Digital Mine AIoT Integrated Solution

Shenzhen WLINK Technology Co., Ltd.

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01 Overall Structure

Background

Mines are an integral part of the national strategic resource security system. In recent years, the government has been accelerating the digital and intelligent transformation of mines to address common issues such as low automation of professional equipment systems, low integration of information systems, and prominent information silos.

Based on a deep understanding of industry needs, combined with its expertise in wireless IoT communications, data acquisition and intelligent digital cloud platforms, as well as extensive experience in digital mine deployment, Shenzhen WLink Technology Co., Ltd. has launched a comprehensive digital mine AIoT solution. This solution achieves one-stop unified information platform management through modular business unit design.

WLINK Digital Mine AIoT Integrated Solution

Overall Structure

The solution centers on a comprehensive management cloud platform, integrating various IoT communication devices, smart terminals, and sensors to collect relevant business data. Through business process development and algorithm model research, it achieves digital management and intelligent operation of multiple digital mine businesses.

Digital Mine Comprehensive Management Cloud Platform

Online Monitoring of Tailings Ponds

- Displacement monitoring
- Water level/rainfall monitoring
- Flood regulation calculation
- Comprehensive early warning

Safety Production

- Personnel positioning
- Vehicle positioning
- AI algorithms
- Safety assistance

Infrared Online Monitoring System

- Infrared temperature monitoring
- Intelligent recognition algorithms
- Short circuit early warning
- Data analysis

Distribution Cabinet Inspection

- Data collection
- Energy consumption analysis
- Intelligent early warning
- Data reporting

Drone Inspection

- Pre-set path inspection
- 2D/3D modeling
- Automatic airport guidance
- Automatic charging

Temperature and Pressure Monitoring System

- Passive wireless
- Automatic 24-hour detection
- Visual simulation

02 Online Monitoring of Tailings Ponds/Slopes

Background

Tailings ponds and slopes are common facilities and geological structures in mines, and they represent the largest sources of danger. These structures are prone to damage and instability, and if not managed properly, various natural and human factors can lead to safety issues, causing significant disasters and losses. They are a crucial part of mine safety management.

Prone to Structural Damage and Instability

Continuous accumulation and edge locations result in an unstable state, leading to surface and deep displacement

Environmental Impact

Especially susceptible to rainfall, increasing risk factors

Challenges with Manual Inspection

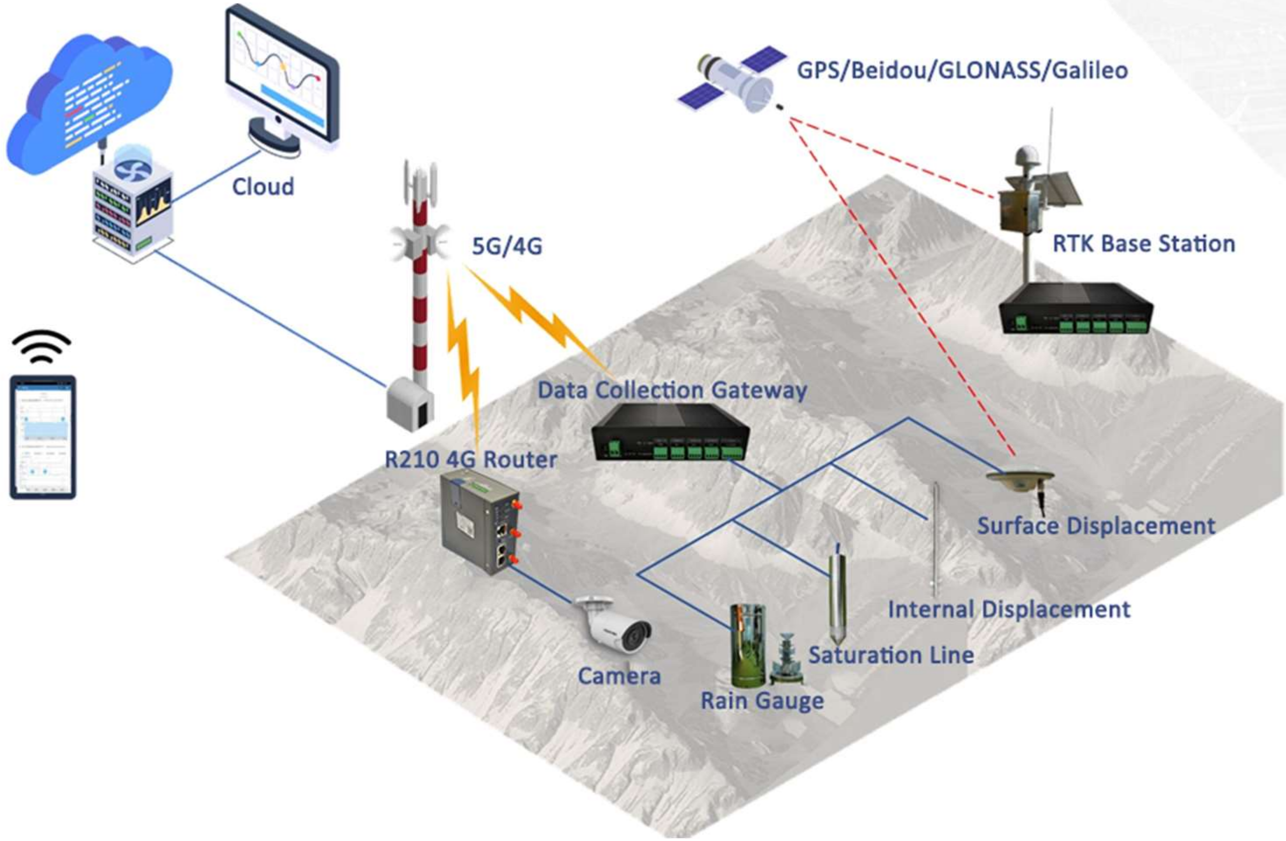
The frequency of manual inspections cannot meet real-time requirements and fails to predict changes and risks in slopes

Serious Safety Risks

The high terrain and large volume of tailings ponds and slopes pose significant threats to personnel and property safety in case of collapse or rockfall incidents

System Introduction

The system collects various data such as surface displacement, internal displacement, rainfall, and pore pressure through the RT20 high-precision positioning and data acquisition terminal. The data is remotely transmitted to the management platform via 4G network. The management platform uses preset parameters and algorithm models to provide early warnings of risk and supports querying and statistical analysis of historical data


GPS/Beidou/GLONASS/Galileo
Cloud
5G/4G
RTK Base Station
Data Collection Gateway
R210 4G Router
Surface Displacement
Internal Displacement
Saturation Line
Camera
Rain Gauge

Key Technologies

Utilizing advanced algorithms based on industry models to achieve efficient and accurate data analysis and early warning.

Cloud computing and early warning

Data Analysis

Comprehensively adopt 5G and LoRa to build an efficient, stable, and reliable wireless data connection.

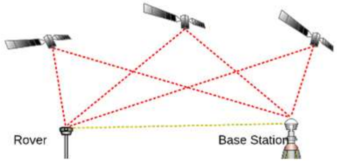
5G Mobile Network

LoRa Network

Data Transmission

The RTK high-precision positioning calculation software, as well as the 3D modeling of digital mines and sensor data collection, are all at the industry-leading levels.

Realistic 3D modeling of mines

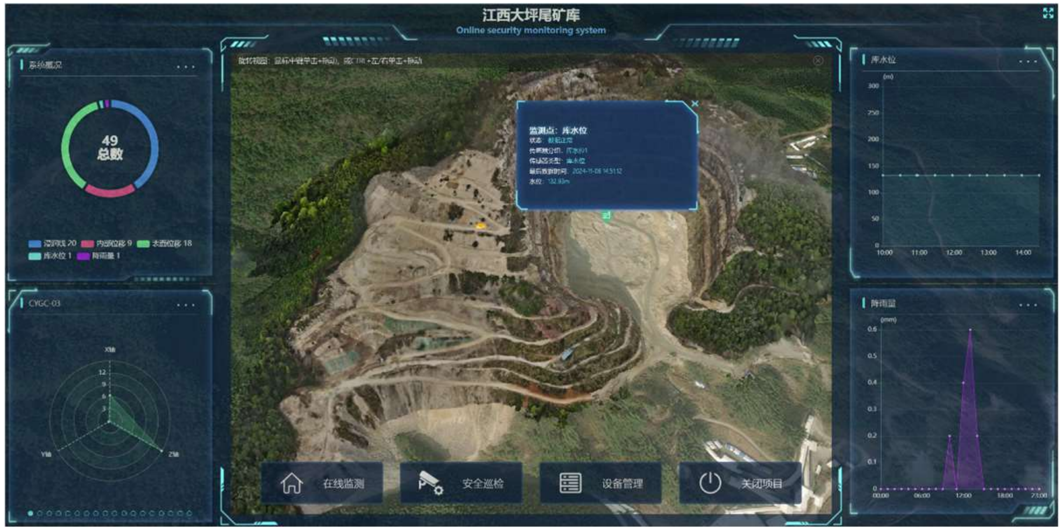


RTK high-precision positioning

Sensor data collection

Data Collection

Monitoring Platform


江西大坪尾矿库
Online security monitoring system
49
总数
内部位移 9
表面位移 18
库水位 1
降雨量 1
CYGC-03
X轴
Y轴
Z轴
库水位
降雨量
监测点：库水位
在线监测
安全巡检
设备管理
关闭项目

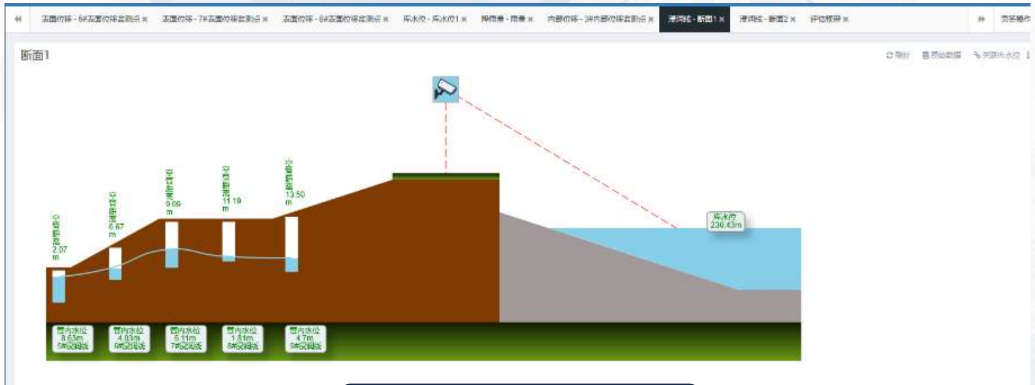
3D visual integration, embedded aerial 3D model

Scalable designed comprehensive control platform

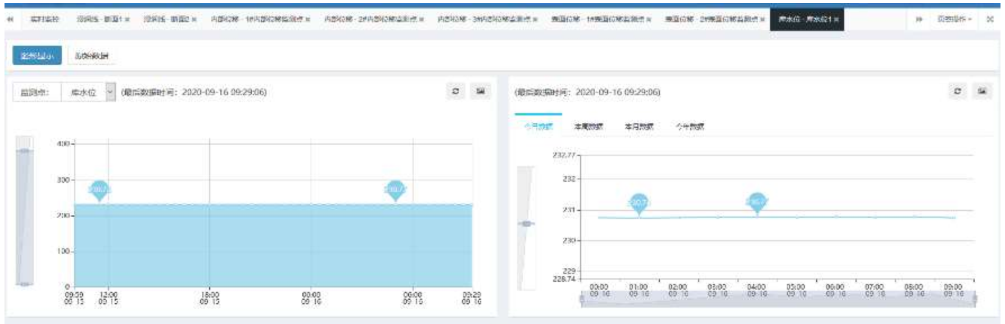
API design for easy integration with third-party systems

Water Monitoring

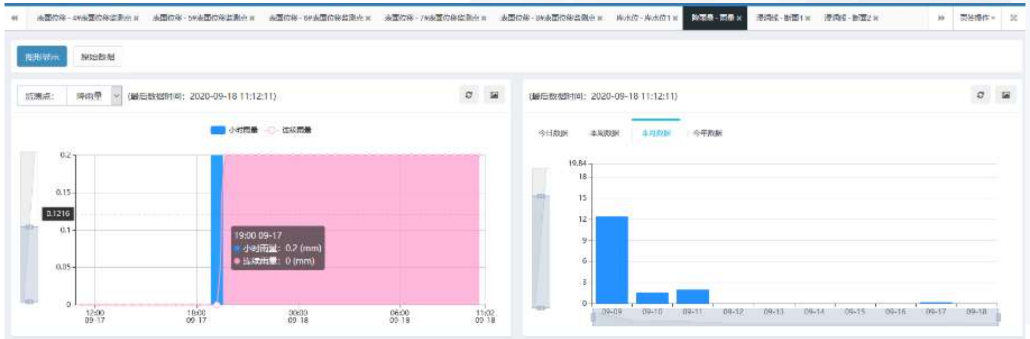
The data collected by various sensors is sent to the backend for storage and presented in a graphical way on the monitoring interface.



Saturation Line


2020-09-16 09:29:06
2020-09-16 09:29:06

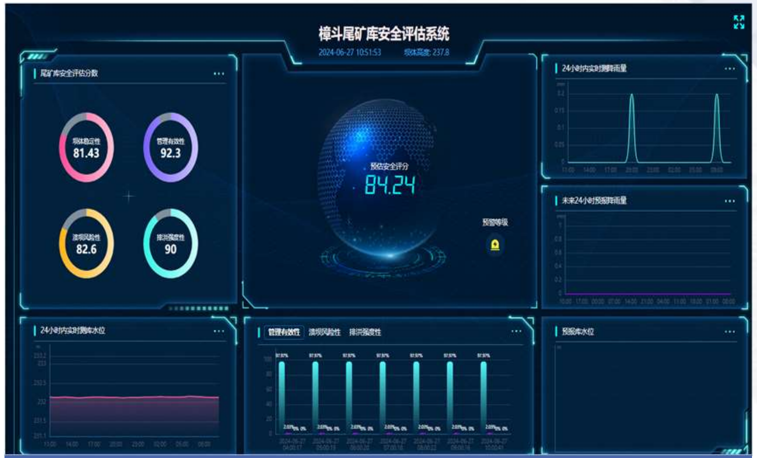
Reservoir water level


2020-09-18 11:12:11
2020-09-18 11:12:11

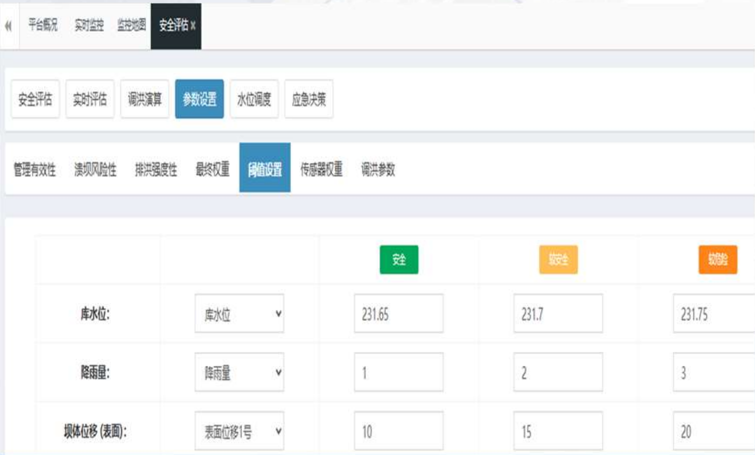
Rainfall

Flood Regulation & Calculation

The platform integrates advanced flood regulation calculation models to conduct comprehensive safety assessments of the monitoring area based on collected water system data in real-time. Alerts are issued when monitoring parameters trigger thresholds. Features include safety dashboards, parameter settings, real-time assessment, and AI-based data calculations.

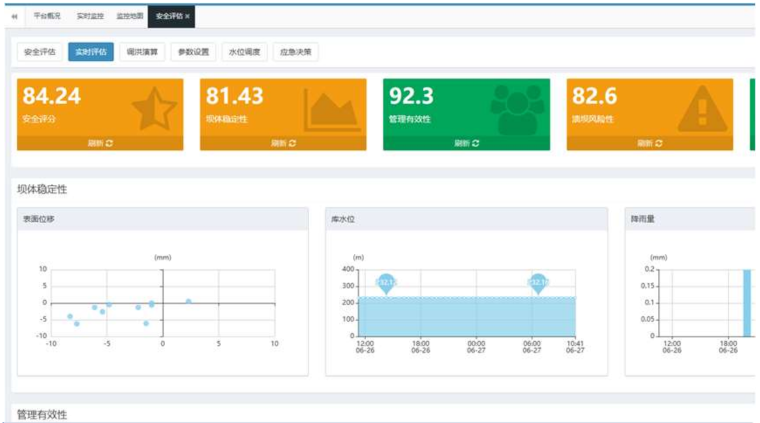

樟斗尾矿库安全评估系统
尾矿库安全评估分数
坝体稳定性 81.43
管理有效性 92.3
溃坝风险性 82.6
排洪强度性 90
预估安全评分
84.24
预警等级
24小时内实时降雨量
未来24小时预报降雨量
24小时内实时库水位
管理有效性
溃坝风险性
排洪强度性
预报库水位

Safety Dashboards

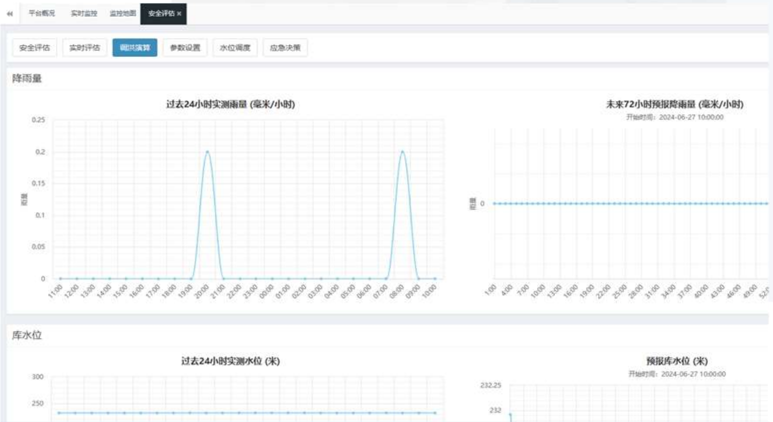

平台概况
实时监控
监控地图
安全评估
安全评估
实时评估
调洪演算
参数设置
水位调度
应急决策
管理有效性
溃坝风险性
排洪强度性
最终权重
阈值设置
传感器权重
调洪参数

		安全	较安全	较危险
库水位:	库水位	231.65	231.7	231.75
降雨量:	降雨量	1	2	3
坝体位移 (表面):	表面位移1号	10	15	20

Parameter Settings


平台概况
实时监控
监控地图
安全评估
安全评估
实时评估
调洪演算
参数设置
水位调度
应急决策
84.24
安全评分
81.43
坝体稳定性
92.3
管理有效性
82.6
溃坝风险性
刷新
坝体稳定性
表面位移
库水位
降雨量
管理有效性

Real-time Assessment

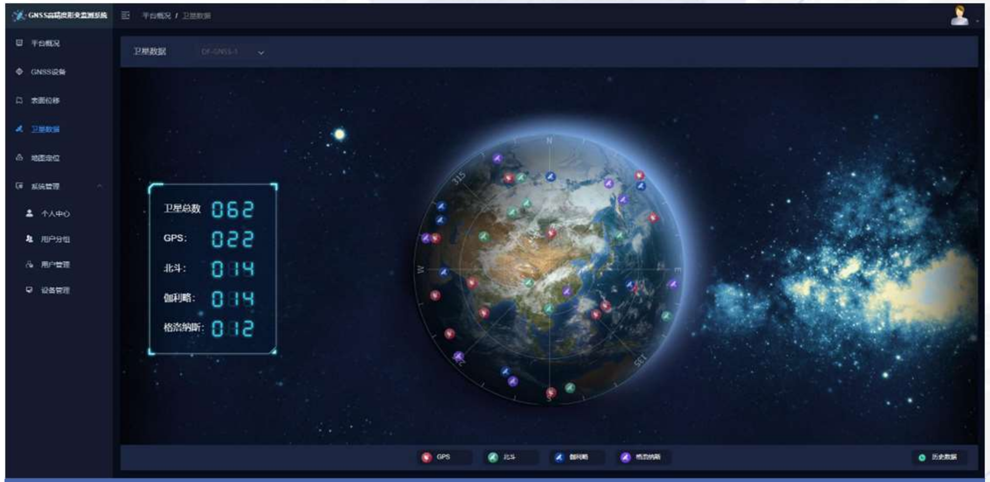

平台概况
实时监控
监控地图
安全评估
安全评估
实时评估
调洪演算
参数设置
水位调度
应急决策
降雨量
过去24小时实测雨量 (毫米/小时)
未来72小时预报降雨量 (毫米/小时)
开始时间: 2024-06-27 10:00:00
库水位
过去24小时实测水位 (米)
预报库水位 (米)
开始时间: 2024-06-27 10:00:00

AI-based Data Calculations

High-precision Satellite Monitoring of Displacement

RTK Base Station

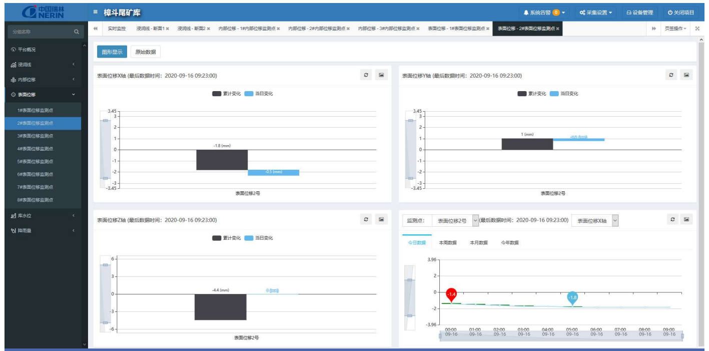
RTK Receiver


GNSS高精度形变监测系统
平台概况 / 卫星数据
平台概况
GNSS设备
表面位移
卫星数据
地图定位
系统管理
个人中心
用户分组
用户管理
设备管理
卫星数据
GPS
北斗
伽利略
格洛纳斯
历史数据

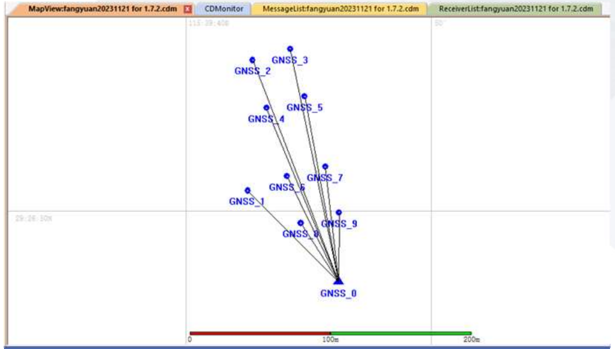
卫星总数 062
GPS: 022
北斗: 014
伽利略: 014
格洛纳斯: 012

Real-time satellite imagery

WLINK's independently developed high-precision RTK receiver, RTK base station, and high-performance data calculation platform provide millimeter-level precision real-time monitoring of surface displacement. It features real-time satellite imagery, displacement data viewing, and a calculation platform interface



Displacement Data


CDMonitor
GNSS_3
GNSS_2
GNSS_5
GNSS_4
GNSS_7
GNSS_6
GNSS_1
GNSS_9
GNSS_8
GNSS_0
0
100m
200m

Calculation Platform

Comprehensive Early Warning

Various measurement devices can be integrated based on project requirements to provide comprehensive early warning capabilities

Camera

Triaxial Accelerometer

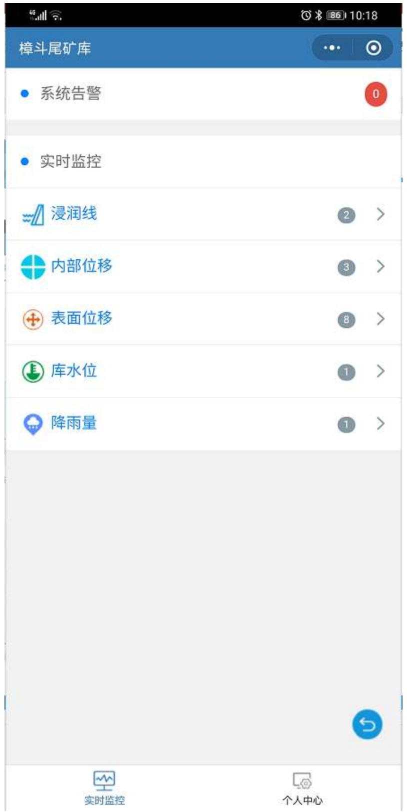
Warning

Inclinometer

Crack Meter

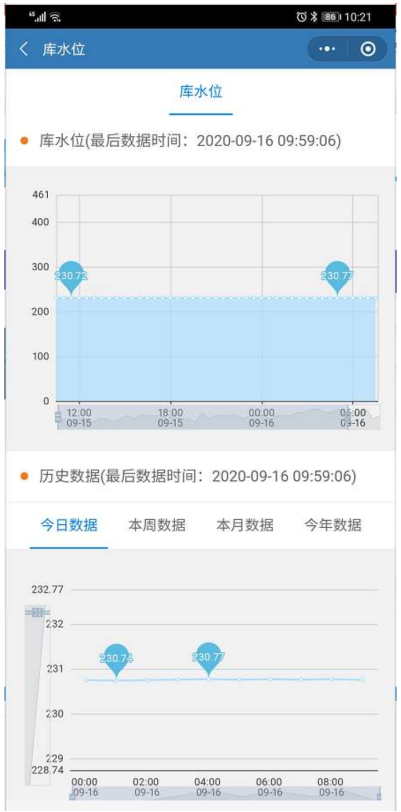
Tailings Ponds/Slopes Mini Program

Real-time data monitoring and alerts on WeChat mini program.



樟斗尾矿库

10:18
系统告警
0
实时监控
浸润线
2
内部位移
3
表面位移
8
库水位
1
降雨量
1
实时监控
个人中心

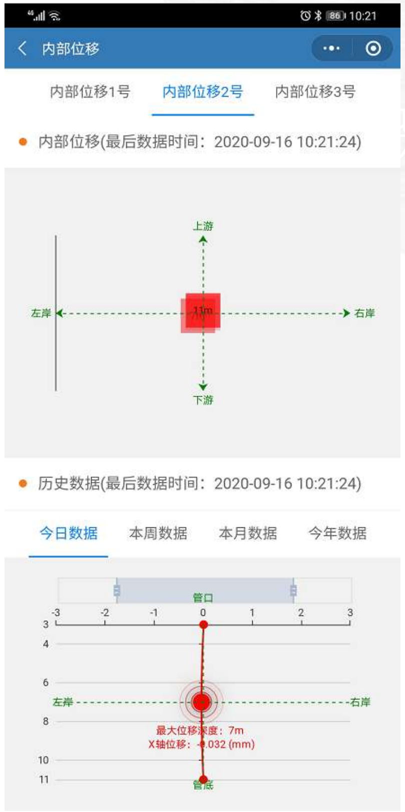


库水位

库水位(最后数据时间：2020-09-16 09:59:06)

历史数据(最后数据时间：2020-09-16 09:59:06)

10:21
库水位
461
400
300
200
100
0
230.72
230.77
12:00 09-15
18:00 09-15
00:00 09-16
06:00 09-16
今日数据
本周数据
本月数据
今年数据
232.77
232
231
230
229
228.74
230.74
230.77
00:00 09-16
02:00 09-16
04:00 09-16
06:00 09-16
08:00 09-16



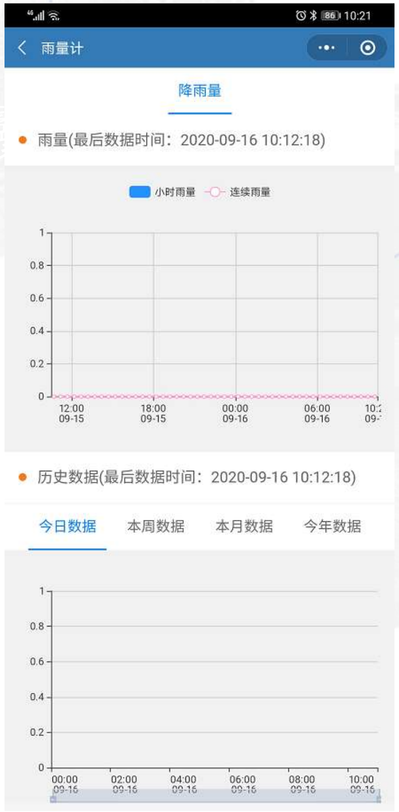
内部位移

内部位移(最后数据时间：2020-09-16 10:21:24)

历史数据(最后数据时间：2020-09-16 10:21:24)

最大位移深度：7m
X轴位移：-0.032 (mm)

10:21
内部位移1号
内部位移2号
内部位移3号
上游
左岸
11m
右岸
下游
今日数据
本周数据
本月数据
今年数据
管口
-3
-2
-1
0
1
2
3
3
4
6
8
10
11
左岸
右岸
管底



雨量计

雨量(最后数据时间：2020-09-16 10:12:18)

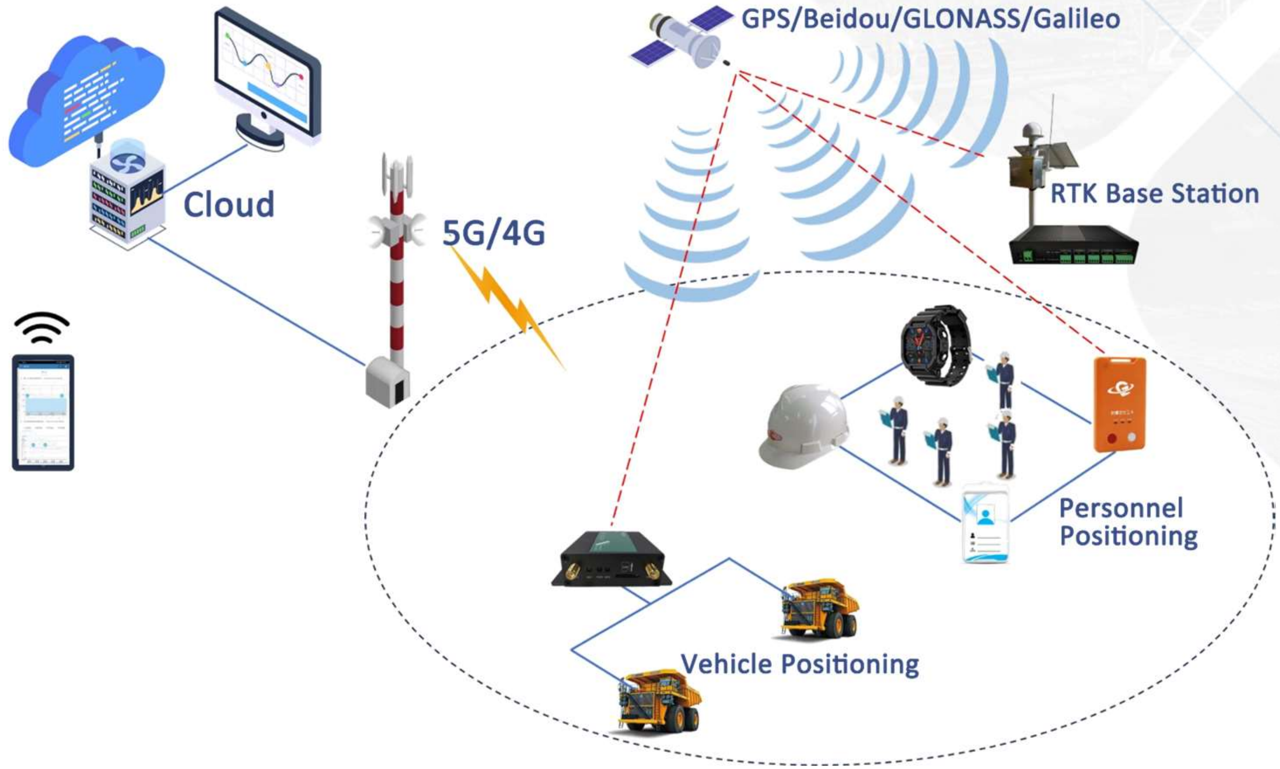
历史数据(最后数据时间：2020-09-16 10:12:18)

10:21
降雨量
小时雨量
连续雨量
1
0.8
0.6
0.4
0.2
0
12:00 09-15
18:00 09-15
00:00 09-16
06:00 09-16
今日数据
本周数据
本月数据
今年数据
1
0.8
0.6
0.4
0.2
0
00:00 09-16
02:00 09-16
04:00 09-16
06:00 09-16
08:00 09-16
10:00 09-16

03 Safety Production

System Introduction

The safety production solution focuses on the protection of personnel and vehicles. The system involes various positioning devices that can track the geographical location of staffs and vehicles in real time, offers many useful functions incl. one-click SOS calls, trajectory tracking, personnel health monitoring, and AI behavior recognition.


GPS/Beidou/GLONASS/Galileo
Cloud
5G/4G
RTK Base Station
Personnel Positioning
Vehicle Positioning

Personnel Inspection & Positioning

Positioning Badge

- ✓ High integration single-chip solution
- ✓ Supports all 4G network bands
- ✓ Multiple positioning modes including WIFI/Beidou/GPS/LBS
- ✓ Positioning accuracy <10 meters

Watch

- ✓ High stability with four-star positioning
- ✓ Supports all 4G network bands
- ✓ Supports heart rate and blood oxygen monitoring
- ✓ Positioning accuracy <10 meters

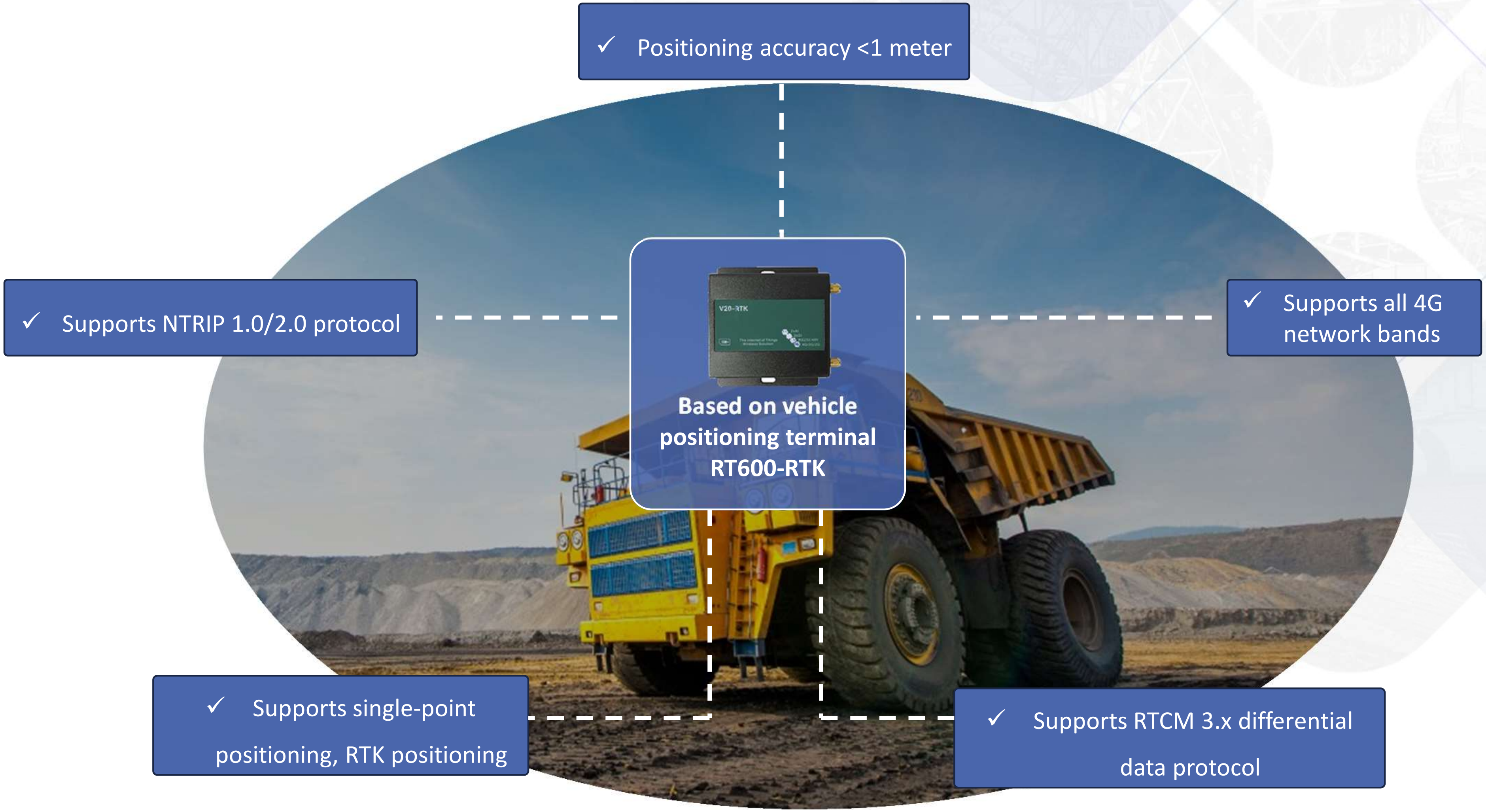
RTK High-precision Positioning Badge

- ✓ With RTK base station, sub-meter level high precision
- ✓ Supports all 4G network bands
- ✓ Multiple positioning modes including WIFI/Beidou/GPS/LBS
- ✓ Positioning accuracy <10 meters

Positioning Safety Helmet

- ✓ Combines safety helmet and data communication
- ✓ Supports helmet removal detection
- ✓ Multiple positioning modes including WIFI/Beidou/GPS/LBS
- ✓ Positioning accuracy <10 meters

High-precision Vehicle Positioning



✓ Positioning accuracy <1 meter

✓ Supports NTRIP 1.0/2.0 protocol

Based on vehicle positioning terminal RT600-RTK

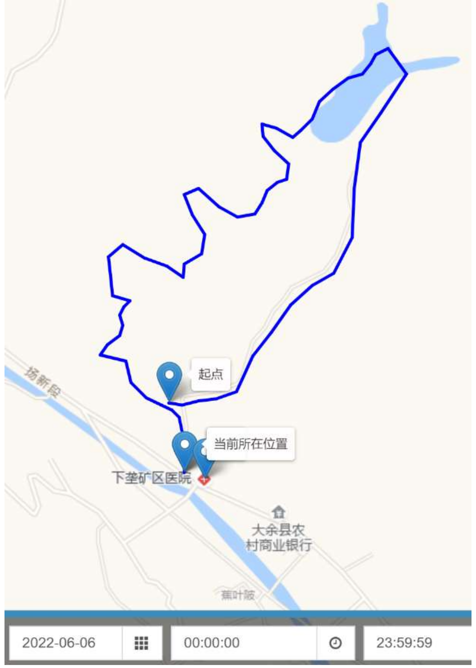
✓ Supports all 4G network bands

✓ Supports single-point positioning, RTK positioning

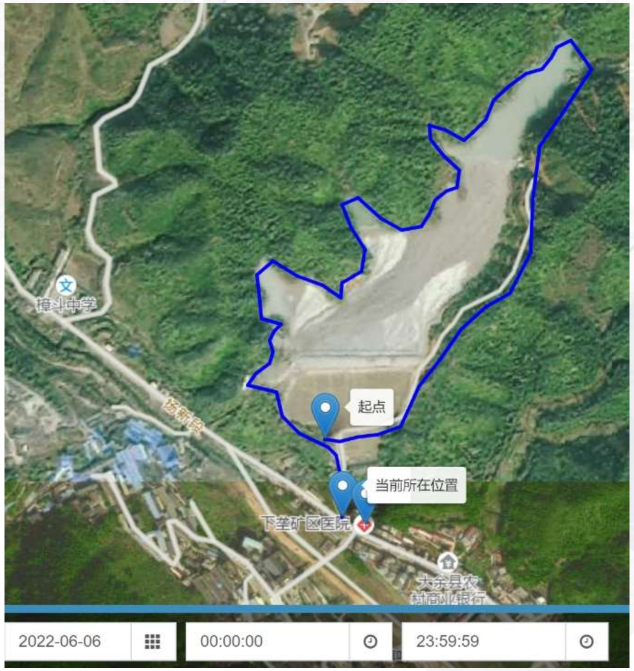
✓ Supports RTCM 3.x differential data protocol

Backend Map and Trajectory

- ✓ Can retrospectively view map trajectories
- ✓ Supports building own maps, covering blind spots
- ✓ Supports aerial 3D mapping to enhance visualization

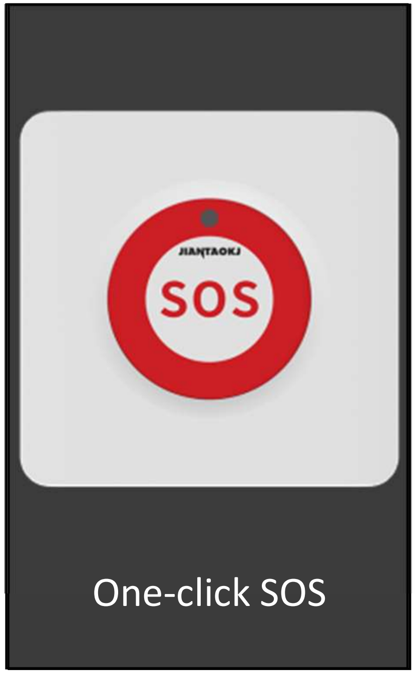

扬新段
起点
当前所在位置
下垄矿区医院
大余县农村商业银行
蕉叶陂

2022-06-06 | 00:00:00 | 23:59:59


樟斗中学
扬新段
起点
当前所在位置
下垄矿区医院
大余县农村商业银行

2022-06-06 | 00:00:00 | 23:59:59

Other Auxiliary Safety Functions


JIANTAOKJ
SOS

One-click SOS

24小时心率监测
时刻关注您的心脏健康

采用自主研发的 PPG 心率监测技术，结合心率算法，24 小时智能监测心率，实时查看您的心率值，无论是静息心率还是运动心率都能准确监测，在 App 上还可以关注每天的心率起伏变化。

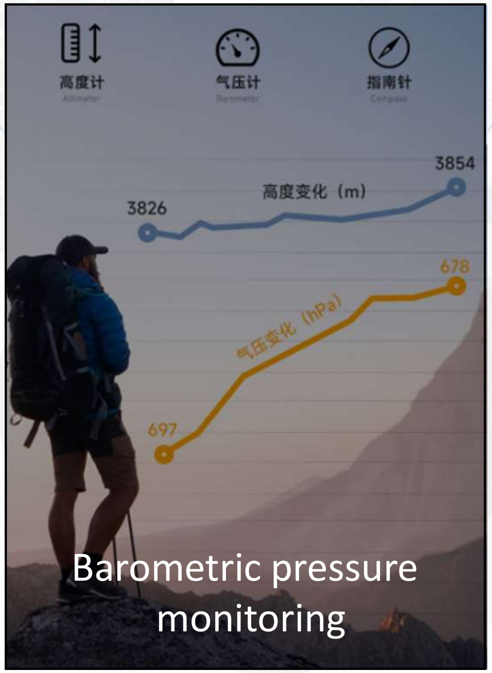
背面绿色灯亮起
最近心率：120 次 / 分钟
bpm
200
175
150
125
100
50
25
0

Heart rate monitoring

当你进行持续的脑力劳动或进行剧烈的户外运动时,你可以在感到不适的时候测量你血氧水平,了解体内是否缺氧，以便更好地了解您的身体状况；正常血氧饱和度值不应低于93%。

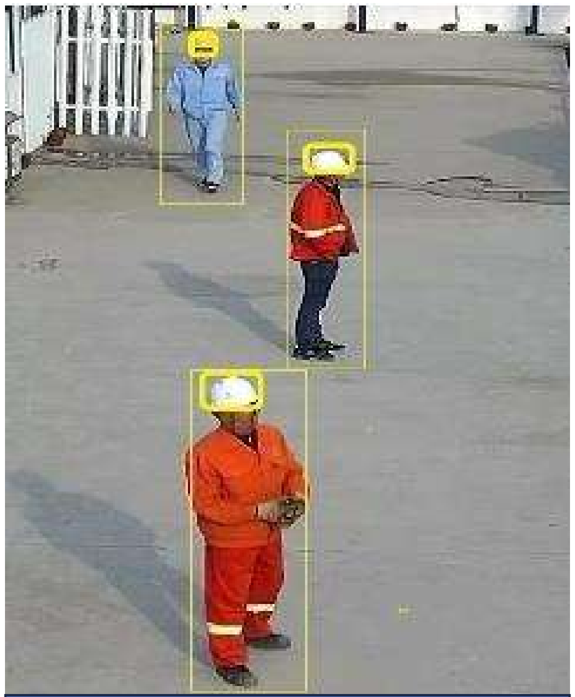
[%]
100
95
90
85
97 10:00-11:00
背面红色灯亮起
00:00
06:00
12:0
平均 94%
最低 92%
下午 14:30
97%
测量

Blood oxygen monitoring


高度计
气压计
指南针
3854
高度变化（m）
3826
678
气压变化（hPa）
697

Barometric pressure monitoring

AI Safety Production Applications



Detection of safety helmet wearing

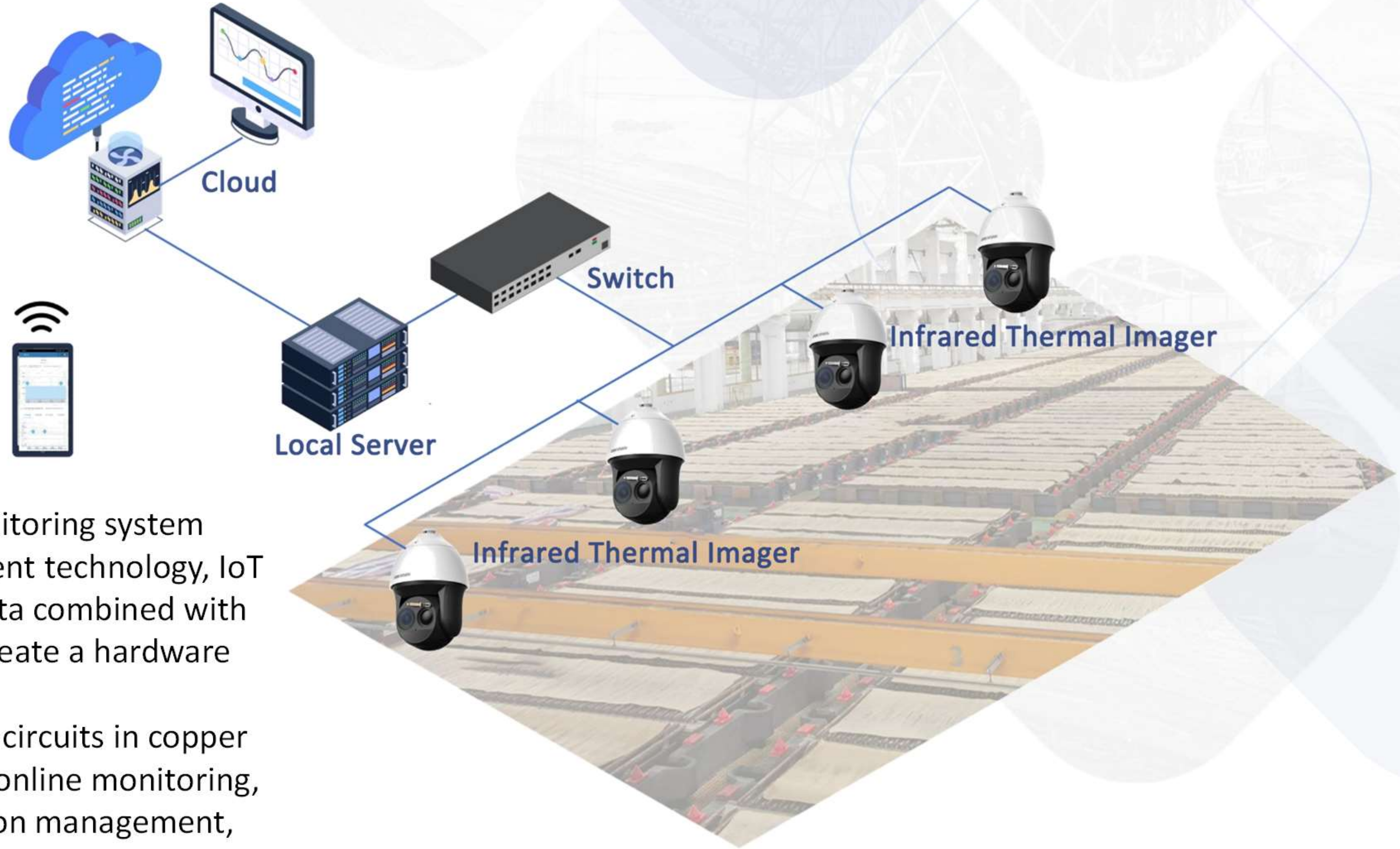
Open flame detection

Staff departure detection

04

Infrared Online Monitoring System for Copper Electrolytic Tank Plants

System Introduction


Cloud
Switch
Local Server
Infrared Thermal Imager
Infrared Thermal Imager

The electrolytic tank infrared online monitoring system utilizes infrared temperature measurement technology, IoT technology, cloud computing, and big data combined with professional monitoring equipment to create a hardware and software system.
It addresses the hidden dangers of short circuits in copper electrolytic tanks by providing real-time online monitoring, early warning and forecasting, information management, and data mining. This improves smelting efficiency, reduces labor costs, and minimizes the risks associated with detecting short circuits

Infrared Temperature Measurement Camera

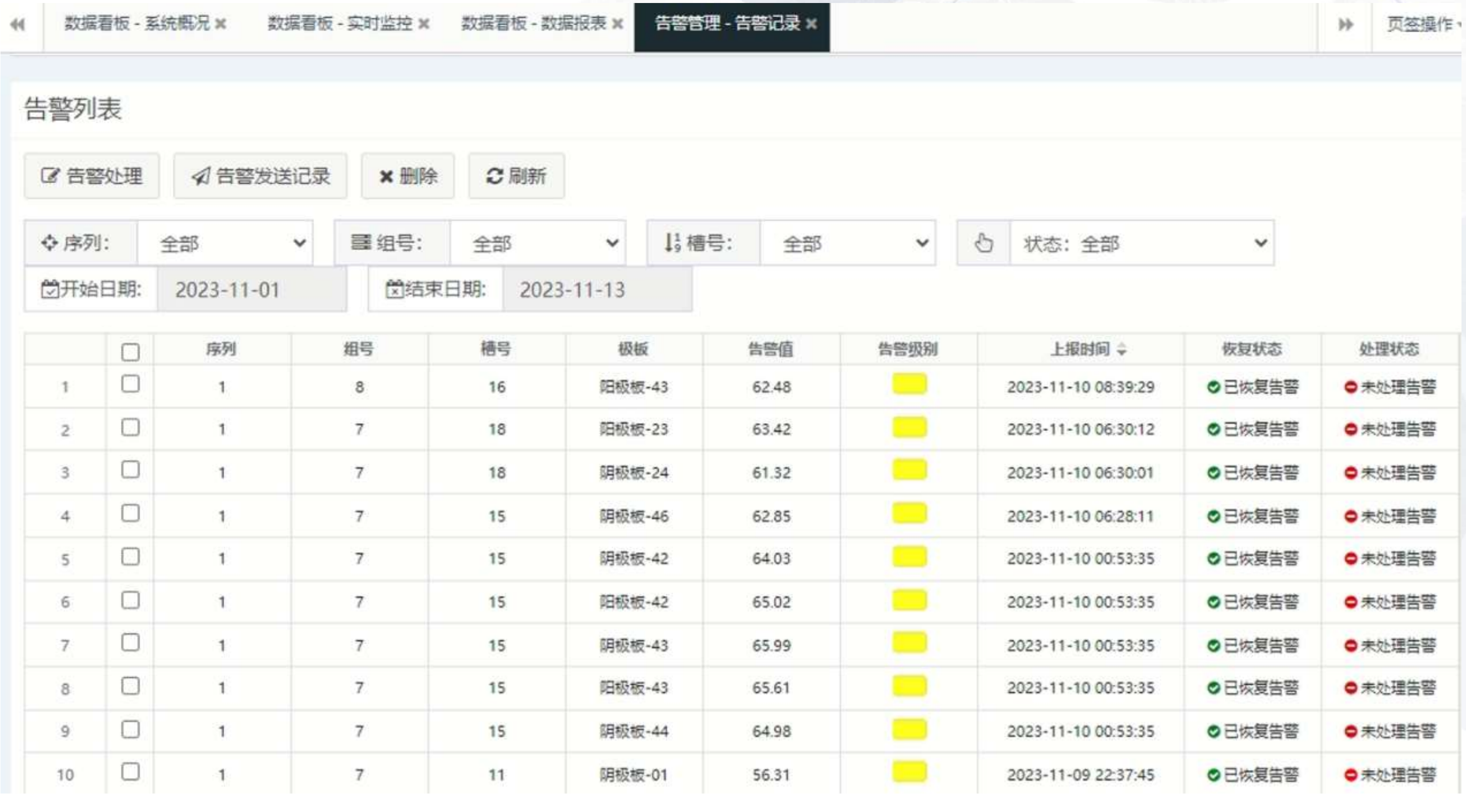
The dual-spectrum temperature measurement thermal imager is equipped with a sensitive infrared thermal imager and a high-definition camera. Its high-precision photoelectric turntable can preset scanning paths to conduct wide-range scanning searches on the short-circuited plates of the electrolytic tank surface. It is suspended in the electrolytic workshop below the lighting beams and coated with an anti-corrosion layer to resist corrosion and acid rain.

Key Features:

- Supports temperature measurement with a range of -20℃ to 550℃（±2℃)
- Highest temperature cross-positioning
- Supports 1-line temperature measurement, 10-frame temperature measurement, and 10-point temperature measurement
- 274 x preset positions
- Precision motor drive, responsive and stable operation, accuracy deviation less than 0.1 degree, no image shake at any speed
- Supports 3D positioning, enabling click-to-zoom with client software/IE
- Supports system dual backup function to ensure data safey during power outages

Backend Recognition and Reporting

The management platform's backend configures the temperature measurement range, sets alarm thresholds, receives and records temperature, and sends alarms when the data reaches the threshold as preset.



告警列表

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槽号：全部
状态：全部
开始日期：2023-11-01
结束日期：2023-11-13

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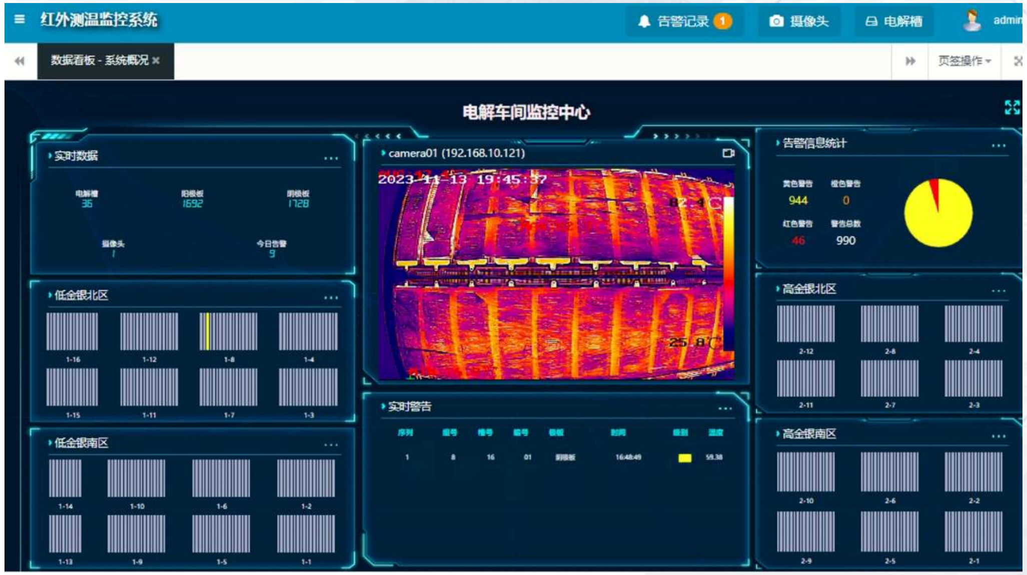
2	□	1	7	18	阳极板-23	63.42	🟨	2023-11-10 06:30:12	✓ 已恢复告警	⊖ 未处理告警
3	□	1	7	18	阴极板-24	61.32	🟨	2023-11-10 06:30:01	✓ 已恢复告警	⊖ 未处理告警
4	□	1	7	15	阴极板-46	62.85	🟨	2023-11-10 06:28:11	✓ 已恢复告警	⊖ 未处理告警
5	□	1	7	15	阴极板-42	64.03	🟨	2023-11-10 00:53:35	✓ 已恢复告警	⊖ 未处理告警
6	□	1	7	15	阳极板-42	65.02	🟨	2023-11-10 00:53:35	✓ 已恢复告警	⊖ 未处理告警
7	□	1	7	15	阴极板-43	65.99	🟨	2023-11-10 00:53:35	✓ 已恢复告警	⊖ 未处理告警
8	□	1	7	15	阳极板-43	65.61	🟨	2023-11-10 00:53:35	✓ 已恢复告警	⊖ 未处理告警
9	□	1	7	15	阴极板-44	64.98	🟨	2023-11-10 00:53:35	✓ 已恢复告警	⊖ 未处理告警
10	□	1	7	11	阴极板-01	56.31	🟨	2023-11-09 22:37:45	✓ 已恢复告警	⊖ 未处理告警

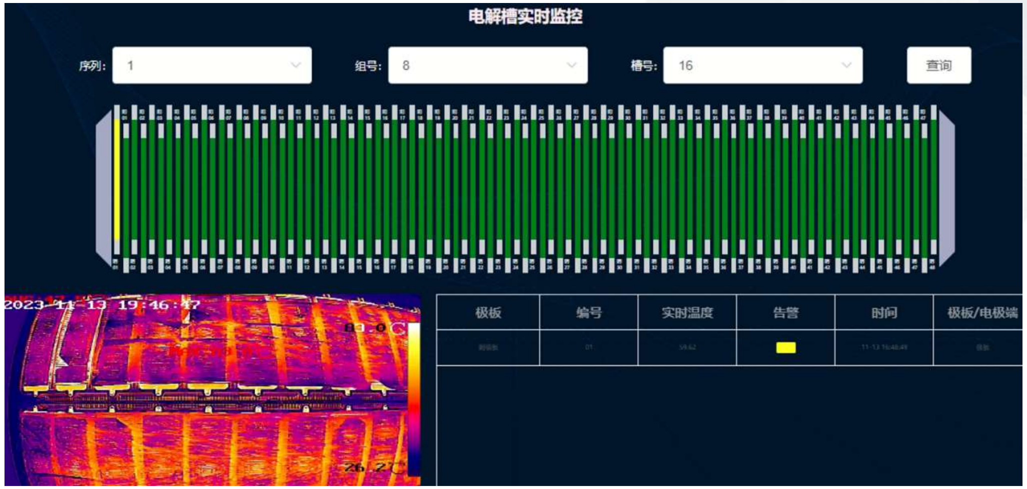
Frontend Recognition and Display

Real-time monitoring images and data on the dashboard, can also filter a specified slot number.


红外测温监控系统
告警记录 1
摄像头
电解槽
admin
数据看板 - 系统概况
页签操作
电解车间监控中心
实时数据
camera01 (192.168.10.121)
2023-11-13 19:45:37
82.4℃
25.8℃
告警信息统计
低金银北区
1-16
1-12
1-8
1-4
1-15
1-11
1-7
1-3
低金银南区
1-14
1-10
1-6
1-2
1-13
1-9
1-5
1-1
实时警告
高金银北区
2-12
2-8
2-4
2-11
2-7
2-3
高金银南区
2-10
2-6
2-2
2-9
2-5
2-1

电解槽 36
阳极板 1692
阴极板 1728
摄像头 1
今日告警 9

黄色警告 944
橙色警告 0
红色警告 46
警告总数 990

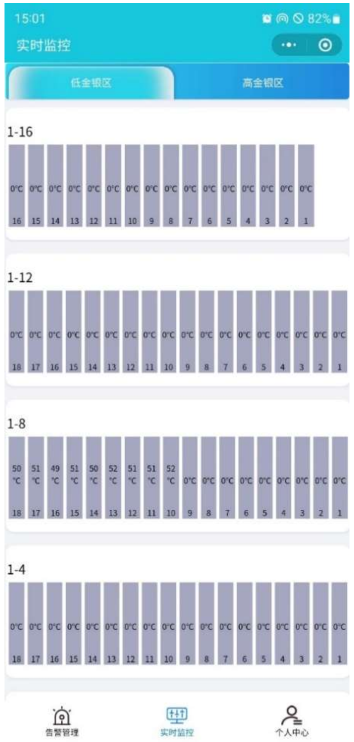

电解槽实时监控
查询
2023-11-13 19:46:47
83.0℃
26.2℃

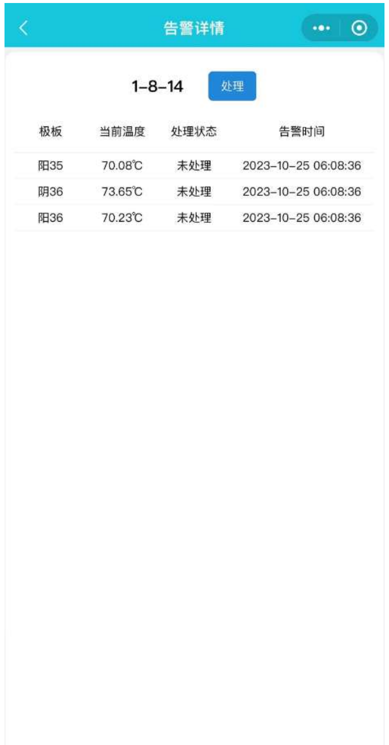
序列: 1
组号: 8
槽号: 16

极板	编号	实时温度	告警	时间	极板/电极端
[illegible]	01	59.62	🟨	11-13 16:48:49	[illegible]

Electrolytic Tank Monitoring Mini Program

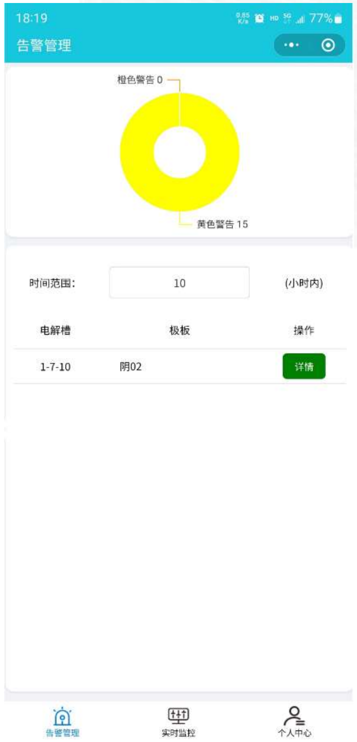
Real-time status monitoring and alerts disply on WeChat mini-program.


15:01
82%
实时监控
低金银区
高金银区
1-16
1-12
1-8
1-4
告警管理
实时监控
个人中心



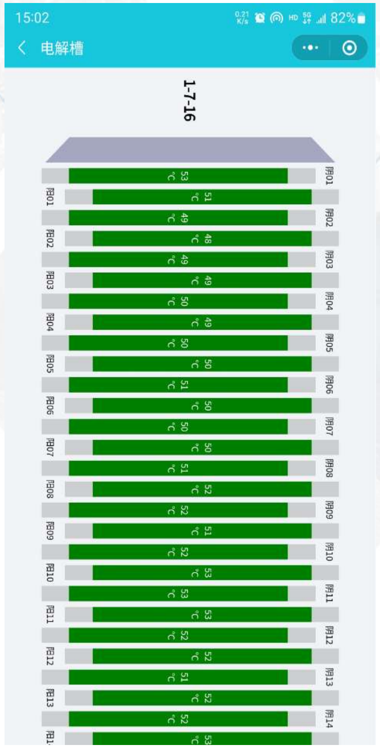
1–8–14 处理

极板	当前温度	处理状态	告警时间
阳35	70.08℃	未处理	2023–10–25 06:08:36
阴36	73.65℃	未处理	2023–10–25 06:08:36
阳36	70.23℃	未处理	2023–10–25 06:08:36


18:19
77%
告警管理
橙色警告 0
黄色警告 15
告警管理
实时监控
个人中心

时间范围: 10 (小时内)

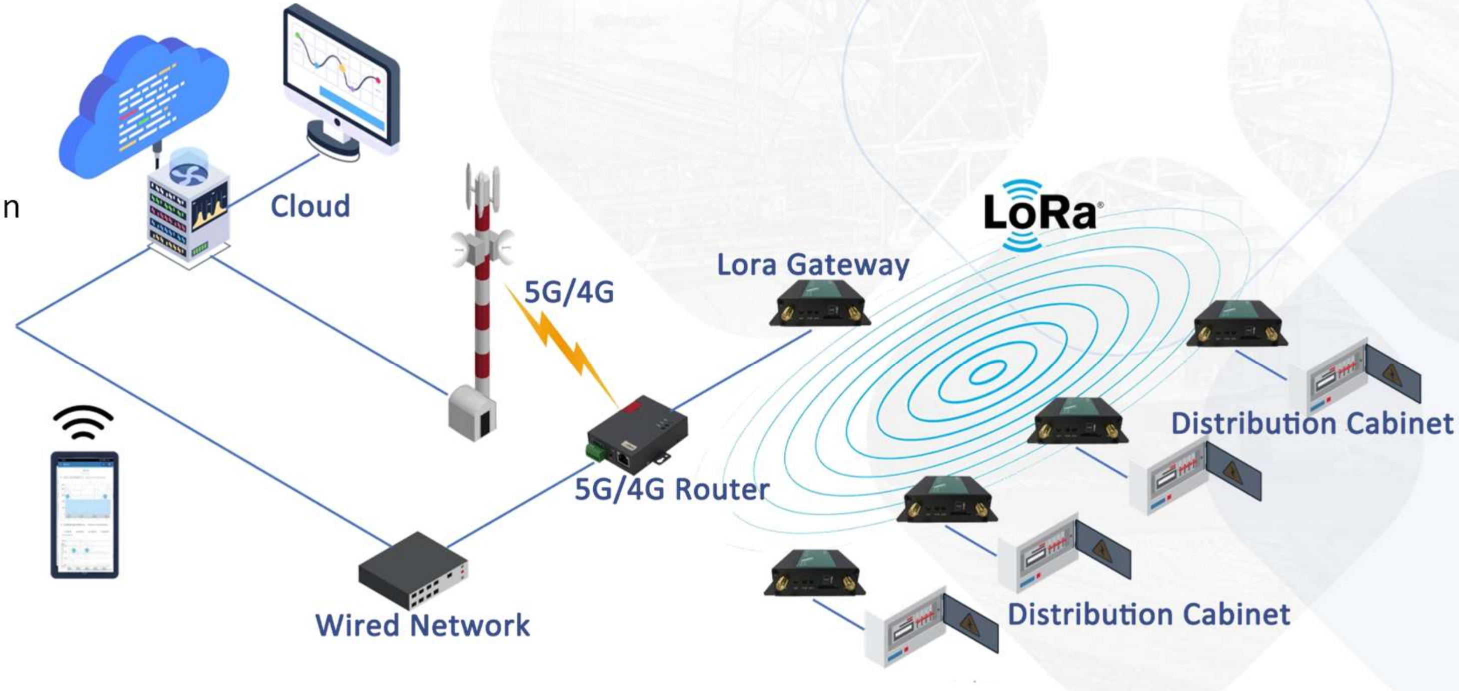
电解槽	极板	操作
1-7-10	阴02	详情


15:02
82%
电解槽
1-7-16

05 Distribution Cabinet Inspection

System Introduction

The system integrates high-voltage distribution system data into a unified management platform to achieve real-time energy data collection and centralized management.
By monitoring and analyzing the energy consumption equipment in real-time and over the long term, so as to improve energy efficiency.


Cloud
5G/4G
LoRa
Lora Gateway
5G/4G Router
Distribution Cabinet
Wired Network
Distribution Cabinet

Key Products

RT600-LoRa

- LoRa transmission, configurable as a gateway or node
- RS232/RS485 interface, supports ModBus protocol
- DI, 2 analog inputs
- Compatible with various distribution cabinet models via script adaptation
- 8MB data storage

With multiple node devices and gateway devices forming a network. Node devices collect distribution cabinet data and transmit it to gateway devices

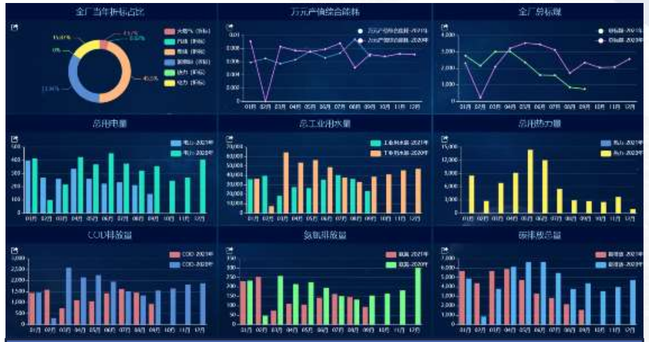
WL-R100 4G Industrial Router

- Compact design for easy installation
- High-speed 4G/5G network connection
- 1*LAN, 1*RS232/485
- Supports multiple VPN protocols

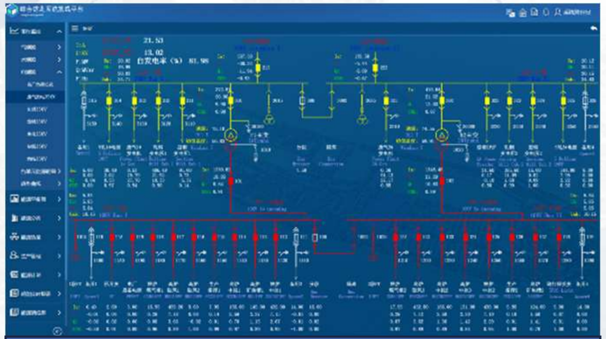
Connects LoRa gateway devices and sends aggregated data to the management platform over 4G network

Backend Introduction

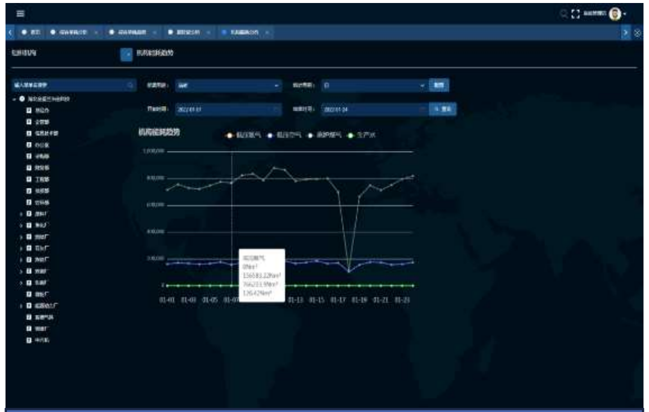
The backend supports comprehensive system management needs such as energy consumption queries, analysis, alarm management, report management, and permission management
It includes energy dashboards, energy flow diagrams, energy consumption trend analysis, and time period analysis



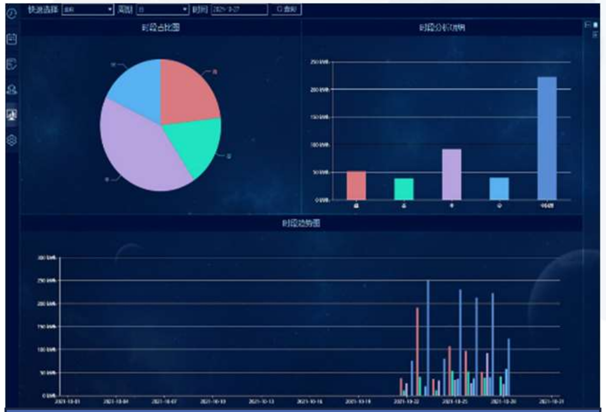
Energy Dashboards



Energy Flow Diagrams



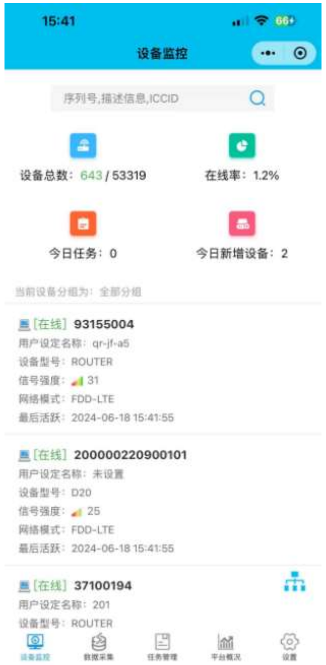
Energy Consumption Analysis



Time Period Analysis

Mini Program

Supports viewing system information remotely via WeChat mini-program


15:41
设备监控
序列号,描述信息,ICCID
设备监控
数据采集
任务管理
平台概况
设置

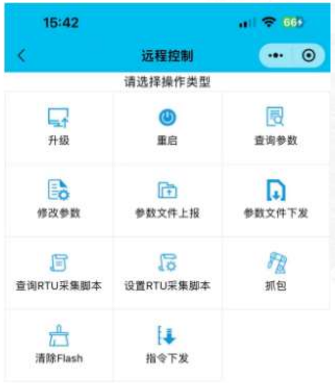
设备总数：643 / 53319
在线率：1.2%
今日任务：0
今日新增设备：2

当前设备分组为：全部分组

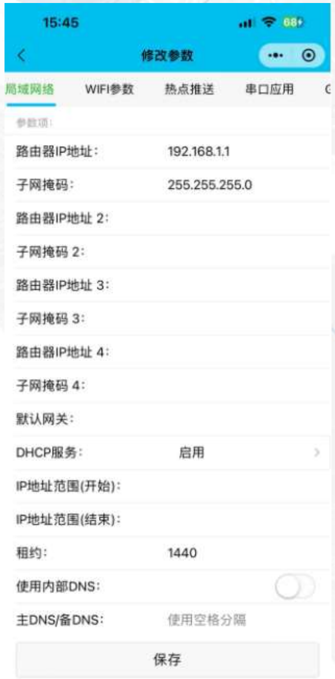
[在线] 93155004
用户设定名称：qr-jf-a5
设备型号：ROUTER
信号强度：31
网络模式：FDD-LTE
最后活跃：2024-06-18 15:41:55

[在线] 200000220900101
用户设定名称：未设置
设备型号：D20
信号强度：25
网络模式：FDD-LTE
最后活跃：2024-06-18 15:41:55

[在线] 37100194
用户设定名称：201
设备型号：ROUTER

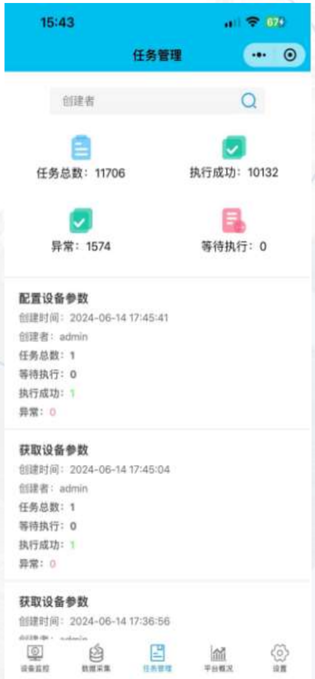

15:42
远程控制
升级
重启
查询参数
修改参数
参数文件上报
参数文件下发
查询RTU采集脚本
设置RTU采集脚本
抓包
清除Flash
指令下发

请选择操作类型


15:45
修改参数
局域网络
WIFI参数
热点推送
串口应用
保存

参数项：

路由器IP地址：192.168.1.1
子网掩码：255.255.255.0
路由器IP地址 2：
子网掩码 2：
路由器IP地址 3：
子网掩码 3：
路由器IP地址 4：
子网掩码 4：
默认网关：
DHCP服务：启用
IP地址范围(开始)：
IP地址范围(结束)：
租约：1440
使用内部DNS：○
主DNS/备DNS：使用空格分隔


15:43
任务管理
创建者
设备监控
数据采集
任务管理
平台概况
设置

任务总数：11706
执行成功：10132
异常：1574
等待执行：0

配置设备参数
创建时间：2024-06-14 17:45:41
创建者：admin
任务总数：1
等待执行：0
执行成功：1
异常：0

获取设备参数
创建时间：2024-06-14 17:45:04
创建者：admin
任务总数：1
等待执行：0
执行成功：1
异常：0

获取设备参数
创建时间：2024-06-14 17:36:56

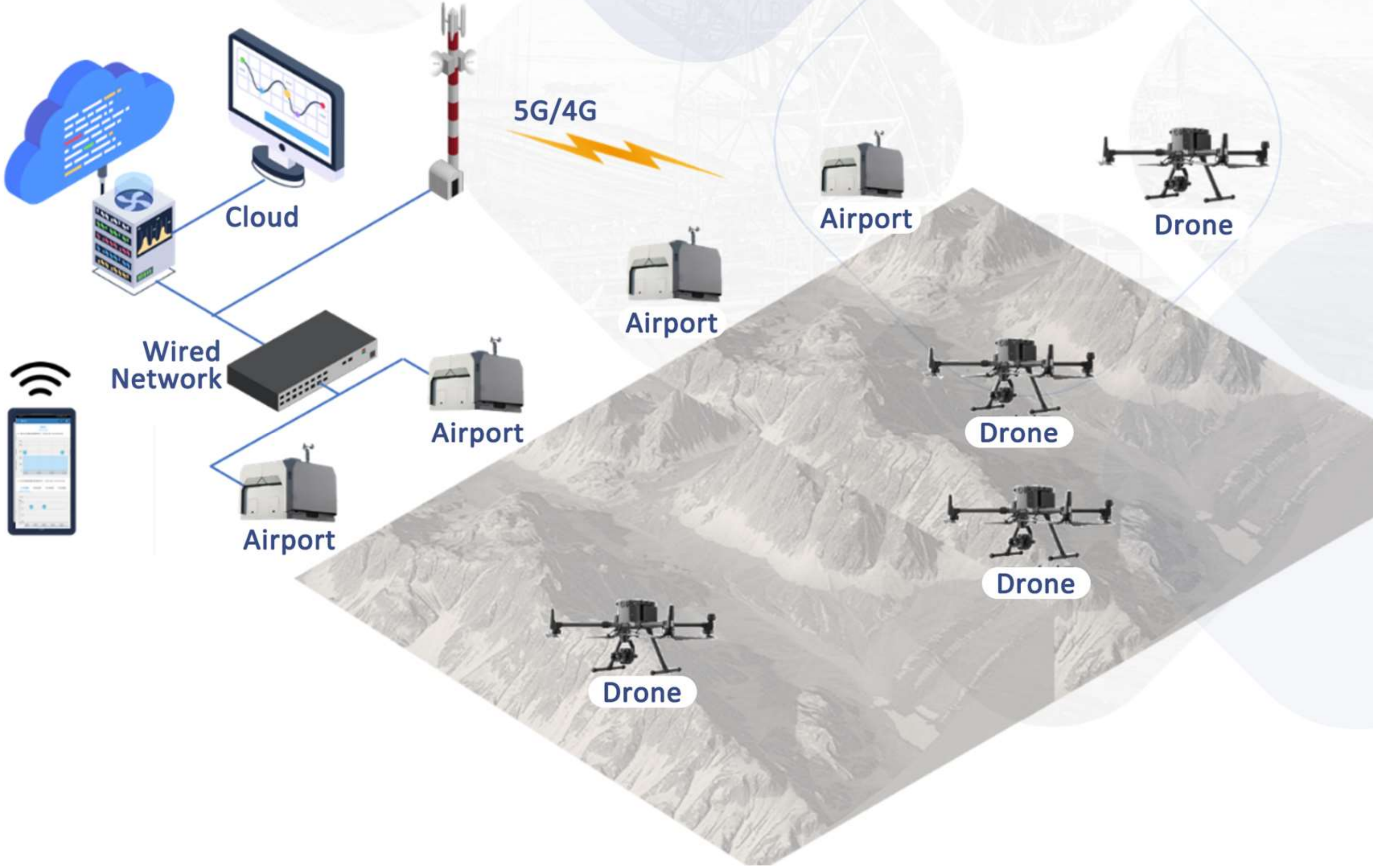
06 Drone Inspection

System Introduction

The drone inspection system uses the most advanced drone technology in the industry today, including an airport system.

Drones take off from the airport at preset times or upon receiving real-time instructions, perform inspections of tailings ponds along preset paths, return to the airport upon completion, and upload data.

The airport uploads the data to the cloud platform, where image updates and 3D model generation are completed


5G/4G
Cloud
Wired Network
Airport
Airport
Airport
Airport
Drone
Drone
Drone
Drone

Drone

The drone follows a pre-programmed flight path to carry out the inspection

Main Parameters:

- Maximum flight time: 55 minutes
- Protection rating: IP55
- Operating temperature: -20° C to 50° C
- Maximum flight altitude: 7000 meters
- Mechanical shutter to reduce jelly effect
- Six-directional positioning and obstacle avoidance

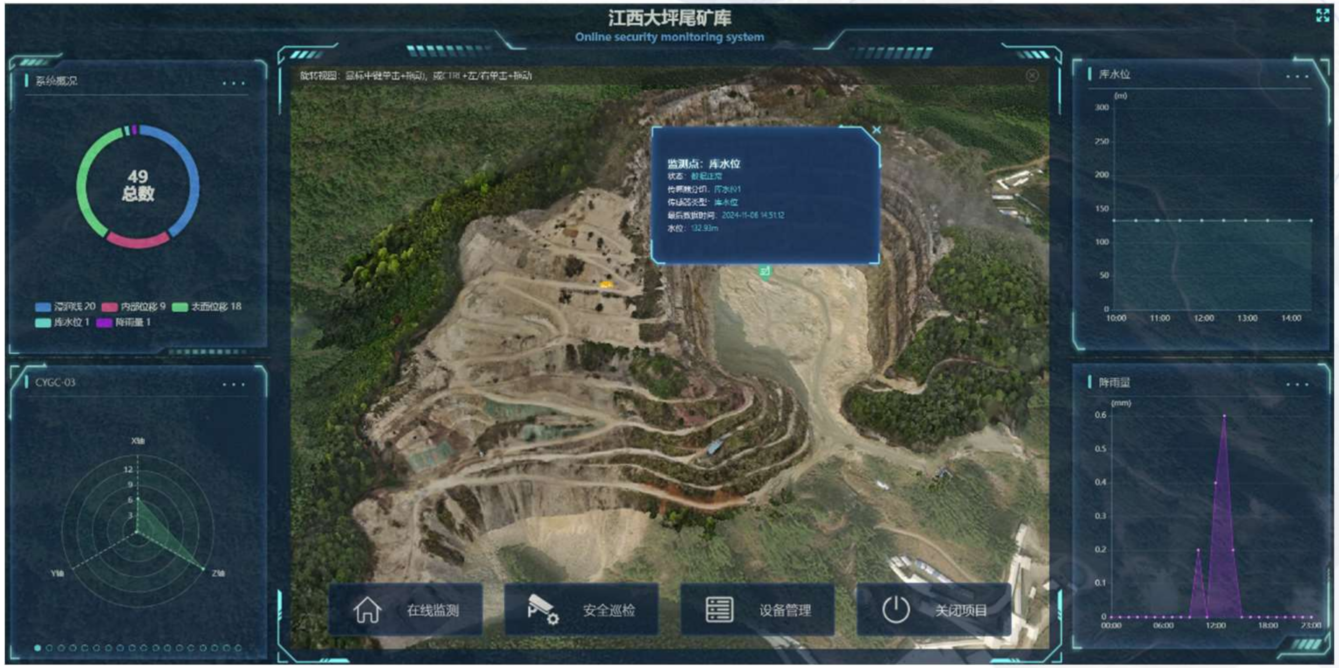
Drone Airport

The drone airport equipment completes the fixed-point recovery of drones, data upload after recovery

- Lightweight, easy to deploy
- Protection rating: IP55
- Max operation radius: 10 kilometers
- Supports point-to-point flight
- Supports cloud modeling

Backend Monitoring Screen

Drone images are updated to the monitoring screen in real time, ensuring effective observation


江西大坪尾矿库
Online security monitoring system
系统概况
49
总数
浸润线 20
内部位移 9
表面位移 18
库水位 1
降雨量 1
CYGC-03
X轴
Y轴
Z轴
库水位
(m)
降雨量
(mm)
在线监测
安全巡检
设备管理
关闭项目

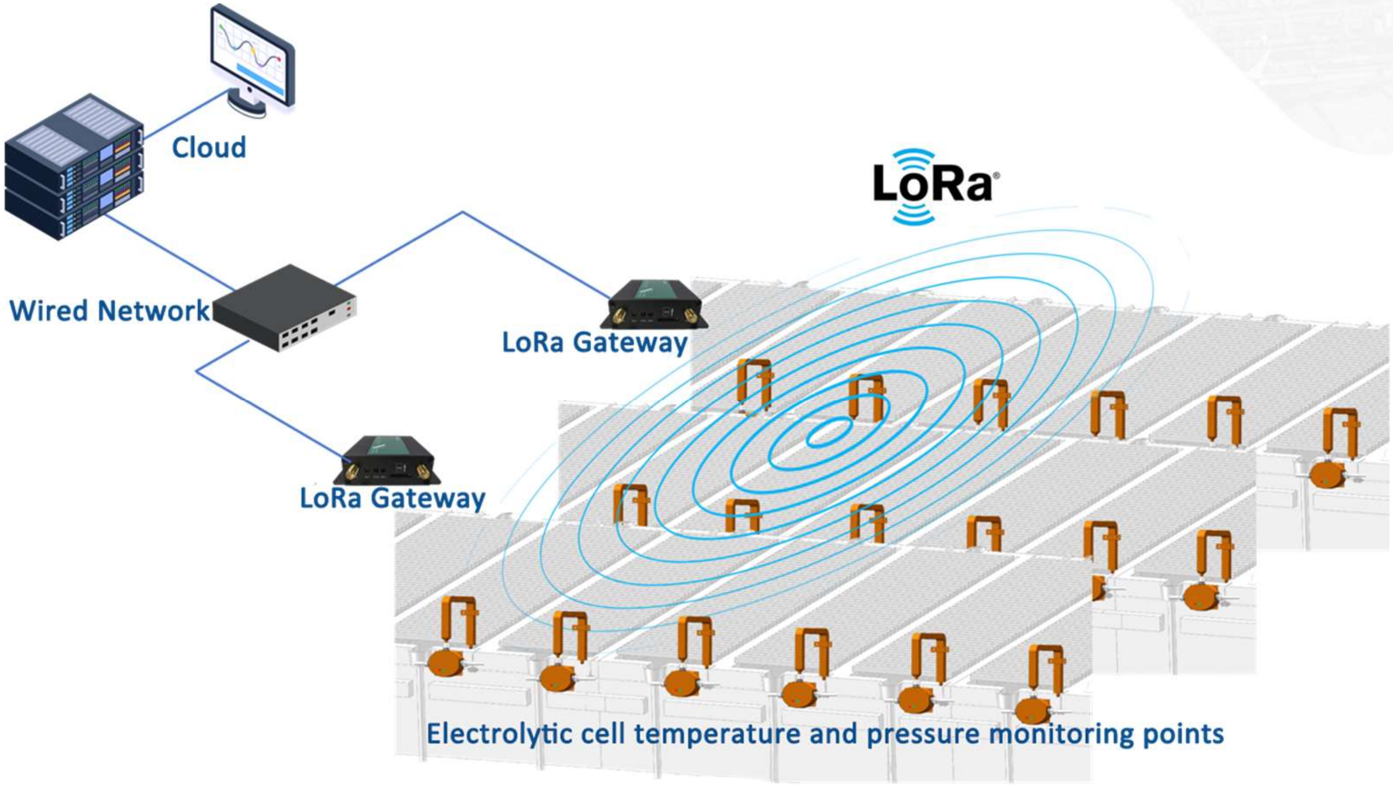
监测点：库水位
状态：数据正常
传感器类型：库水位
最后数据时间：2024-11-06 14:51:12
水位：132.93m

07 Temperature and Pressure Monitoring System for Electrolytic Cells

System Introduction

The electrolytic cell temperature and pressure monitoring system consists of a wireless passive temperature and pressure detection device and a LoRa edge gateway.

The detection device are installed on the electrolytic cell, and transmit the collected temperature and pressure data to the edge gateway via LoRa wireless communication. The edge gateway then aggregates the data and transmits to the cloud.


Cloud
LoRa
Wired Network
LoRa Gateway
LoRa Gateway
Electrolytic cell temperature and pressure monitoring points

Key Product

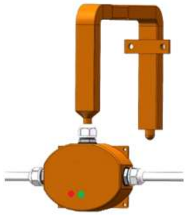
RT600-LoRa

Centralizes the reception of data sent by the temperature and pressure detection device via LoRa, and uploads it to the server

- LoRa transmission, configurable as a gateway or node
- RS232/RS485 interface, supports ModBus protocol
- 2 x DI, 2 x AI
- Compatible with various distribution cabinet models via script adaptation
- 8MB data storage

Temperature and Pressure Detection Device

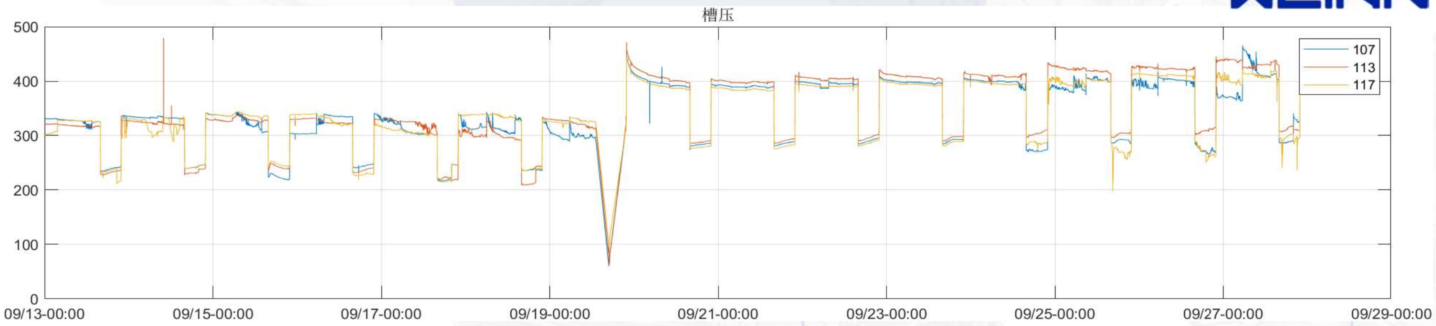
Measures voltage and temperature and connects with the gateway via LoRa wireless communication

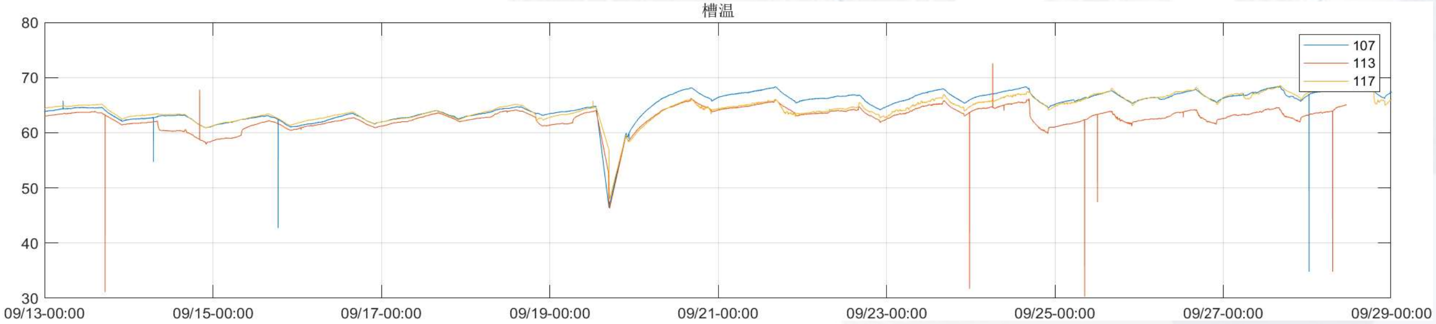


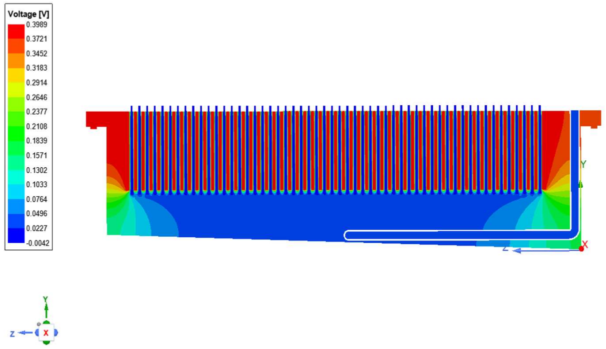
- Low power boost
- Voltage AI collection
- Thermistor temperature measurement
- LoRa communication
- Plastic shell, built-in antenna
- Corrosion-resistant connector
- 3M adhesive fixation

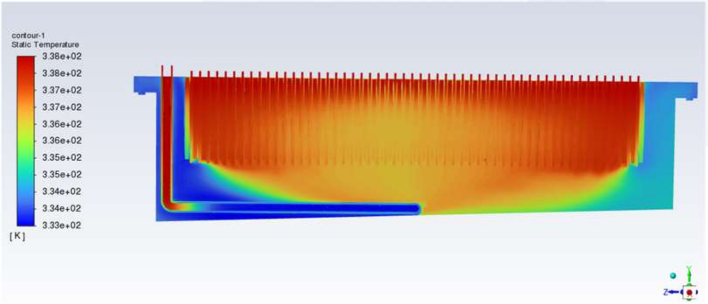
Backend Data Monitoring

Real-time monitoring of temperature and pressure, supporting graphical and simulation displays






Voltage [V]
0.3989
0.3721
0.3452
0.3183
0.2914
0.2646
0.2377
0.2108
0.1839
0.1571
0.1302
0.1033
0.0764
0.0496
0.0227
-0.0042
Y
Z
X


contour-1
Static Temperature
3.38e+02
3.38e+02
3.37e+02
3.37e+02
3.36e+02
3.36e+02
3.35e+02
3.35e+02
3.34e+02
3.34e+02
3.33e+02
[K]

08

Key Product Intellectual Property Actual Cases

Key Products

RT20 GNSS High-precision Data Collection Gateway

- Built-in GNSS multi-system high-precision positioning module
- - 4G, dual SIM backup
- - RS232/485, sine wave, switch quantity, analog quantity
- - Built-in lightning protection interface, built-in lithium battery
- - Supports cloud management, built-in storage

Designed for monitoring geological disaster deformation, used for collecting high-precision positioning information

RT600 Ultrasonic Data Collection Transmission Terminal

- Small size, low power consumption
- Programmable scripts, adaptable to various distance measuring instruments
- RS485 interface, switch quantity, analog input
- Supports Modbus protocol
- Supports cloud management, built-in storage

Programmable data collection functions with ultrasonic distance measuring instruments, solar panels, and lithium batteries, forming ultrasonic distance measuring stations

Key Products

DZ42 Infiltration Line Collection Terminal

- 4-channel 4-wire vibrating wire sensor input
- Frequency range: 400-6K Hz
- Sampling method: time-sharing continuous frequency sweep collection
- 2 RS-485 interface data outputs

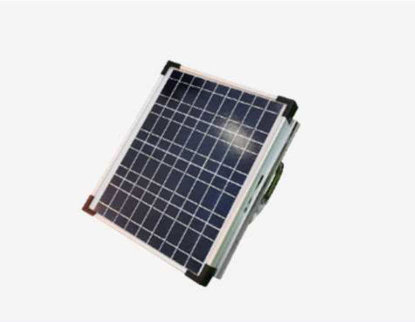
Customized for vibrating wire signal sensors, supports most standard vibrating wire sensor products like piezometers, rebar strain gauges, crack meters, used for detecting surface displacement

R210 Industrial 4G Router

- 4G, WiFi
- 2x Ethernet ports, 1x RS232/485, 2x DI, 1x DO
- Supports multiple VPNs
- Industrial-grade design, withstands high and low temperatures

Key Sensors

Rainfall measurement


Solar power supply

Reservoir water level

Crack meters

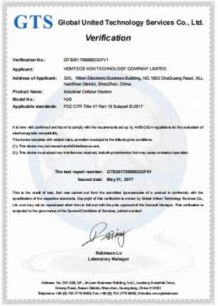
Internal displacement

Infiltration line

Surface displacement monitoring

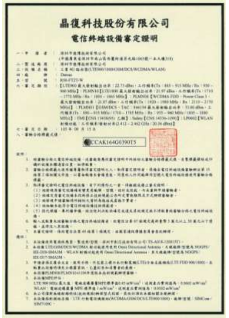
Geotechnical pressure gauges

Key Intellectual Property and Certifications


GTS Global United Technology Services Co., Ltd.

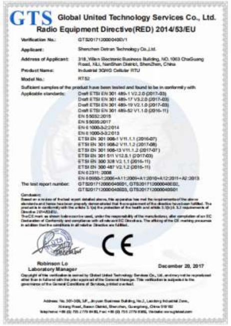
Verification

FCC


晶復科技股份有限公司

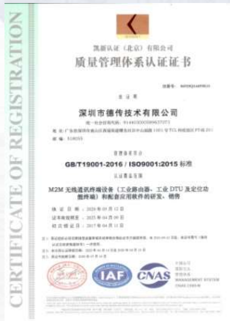
電信終端設備審定證明

NCC


GTS Global United Technology Services Co., Ltd.

Radio Equipment Directive(RED) 2014/53/EU

CE

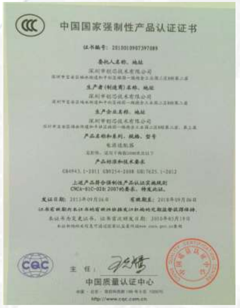

CERTIFICATE OF REGISTRATION

质量管理体系认证证书

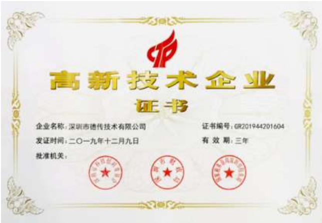
深圳市德传技术有限公司

GB/T19001-2016 / ISO9001:2015

ISO9001


中国国家强制性产品认证证书

China National Compulsory Product Certification


高新技术企业

证书

企业名称：深圳市德传技术有限公司

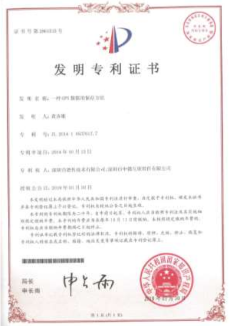
证书编号：GR201944201604

发证时间：二〇一九年十二月九日

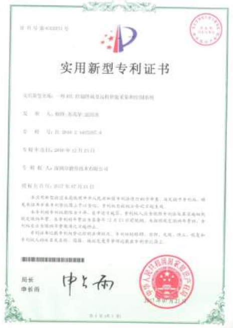
有效期：三年

批准机关：

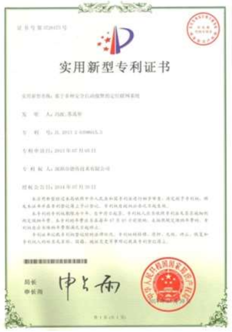
High-tech enterprise certificate


发明专利证书

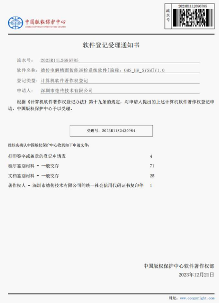
GPS data preservation


实用新型专利证书

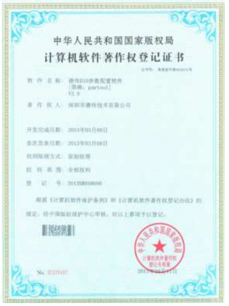
RTU Terminal and Remote Intelligent Acquisition Control System


实用新型专利证书

Automatic security alarm and localization networking system


软件登记受理通知书

Intelligent inspection system software for electrolytic tank surface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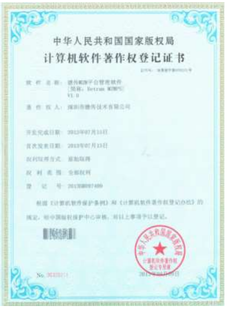
DTU parameter configuration software copyright certificate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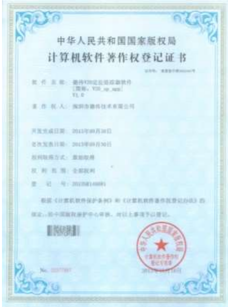
Cloud management platform software copyright certificate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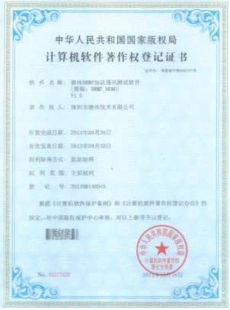
RT600 Location tracker software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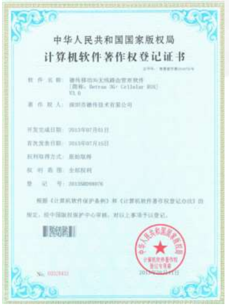
DRMP protocol communication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Mobile wireless routing management software

Actual Cases

- Tailings ponds at in Jiangxi

中国瑞林
NERIN
自动化监测站
当心触电

- Slope deformation monitoring in Guizhou

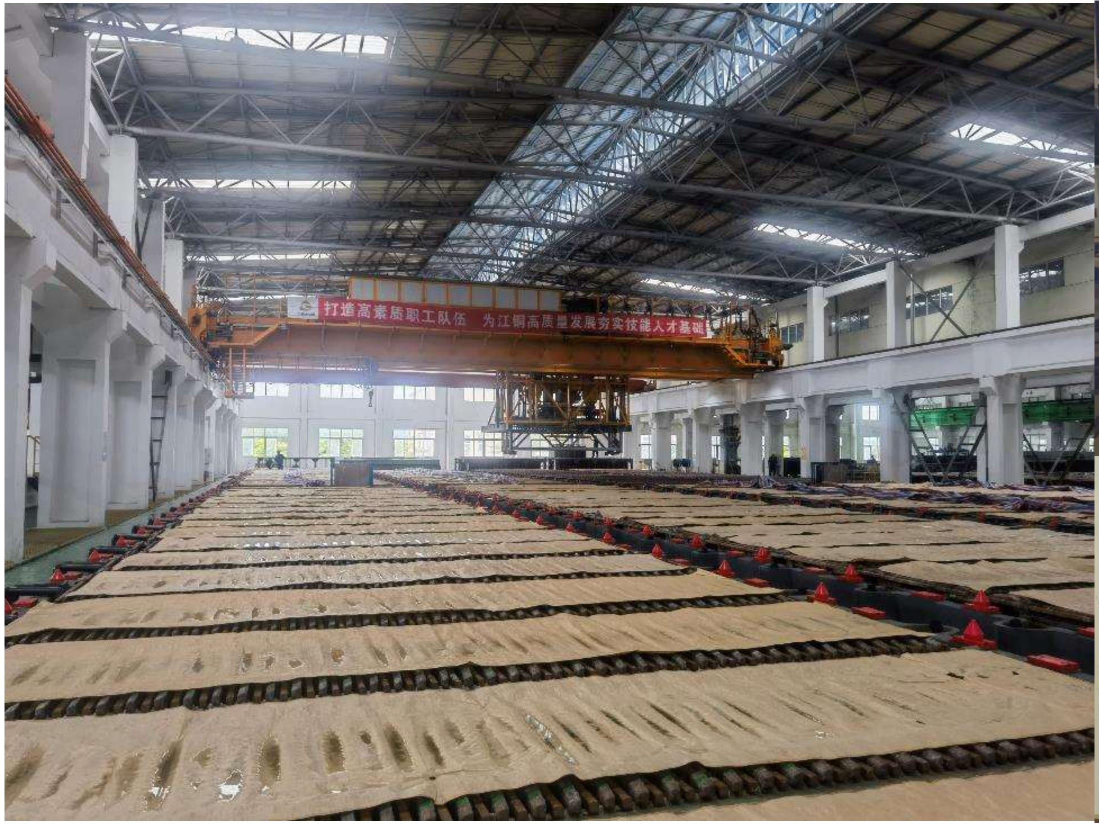
- Dam slope deformation monitoring

- Dam slope deformation monitoring

- Dam slope deformation monitoring

Actual Cases

- Electrolytic tank workshops at Jiangxi Copper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Thank you