

Agricultural IoT Environmental Monitoring Solutions

Shandong Renke Control Technology

Programme Background

In agricultural production, the increase of production mainly depends on the large amount of pesticide and chemical fertilizer inputs, but most of these fertilizers and water resources are not effectively used and disposed of anywhere, resulting in a large amount of nutrient loss and environmental pollution, posing a serious threat to environmental protection and soil and water conservation, and posing a serious challenge to the sustainable development of agriculture until the advent of the era of smart agriculture.



Smart agriculture is the advanced stage of agricultural production, based on the IoT, cloud platform of the new business model of modern agriculture and new mode. Smart agriculture promotes the transformation and upgrading of the agricultural industry chain through intelligence in the field of production, differentiation in the field of operation and comprehensive information services in the field of services, to achieve agricultural refinement, efficiency and greening, to ensure the safety of agricultural products, agricultural competitiveness and sustainable development of agriculture. Therefore, smart agriculture is an inevitable trend in the development of China's agricultural modernization.

Programme Introduction

Smart Greenhouse Monitoring

For the characteristics of greenhouse, Jianda Renke provides smart solutions for greenhouse. The solution consists of LED screen (containing smart monitoring host), multi-element louvered box, soil moisture/temperature/conductivity sensor, and environmental monitoring cloud platform. The air temperature and humidity, soil temperature and humidity, soil conductivity, carbon dioxide concentration, and light intensity in the greenhouse can be monitored and uploaded to the cloud platform in real time.

Smart Agricultural Fields Monitoring

In agricultural production, crops need fine management and maintenance from sowing to harvesting, requiring constant attention to the soil and crop growth. Jianda Renke's agricultural field smart monitoring system integrates Internet+, big data, cloud computing, Internet of Things and expert technology and knowledge, and applies to traditional agriculture to monitor soil and crop production, and transmits the monitoring data to the farm monitoring platform in real time, so that managers can understand the seedling, water and fertilizer, pest and weed situation according to the data.

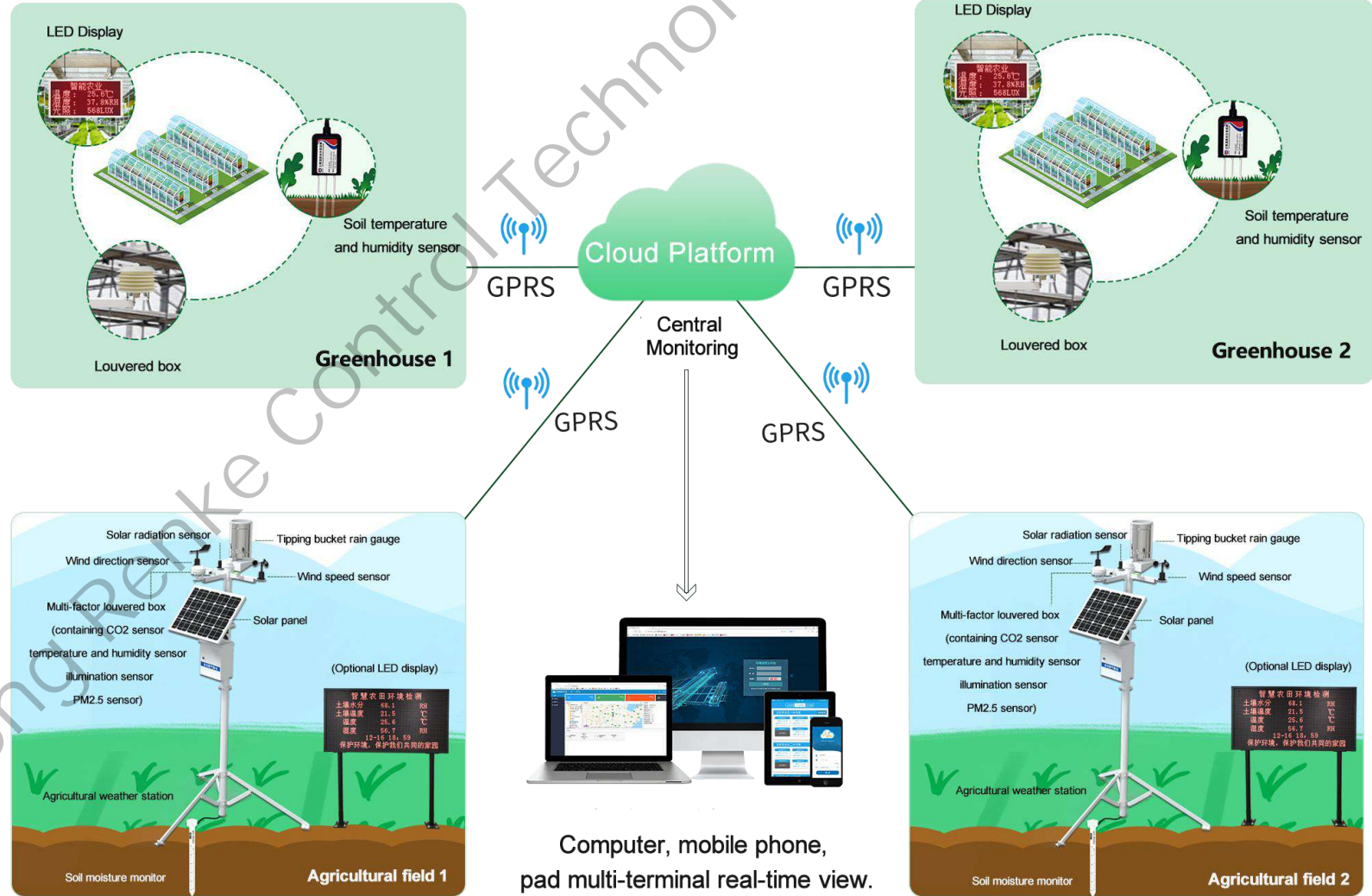
Agricultural IoT Environmental Monitoring Content



Programme Introduction

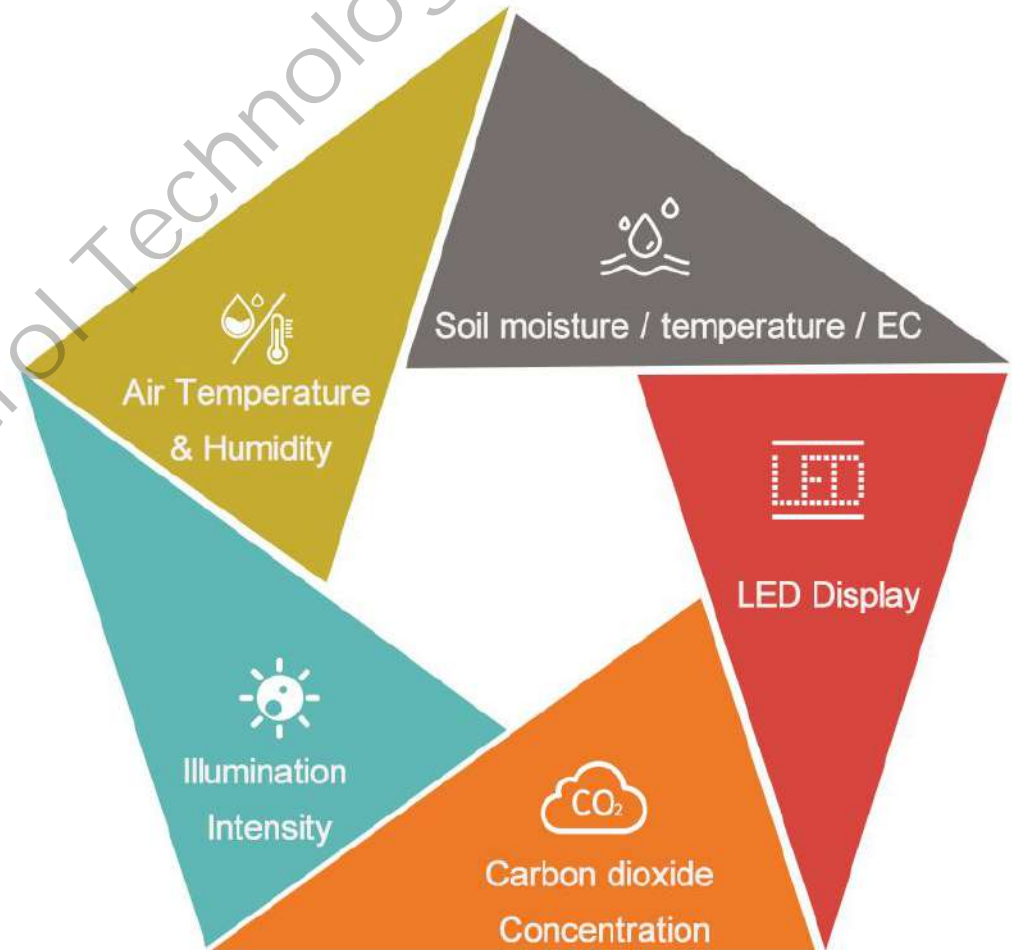
Agricultural IoT Environmental Monitoring Schematic

Agricultural IOT environmental monitoring solutions integrate monitoring data from greenhouses and agricultural fields in the park and view the data in real time at multiple terminals such as computers, mobile phones and pads through the cloud platform.



Smart Greenhouse Monitoring System

For the characteristics of greenhouse, Jianda Renke provides smart solutions for greenhouse. The solution consists of **LED screer (containing smart monitoring host), multi-element louvered box soil moisture/temperature/conductivity sensor, and environmental monitoring cloud platform.** The air temperature and humidity, soil temperature and humidity, soil conductivity, carbon dioxide concentration, and light intensity in the greenhouse can be monitored and uploaded to the cloud platform in real time.



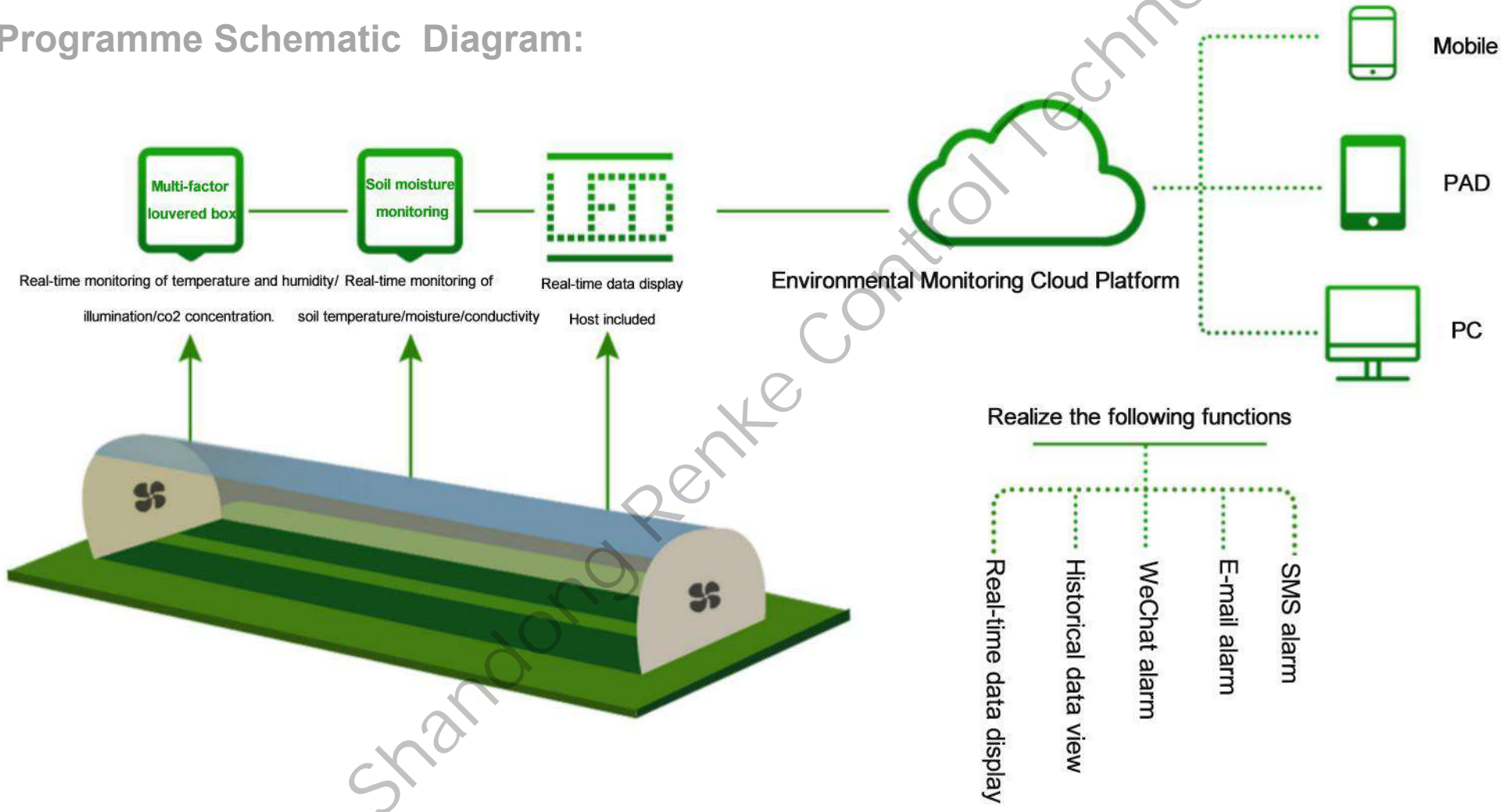
Smart Greenhouse Monitoring System

At the same time, the system can also push real-time monitoring information and alarm information to managers through computers, mobile phones, pads and other information terminals to realize the informationization and intelligent remote management of greenhouse. Give full play to the role of IOT technology in agricultural production to ensure that the environment in greenhouses is suitable for crop growth. To achieve fine management, to create conditions for high yield, high quality, high efficiency, ecology and safety of crops, to help customers improve efficiency, reduce costs, increase revenue and reduce human labor.



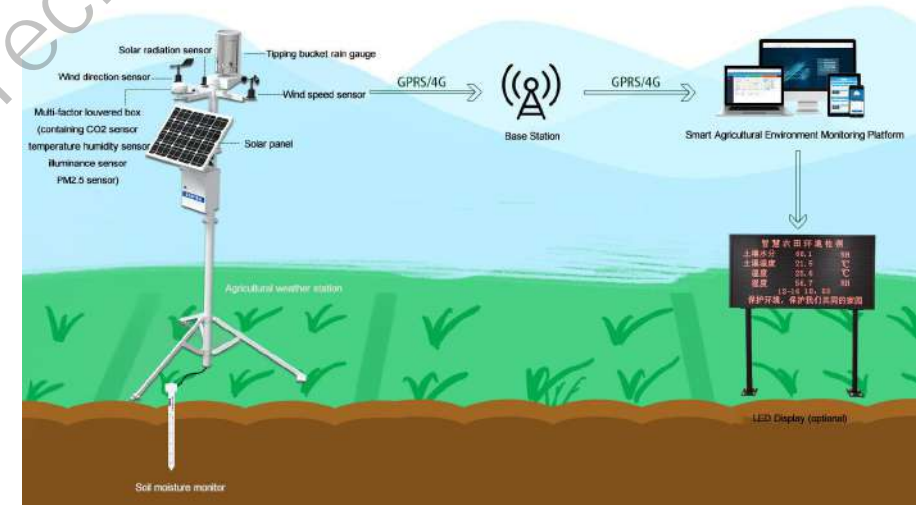
Smart Greenhouse Monitoring System

Programme Schematic Diagram:



Smart Agricultural Field Monitoring System

The smart agricultural field monitoring system mainly consists of **agricultural weather station, agricultural environment monitoring platform and LED display screen**. The agricultural weather station contains soil moisture monitor, multi-element louver box, solar radiation sensor, tipping bucket rain gauge, wind speed and direction sensor, which can monitor the air temperature and humidity, soil temperature and humidity, soil conductivity, carbon dioxide concentration, atmospheric pressure intensity, illumination, wind speed and direction parameters in farmland, and upload to agricultural environment monitoring platform in real time via GPRS, and then pass to LED display screen through communication server to view the data in real time.





LED Display

The LED display contains a smart monitoring host that collects and displays data from the greenhouse in real time. Data can be uploaded to the monitoring software platform via **GPRS**, and the monitoring host also has a ModBus-RTU slave interface that can also upload data to the customer's monitoring software or PLC configuration screen via 485 communication.

With 1 ModBus-RTU master interface can access 485 sensors: soil temperature and moisture, soil EC, PH, light, CO2, NPK etc.

Optional 2-way relay output for remote manual control.

External 1-channel outdoor LED monochrome display, 96*48 dot matrix.

Without LED display, it can be used with solar panel and battery for field measurement to solve the power supply problem.

The unique 8-digit address of the device is easy to manage and identify, and can be used with a variety of software platforms provided by our company.



LED Display(RS-FQXZ-M-*)

Multi-factor Louver Box

Multi-element louvered box integrated **temperature and humidity sensor, carbon dioxide sensor and illumination sensor**, can monitor air temperature and humidity, carbon dioxide concentration and illumination in real time and upload to the host. The product is small in size, light in weight, made of high quality anti-UV material, with long service life, using high sensitivity probe, with stable signal and high precision.

CO2 range: 0-5000ppm, resolution 1ppm.

Measure environmental temperature and humidity, the measurement unit is imported from Switzerland, accurate measurement, -40~120 °C.

The light acquisition module adopts a high-sensitivity light-sensing probe with illumination range of 0~200,000 Lux.

Adopt special 485 circuit, communication is stable, 10~30V wide voltage range power supply.

The key components are imported, featuring wide measuring range, good linearity, good waterproof performance, easy to use and install, long transmission distance.



Multi-factor louver box

(RS-BYH-M)

Soil Moisture/Temperature/EC Sensor

The Soil Moisture Temperature Conductivity Sensor monitors **water content**, **temperature and conductivity** in the soil simultaneously, with stable performance and high sensitivity, it is an important tool for observing and studying the occurrence, evolution and improvement of saline soils as well as water and salt dynamics. By measuring the dielectric constant of the soil, the true moisture content of various soils can be directly and consistently reflected. It can measure the volume percentage of soil moisture, and is a soil moisture measurement method that meets current international standards.

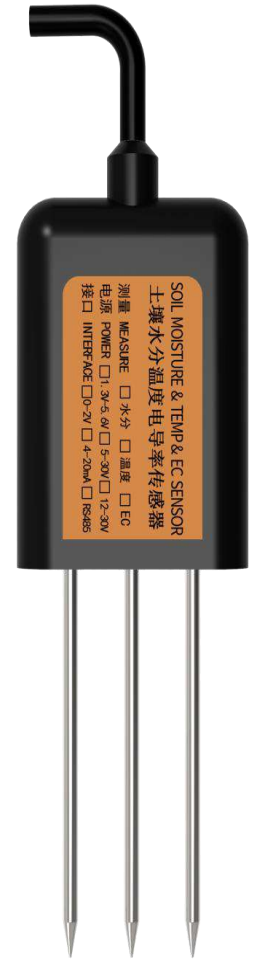
Soil moisture, electrical conductivity and temperature are combined.

It can also be used for the conductivity of water and fertilizer solutions, and other nutrient solutions and substrates.

The electrode is made of specially treated alloy material, which can withstand strong external impact and is not easily damaged.

Completely sealed, resistant to acid and alkali corrosion, can be buried in the soil or directly into the water for long-term dynamic testing.

High precision, fast response, good interchangeability, probe insertion design ensures accurate measurement and reliable performance.



➤➤➤ Agricultural Weather Station

The agricultural weather station integrates multi-factor louvered box, wind speed and direction sensor, solar radiation sensor, tipping bucket rain gauge and soil moisture sensor. The multi-factor louver box contains carbon dioxide sensor, temperature and humidity sensor, illuminance sensor and PM2.5 sensor, which can monitor CO2, temperature and humidity, illuminance, PM2.5, PM10, wind speed and direction, solar radiation, rainfall and other environmental parameters. The device supports dual power supply from mains supply and solar power, ensuring that the device can work normally and uninterruptedly even under harsh conditions. 1 channel multi-functional GPRS communication interface, just insert a mobile phone card to upload data to the remote monitoring software platform. 1 channel ModBus-RTU slave interface, can be connected to the user's own monitoring host, PLC, configuration screen or configuration software, and can also be used as an external 192*96 outdoor screen (optional).



Agricultural weather station
(RS-QXZ*-M*-*.)

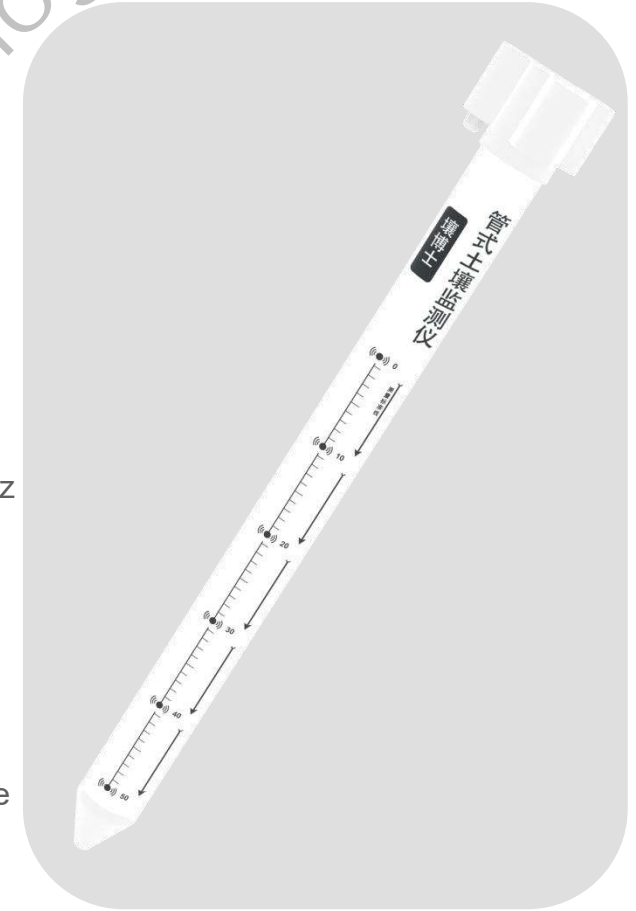
Soil Moisture Sensor

The soil moisture sensor is a sensor based on the dielectric constant principle. It can dynamically observe soil moisture content and temperature at different levels. **This sensor can detect soil temperature and humidity at least 3 layers and at most 5 layers.** It can quickly and comprehensively understand the set of soil moisture information, scientifically develop drought dispatching plan, provide decision support for correct command of drought relief, and minimize disaster losses.

The product shell is made of PVC plastic tube, and the internal emission of high frequency detection wave of nearly 1G Hz can penetrate the plastic tube and effectively sense the soil environment. It is not affected by salt ions in the soil, and agricultural activities such as fertilizer, pesticide and irrigation will not affect the measurement results, and the data is accurate.

The electrode of the sensor is not directly in contact with the soil, avoiding the interference of electricity on the soil and the plants in the soil.

The product adopts the standard Modbus-RTU485 communication mode and can communicate up to 2000 meters.



Soil moisture sensor
(RS-*W*S-*-TR-3)

LED display with communication (Optional)

The LED display with communication is a fixed device that displays data on the LED screen after obtaining data from the cloud platform.

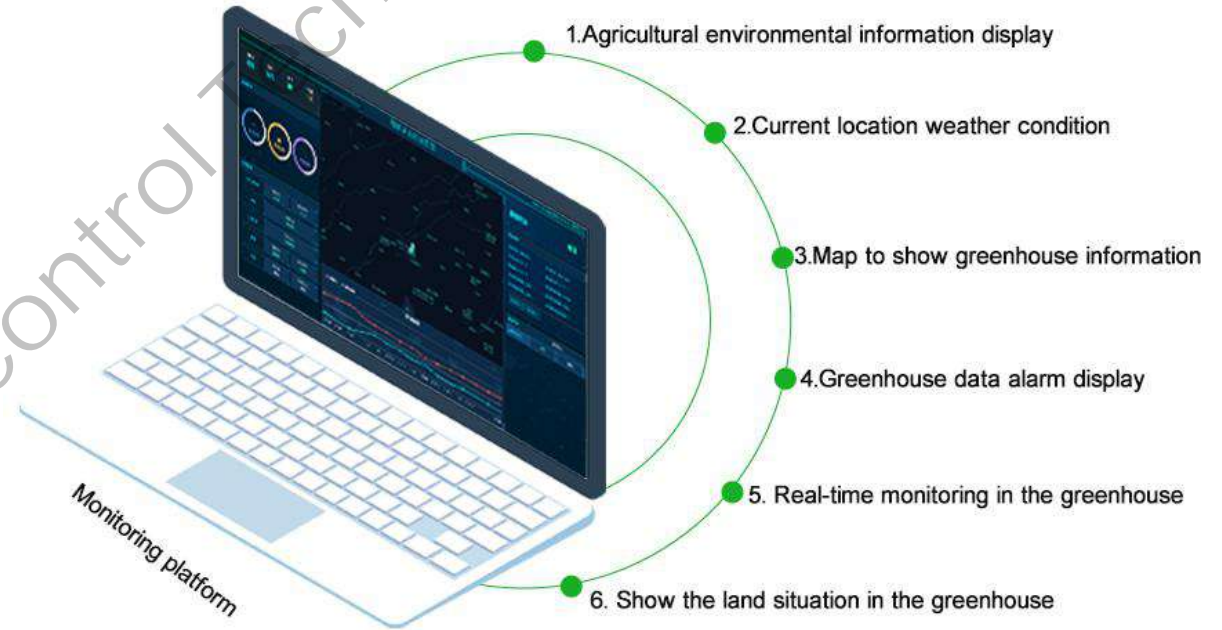
The display can play the real-time data of 32 nodes in 4 screens, with 192*96 array, 1.5m high pole, 2m wide and 1.04m high, and the font size can be set to see the real-time data from a distance.



LED display with communication
(RS-DCEN-LED-19296-*)

Introduction of Environmental Monitoring Cloud Platform

Environmental Monitoring Cloud Platform is a web-based login platform specially developed by our company to provide convenient services to users. The cloud platform is free, with a completely neutral interface, support for multi-level access, and support for customers to add sub-accounts. Customers can log in anytime and anywhere with their accounts to conveniently check their device status, query data records, download and print data, etc. They can also choose services such as SMS alarm and email alarm according to their needs. The platform is stable and reliable, and the number of devices accessed has exceeded 10,000.



Environmental Monitoring Cloud Platform Advantages

Professional Platform

Environmental monitoring cloud platform is our company to provide users with convenient services, specially developed web login platform, the platform is stable and reliable, has access to the number of more than 10,000 devices.

Free Maintenance

The cloud platform is free, the interface is completely neutral, and the user can connect to the cloud platform without complicated network settings after the equipment arrives on site, which greatly saves the time of on-site construction.

Powerful Function

It supports multi-level authority access, and customers to add sub-accounts. Customers can log in anytime and anywhere with their accounts to conveniently check their device status, query data records, download and print data, etc. They can also choose services such as SMS alarm and email alarm according to their needs.