

USER'S HANDBOOK



Information to user

The users 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.

HORTIMETRE P probes are derived from a new optical and digital patented technology that allows readings of soil and substrate tension for plant growing.



HANDLE THIS PROBE WITH CARE AT ALL TIMES. AVOID CONTACT WITH FATS AND OILS AND DO NOT COMPLETELY SUBMERGE IN A LIQUID.

PROCEDURES



5-. Reinsert the metal head into the head by rotating it in one direction then in the other (a quarter of a turn maximum).

6-. Tighten the three Allen screws under the head of the Hortimetre.

7-. Verify that the instrument is activated by checking if the display is working. If not, refer to the TROUBLESHOOTING section of this manual.

INITIALIZATION AND POWER-ON PROCEDURE



During the power-on procedure, the instrument goes through an initialization routine, the progression of which is displayed on the screen.

- 1) All LCDs displayed
- 2) One-second pause
- 3) Battery power level displayed (mV)
- 4) Tension in cbar / kPa displayed

1-. Wet the tip of the ceramic in free water for 15 minutes (as shown), after which period, the display screen will indicate 00.0 cbar / kPa. If the display does not indicate 00.0, refer to the TROUBLESHOOTING section of this manual.

LOCATION/INSTALLATION

B-. Install at least one Hortimetre per irrigation area. Ideally, five Hortimetres are needed to manage irrigation and obtain an average representation of the water needs of plants. However, three Hortimetres are enough to ensure proper management.

THE NUMBER OF HORTIMETRES PER IRRIGATION AREA IS GIVEN BY WAY OF INDICATION ONLY. EVERY SITUATION INVOLVES PARTICULAR CIRCUMSTANCES THAT CANNOT BE ESTABLISHED IN THIS MANUAL. THESE INDICATIONS CANNOT IN ANY WAY REPLACE PERSONAL JUDGMENT.

PENETRATION INTO THE SOIL / SUBSTRATE

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

THE AVERAGE ROOTING DEPTHS ARE GIVEN FOR INFORMATION ONLY. THESE MEASUREMENTS MAY VARY FROM ONE GEOGRAPHICAL AREA TO THE NEXT OR FROM ONE CLIMATIC AREA TO THE NEXT, DEPENDING ON SOIL TYPE AND OTHER FACTORS. THESE INDICATIONS CANNOT IN ANY WAY REPLACE PERSONAL JUDGMENT.

COMMUNICATIONS

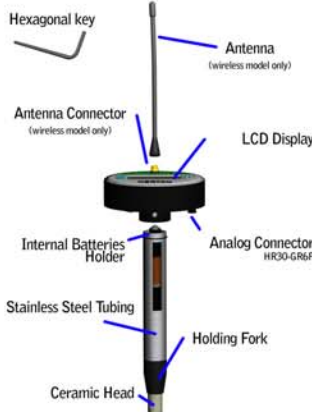


Autonomous Mode
The tension measurement in the growing environment can be read directly on the Hortimetre display. The display is refreshed on a random average of five minutes.



Connected Mode
The Hortimetre is connected to an irrigation monitoring system by a wire linked to the connector located under the head of the Hortimetre. The monitoring system must supply power to the Hortimetre one second before taking the reading and then cut the supply. Only supplying power to the Hortimetre when it is making measurements helps limit the development of algae inside the ceramic and thus ensure the ongoing accuracy of the instrument. While operating in connected mode, it is recommended to use Ni-Cd type rechargeable batteries. These batteries keep the display working even when the Hortimetre is not being supplied by the irrigation monitoring system.

HORTIMETRE P / PWL



FEATURES



Display screen
All available information can be accessed on the display screen.



Electrical supply indicator
If this indicator is displayed, it means that the power level of the battery will shortly prove to be insufficient.



Tension indicator
The label shows the instrument's scale of measurement. The Hortimetres display soil tension on a centibar or kilopascal scale.



Moisture indicator
This indicator is displayed according to the general moisture conditions of the soil. It does not give an accurate measurement, but rather an estimated based on the full spectrum of the instrument (0 to 50 cbar).

- 3 drops : wet
- 2 drops : spectrum middle point
- 1 drop : dry

LOCATION/INSTALLATION



B-. Wetting the ceramic
Wet the ceramic by letting it soak in drinking water for 10 minutes. The theory of operation of the Hortimetre is based on the balance between the water tension (moisture) of the ceramic and that of the soil. By wetting the ceramic before inserting into the soil, this balance will be established within about 15 minutes. Without this initial wetting, the Hortimetre would need several hours in order to reach a balance with the soil. If the soil is very dry, it could even be necessary to wait until the next watering or rainfall before reaching that balance.

C-. Preparing the hole
Using a 1/2 inch (13 mm) diameter rod, make an insertion hole in the substrate at the place where the Hortimetre will be installed. Once inserted in the soil, the entire surface of the Hortimetre ceramic must remain in contact with the soil. Therefore, to not insert the rod at a depth exceeding the penetration depth of the Hortimetre to allow the ceramic to remain in contact with the soil at the bottom of the insertion hole. A convenient tip would be to mark the rod at the desired insertion depth and use the same rod for all the Hortimetres to be inserted at that depth.

COMMUNICATIONS



Wireless Mode
Only type WL Hortimetres can be operated in wireless mode. The magnitude of signal, as well as the battery levels, is transmitted to the Hortaui SIGNUM.
The Hortaui probe can be equipped with various modules that enable data processing and even its connection to an irrigation monitoring system.
Hortimetres that operate in wireless mode must be connected to a Hortaui SIGNUM Data Signal Converter receiver.



Wireless SIGNUM Data Signal Converter
The SIGNUM Data Signal Converter for the Hortimetre wireless probe is the dedicated instrument for receiving and converting the RF signal into an RS-232 signal.

WARNING

IMPORTANT

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



Avoid exposure to magnetic fields.



Do not expose to extreme temperatures.



Do not put the ceramic in contact with oil, fats or any other contaminant that could affect their wettability.



Never totally immerse a HORTIMETRE.



The HORTIMETRE is sealed and cannot be opened, except for the battery compartment.



Protect the end piece of the ceramic at all times against shocks.

FEATURES



Analog network connector
All HORTIMETRE models are equipped with a DB6 HR30-GR6F analog connector. It is possible to connect it to an irrigation management system.



Antenna connector
The receiver connector for the antenna (wireless model only) is located on the head of the HORTIMETRE.



Antenna (wireless model)
The antenna screws on to the reception screw located on the head of the HORTIMETRE. This antenna can remain screwed on for the lifetime of the instrument.

Use the HORTAU SIGNUM wireless receiver to connect the wireless model.



Dust Cap

All Hortimetres are delivered with Dust Cap on the connector(s). If you are not using connector(s) leave the Dust Cap in place all the time.

LOCATION/INSTALLATION

DO NOT ROTATE THE INSTRUMENT IN ORDER TO WIDEN THE INSERTION HOLE. THIS WILL REDUCE THE CONTACT SURFACE BETWEEN THE HORTIMETRE CERAMIC AND THE SOIL AND CAUSE THE INSTRUMENT TO DISPLAY FALSE MEASUREMENT READINGS.



D-. Inserting the Hortimetre
Install the Hortimetre in the insertion hole, ceramic first, by pushing lightly on the head of the Hortimetre. Do not exert undue pressure on the head of the Hortimetre. If it does not glide in easily, widen the insertion hole by using a 1/4 inch (19 mm) diameter metal rod. Try once more. If it is still impossible to push the Hortimetre into the insertion hole, dig another hole at a different place.

E-. Dry and compacted soil
If the soil is very dry when attempting to install the Hortimetre, it is also recommended to pour water at the surface of the soil, around the Hortimetre, to ensure an adequate contact between ceramic and soil.

TROUBLESHOOTING

No Display

- a. Verify that the batteries are not dead by replacing them with new ones.
- b. If the batteries are good, shake the instrument from left to right while maintaining in a vertical position. If the display comes back on, it was a case of bad battery contact.
- c. If the problem continues, use the attached warranty form.

Ceramic end piece does not wet

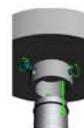
- a. Pour approximately 2 ml of liquid soap into 500 ml of water. Mix the water and let the Hortimetre ceramic end piece soak in it. The display should gradually return to 0.00.
- b. If the problem continues, use the attached warranty form.

Worn or broken ceramic

- a. 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.
- b. If the end piece is broken to the extent of impeding operation, order a replacement from your authorized distributor or from the manufacturer.

PROCEDURES

INSERTING AND CHANGING BATTERIES



- 1-. Loosen the three Allen screws under the head of the Hortimetre with the hexagonal key included in your package.
- 2-. Remove the metal rod from the head by rotating it a quarter of a turn in one direction then the other.



NEVER ROTATE THE HEAD BY MORE THAN A QUARTER OF A TURN (90°) IN ONE DIRECTION. DOING SO COULD DAMAGE THE WIRES AND CAUSE THE INSTRUMENT TO BECOME INOPERABLE.

- 3-. Carefully remove the head.
- 4-. Insert two(2) AA batteries in the metal tube, the "+" upward.

LOCATION/INSTALLATION

For a better interpretation of the readings, the Hortimetre should be placed in a representative location.

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

SOIL TENSION IS A VARIABLE PARAMETER BASED ON CLIMATIC CONDITIONS AND DATA AND SOIL OR SUBSTRATE CHARACTERISTICS. THE HORTIMETRE PERFORMS A MEASUREMENT FROM THE LOCATION WHERE IT HAS BEEN INSTALLED. THIS IN NO WAY GUARANTEES THAT THE TENSION READ WHEN THE PROBE IS PLACED AT ANOTHER LOCATION, EVEN IF IT WERE CLOSE TO THE INSTRUMENT, CANNOT IN ANY CASE REPLACE PERSONAL ASSESSMENT.

A-. Determine irrigation areas.

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 of a specific area. Watering in this area is relatively consistent, so that the plants it contains must normally have similar water needs. If you water manually, define the areas where plants have similar water needs.

IMPORTANT NOTICE

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 his 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.

INFORMATIONS

All Models	Specs
Display:	LCD
Power Supply:	2.4 to 3.3 DC
Data Output :	50 mAmp
Signal :	Analogic
Connector :	0 - 2.5 Volt DC
Battery :	HR30-GR6F
Weight :	2 x AA
Height :	1.25 kg
Length :	14cm
Wireless Models	P-WL
Frequency :	418 mHz
Communication Protocol:	RS-232
Sampling Spectrum	
cbar/kPa :	00.00 à 05.00



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