

Intelligent Monitoring Product Introduction

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1. Background

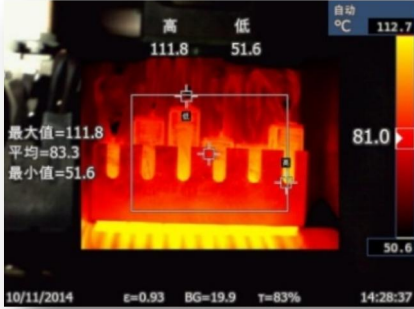






Generator collector ring is an important device to transfer the excitation current under the high-speed rotation of the rotor, and the device is prone to the following phenomena in operation:

high local temperature, uneven current-carrying carbon brushes, excessive vibration, and oil leakage from bearings, etc., and some of them will also be overloaded due to the overload damage caused by untimely replacement of carbon brushes.

The above faults may exist individually, or a variety of faults co-exist. If short-term attention is not paid in time, problems such as slip ring fire may occur, and if these faults are allowed to expand for a long period of time, it may cause major accidents such as collector ring fire and non-stopping of the unit.

1.1 concrete issue

 <p>高 低 111.8 51.6 自动 °C 112.7 最大值=111.8 平均=83.3 最小值=51.6 81.0 50.6 10/11/2014 ε=0.93 BG=19.9 T=83% 14:28:37</p>	<p>High localized temperatures</p>
	<p>uneven current-carrying capacity</p>
	<p>High vibration, oil leakage</p>
	<p>Slip ring firing</p>
	<p>Collector ring fire</p>

1.2 practical example



合肥电厂集电环因温度高烧毁

The collector ring of Anhui Hefei Power Plant was blocked by willow flakes being sucked into the outer cover and blocked the ventilation slot holes, and the temperature of its collector ring continued to rise

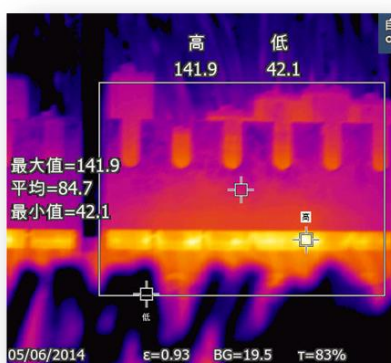
but was not paid attention to in time, resulting in the burnout of the collector ring.



印度莎圣电厂因未及时更换碳刷过载跳火后刷握和碳刷烧毁

Negative 8 brush grips and carbon brushes burned out due to

overloading and tripping of carbon brushes that had not been replaced in time for the end of their useful life at the collector ring of Shah Sahib Power Plant, India.



乐清电厂碳刷和滑环接触温度达142℃

The static excitation device of 660MW hydro-hydrogen-cooled generator of Zheneng Yueqing Power Plant can reach a maximum temperature of 142 °C (ambient temperature of 41°C) at the contact between the slip rings and carbon brushes due to

uneven current-carrying.

2.Function Introduction

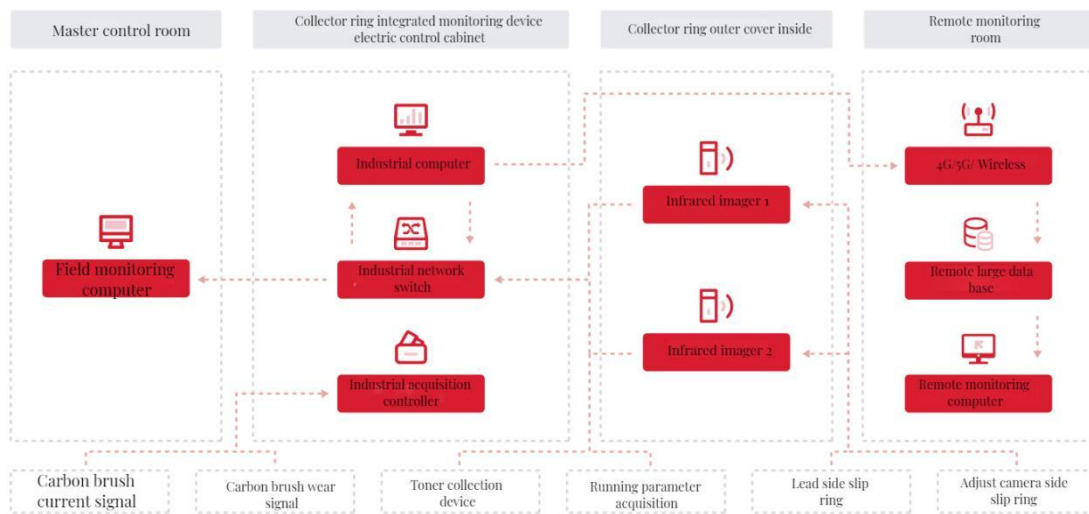
(1).Slip ring and brush grip surface temperature monitoring, fault judgement alarm and other functions;

(2).Carbon brush life monitoring, fault judgement alarm and other functions;

(3) .Carbon brush current monitoring, fault judgement alarm and other functions;

(4) .Carbon powder collection device operation data collection monitoring, operation control, alarm, fault protection and other functions;

Docking with DCS system through data communication to achieve data exchange.



①Users can check the operation data and status of static collector ring device at anytime and anywhere through the collector ring intelligent monitoring software (or APP) - unmanned or reduce the daily manual inspection workload, and put limited manpower into other more complex or more effective work, and obtain better short-term economic benefits.

② Collector ring intelligent monitoring software (or APP) can actively push

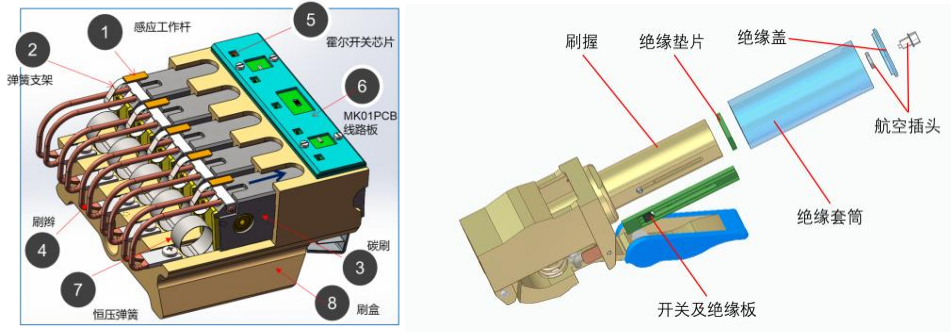
Functions realised :

- ①Real-time temperature display
- ②Slip ring surface temperature
- ③Carbon brush and slip ring contact surface temperature
- ④Collector ring area temperature
- ⑤ Temperature overrun alarm to avoid all kinds of risks caused by high temperature of slip rings and carbon brushes.
- ⑥ Temperature history data record, query the history data and temperature trend of slip ring and carbon brush operation.

practical example :

models	Related Configurations	Configuration differences
300Mvar dual water-cooled regulator Zhuhai Power Plant	Imported thermal imaging cameras	Requires data adapter box Dedicated data conversion software
50Mvar air-cooled regulator Gaoyantun Combustion Machinery & Electricity Plant	Domestic thermal imaging camera	Data Direct Connect Switch Firmware can be customised

2.2 Carbon brush life monitoring



Working Principle:

① Synchronised displacement of the device and the carbon brushes, generating a signal when the warning position is reached

② Signal acquisition and software display



Functions realised:

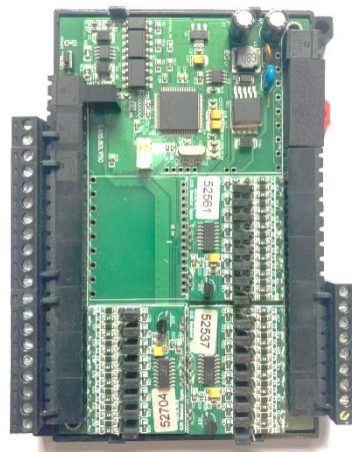
① A single brush grip is the alarm unit, if any of the carbon brushes in the brush grip reaches the end of its service life, the alarm will be triggered, prompting the operator to replace it.

② Adjust the carbon brush wear sensor switch determination time and debugging simulation through the software to ensure that the alarm system operates normally and does not generate false alarms.

practical example:

models	Related Configurations	Configuration differences
300Mvar dual water-cooled regulator	Hall switch	Carbon brushes to be customised One signal per brush grip
50Mvar air-cooled regulator	contact switch	Brush grips do not require customisation One signal output per brush

2.3 Carbon brush current monitoring



Working Principle:

- ① Current sensor monitors carbon brush current
- ② Signal acquisition and software display



Functions realised:

- ①Monitoring the current of each carbon brush and displaying it in real time
- ②Current history data is recorded and given based on recorded values and

background logic:

- ③Flexibility running operation recommendations
- ④Recommendations for maintenance of brush grip springs
- ⑤Slip ring surface maintenance recommendations

3.Hardware function extension development

- ①Collector ring temperature monitoring

Increased visible light probe configurations

Reduced camera costs

- ②Carbon brush life monitoring

One brush grip contact switch design

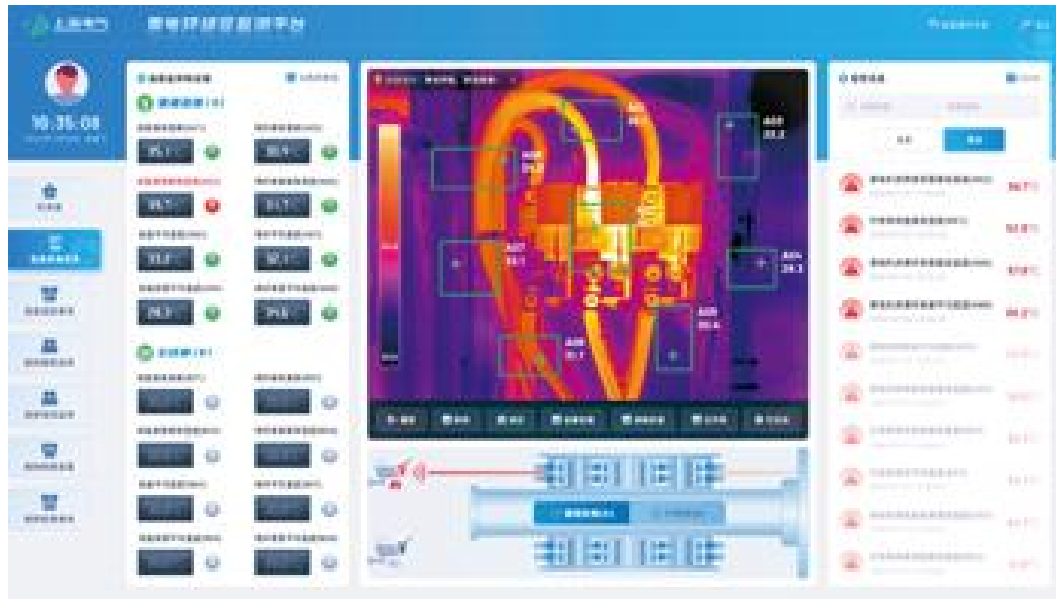
Eliminates need for custom carbon brushes

- ③Wireless transmission capability

Differences in wireless transmission implementation

WIFI mode/4G/Bluetooth/Lora

4.Software Introduction



The software development version can be customised according to the customer's requirements, is an industrial control soft configuration parts, on the Windows XP, Win7, Win8, Win10 operating systems have good compatibility, can be in 32-bit, 64-bit operating systems in stable operation, has a powerful configuration functions and data transmission functions, and has a powerful configuration function and data transmission function. It can run stably in 32-bit and 64-bit operating systems, and has powerful configuration functions and data transmission functions. It has powerful configuration function and data transmission function, which can meet the application and development of various monitoring methods and control functions of the monitoring system.

Functional Support:

- ①Support third-party interface code, can accept application software SDK development kit for various sensors.
- ②Support real-time and historical data curve recording and storage functions.
- ③Support a variety of remote communication functions, such as Modbus

TCP/IP, Modbus RTU/DTU and other standard data communication protocols, suitable for industrial Large data collection.

④Support Web/Internet remote configuration function, increase the corresponding software Expansion packages, mobile phones, tablet PCs and other mobile customer terminals can achieve remote Data monitoring function of mobile phones, tablet PCs, etc.

⑤Support all kinds of hardware bus module driver function, provide support for data acquisition hardware module. module for data acquisition.