



ELECTRONIC SMART BOUNDARY MARKER



Product Introduction

Zhice Yunlian Electronic Smart Boundary Marker System integrates IoT, positioning sensing and remote monitoring technologies, replacing traditional physical boundary stakes to realize intelligent upgrading of boundary management.

The system adopts a high-strength composite pile body as the carrier, built-in GNSS positioning module, tilt sensor and IoT communication unit.

The pile body features impact resistance, corrosion resistance, and wide temperature adaptability, suitable for harsh wild environments.

Core functions include real-time position tracking. When abnormal movement or tilt occurs, the device instantly triggers sound-light alarms and uploads alerts to the cloud. It supports remote identity verification and data interaction. Managers can check stake status and update boundary information via WeChat Mini Program.



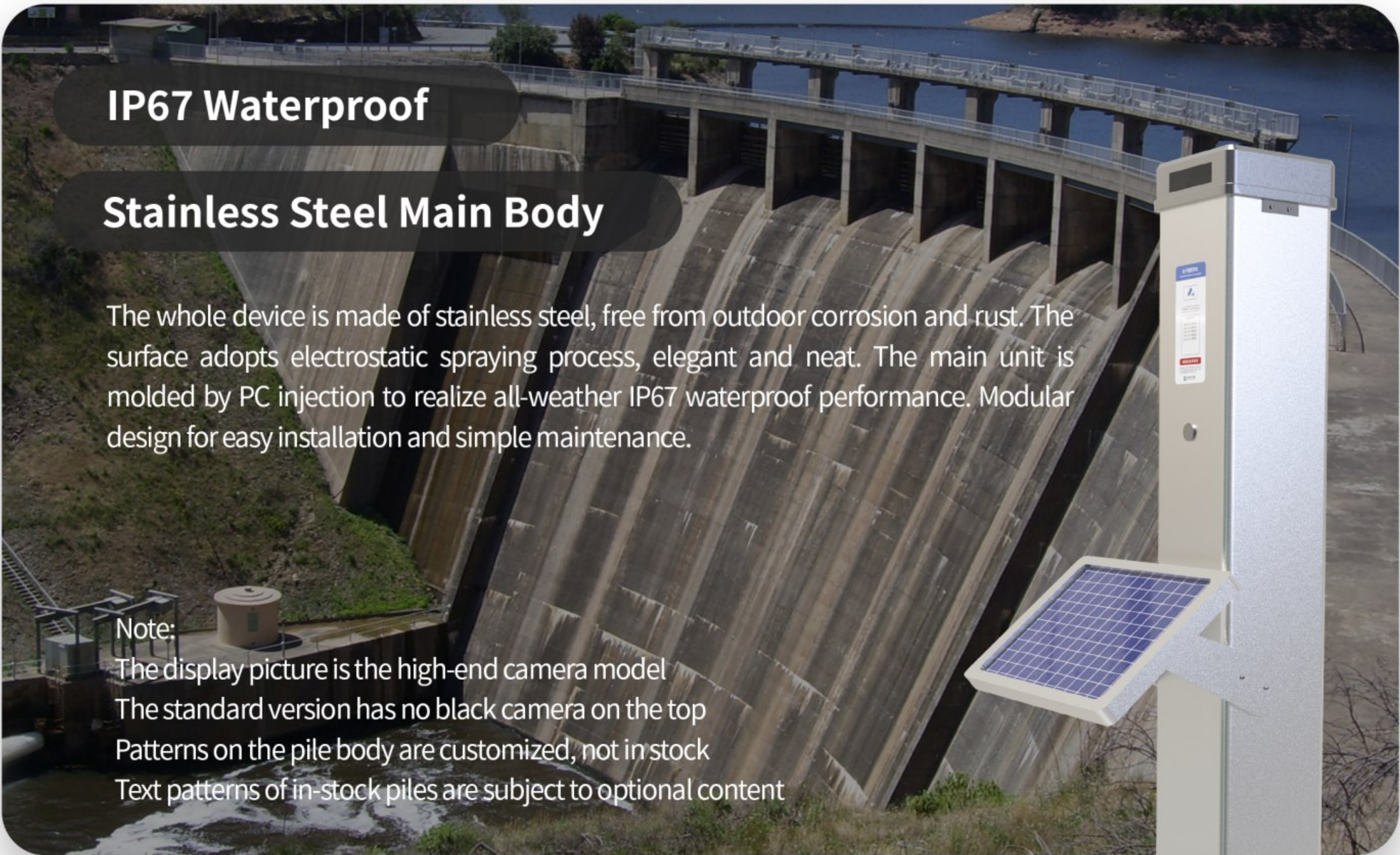


Metal Type Product Structure

NFC Touch Query
Simply tap the top of the device to quickly read basic equipment information, including monitoring parameters, voltage, positioning, attitude data, etc.

Camera Module
2 million pixel HD remote shooting camera, 120° ultra-wide-angle lens to capture field details precisely.

Solar PV Panel
Adopts advanced photoelectric conversion technology to efficiently convert sunlight into electric energy for continuous equipment power supply.



IP67 Waterproof

Stainless Steel Main Body

The whole device is made of stainless steel, free from outdoor corrosion and rust. The surface adopts electrostatic spraying process, elegant and neat. The main unit is molded by PC injection to realize all-weather IP67 waterproof performance. Modular design for easy installation and simple maintenance.

Note:
The display picture is the high-end camera model
The standard version has no black camera on the top
Patterns on the pile body are customized, not in stock
Text patterns of in-stock piles are subject to optional content



General Type Product Structure

IP67 WATERPROOF

NFC Touch Query



The main shell is made of high-toughness injection molded PC material, continuously usable for 15 years outdoors without deformation.

EASY INSTALLATION



3.6V DC power port
external switch
mounting holes.

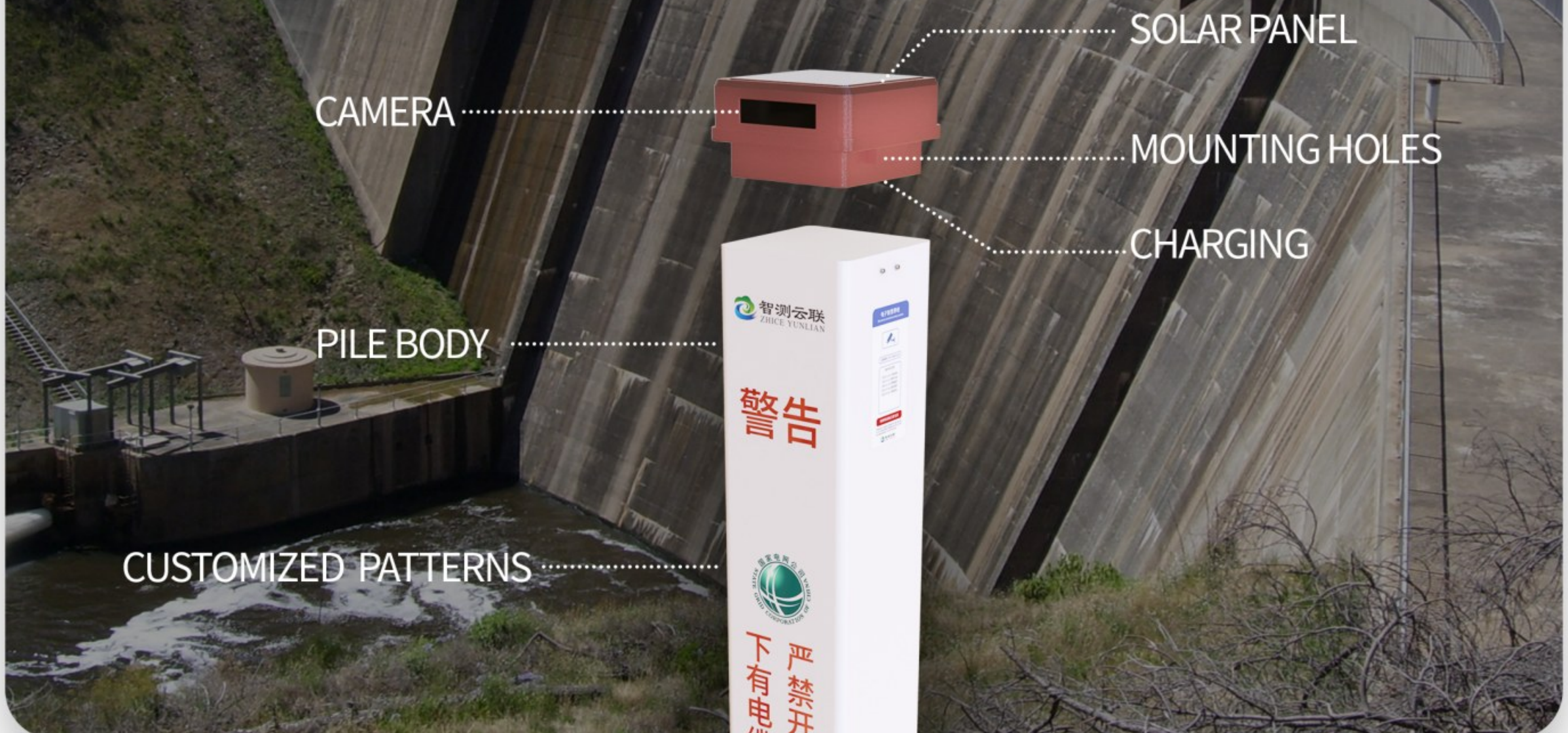
INDEPENDENT UNIT



The main unit adopts independent split design, compact size and easy installation on various carriers.

The main unit and pile body can be freely replaced:

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Boundary intrusion monitoring for nature reserves, wetlands and parks
Monitoring of underground pipe galleries, national defense optical cables and oil transmission pipelines
Safety monitoring for geological disasters, slope collapse and highway side slopes
Real-time boundary safety monitoring for illegal mining in mines and reservoir dams

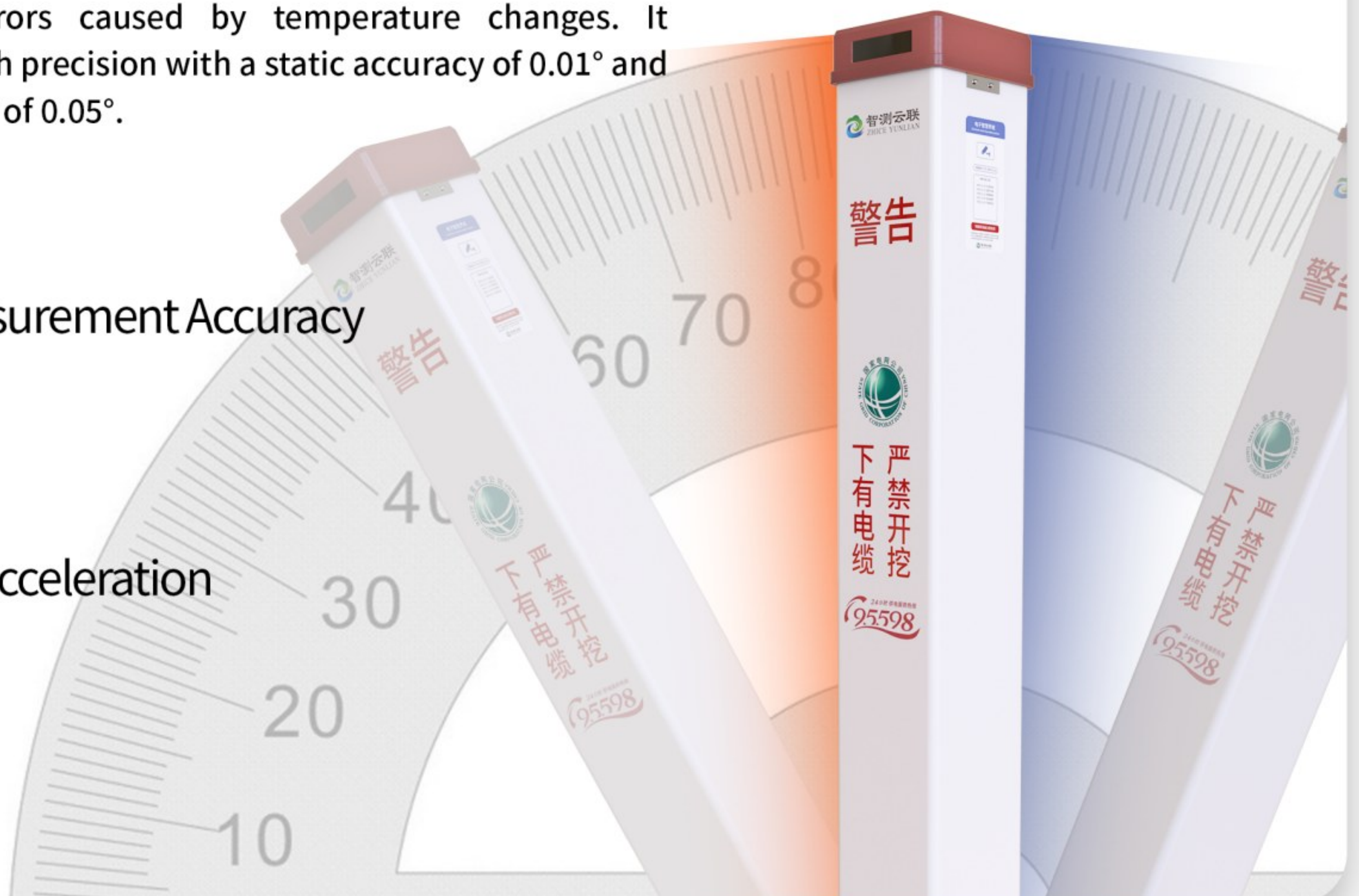


High-precision 3D Attitude Monitoring

This device adopts an imported attitude sensor chip featuring low drift and stable performance, which effectively eliminates measurement errors caused by temperature changes. It achieves ultra-high precision with a static accuracy of 0.01° and dynamic accuracy of 0.05° .

0.01°
Static Measurement Accuracy

$0.1G$
Dynamic Acceleration





Directional Microwave Scanning

The radar module integrates an imported high-precision attitude sensor chip, with static measurement accuracy of 0.01° and dynamic accuracy of 0.05° , supporting stable data transmission at 2K per second for multi-scenario monitoring.

Object Recognition

120° Directional Detection

Max Detection Distance $\leq 5m$



High-definition Photography

The optional camera module features high definition and excellent color reproduction. It can trigger linked shooting in conjunction with other monitoring data or preset threshold events, and captured images can be viewed and downloaded via the cloud platform.



2 Megapixel Resolution

Delivers low-noise, clear images with built-in adaptive white balance to ensure uniform brightness and color under complex light conditions.

Ultra-wide-angle

Adopts a large-aperture lens and CCD image sensor to realize fisheye-level ultra-wide shooting range.

Cloud Image Management

Supports remote snapshot via cloud commands; captured pictures are stored in the cloud for real-time preview, deletion and download.





Data Transmission



GPRS Multi-mode Positioning

4G Wireless Data Transmission



The 4G communication chip supports high-speed transmission with a downlink rate up to 100Mbps and an uplink rate up to 50Mbps. It ensures stable network connection even in remote areas with weak signals.

The low-power module design effectively reduces power consumption and extends the equipment's outdoor service life. Highly integrated baseband, radio frequency and power management modules guarantee smooth data transmission.

NFC Tap-to-view

Users can read full device information including monitoring parameters, voltage, positioning and attitude data by tapping the device with an NFC-enabled mobile phone, facilitating on-site maintenance and inspection.



Bluetooth Connection Function

Customizable Bluetooth function supports simple pairing between mobile phones and the device. After connection, users can locally view operating parameters, execute regular inspection tasks, configure equipment parameters and export offline data.

The Bluetooth module features low power consumption, fast transmission speed and stable signal to ensure data security and integrity during field operations.







Installation on Soil Ground



Positioning & Excavation

Mark the installation position according to design drawings, dig a pit with a depth of 30cm and a diameter 5cm larger than the base of the boundary marker.



Place the Boundary Marker

Align the bottom of the boundary marker with the center of the pit and keep it vertically upright.



Calibration & Fixation

Adjust the verticality of the boundary marker with a level gauge, then fix the bottom with concrete.

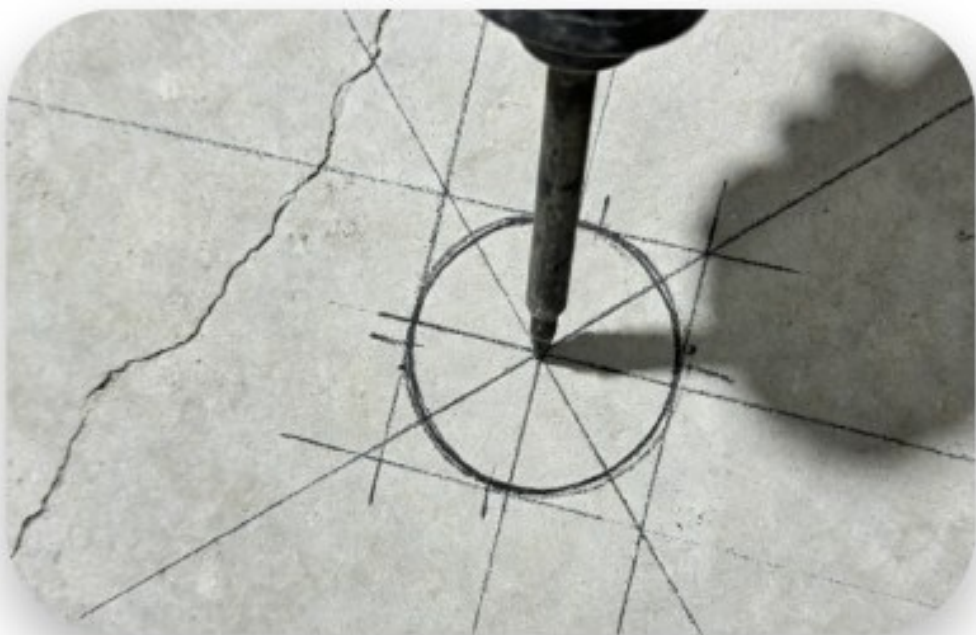


Backfilling & Compaction

Backfill soil in layers and compact each layer until the ground surface is level with the surrounding terrain.



Installation on Cement Ground



Position Layout

Determine the installation position as per construction drawings and mark the center point.



Foundation Drilling

Drill the foundation pit with a pile driver; the recommended pit depth shall be no less than 20cm.



Foundation Casting

Pour concrete to form the base, pre-embed anchor bolts which shall align with the mounting holes of the equipment base.



Fix the Boundary Marker

Place the boundary marker steadily on the anchor bolts, adjust the horizontal level and fasten all nuts tightly.



Backfill & Level

Fill the gaps around the foundation with cement or gravel, compact the filling and clean the equipment surface.



Power-on Commissioning

Complete device configuration via NFC after power-on, verify normal operation of positioning, communication.





Multi-dimensional Monitoring

FOUR WAKE-UP MODES

Tilt Wake-up | Vibration Wake-up | Radar Scanning Wake-up | Remote Command Wake-up



External Damage

When the device is displaced or damaged externally, parameter changes will be rapidly detected to trigger an alarm and upload data to the backend system.



Severe Vibration

Intense ambient vibration around the equipment will wake up the device for data uploading and linkage alarm with other monitoring modules.



Attitude Tilt Angle

Sudden or slow tilt will trigger data uploading; the camera will capture photos for evidence if equipped.



Position Displacement

An alarm will be triggered if the device deviates more than 2-5km from the initial installation position.



Remote Command

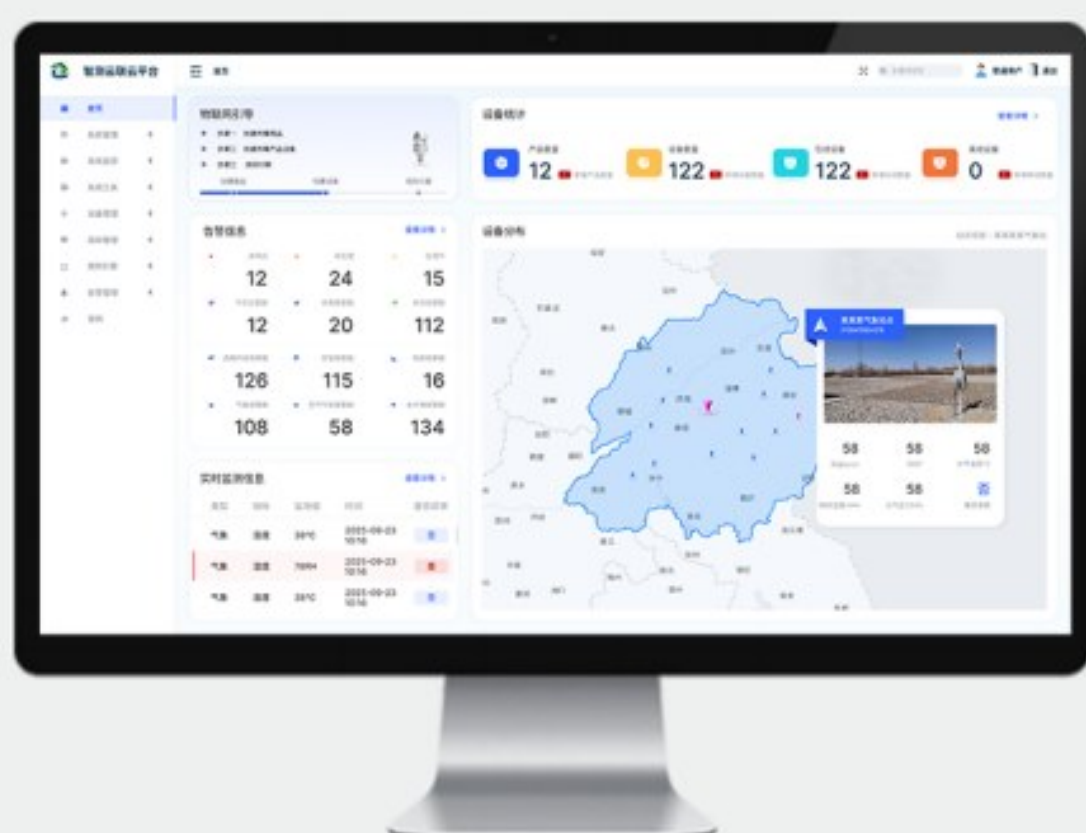
Users can send remote instructions to wake up the device and upload real-time monitoring data on demand.



Timed Data Upload

The device automatically uploads monitoring data to the management platform at preset intervals.





Core Functions

- Device management & parameter config
- Open API for third-party push
- SMS alert recipient config
- Admin backend (CRUD devices)

ZHICLOUD

CLOUD MANAGEMENT PLATFORM

The brand-new remote early warning platform is built based on B/S architecture, which requires no client installation. Users can manage all devices and data directly via a web browser.

The data uploaded by devices will be analyzed by cloud servers to judge status anomalies and threshold violations, then displayed on the web client, delivering an excellent real-time data viewing experience.

Adopting mainstream flat UI design, the platform features concise and elegant appearance with reasonably arranged device parameter layouts. Visual dynamic optimization is available for different monitoring devices and categories. Professional developers conduct regular platform upgrades to guarantee stability and timeliness.

API DATA INTERFACE

The obtained data can be applied to secondary development or forwarded to third-party platforms. The supporting backend management system allows users to modify and configure all types of device parameters remotely.



VISUAL INTERFACE

All monitoring data is presented in intuitive graphical forms. Both industry professionals and ordinary staff can quickly view and identify monitoring information, which greatly reduces the platform operation learning cost.

With flat graphical design, each page of the platform is concise, intuitive and clearly structured.



Parameter Specification Table

Item	Metal	Metal + Camera	FRP	FRP +Camera	Basic
Material	Stainless steel		FRP		PVC
Dimension	20×20×120cm		15×15×160cm		Customizable
Attitude	XYZ 3-axis, 90°				
Accuracy					
Vibration Detection					
Tilt Monitoring					
Position					
Monitoring					
NFC					
Bluetooth					
Radar Detection					
Camera Configuration	N/A	2MP, 120° wide-angle lens	N/A	2MP, 120° wide-angle lens	N/A
Data	4G full network access, WiFi, LoRa				
Sleep Standby Current					
Rated Operating Voltage					
Operating Ambient Temperature					
Expandable Functions	N/A	Voice alarm module	N/A	Voice alarm module	Tilt & vibration monitoring module Photo upload module





Introduction to the upper computer software

Function Category	Specific Description
Core Functions	Realize integrated management of data reception, storage, viewing and analysis in the PC standalone environment
Data Reception and Processing	1. Support data reception via serial port, as well as data processing and visual display 2. Compatible with communication methods such as JSON string and MODBUS485
Parameter Configuration	1. Allow independent setting of data storage time 2. Support custom collection time in MODBUS485 collection mode
Monitoring Parameter Management	Support users to independently add, delete and modify monitoring parameters, including information such as parameter protocols, names and icons
Data Processing Expansion	1. Equipped with data post-processing function 2. Support external running of JAVASCRIPT scripts



Introduction to Cloud Platform

Function Category	Specific Description
Architecture & Access Method	Adopts a CS architecture software platform, supporting direct access and observation via mobile phones and PC browsers without additional software installation
Account & Device Management	Supports multi-account and multi-device login, meeting the collaborative management needs of multiple users and terminals
Data Display Function	1. Provides dashboards for real-time data display and historical data display 2. Supports data curve analysis 3. Supports map display and device information viewing
Data Storage & Stability	Implements cloud data storage based on cloud servers, featuring stability, reliability, easy scalability and load balancing
Alarm & Threshold Management	Supports SMS alarm function, allowing custom alarm threshold settings to respond to abnormal data in a timely manner
Data Processing & Output	1. Supports data export in table format 2. Has data post-processing function 3. Supports external running of JAVASCRIPT scripts to enhance customization capabilities
Data Forwarding Function	Supports data forwarding via multiple protocols, including HJ-212 protocol, TCP forwarding, HTTP protocol, etc.

