Smarter Monitoring.
Reliable Power.

Passive Wireless Online Temperature Monitoring Device
For High-voltage transmission lines & conductor plates (tension clamps)
for substations (AC, DC)
SCYC-PWTM2304

无源无线在线温度监测装置
适用于高压输电线及导流板（耐张夹）、变电站（适用于交、直流）

四川亚辰电气有限公司
Sichuan Yachen Electric Co., Ltd.

Sichuan Yachen Electric
四川亚辰电气

Sichuan Yachen Electric Co., Ltd. is a technology-driven manufacturing enterprise headquartered in Mianyang, Sichuan Province—known as China's "City of Science and Technology." Since its establishment in 2004, the company has specialized in the R&D and production of electromagnetic pulse (EMP) protection products, power transmission network monitoring equipment, lightning protection systems, instrumentation, high/low voltage electrical switches, and medical isolated power (IT) systems.

Our solutions are widely deployed across diverse sectors, including construction, electric power, telecommunications, railways, healthcare, and defense. Leveraging a robust R&D team, significant capital investment, and state-of-the-art infrastructure, Yachen Electric maintains long-term strategic partnerships with leading universities and research institutions. This commitment to collaboration ensures continuous technological optimization and innovation. To date, the company holds numerous invention and utility model patents, and all products have been rigorously tested and certified by authoritative Chinese industry bodies.

Our unwavering focus on advanced R&D, stringent quality control, and exceptional product reliability has earned Yachen Electric extensive recognition and acclaim from clients worldwide.

Mission: To enhance global power reliability through cutting-edge intelligent monitoring technology and innovative protection solutions. (使命：通过尖端的智能监测技术和创新的防护方案，提升全球电力的可靠性。)

Core Values:

Precision: In every sensor and every data point. （精准：对待每一个传感器和数据点。）
Integrity: Building trust through reliable infrastructure. （正直：通过可靠的基础设施建立信任。）
Innovation: Solving tomorrow's grid challenges today. （创新：今日即解决明天的电网挑战。）

Sichuan Yachen Electric
四川亚辰电气

Corporate Qualifications & Certifications: Yachen Electric is committed to operational excellence and holds several international management certifications, including:

ISO 9001:2015 (Quality Management System)
ISO 45001:2018 (Occupational Health and Safety Management System)
ISO 14001:2015 (Environmental Management System)
AAA-rated Credit Enterprise (since 2011) and **AAA-rated Quality & Integrity Excellence Unit** (since 2012)

Furthermore, the company serves as the Vice Chairman Unit of the Electromagnetic Pulse and Lightning Protection Technology Professional Committee of the Sichuan Institute of Electronics, and a Director Unit of the Southwest Construction Electrical Information Network. We are also a selected supplier for military-grade products.

To ensure superior customer experience, Yachen Electric maintains a strong presence across major regions in China, providing rapid and high-quality technical support and after-sales service. Our global reach is further extended through an extensive network of authorized distributors.

We sincerely welcome domestic and international partners to explore collaborative opportunities and achieve mutual growth.

Passive Wireless Online Temperature Monitoring Device (PWOTMD)

SCYC-PWTM2304

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Content

1 The purpose of temperature measurement for HV equipment

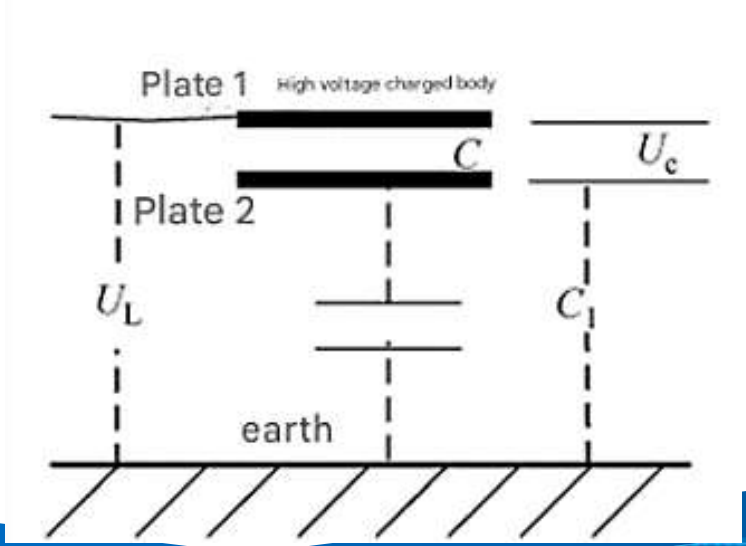
Long-term power grid operation data shows that most power grid electrical equipment failures are caused by high current operation, equipment aging, and decreased insulation levels, which lead to the equipment operating under high temperature conditions and subsequently causing serious consequences such as combustion and explosion.

In power systems, temperature changes in high-voltage electrical equipment are a very important indicator, as they are related to whether the equipment can operate safely and stably.

Real-time monitoring of the temperature of electrical equipment can help on-duty personnel detect problems early, eliminate potential hazards, and ensure the safe operation of the power system.

2 Working principle

This system is based on high-voltage electric field induction power extraction. This power extraction method differs from the current-induction CT power extraction method. Current-induction CTs require current in the power extraction line; if there is no current or the current is too low, power cannot be extracted, and the equipment cannot operate. High-voltage electric field induction power extraction does not require current; only a high voltage is needed. Its working principle is shown in the figure.



3 Sensors

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4 Technical features

1) Temperature measurement and wireless digital communication are achieved based on high-voltage inductive power extraction technology .

2) Each sensor has a unique ID code and a long wireless communication distance.

3) Passive temperature sensors do not require built-in batteries, use digital measurement and digital transmission; they eliminate battery risks, have good anti-interference capabilities, and are efficient and stable .

4) The passive temperature sensor is permanently maintenance-free and can be directly integrated with existing products or encapsulated into a single unit .

5) The passive temperature sensor uses wireless communication, high-voltage isolation , and is safe and reliable; it is also convenient for construction and maintenance.

5 Common temperature measurement methods

Temperature measurement method	Passive wireless temperature measurement	Surface acoustic wave temperature measurement	RFID temperature measurement	CT energy harvesting temperature measurement	Wireless battery temperature measurement	Infrared temperature measurement
Power supply and transmission	High-voltage induction power extraction wireless transmission	Radio frequency induction power generation wireless transmission	Radio frequency induction power generation wireless transmission	CT sensor power generation wireless transmission	Battery powered wireless transmission	No power required
Sense of temperature Way	direct contact	direct contact	direct contact	direct contact	direct contact	Non-contact
Applicable scope	Circuit breakers, busbar cable connections, busbars, overhead lines	Circuit breakers, busbar cable connections, etc.	Circuit breakers, busbar cable connections, etc.	Circuit breakers, busbar cable connections, etc.	Circuit breakers, busbar cable connections, etc.	Hotspot temperature measurement
construction	Simple and convenient	Simple and convenient	Simple and convenient	Different models need to be selected according to the size of the measuring point.	Simple and convenient	Manual on-site measurement
Advantages and disadvantages	Good stability; As long as the line is energized, the equipment can work normally. Accurate temperature measurement ; No battery required, maintenance-free;	Poor stability; Susceptible to electromagnetic interference, short wireless transmission distance, and prone to disconnection during operation; poor measurement accuracy, susceptible to temperature fluctuations leading to false alarms; and cannot be calibrated.	Stability is average; Small size; Stability is average; Because RFID tags have the characteristic of being reflective, it is difficult to apply them to the surface of metal objects.	Due to load fluctuations at the temperature measurement point, limited space volume, and poor energy extraction stability, it is unable to measure temperature normally when the load current at the temperature measurement point is small.	Batteries have reliability issues in high-temperature environments and are easily damaged; regular battery replacement increases costs.	Large size, high cost, poor accuracy; unable to measure online in real time; unable to diffract through obstructions, requires alignment with the point being measured, and is limited in many locations.

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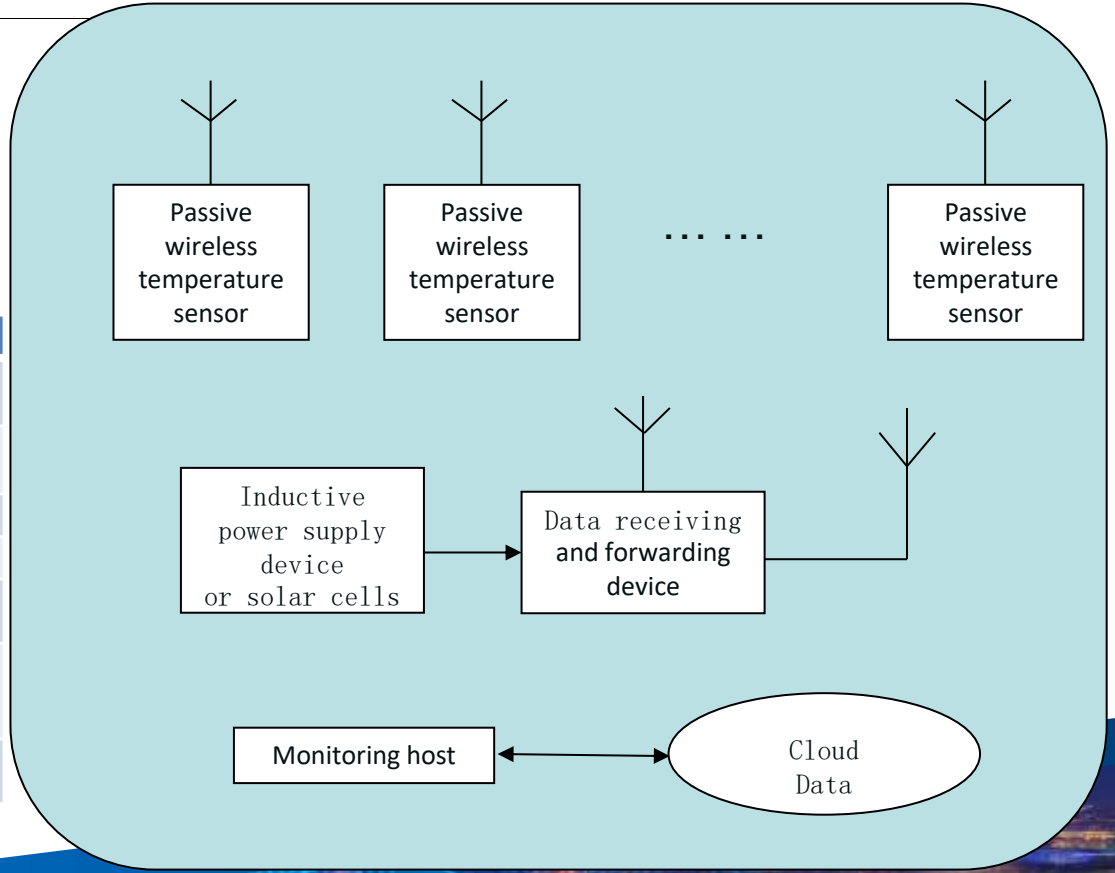
6 Composition of PWOTMD

The monitoring system consists of temperature sensors, data receiving and forwarding devices, and a communication system.

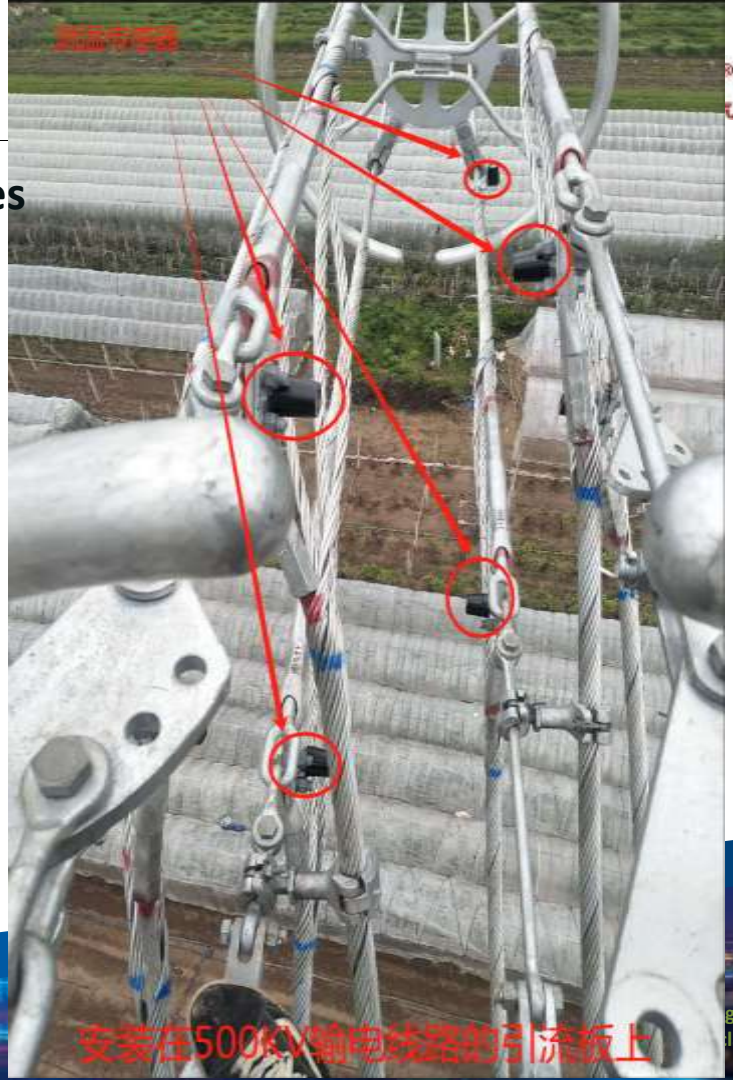
Temperature sensor parameters	
Temperature measurement range	-30 ℃ ~ 135 ℃
Temperature measurement accuracy	± (standard reading × 1% + 1 ℃)
resolution	0.1 ℃
Sensor size	Built into the insulating plug
Power supply method	Inductive power supply, no built-in battery required.
Measurement cycle	The initial power-on time is less than 20 minutes, and the measurement cycle is less than 3 minutes.
Radio frequency standards	2.4GHz



7 Applications

I, Temprature monitoring of high voltage power lines

Sensors installed on power lines
<-500KV->



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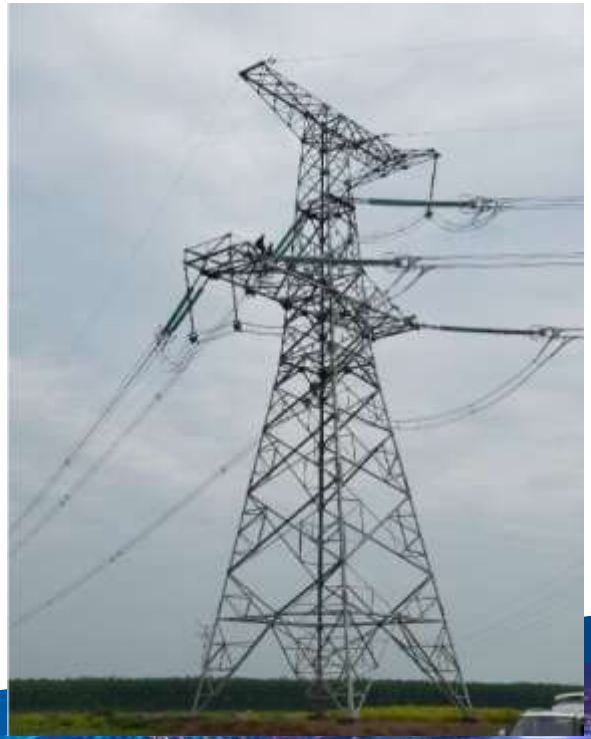

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7 Applications

I, Temprature monitoring of high voltage power lines

Sensors installed on power lines
<-110KV->

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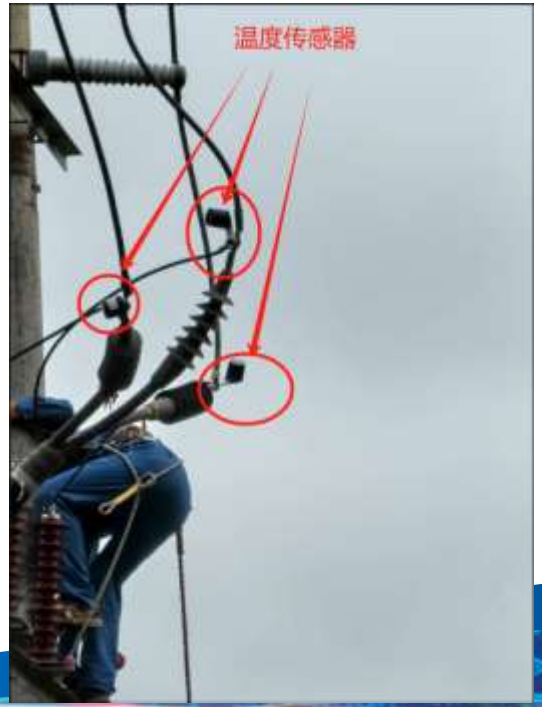
I, Temprature monitoring of high voltage power lines

Sensors installed on power lines
<-35KV->



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II. Temperature Monitoring of Railway Traction Substations

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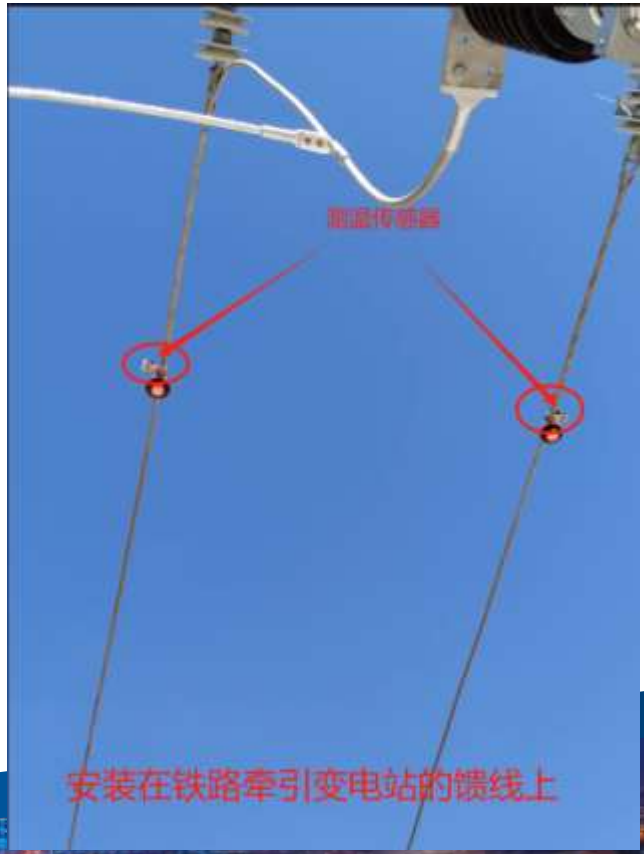

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III. Temperature Monitoring of Power Grid Company Substations

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III. Temperature Monitoring of Power Grid Company Substations

Online Temperature Monitoring Device
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Currently, Sichuan Yachen Electric's products have been installed in 1000kV converter stations, 500kV transmission lines, 110kV transmission lines, 35kV transmission lines, and 110kV/27.5kV railway traction substations.

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在此录入上述图表的综合分析结论
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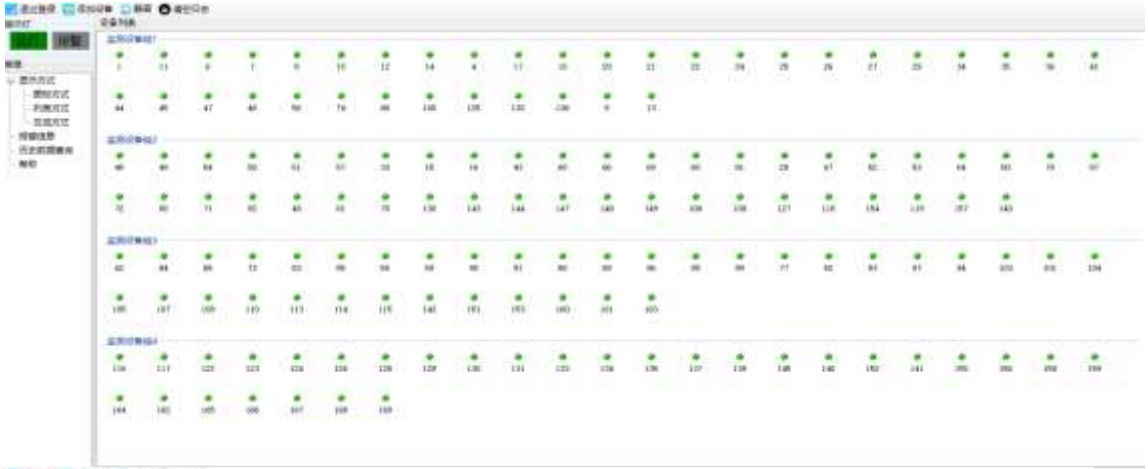
8 Cases

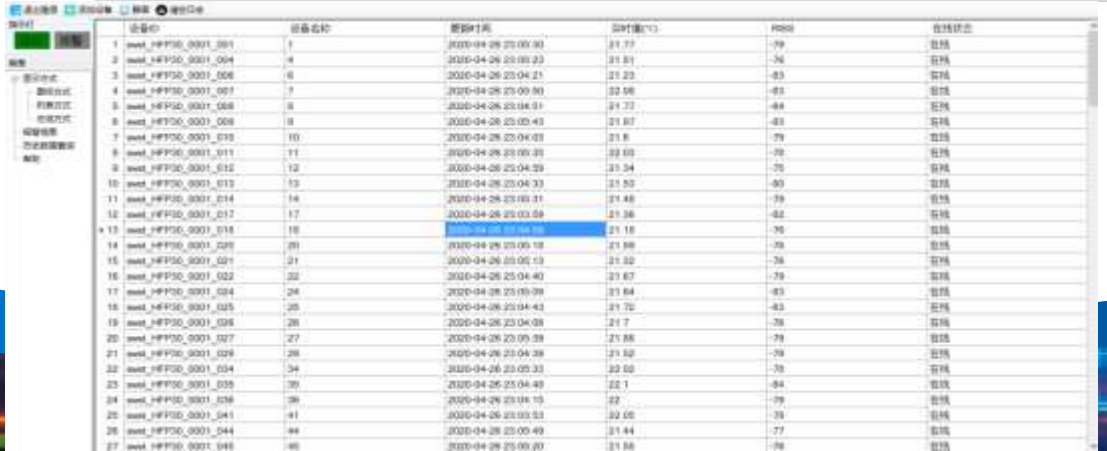
In a 500kV line relocation project, a power engineering company installed our wireless passive temperature detection device on the conductor plates to ensure normal conductor operation and reduce manual maintenance workload. This device allows for real-time remote monitoring of conductor temperature changes. This significantly reduces manual inspections and greatly improves maintenance efficiency.

To date, the monitoring equipment is operating well, and the detection data is accurate.

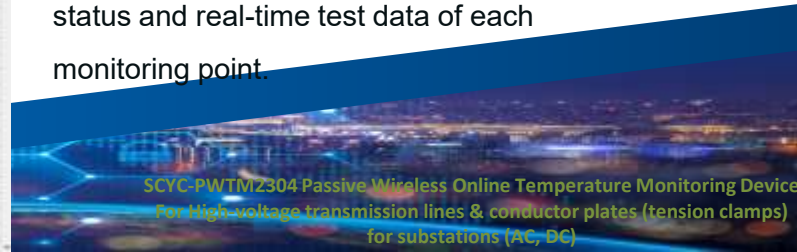
8 Cases



If each point is displayed in green on the platform, it indicates that the real-time temperature is normal; if it is displayed in red, it indicates that the temperature is abnormal, and an alarm message will be issued in a timely manner.



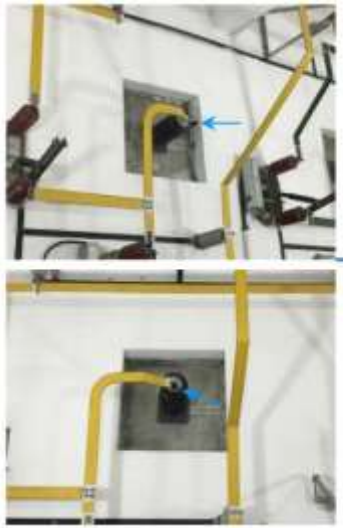
The management platform allows for real-time monitoring of the specific status and real-time test data of each monitoring point.



8 Cases

In June 2018, a railway traction substation installed our company's wireless passive temperature detection device at the line connection points to prevent abnormally high temperatures from affecting the normal operation of the line and to reduce the workload of manual maintenance. This device allows for real-time remote monitoring of temperature changes at the connection points, simultaneously monitored remotely through a platform. This significantly improved maintenance efficiency while reducing manual inspections.

To date, the monitoring equipment is operating well, and the detection data is accurate.



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More to come

THANK YOU

Smarter Monitoring, Reliable Power.

(For China market):
Sichuan Yachen Electric Co., Ltd.

Homepage: http://www.ycdqkj.com.cn
Contact: Mr. Xu
Tel (Wechat): +86 13088269292
Technical: +86 816 6394499
Commercial: +86 816 2311298

For international sale, please contact:
Qingdao Britop International Trading Co.,Ltd.

Website: https://qdbritop.com
Contact: Bright Meng
Email: britop@qdbritop.com
Tel (Wechat): +8613811458455