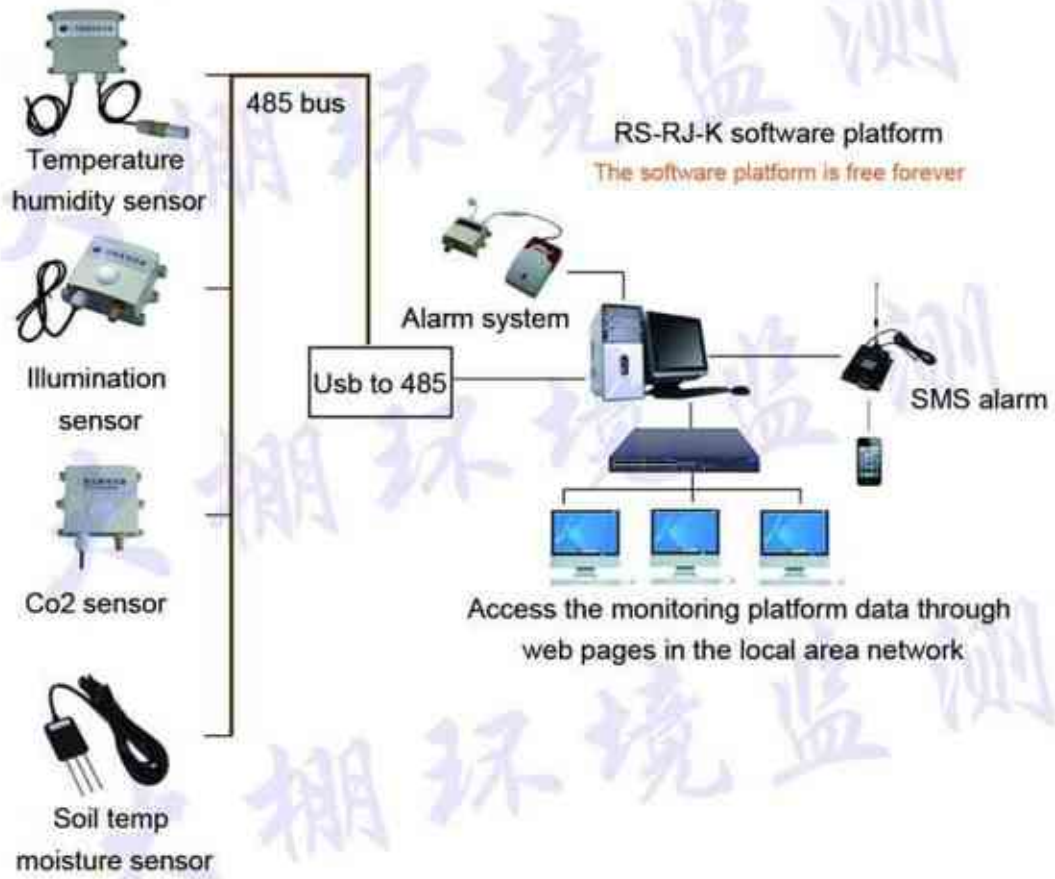


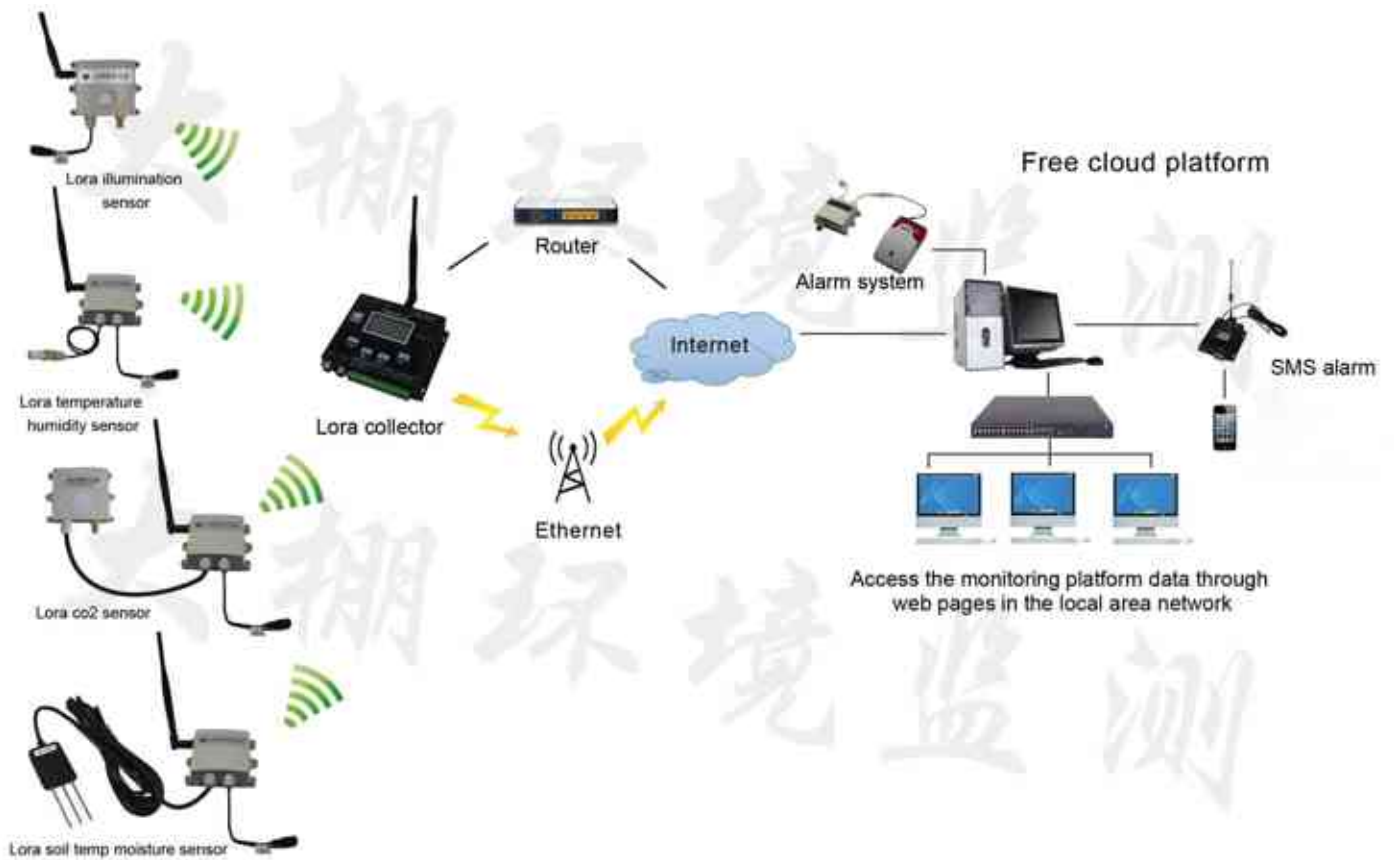
Greenhouse monitoring solution

Shandong Renke Control Technology Co.,Ltd.

1. Wired monitoring system

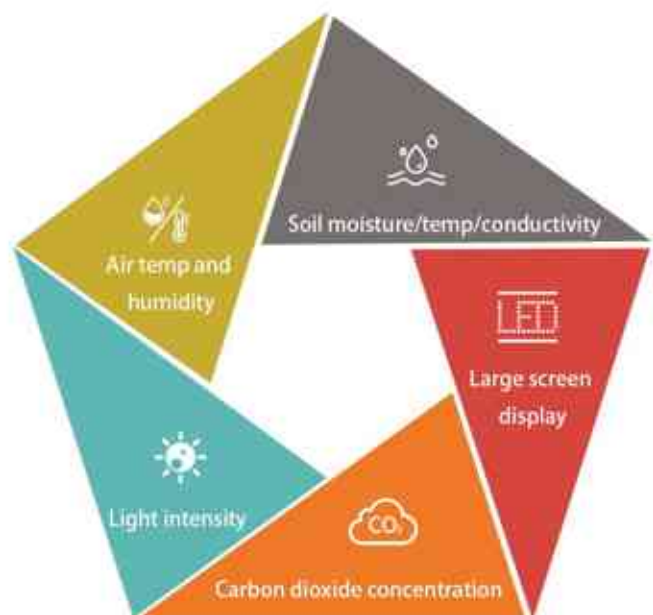


2. Wireless monitoring system



3. Solution introduction

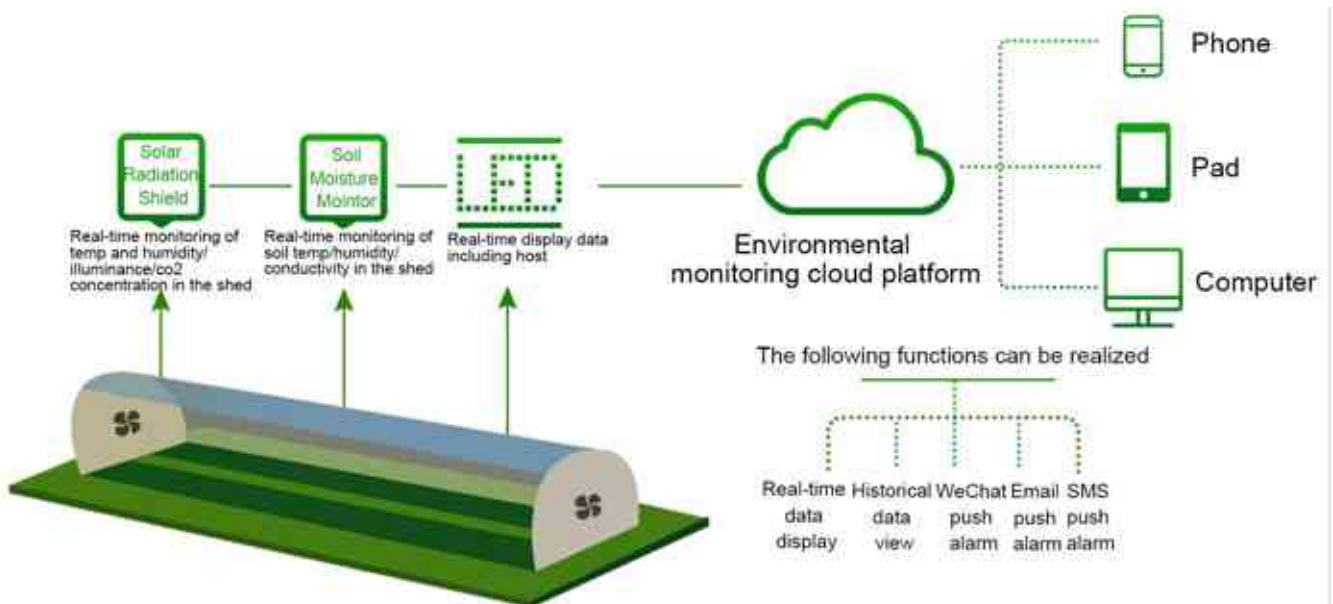
In view of the characteristics of greenhouses, Jianda Renke launched the intelligent solution for greenhouses, which consists of LED sightseeing screens (including intelligent monitoring host), multi-element solar radiation shield, soil moisture/temperature/conductivity sensors, and environmental monitoring cloud platform. It can monitor the air temperature and humidity, soil temperature and moisture, soil conductivity, carbon dioxide concentration, and light intensity in the greenhouse in real time, and upload it to the cloud platform in real time.



At the same time, the system can also push real-time monitoring information and alarm information to managers through computer, mobile phone, Pad and other information terminals to realize greenhouse informatization and intelligent remote management, give full play to the role of Internet of Things technology in agricultural production, and ensure that the greenhouse environment is suitable for crop growth, realizing refined management, creating conditions for high-yield, high-quality, high-efficiency, ecological, and safe crops, and helping customers improve efficiency, reduce costs, increase profits, and reduce human labor.



4. Scheme schematic diagram



5. Monitoring sensors

5.1 LED temperature humidity display board

The LED sightseeing screen contains an intelligent monitoring host, which collects and displays the data in the greenhouse in real time. Data can be uploaded to the monitoring software platform via GPRS. At the same time, the monitoring host also has a ModBus-RTU slave interface. It can also upload data to the customer's monitoring software or PLC configuration screen via 485 communication.



- With 1 ModBus-RTU master station interface, it can be connected to 485 transmitters: soil temperature and moisture, soil EC, PH, light, CO2, nitrogen, phosphorus and potassium transmitters.
- Optional 2 relay outputs for remote manual control.
- It can be connected to an outdoor LED monochrome display with 96*48 dot matrix.
- When the LED screen is not displayed, it can be used with solar panels and accumulators for field measurement to solve power

supply problems.

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

5.2 Solar radiation shield

The multi-element solar radiation shield integrates temperature and humidity sensors, co2 sensors, and illuminance sensors, which can monitor air temperature and humidity, co2 concentration and illuminance in real time and upload them to the host. The product is small in size, light in weight, high-quality anti-ultraviolet material, long service life, high-sensitivity probe, stable signal and high precision.



- CO2 range: 0-5000ppm, resolution 1ppm.
- Measure the environmental temperature and humidity, the measuring unit is imported from Switzerland, the measurement is accurate, and the range is -40~120 degrees.
- The light collection module adopts a high-sensitivity photosensitive probe, and the light intensity range is 0~200,000 Lux.
- Using dedicated 485 circuit, stable communication, 10~30V

wide voltage range power supply.

- The key components adopt imported components, which have the characteristics of wide measurement range, good linearity, good waterproof performance, convenient use, easy installation, and long transmission distance.

5.3 Soil sensor

The soil moisture temp ec sensor can simultaneously monitor the moisture content, temperature and conductivity in the soil. It has stable performance and high sensitivity. It is an important tool for observing and studying the occurrence, evolution, improvement and water-salt dynamics of saline soil. By measuring the dielectric constant of the soil, it can directly and stably reflect the true moisture content of various soils. It can measure the volume percentage of soil moisture, which is a soil moisture measurement method that meets the current international standards.



- The three parameters of soil moisture content, electrical conductivity and temperature are combined into one.
- It can also be used for the conductivity of water and fertilizer integrated solutions, as well as other nutrient solutions and

substrates.

- The electrode is made of specially treated alloy material, which can withstand strong external impact and is not easy to damage.
- Completely sealed, resistant to acid and alkali corrosion, and can be buried in soil or directly into water for long-term dynamic testing.
- High precision, fast response, good interchangeability, probe plug-in design to ensure accurate measurement and reliable performance.

6. Monitoring Cloud Platform

The environmental monitoring cloud platform is a web login platform specially developed by our company to provide users with convenient services. The cloud platform is free to use, the interface is completely neutral, supports multi-level permission access, and supports customers to add sub-accounts. Customers can log in anytime and anywhere with their account to conveniently view their own equipment status, query data records, download and print data, etc. You can also choose SMS alarm, email alarm and other services according to your needs. The platform is stable and reliable, and the number of connected devices exceeds 10,000.

