

# PlantCare IoT Soilmoisture Sensors



# PlantCare IoT Soilmoisture Sensors

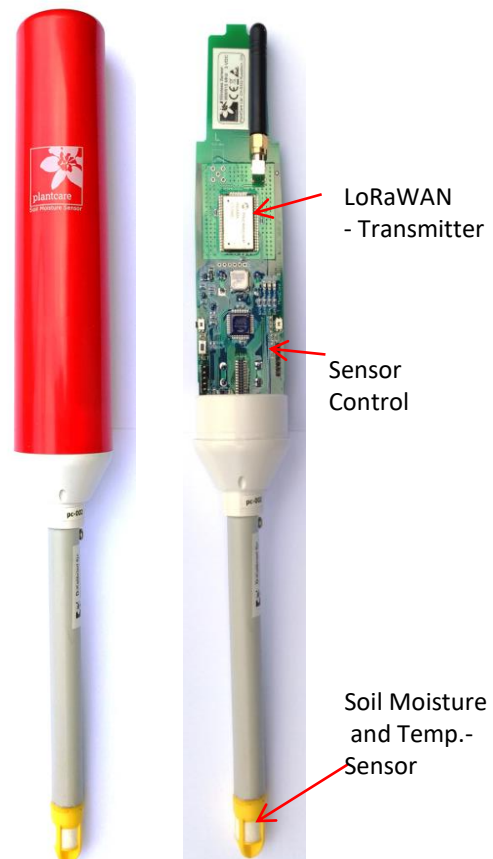
In 2004, PlantCare developed a novel Soil Moisture Sensor that combines a number of key advantages over all other known sensor types. Therefore, the sensor based on a micro-thermal measurement has already established itself in all sectors, as can be seen from the approximately 250,000 pieces of sensors sold worldwide.

Scientifically well-known institutes such as the Max Planck Institute of Molecular Plant Physiology, ETH Zurich, Syngenta, BASF, Julius Kuehn Institute, Pioneer and several universities in Germany, Turkey and South Korea use our sensors for scientific research in the agricultural sector.

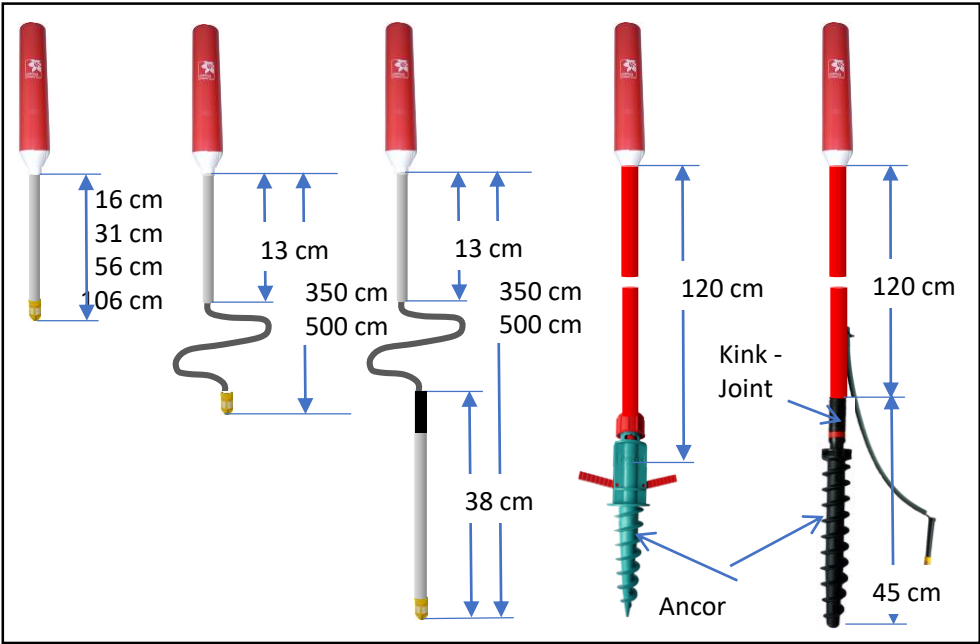
For about 8 years, our sensors have also been used in agriculture and professional landscaping to monitor water status and very intelligent irrigation control. Scientific research has shown that this can drastically reduce water consumption. In addition to a water saving of up to 70%, real comparison measurements also demonstrated a substantial increase in yield.

**As specific advantages can be mentioned:**

- Measures exclusively the plant-available water
- Can be used in naturally grown soils and any artificial substrates
- Is very easy and quick to assemble
- It is robust, corrosion-resistant and main-tenance-free
- The fertilizer content and the soil temperature have no influence on the measurement
- Responds very quickly to changes in soil moisture
- Has a very low energy requirement. With 2 AA batteries and a measuring period of 1 hour, the sensor can be operated for one year.
- The data can be transmitted by radio over distances of up to 20 km to a central office or to the Internet
- Each sensor is calibrated by the delivery
- The sensors send an alarm message if it is accidentally pulled out of the ground, if the batteries are to be replaced or the measuring probe is defective.
- Available in various designs optimized for specific applications.



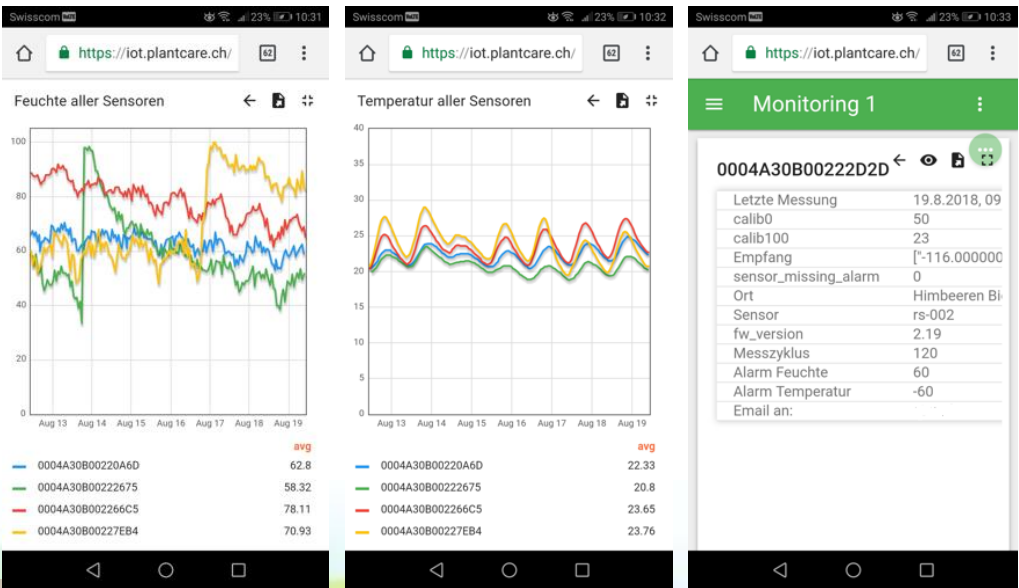
# PlantCare IoT Soilmoisture Sensors



## Applications

Basically, the PlantCare Soil Moisture Sensor can be used for two different applications:

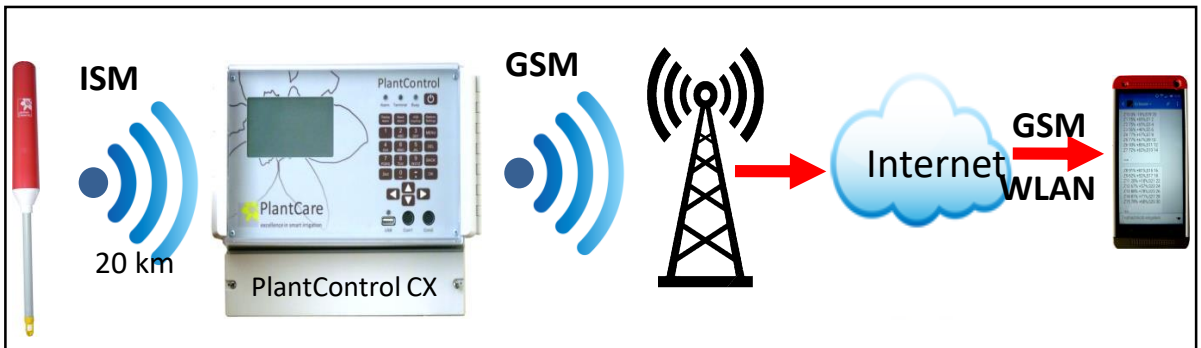
**1. Active soil monitoring:** The sensor measures soil moisture and soil temperature at adjustable intervals, and transmits the data to a control center. The user has the opportunity to view the data in edited form on the Smartphone or PC. In addition, the user may specify certain data, such as a wet threshold word. Upon reaching this limit, the user will automatically be informed by email. Even with a necessary battery change an email is sent.



# PlantCare IoT Soilmoisture Sensors

The measured data must be able to be transmitted wirelessly over large distances without interference. Depending on the application, different methods can be used.

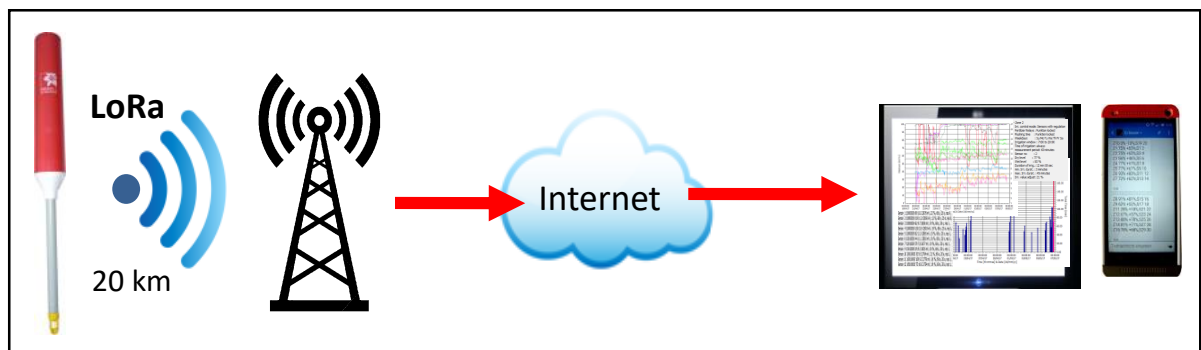
A. Use of the license-free ISM frequency band: This frequency band is used for many private applications, such as door openers and so on.



This variant corresponds to the monitoring solution already offered by PlantCare for a long time. The PlantControl CX computer is used to translate the sensor radio signal into an SMS message or into a data file.

B. Using LoRa wireless technology: This method uses a novel modulation technique that achieves a high range with very low transmission power. It was specially developed for Internet of Things (IoT) applications. This technique includes 3 sub-variants:

B1: Use of a public low-power network (if available)



Using a nationwide available LPN network, e.g. Swisscom in Switzerland or KPN in the Netherlands, the sensors can be placed anywhere, because they have connection to the cloud everywhere. Other public networks, such as the TTN network, are only available locally.

In such a case, each sensor must be registered with the network operator, which also requires a fee. There are costs for each sensor and also for the use of the server and the dashboard portal (display on PC or mobile phone).

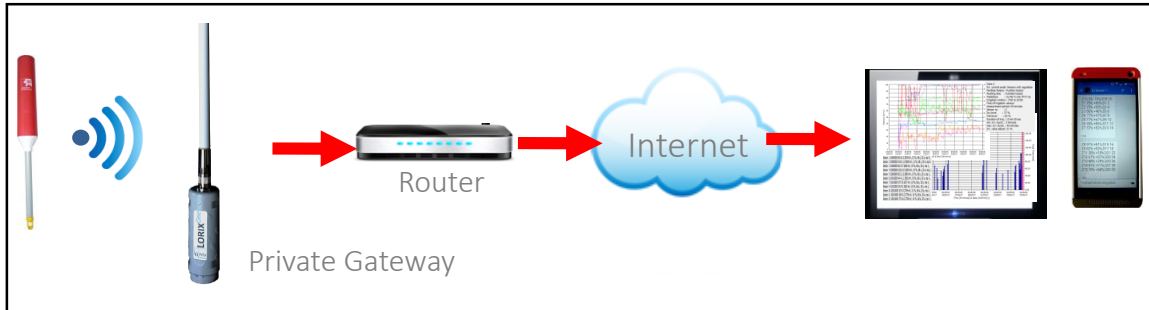
This variant is only suitable for field monitoring and can not be used for automatic irrigation control.



# PlantCare IoT Soilmoisture Sensors

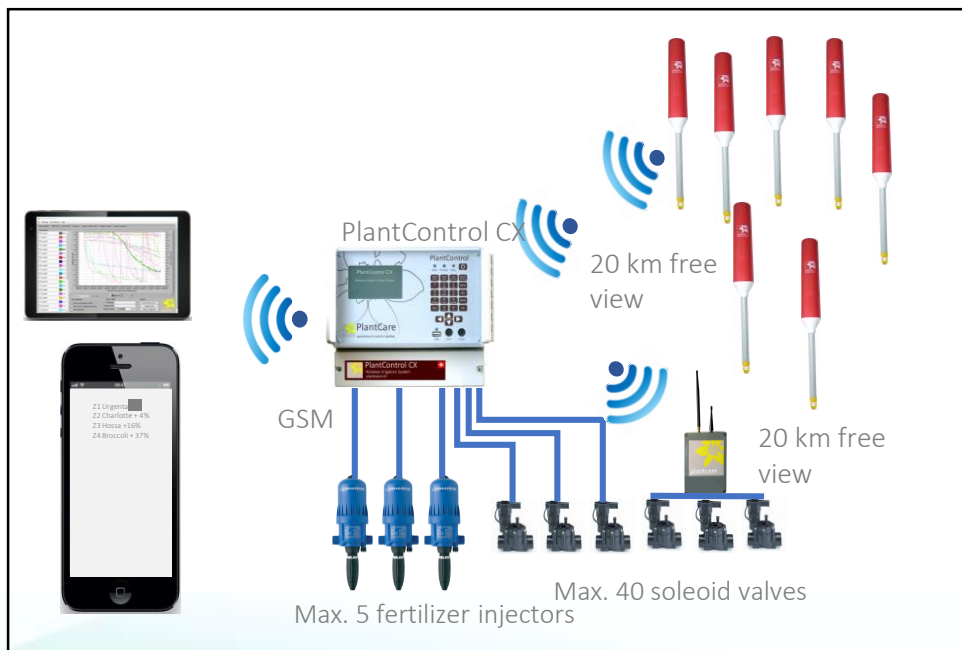
## B2: Use of a private low-power network

By purchasing a private gateway you can build your own LP network. If the gateway has "visual contact" with the sensors, with houses or shrubs etc. hardly playing a role, so that a large area (15-20 km radius) can be covered. It is also possible to use several gateways. The Gateway requires a power connection and a cable connection to a router to secure access to the Internet. There are no costs for the operation of the sensors, but only annual costs for the use of the server and the portal.



## C: Intelligent irrigation control

The sensors can be configured to communicate with the PlantControl CX Irrigation Controller. The high radio range of 20 km is retained. Up to 60 sensors can be connected to the control panel, which use a patented algorithm to convert the measured data into control commands for solenoid valves.



# PlantCare IoT Soilmoisture Sensors

## Summary:

PlantCare can offer all variants described above. With low sensor quantities, the use of a public LP network (variant B1) - if available - is usually more cost-effective, as no gateway has to be procured (about CHF 1'000). For larger quantities and without automatic irrigation, the variant B2 is certainly optimal. Variant C (irrigation control) leaves nothing to be desired. In addition to the active monitoring, all functions of the PlantControl CX irrigation computer are fulfilled.

By active monitoring, experience has shown that water consumption can be reduced by up to 30%. This is because watering is always done at the right time. By analyzing the recorded data after irrigation, it is also possible to determine if the irrigation was too long or too short. When variant C is the use of the PlantControl CX, water savings of up to 90% have already been achieved.

Further information at [support@plant-care.ch](mailto:support@plant-care.ch)

