



**Electrical facilities
Smart Operation and Maintenance
products and solutions**

On-line Continuous Thermal Monitoring



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On-line Continuous Thermal Monitoring

- How to effectively prevent fire

Unbearable “better late than never”

- Every year, electrical fires have devastating consequences for all kinds of facilities. For critical buildings such as hospitals, airports or data centers, significant economic losses and even loss of life can occur. In 2021, 745,000 fires were put out in China, among which electric fires accounted for 28.4 percent, ranking first.
- Electrical fire mainly comes from three aspects:
 - Short circuit - short circuit current quickly rises to 10-15 times the rated current, so that the circuit is seriously overloaded and heated, leading to fire.
 - Overload - Electrical equipment itself and the line due to overload heat burning, leading to fire.
 - Static electricity and electric arc -- Electric arc caused by static electricity or poor contact ignites flammable objects or gases and causes fire.
- The formation process of electrical fire:
 - All kinds of abnormal (short circuit and poor contact, overload, etc.) → temperature rise → thermal breakdown → spark, flashover, explosion → fire accident



- In most cases, early detection of abnormal temperature rise of electrical appliances or lines, and take corresponding measures, can effectively prevent the problem before it occurs
- How to effectively monitor the temperature of electrical equipment and connection points? →

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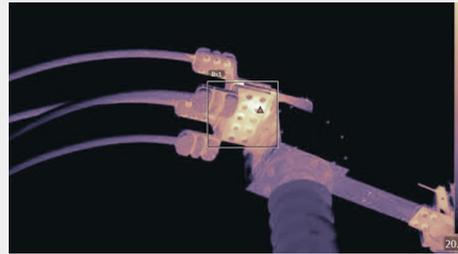
On-line Continuous Thermal Monitoring

- Traditional electrical system temperature monitoring

Infrared thermal imager inspection

■ Disadvantages and Shortcomings:

- If the inspection interval is too long, the potential risk of fever will be missed.
- The temperature data is discontinuous, and it is difficult to find the abnormal trend of temperature.
- It takes a lot of manpower to complete the inspection;
- Handheld inspection camera will appear inspection blind area;
- Outdoor equipment infrared temperature inspection is easily disturbed by weather conditions;
- Certain controlled areas are difficult to access, bringing difficulties to regular patrol.....



- Online continuous temperature monitoring

7*24h continuous temperature monitoring based on intelligent wireless sensors

■ Advantage:

- 7*24-hour monitoring, with second level sampling frequency;
- Temperature range: - 40~+200℃ , accuracy: ± 1℃ ;
- Continuous temperature data can be used for predictive maintenance;
- Automatic data collection, automatic alarm for temperature exceeding limit, no personnel on duty;
- Wireless sensors have a variety of sizes and installation methods;
- Wireless communication can be installed indoors, in cabinets, outdoors and other environments, no blind area for temperature measurement;
- Outdoor measurement will not be affected by weather or light interference;
- Realize real-time active operation and maintenance to prevent problems



- Tensor Sight™ Series wireless temperature monitoring products
- Make preventive maintenance a reality →

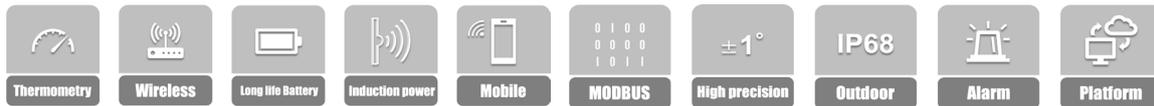
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On-line Continuous Thermal Monitoring

- TS-WTM

Wireless temperature measurement series products

To measure the surface temperature of motor equipment or contacts of high-voltage live objects, such as the operating temperature of exposed contacts in high-voltage switch gear, bus connection, outdoor knife switch and transformer. The sensor sends the collected temperature signal to the host through the wireless network. Compared with infrared temperature measurement, TS-WTM series is an online monitoring solution with wider application coverage and more cost-effective.



TS-WTM-E

Passive wireless digital sensor (In/Out door)



TS-WTM-E Technical Data

Range & Accuracy	-40 C +200 C , ±1 C
Sampling Frequency	20s by default
RF & Distance	433MHz, ≥300m (open area)
Power mode	No battery, Induction power on, starting current >5A
Electric requirement	V ≤220KV, I ≤5000A
Installation	IP68 (optional), metal strap
Sensor Size	26mm*22mm*10mm

TS-WTM-B

Active wireless sensor (Indoor)

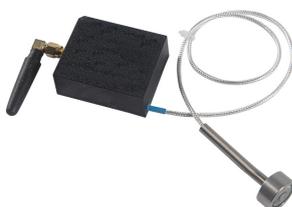


TS-WTM-B Technical Data

Range & Accuracy	-40 C +200 C , ±1 C
Sampling Frequency	10s by default
RF & Distance	433MHz, ≥380m (open area)
Power mode	Built in long-term battery (5-8 years)
Electric requirement	Only indoor ; Silicone bandage (385mm)
Installation	38mm*35mm*24mm

TS-WTM-D

Active wireless sensor (In/Out door)



TS-WTM-D Technical Data

Range & Accuracy	-40 C +200 C , ±1 C
Sampling Frequency	10s by default
RF & Distance	433MHz, ≥300m (open area)
Thermistor	PT1000
Power mode	Built in long-term battery (5-8 years)
Installation	IP68 In/outdoor Bolt or magnetic suction fixing
Sensor Size	60mm*45mm*25mm

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On-line Continuous Thermal Monitoring

TS-WTM-HR

Din rail type temperature host (no display)

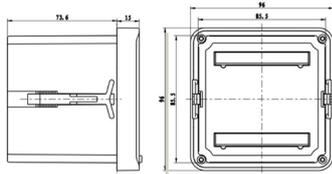


TS-WTM-HR Technical Data

Qty of of accessible sensors	Max 240
RF & Distance	433MHz, $\geq 300m$ (open area)
Cable communication	TTL, RS485
Upstream Protocol	MODBUS
Power supply	AC/DC110-220V or DC12-24V
Installation	35mm din rail
Dimension	88*37*59(mm)

TS-WTM-B

Active wireless sensor (Indoor)



TS-WTM-HB Technical Data

Qty of of accessible sensors	Max 240
RF & Distance	433MHz, $\geq 300m$ (open area)
Temperature alarm	High threshold +90 C Low threshold -20 C
Temperature warning	High threshold +60 C Low threshold -10 C
Screen	Color, CH & En optional
Cable communication	RS485
Upstream Protocol	MODBUS
Power supply	AC85~265V/DC110~370V
Installation	Mounted, hole size (86*86mm)
Output relay	AC220V/5A (1 NO/NC dry type)
Dimension	60mm*45mm*25mm

TS-WTM-HP

10 inch touch pad temperature host



TS-WTM-HP Technical Data

Qty of of accessible sensors	Max 240
RF & Distance	2.4GHz/433MHz/470~510MHz $\geq 300m$ (open area)
Temperature alarm	High threshold +90 C Low threshold -20 C
Temperature warning	High threshold +60 C Low threshold -10 C
Screen	10 inch capacitive touch screen, CH & En optional
Cable communication	RS485、Ethernet、Optic fiber & 4G optional
Upstream Protocol	MODBUS
Power supply	AC85~265V/DC110~370V
Installation	Wall / door mounted
Output relay	AC220V/5A (1 NO dry type)
Dimension	L*W*H: 256*170*33 mm
Weight	1.2KG

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On-line Continuous Thermal Monitoring

- Advantages of TS-WTM temperature monitoring scheme and typical networking scheme

- The temperature sensor (TS-WTM-E/B/D) is easy to install and supports multiple installation methods, including but not limited to strap installation, bolt fixation and magnetic absorption. IP68 protection grade can be customized for outdoor use;
- Battery life of active sensor (TS-WTM-B/D) is 5-8 years, and passive digital sensor (TS-WTM-E) is purely inductive;
- The temperature sensor and the temperature monitoring host (TS-WTM-HR/HB/HP) are automatically connected through wireless transmission;
- RS485 Modbus communication connection is used between the temperature monitoring host and the upper level monitoring platform. By configuring 4G communication module, the on-site temperature data can be uploaded to the intelligent operation and maintenance cloud platform and mobile phone APP in real time.



Networking scheme

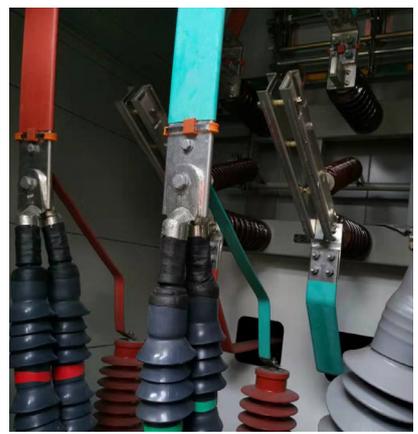
- Typical mounting point of TS-WTM temperature sensor



Sensing Element: TS-WTM-E
Mounting point: LV cabinet



Sensing Element: TS-WTM-E
Mounting point: CB contact



Sensing Element: TS-WTM-E
Mounting point: Copper bar

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On-line Continuous Thermal Monitoring



Sensing Element: TS-WTM-D
Mounting point: Busbar



Sensing Element: TS-WTM-D
Mounting point: Cable



Sensing Element: TS-WTM-B
Mounting point: Ring main unit



Sensing Element: TS-WTM-E
Mounting point: Outdoor HV equipment



Sensing Element: TS-WTM-D
Mounting point: Motor



Sensing Element: TS-WTM-E
Mounting point: Outdoor transformer

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