maintenance free
- Long wireless range
- Wide operating temperature
- Rugged outdoor reliability

Ceres (Demeter) was the Greek and Roman goddess of agriculture. "Cereal" comes from her name.

Contact Us

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