

USER MANUAL

IRROLIS SENSE Tx SOIL AND SUBSTRATE TENSION MEASUREMENT

Irrolis Sense Tx probes are derived from a classical tensiometer technology that allows readings of soil and substrate tension for optimized plant growing, experiment monitoring and environmental follow-up.

FOR SERVICE PLEASE CALL
1-888-5-HORTAU

1 IRROLIS SENSE Tx



2 WARNING

IMPORTANT

Before using or preparing your IRROLIS SENSE Tx, check that you have all parts at hand and in good working order.

- Handle the IRROLIS SENSE Tx with care at all times.
- The Ceramic Tip MUST be in contact with soil or substrate in order to generate an accurate reading.
- Do NOT put the Ceramic Tip in contact with oil, fats or any contaminant that could affect its wettability.
- Never totally immerse the IRROLIS SENSE Tx.
- The IRROLIS SENSE Tx is sealed and cannot be opened except for the Water Inlet and the Ceramic Tip which can be replaced if broken.
- Protect the Ceramic Tip at all times against shocks.
- The IRROLIS SENSE Tx should be protected at all times against frost. Under no circumstances should the storage temperature be below 5 °C (40 Fahrenheit).
- Avoid exposure to magnetic fields.
- Do not expose to extreme temperatures.

3 IMPORTANT NOTICE

The user manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication. This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at its own expense. This device has been designed to operate with an antenna having a maximum gain of 2.2 dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms. The ¼ wave antenna provided with this device has a gain of 2.2 dB and is manufactured by Antenna Factor (P/N ANT-418-CW-QW).

4 FEATURES



LCD Display

The tension measurement is displayed on the LCD Display. The LCD Display is always ON when the device is powered. If the device is equipped with a temperature sensor (optional), both tension and temperature measurements are displayed alternatively.



Low Battery Indicator

When the battery level is getting low, an arrow is displayed next to the Low Battery pictogram.



Units

The IRROLIS SENSE Tx displays soil or substrate tension in kilopascal (kPa) or centibar (cbar), two equivalent measurement units. The temperature (optional) is displayed in °C (Fahrenheit in USA).



Analog Output Connector

The IRROLIS SENSE Tx is equipped with an Analog Output Connector. This feature enables connection with most analog data loggers and control systems.



Dust Cap

The Analog Output Connector and Battery Pack Connector are equipped with Dust Caps to protect against dust and debris accumulation. Leave them in place when connectors are not in use.

5 GETTING STARTED

When powered-on, the IRROLIS SENSE Tx goes through an initialization routine :

- Battery voltage displayed.
- Tension displayed (the IRROLIS SENSE Tx is now ready).

INSTALLING THE ANTENNA



- Screw the Antenna on the Antenna Connector. Make sure the Antenna is tightly screwed. This will ensure good transmission.

FILLING THE IRROLIS SENSE Tx

- Unscrew the cap of the Filling Bottle
- Pour drinking water in the Filling Bottle and screw the cap back.
- Using the Hexagonal Key, remove completely the Water Set Screw.
- Squeeze the Filling Bottle to push water in the IRROLIS SENSE Tx directly.

5 GETTING STARTED

- Using the Hexagonal Key, screw the Water Set Screw back, making sure it is firmly tightened.
- Your IRROLIS SENSE Tx is now ready to use.

STORING THE IRROLIS SENSE Tx WHILE FILLED

If you do not install the IRROLIS SENSE Tx after filling it, it is recommended to leave it with the Ceramic Tip in contact with free water. A convenient tip is to place the IRROLIS SENSE Tx in a bucket containing two (2) inches of water until it is installed. Otherwise, the Ceramic Tip will dry and the IRROLIS SENSE Tx will eventually empty.

6 OPERATION - TIPS

The plants (growth stage, size, species, etc.) and the ambient conditions, as well as the characteristics of the soil or substrate, are variable parameters. Hence, soil water tension (moisture) varies from one location to the next. Here is how to choose a location for the IRROLIS SENSE Tx and determine the number of IRROLIS SENSE Tx needed in a given situation.

DEFINING IRRIGATION ZONES

If your irrigation system is installed, this exercise must have been completed during the design stage of the system. Normally, an irrigation valve controls the watering for a specific zone. Watering in this zone is relatively uniform; hence the plants it contains must normally have similar water needs. If you water manually, define the zones where plants have similar water needs. Install at least one (1) IRROLIS SENSE Tx per irrigation zone. Ideally, five (5) IRROLIS SENSE Tx are needed to manage irrigation and obtain an average representation of the water needs of plants within a given irrigation zone. However, three (3) IRROLIS SENSE Tx are often enough to ensure proper management within a zone.

6 OPERATION - TIPS

SOIL TENSION IS A VARIABLE PARAMETER BASED ON, AMONG OTHERS, CLIMATIC CONDITIONS, AND SOIL CHARACTERISTICS. THE IRROLIS SENSE Tx PERFORMS A MEASUREMENT FROM THE LOCATION WHERE IT HAS BEEN INSTALLED. THIS IN NO WAY GUARANTEES THAT THE TENSION READING WOULD BE THE SAME AT ANOTHER LOCATION, EVEN IF IT WERE CLOSE TO THE INSTRUMENT. THE IRROLIS SENSE Tx CANNOT IN ANY CASE REPLACE PERSONAL JUDGEMENT.

THE NUMBER OF IRROLIS SENSE Tx PER IRRIGATION ZONE IS GIVEN FOR INDICATION ONLY. EVERY SITUATION INVOLVES PARTICULAR CIRCUMSTANCES THAT CANNOT BE ESTABLISHED IN THIS MANUAL. THESE INDICATIONS CANNOT IN ANY WAY REPLACE PERSONAL JUDGEMENT.

INSERTING THE IRROLIS SENSE Tx INTO THE SOIL OR SUBSTRATE

1. Determine depth of penetration

For plants growing in a pot or in a grow bag, the penetration depth must be equal to half the height of the pot or bag. As for field-grown plants, the penetration depth must be equal to the average rooting depth of the plants.

6 OPERATION - TIPS

2. Preparing the insertion hole

Using a 25 mm (1 in.) diameter rod, make an insertion hole in the soil or substrate where the IRROLIS SENSE Tx will be installed. Once inserted in the soil, the entire surface of the Ceramic Tip must remain in contact with the soil. Therefore, do not insert the rod at a depth exceeding the penetration depth of the IRROLIS SENSE Tx to allow the Ceramic Tip to remain in contact with the soil at the bottom of the insertion hole. For deep insertion it might be difficult to insert a rod in the soil. To make the insertion easier, pour water at the surface prior making the hole, and pour some more water in the hole as you go deeper. This will make the soil easier to dig. A 25 mm (1 in.) power-driven drill will make deep installation faster and easier. The blue line on the metal tube of the IRROLIS SENSE Tx indicates the maximum insertion depth, this in order to leave the Air Set Screw above soil.

6 OPERATION - TIPS

3. Inserting the IRROLIS SENSE Tx

Insert the IRROLIS SENSE Tx, the Ceramic Tip first, by pushing lightly on the Hortimetre Head. Do not exert undue pressure on the Hortimetre Head. If it does not glide in easily, widen the insertion hole by using a 30 mm (1 1/4 in.) diameter metal rod. Try once more. If it is still not possible to push the IRROLIS SENSE Tx into the insertion hole, dig another hole at a different place. While inserting the IRROLIS SENSE Tx, be careful not to unscrew the Ceramic Tip by rotating the IRROLIS SENSE Tx counter clockwise. Once the installation is done, replace soil or substrate around the Stainless Steel Tubing to avoid water infiltration along the tube.

4. Wetting the soil

Once installed, it is recommended to pour water at the soil or substrate surface, around the IRROLIS SENSE Tx, to ensure adequate contact between the Ceramic Tip and the soil or substrate.

5. Operation / Maintenance

The IRROLIS SENSE Tx is designed to reduce the maintenance to a minimum. However, if the soil tension gets high low or after long use periods, the IRROLIS SENSE Tx might need to be refilled. In such cases, the IRROLIS SENSE Tx will display the value H2O. This display indicates that a refilling is required.

7 COMMUNICATION

Autonomous Mode

The tension measurement can be read directly on the LCD Display. The display is refreshed on a random average of five (5) minutes for the Tx-80 model, and every two (2) minutes for the Tx-07 model.

Analog Mode

The IRROLIS SENSE Tx can be connected to an irrigation control system or a data logging system by a wire linked to the Analog Connector. It is necessary to supply power to the IRROLIS SENSE Tx through the analog connector to get a voltage output. To transform the output voltage into tension, use the following equations where "y" is tension in kPa or cbar and "x" is voltage in Volt:
To-07 and To-07-WL : (y) = 2,4069 (x) - 0,2537
To-35 and To-35-WL : (y) = 11,9750 (x) - 1,1032

Wireless Mode

The tension and temperature (optional) measurements, as well as the battery level and the wireless signal quality, are transmitted to the IRROLIS COM WR (Hortau's wireless receiver, P/N 6010). The Iricom WR translates the wireless signal into a RS-232 signal that can be used by your PC computer using the Irrolis Software by Hortau (P/N 5001). For installation and use, please refer to the User Guide of the IRROLIS COM WR provided with it.

8 STORAGE

When not in use, the IRROLIS SENSE Tx should be stored properly. This will prevent some damage and extend the shelf life of the device.

STORING THE IRROLIS SENSE Tx

- Remove the device from the soil or substrate.
- Wash the aluminium casing and the Ceramic Tip with water.
- Remove the batteries from the IRROLIS SENSE Tx following the INSERTING AND CHANGING THE BATTERIES instructions of section 5 - GETTING STARTED of this manual.
- Release the pressure from the sensor by removing the Water Set Screw using the Hexagonal Key.
- Store the IRROLIS SENSE Tx in a dry place. Storage temperature must stay between 5 and 30 °C (40 and 85 Fahrenheit)

THE IRROLIS SENSE Tx SHOULD BE PROTECTED AGAINST FROST AT ALL TIMES. UNDER NO CIRCUMSTANCES SHOULD THE STORAGE TEMPERATURE BE BELOW 5 °C (40 FAHREHNHEIT).

9 TROUBLESHOOTING

Displaying H2O while the Ceramic Tip is in the water

- Normal while the Ceramic Tip is in the water for a long time.
- Insert the Ceramic Tip into the soil and wait 15 minutes.

No Display

- Verify that the batteries are not dead by replacing them with new ones.

Worn or broken Ceramic Tip

- The material used for the end piece is brittle. Minute splinters and scratches may appear at its surface with extended use. These do not hinder the good operation of the instrument.
- If the end piece is broken, order a replacement from your local distributor

Displaying H2O constantly

- The IRROLIS SENSE Tx is empty and needs to be refilled in order to work properly. Just refill it with water following the FILLING THE IRROLIS SENSE Tx instructions of section 5 - GETTING STARTED of this manual
Or
- The IRROLIS SENSE Tx is in contact with the water table. Wait for the soil to dry.

10 SPECIFICATIONS

Power Supply 2.2 to 3.3 Volt DC

RF Frequency 418 MHz

Tension Range 0.0 – 7.0 kPa (cbar):
Models Tx-07
0.0 – 80.0 kPa (cbar):
Models Tx-80

Analog Data Output 0.0 – 3.3 Volt DC

Analog wires color code Red wire: Supply (+)
Black wire (twisted with red wire): Ground (-)
White wire: Signal (+)
Black wire (twisted with white wire): Signal (-)



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