

USER MANUAL

1 IRROLIS SENSE Tx

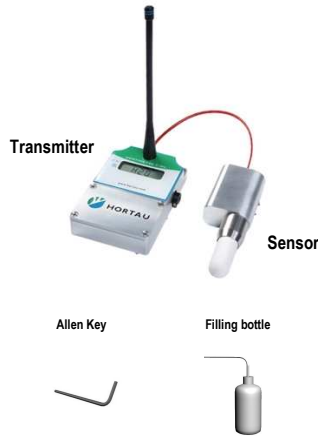
2 WARNING

3 IMPORTANT NOTICE

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



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.

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.

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

INSERTING AND CHANGING BATTERIES

1. Separate the cover from the housing of the Battery Pack.
2. Remove the used batteries (if any).
3. Insert two (2) new AA batteries.
4. Verify that the gasket is well positioned.
5. Put in place the cover on top of the IRROLIS SENSE Tx.
6. Screw back the four (4) screws.

5 GETTING STARTED

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

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

INSTALLING THE ANTENNA



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

FILLING THE IRROLIS SENSE Tx

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

5 GETTING STARTED

5. Using the Hexagonal Key, screw the Water Set Screw back, making sure it is firmly tightened.
6. 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 SENSOR 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 100 mm (1 in.) diameter auger or a shovel, make an hole of desired depth in the soil where the IRROLIS SENSE Tx will be installed. Insert the sensor of the IRROLIS SENSE Tx, ceramic tip first, in the bottom of the hole. Push lightly the ceramic tip into the ground. The ceramic tip must be completely inserted into the ground. Be careful to avoid radial forces in order to prevent ceramic breakage. For shallow installation, insert the sensor with a 10 degree angle. Once the installation is done, replace soil or substrate in the hole and compact lightly. A MINIMUM OF EIGHT (8) CM OF SOIL ON TOP OF THE SENSOR IS RECOMMENDED FOR FIELD USE.

3. **Wetting the soil**

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

6 OPERATION - TIPS

4. **Operation / Maintenance**

The IRROLIS SENSE Tx is designed to reduce the maintenance to a minimum. However, if the soil tension gets high or after a 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.

Once the sensor is correctly positioned into the soil, place the transmitter of the IRROLIS SENSE Tx on its stand (P/N 9112)(optional) at the desired height. If the transmitter must be placed vertically, use the elbow antenna (P/N 9210) in order to keep the antenna vertically-positioned. If a longer transmission distance is needed, it is possible to raise the transmitter using a T bar or a pole.

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 Irricom 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

1. Remove the device from the soil or substrate.
2. Wash the aluminium casing and the Ceramic Tip with water.
3. Remove the batteries from the IRROLIS SENSE Tx following the INSERTING AND CHANGING THE BATTERIES instructions of section 5 - GETTING STARTED of this manual.
4. Release the pressure from the sensor by removing the Water Set Screw using the Hexagonal Key.
5. 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 FAHRENHEIT).

9 TROUBLESHOOTING

- Displaying H2O while the Ceramic Tip is in the water**
1. Normal while the Ceramic Tip is in the water for a long time.
 2. Insert the Ceramic Tip into the soil and wait 15 minutes.

- No Display**
1. Verify that the batteries are not dead by replacing them with new ones.

- Worn or broken Ceramic Tip**
1. 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.
 2. If the end piece is broken, order a replacement from your local distributor

- Displaying H2O constantly**
1. 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
 2. 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 (-)



HORTAU INC.
735, rue de l'Église
St-Romald, QC G6W 5M6
CANADA
1-888-5-HORTAU
www.hortau.com

