

PX-Series

**Revolutionizing Efficient Monitoring and
Diagnostics in the Power Industry**

The Power Industry has always been the backbone of the country.

Powering homes, industry and services, thus supporting economic activity.

As the clean energy transition continues, the role of electricity will become more prominent, with electrification and renewable energy deployment accelerating.



Economic Pillar

- Electricity is the foundation of modern industrial production. The power industry provides a stable power supply for various manufacturing industries and factories, and is an important driving force for economic growth.
- The development of the power industry has also driven the development of related industrial chains, such as power equipment manufacturing and power engineering construction, creating a large number of employment opportunities and tax revenue for the country.



Social Livelihood

- Electricity is an indispensable energy source for residents' daily lives. The power industry guarantees the demand for household electricity, allowing people to carry out daily activities such as lighting, heating, cooling, cooking, etc.
- Electricity also supports the operation of public service facilities such as medical care, education, and transportation, improving the overall quality of life and convenience of society.



Environmental Protection

- With the improvement of environmental awareness, the power industry is gradually transforming to clean energy, such as the use of renewable energy such as wind power and solar energy, which helps to reduce greenhouse gas emissions and environmental pollution.
- The green transformation of the power industry will also help promote the optimization of the national energy structure and promote sustainable development.



National Security

- The power industry is an important part of the national strategic infrastructure and is of great significance to national security.
- A stable power supply is essential to maintaining national security and social stability, especially in emergency situations, such as natural disasters or wars. The emergency response capabilities of the power industry are particularly important.



Technological Innovation

- The power industry is an important field of technological innovation. With the development of smart grids, new energy technologies, energy storage technologies, etc., the power industry is gradually becoming intelligent, efficient and green.
- These technological innovations not only promote the development of the power industry, but also provide technical support and demonstration effects for other industries.



Current Status of Power Development

OUR DISTRIBUTOR NETWORK



SATIR's commitment to global reach is evident in our extensive network of distributors spanning North America, South America, Europe, Asia, the Middle East, and Oceania.



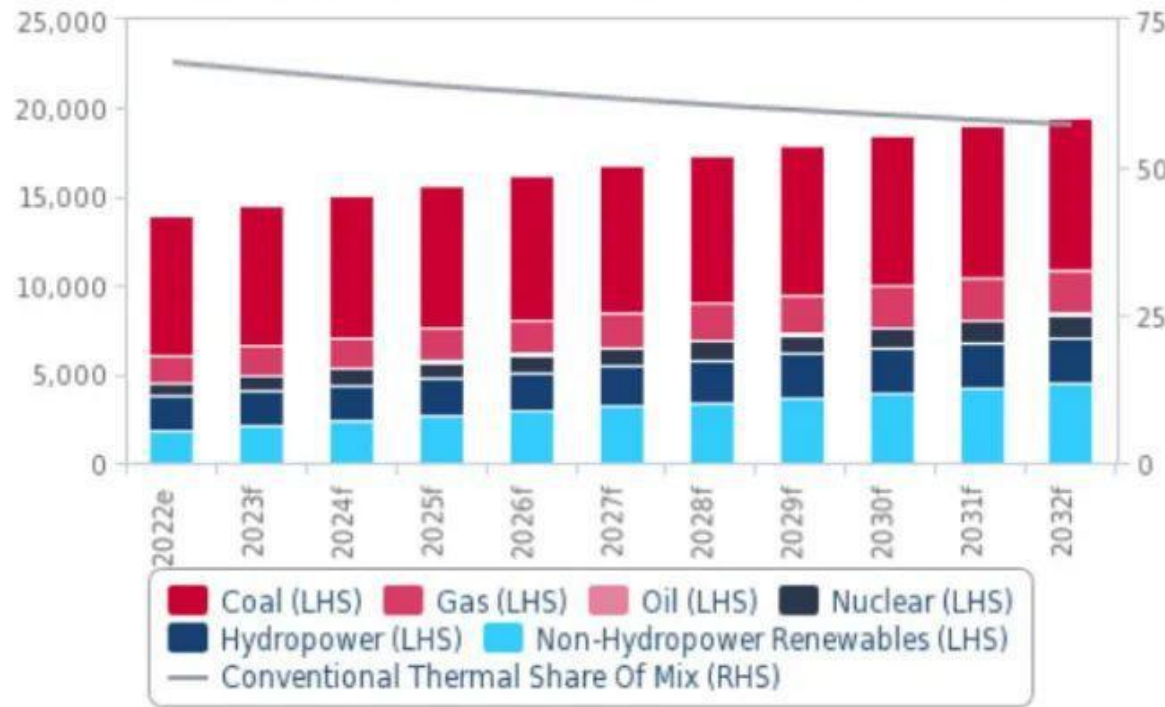
Energy Structure Transformation Accelerates, Asia Leads Global Power Consumption Growth

Continent	Electrical Structure Characteristics	Proportion of Renewable Energy	Highlights and Challenges of Electricity Development
Asia	Coal-fired power generation accounts for a high proportion, renewable energy is developing rapidly.	Varies by country, but overall the trend is upward.	Electricity demand in China and India surges, but Asia's overall electricity greenness needs to be improved.
Europe	The proportion of coal-fired power generation has declined, and renewable energy power generation has developed rapidly.	Higher, some countries such as Germany and Spain exceed 50%.	Europe is committed to achieving green energy transformation and promoting the development of renewable energy power generation.
Africa	The power infrastructure is relatively weak, coal-fired power generation accounts for a high proportion, but renewable energy is abundant	Low, but huge growth potential.	Africa's power development is relatively backward, and it needs to increase investment and improve power infrastructure.
America	Mainly coal-fired power generation, renewable energy power generation is growing rapidly.	Varies by country, but overall the trend is upward.	The U.S. electricity market is relatively stable, while Latin American countries are committed to promoting the development of renewable energy generation.
Oceania	Mainly coal-fired and oil-fired power generation, the power market is relatively small.	Low, but growing rapidly.	Oceania countries are committed to the development of renewable energy power generation, which requires increased investment, improvement of power infrastructure, and increased reliability and stability of power supply.

Asia will lead the growth of global electricity consumption. According to Fitch's forecast, Asia's electricity consumption will increase from 13,073TWh to 18,406TWh from 2022 to 2032, with an average annual growth rate of 3.5%.

Conventional Thermal Power Will Remain More Than 50% Contribution To Asia's Power Mix

Asia - Total Electricity Generation By Type, TWh & Conventional Thermal Power Generation Share Of Mix, % (2022-2032)

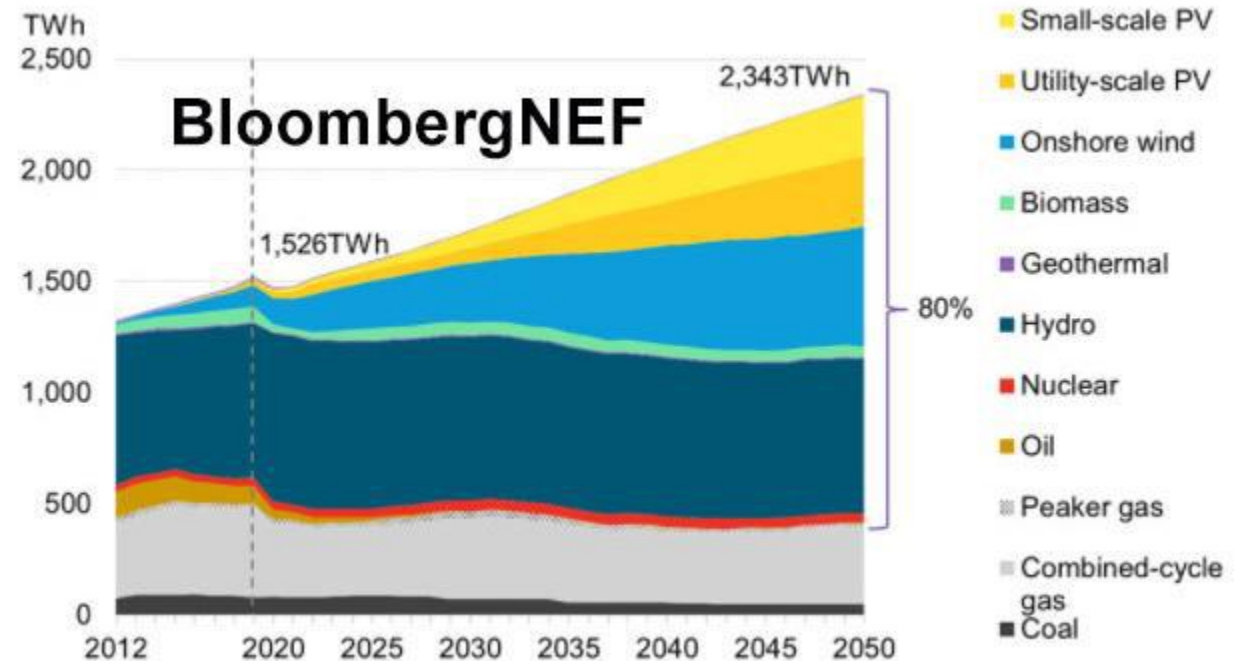


e/f = Fitch Solutions estimate/forecast. Source: EIA, IRENA, local sources, Fitch Solutions

Of the additional 5,333TWh of electricity consumption, China accounts for 69% and India accounts for 17%. During the forecast period, non-hydropower renewable energy such as solar and wind power will grow strongly, but traditional thermal power such as coal, natural gas and oil will still account for more than 50% of Asia's power energy structure.

Photovoltaic power sources are growing rapidly, and hydropower will grow steadily in the next 30 years, accounting for one-third of power generation in 2050, serving as an intermittent power backup. With the help of hydropower, wind power is expected to increase from 8% to 48% in 2050.

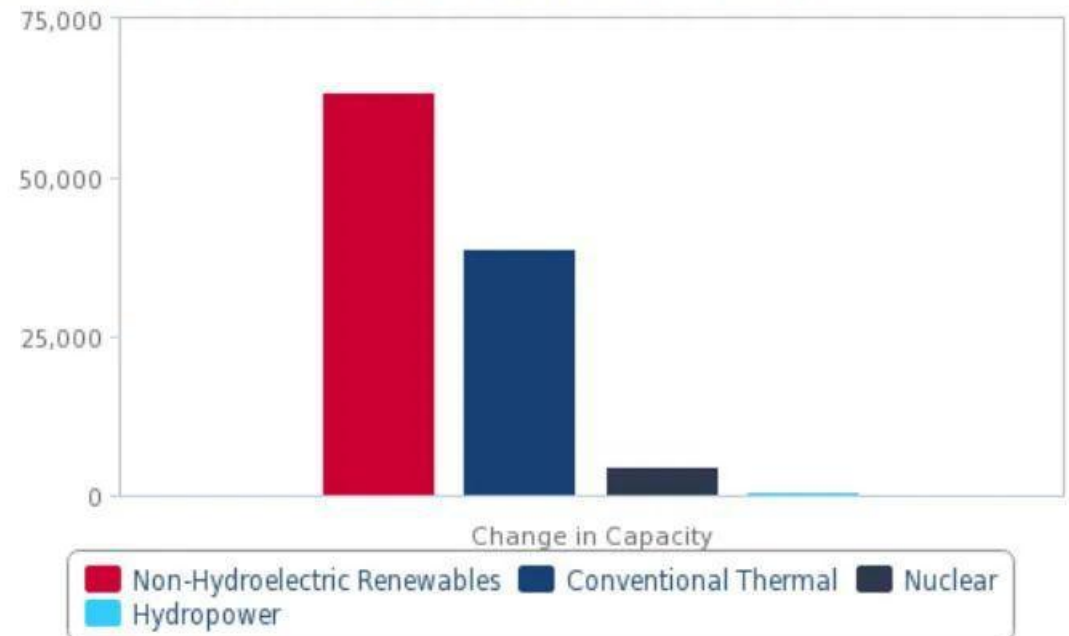
Hydropower and natural gas power are growing in South America, but the global unstable renewable energy boom is often accompanied by the growth of natural gas power. By 2050, zero-carbon power generation in South America will account for 82%, second only to Europe, with wind and photovoltaic power leading the new additions and fossil fuels gradually fading. Carbon dioxide emissions from the power industry are expected to fall by 36%.



The share of thermal power in the Middle East and North Africa will be 94% in 2022 and is expected to drop to 88% in 2032. North Africa and the GCC countries led the decline, with Egypt and the UAE seeing the largest declines, with thermal power decreasing by 24% and 17% respectively. Oil-fired and coal-fired power generation decreased by 55% and 6%, respectively, while natural gas-fired power generation increased by 24%.

Israel and Morocco saw large declines in coal-fired power generation, with Egypt seeing the largest decline in oil-fired power generation. In the next ten years, non-hydropower renewable energy installed capacity will increase by 63.6GW, 1.4 times the total of thermal power, nuclear power, and hydropower. Saudi Arabia, Egypt, and the UAE are the main growth markets.

Non-Hydropower Capacity Growth Outpaces Other Power Sources
MENA – Change In Total Electricity Capacity, MW (2022 - 2033)



Coal will account for less than half of electricity supply in Sub-Saharan Africa by 2023. Most markets, with the exception of South Africa, will continue to rely on hydropower to provide more than 50% of generation. Non-hydro renewables have a limited share of the regional power energy mix, dominated by solar, onshore wind and geothermal.

Non-Hydro Renewables To Account For A Limited Share of Regional Power Mix

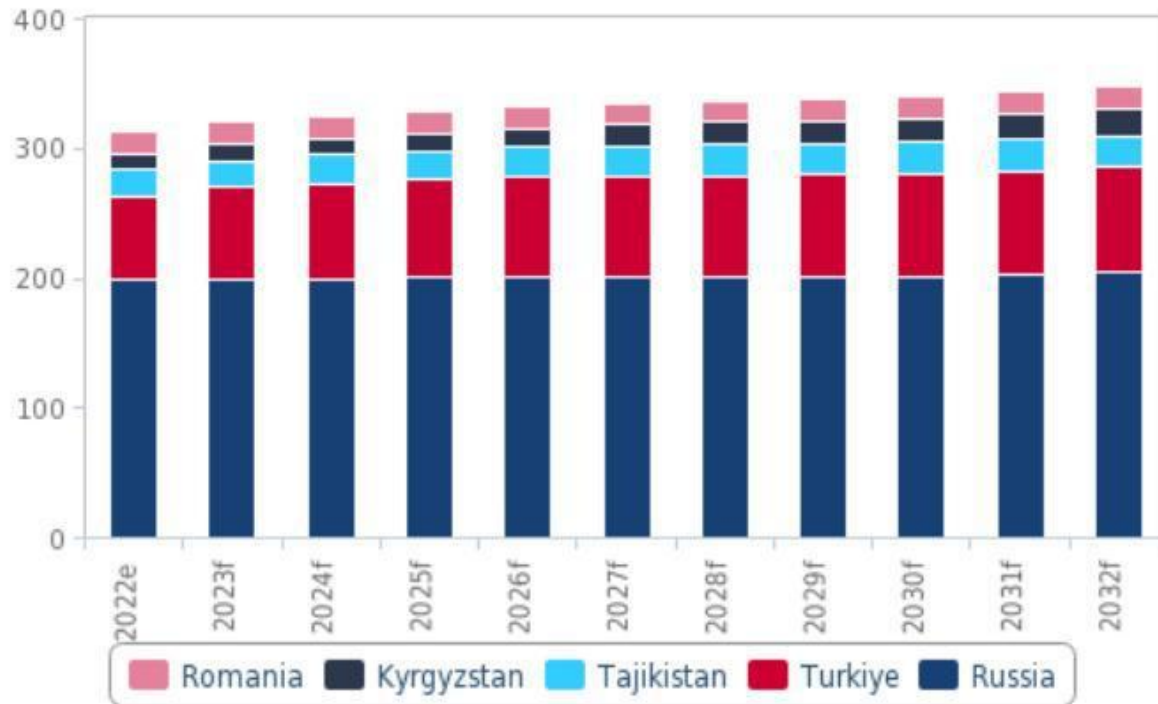
SSA - Non-Hydropower Renewables Capacity By Technology (LHS), MW & Share Of Total Capacity (RHS), %



In Central and Eastern Europe, thermal power will maintain its dominant position in the power energy mix over the next decade.

Hydropower Generation To Remain Flat In Major CEE Markets

Selected Markets – Hydropower Electricity Generation, TWh (2022-2032)



e/f = Fitch Solutions estimate/forecast. Source: EIA, Fitch Solutions

Coal will be the only traditional energy source to see a decrease in power generation during the forecast period, with natural gas and oil-fired power generation increasing by 88.9 TWh and 31.5 TWh, respectively, with natural gas becoming the main source of thermal power by 2032. Hydropower generation in major markets in the region will remain relatively flat. In the renewable energy sector, Poland, Turkey and Romania are expected to account for 75% of new non-hydropower installed capacity in Central and Eastern Europe.

Thermal Imaging Solution: PX Series

PX Series Overview:

The SATIR PX Series is a new generation handheld camera that has a new housing design for the Power Industrial market.

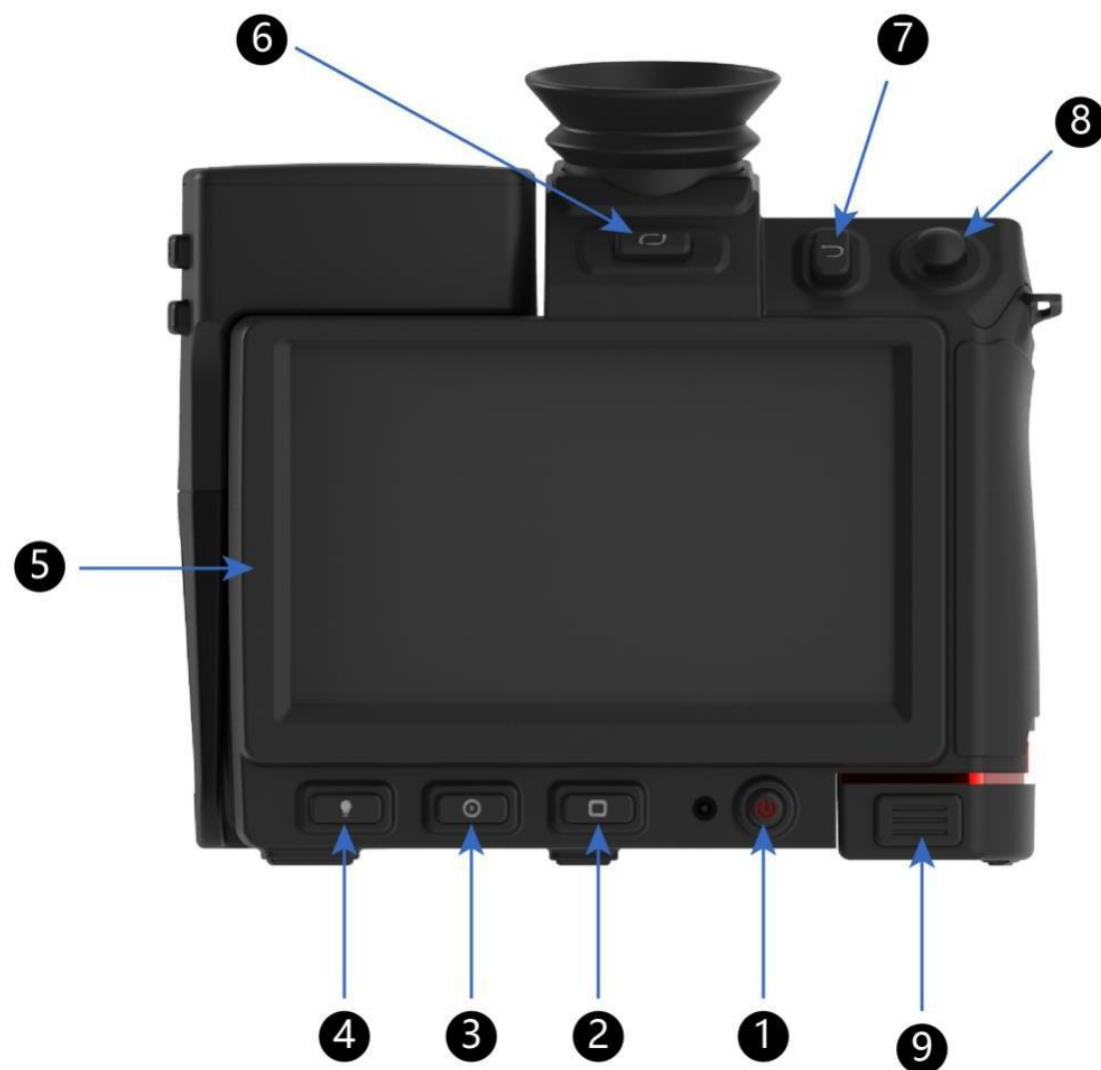


PX Series Highlight:

- 384x288/640x480/1024x768 Detector Resolution
- HD 5MP Digital Camera
- IR/Digital/Duo-vision/PiP
- Manual/Motorized/Auto Focus
- Bluetooth/WIFI/4G/USB/HDMI Transmission
- QR Code and Barcode Function
- GPS



Part Name and Description



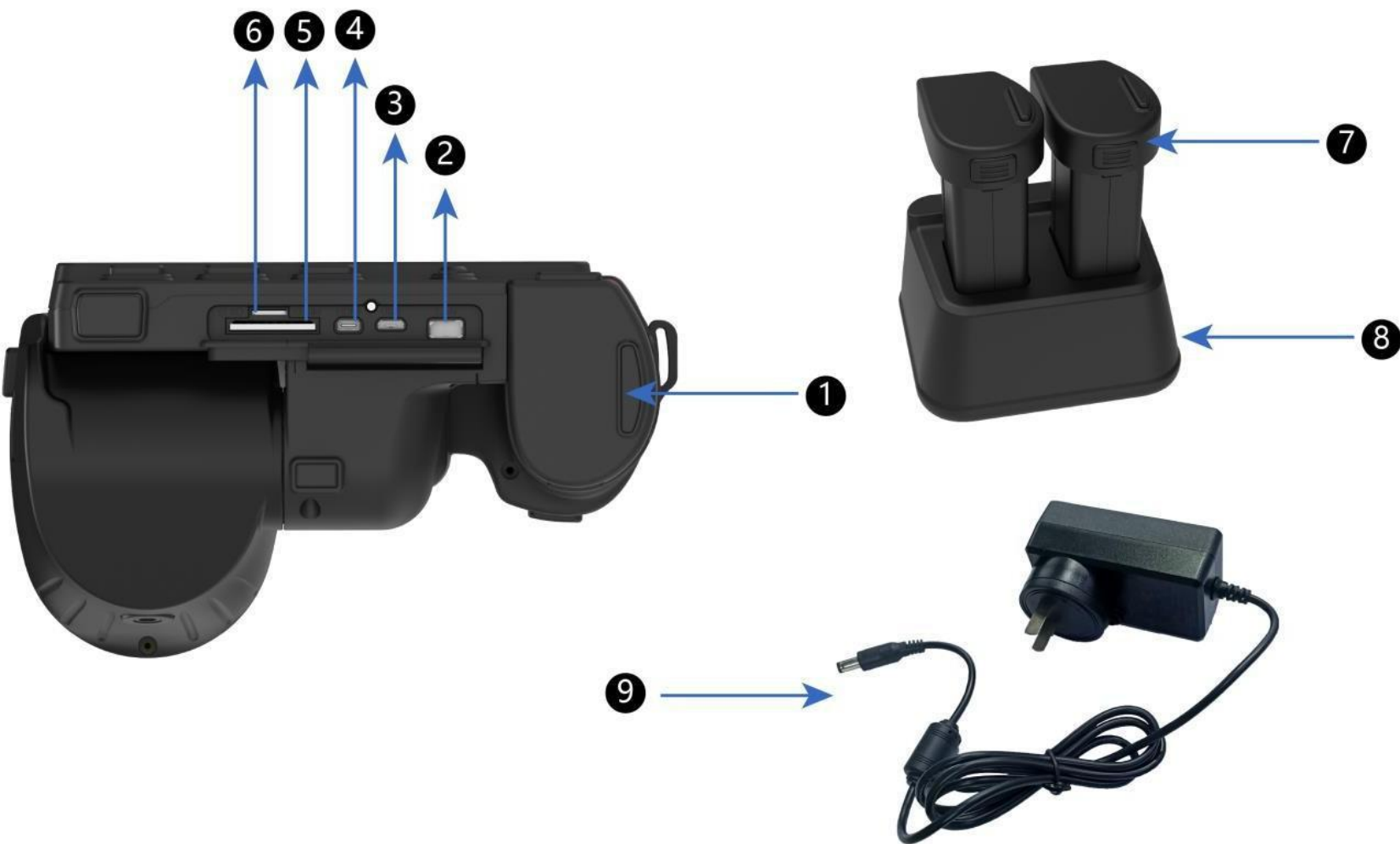
Items	Part Names
①	ON/OFF
②	Palette Switch
③	File Preview
④	Flashlight
⑤	Touch Display Screen
⑥	Viewfinder Switch Key
⑦	Return
⑧	Five-way Key
⑨	Battery Unlock Key

Part Name and Description



Items	Part Names
①	Shoot Key
②	Digital Zoom Key
③	Viewfinder
④	Laser Ranging
⑤	Visible Light
⑥	Infrared Lens
⑦	Flash
⑧	Temperature Measurement Key
⑨	Auto Focus Key

Connection Controls



Items	Part Names
①	Battery Unlock Key
②	Network Interface
③	Micro USB Interface
④	Micro HDMI Interface
⑤	SD Card Slot
⑥	SIM Card Slot
⑦	Rechargeable Lithium Battery
⑧	Battery Charging Base
⑨	Charger

Main Menu Function Description



Imagine Mode

SATIR



Picture in Picture



Duo-vision



Duo-vision Plus



CCD



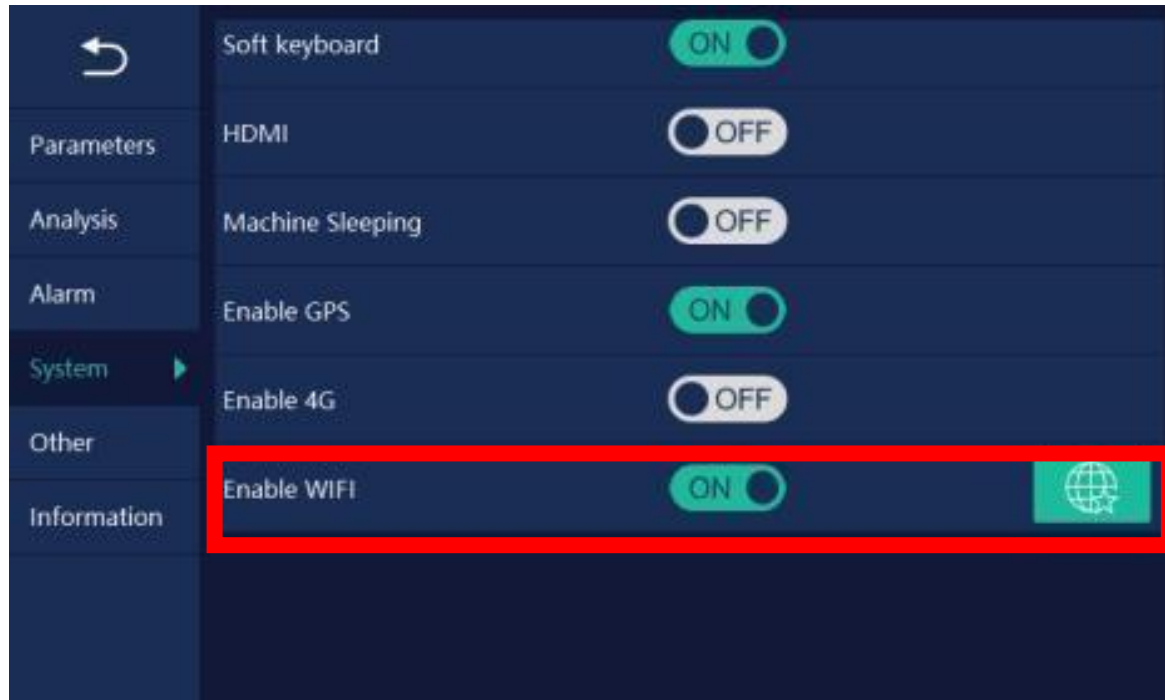
IR

Pseudo Color

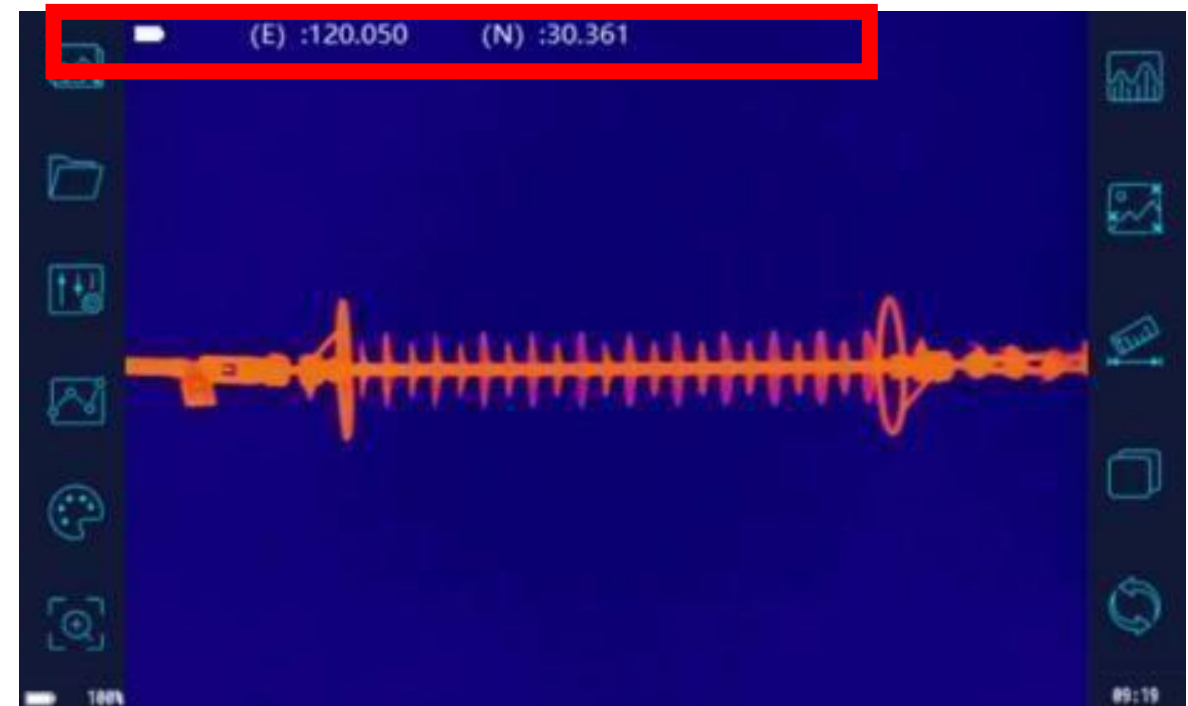


10 types including Iron, Iron-inverted, Grey, Grey-inverted

Other Functions



Real-time Wi-Fi transmission of instrument videos (optional)



Real-time GPS positioning of the instrument (optional)

PX-100 Video:



Application Cases

Monitoring of Substation

Real-time Monitoring

The PX Series, as a supporting facility, provides functions such as real-time temperature data and images, and dual-channel real-time monitoring. It makes the operation of substations safer and more reliable and has already become an important supporting part of the informatization construction of substations.

Fault Detection

The PX Series can check and conduct fault diagnosis on the states of power equipment including transformers, lightning arresters, capacitors, circuit breakers, insulator strings, mutual inductors, generators, cables, conductors, and disconnectors.



Monitoring of Transmission Link

Fire Prevention and Control

The PX Series inspects in smart power transmission. Its thermal imaging finds heat sources. Visible light locates fire points. Sends alarm after double confirmation for manual review.

Circuit Inspection

Monitor temperature of cables and joints in underground. Also measure bushings and wire clamps for efficient inspection.



Monitoring of Energy Storage Power Station

Temperature Monitoring

The PX Series can conduct visual temperature monitoring on batteries and the entire energy storage station. The temperature field distribution of the station is clear at a glance.

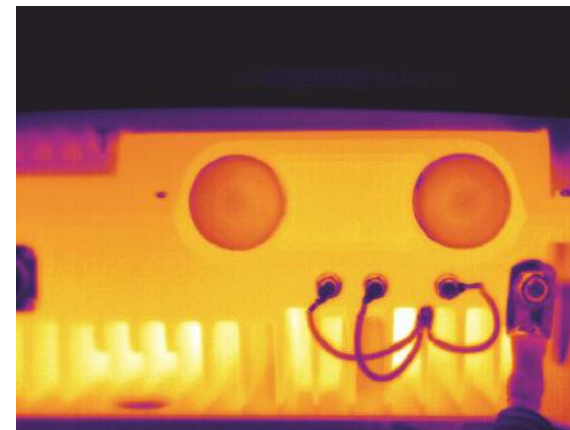
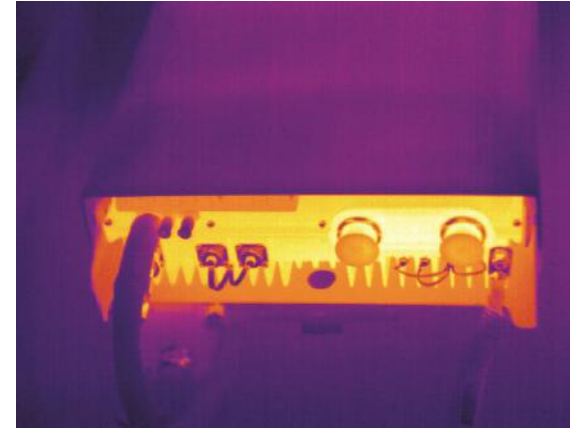
Early Warning and Linkage

The PX Series can automatically capture high-temperature hazard points, issue timely alarms for local thermal runaway caused by increased battery voltage leading to internal short circuits and overcharging of battery cells, and link with cooling and fire protection systems to prevent fire.

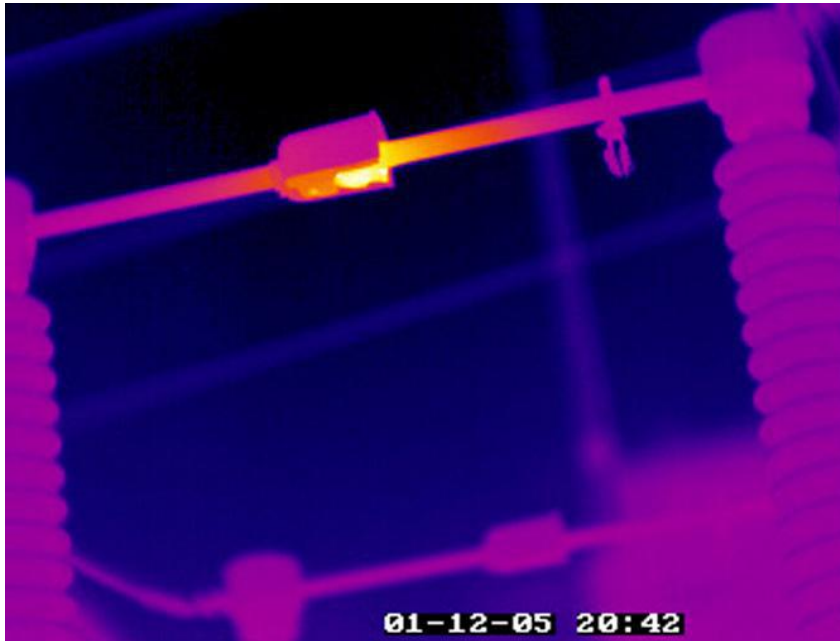


What Type of Faults Will Show Up on PX Series

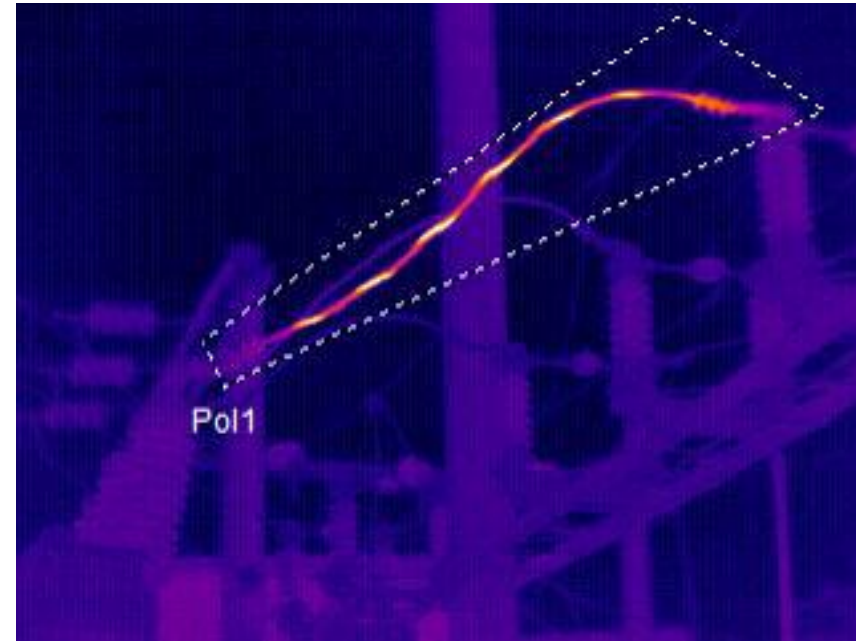
- Overloads
- Loose Connections
- Defective Equipment
- Faulty Connections
- Systems Overheating
- And Many More!



What Type of Faults Will Show Up on PX Series

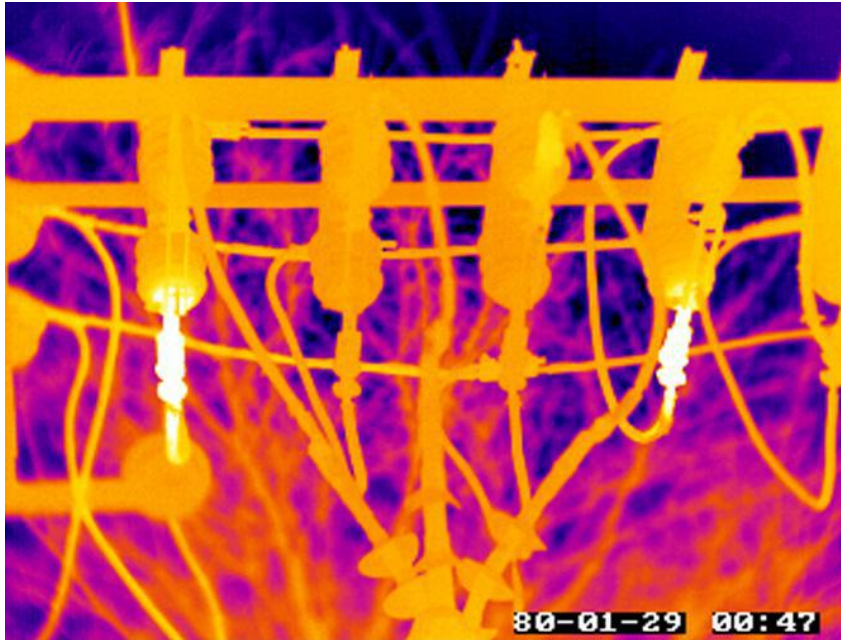


Thermal Imager of Faulty Electrical

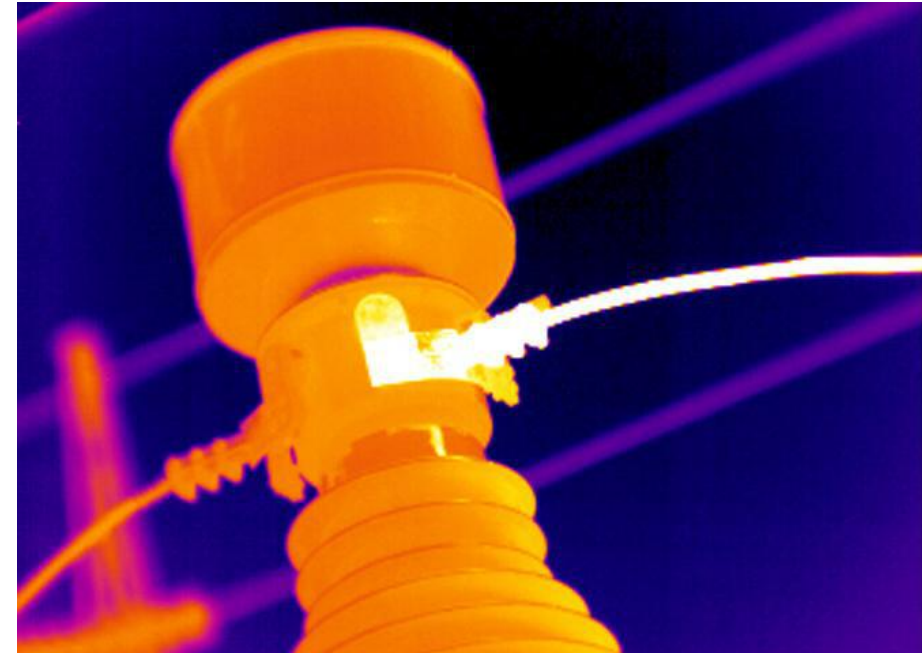


Thermal Imager of an Electrical Cable Break

What Type of Faults Will Show Up on PX Series

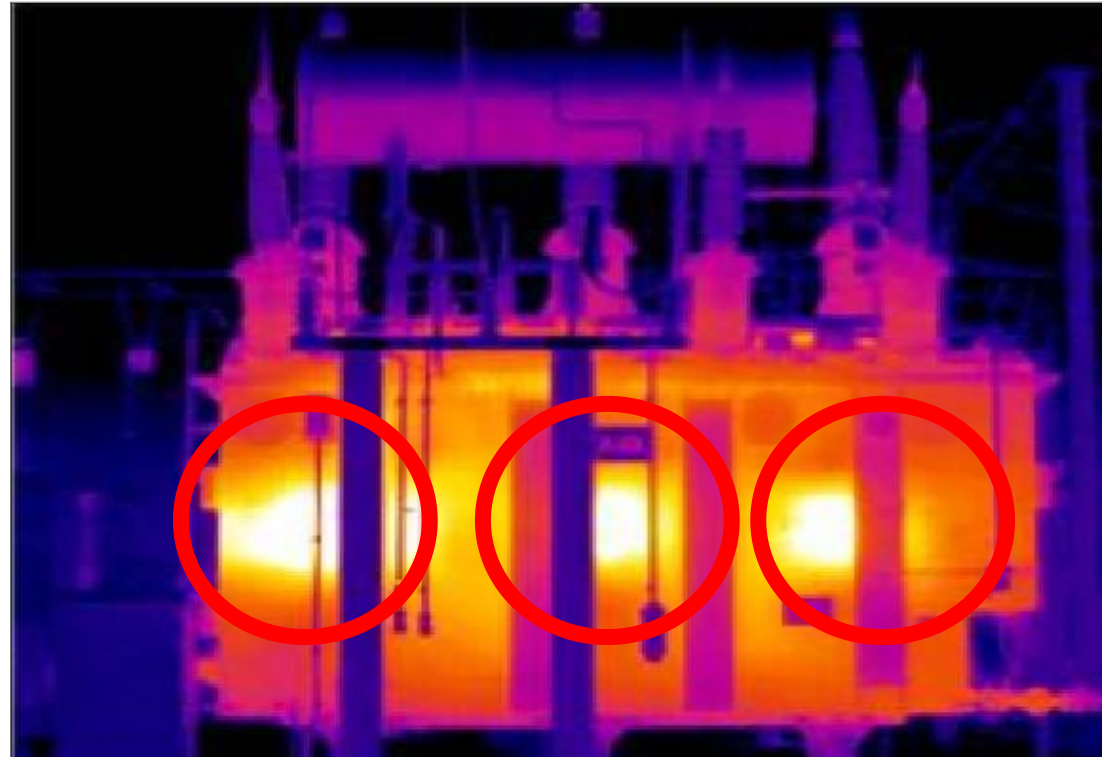


Thermal Imager of Faulty Disconnection



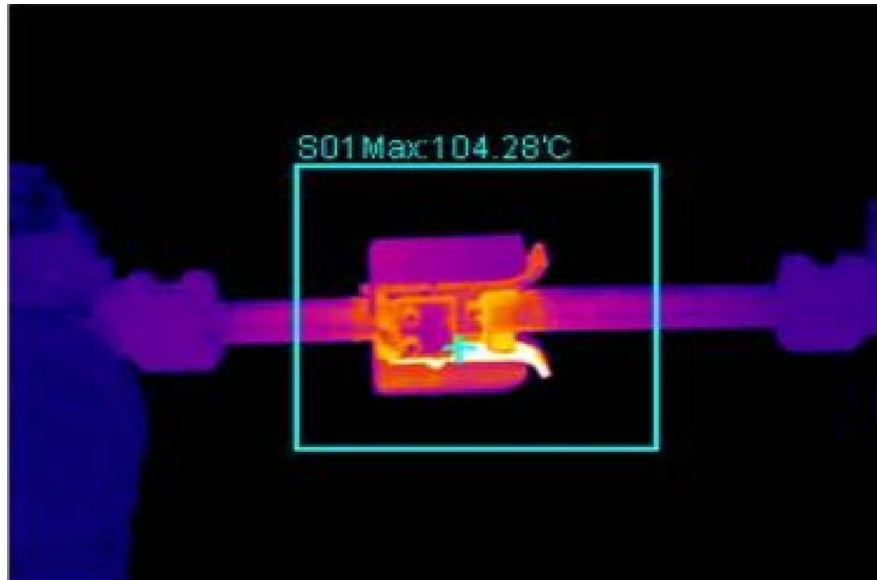
Thermal Imager of Bad/Loose Connection

What Type of Faults Will Show Up on PX Series

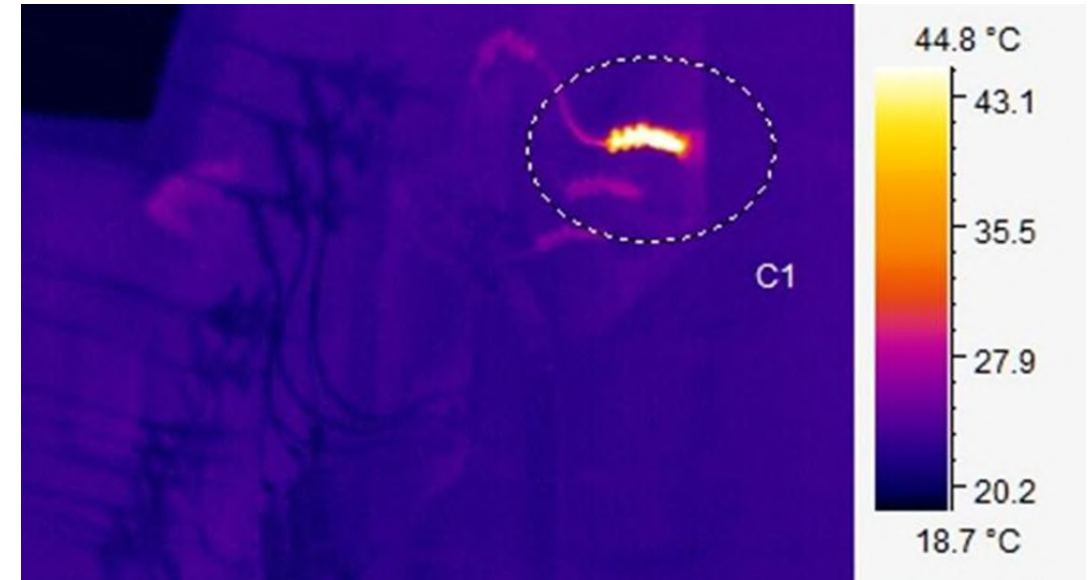


Transformer Leakage Leads to Local Temperature Rise

What Type of Faults Will Show Up on PX Series

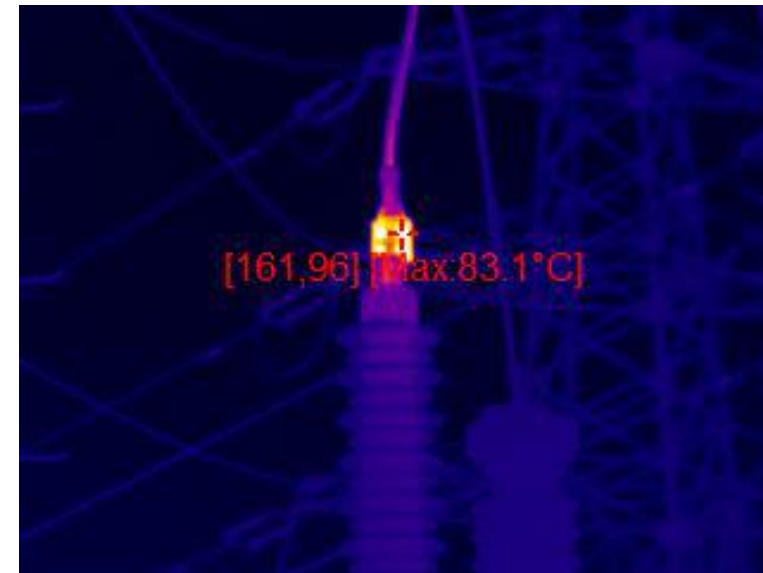
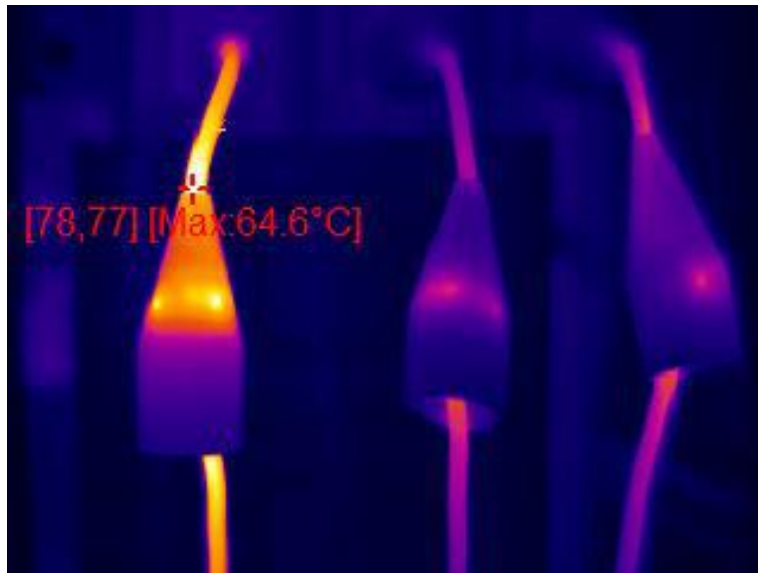


Abnormal Temperature Caused by Poor Contact



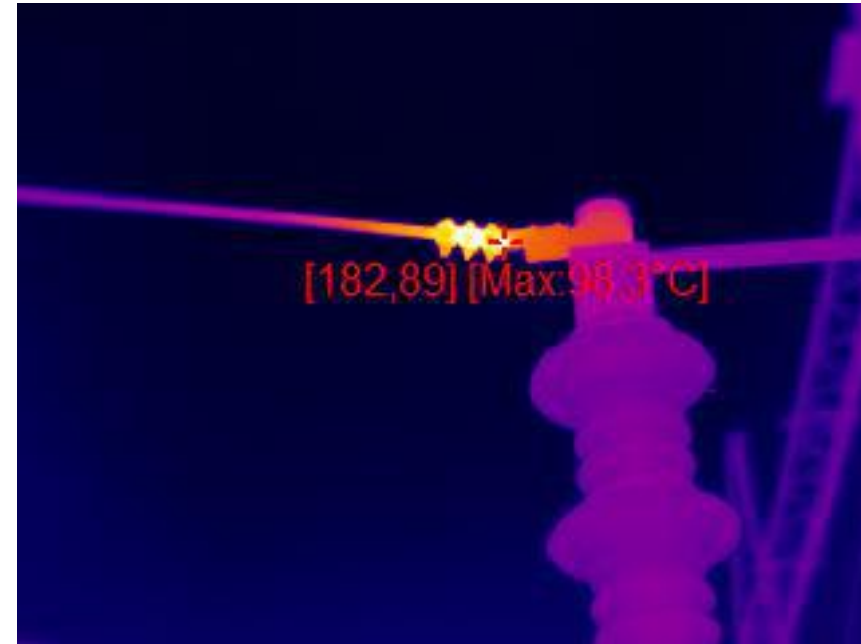
Heating of Wall Bushing

What Type of Faults Will Show Up on PX Series



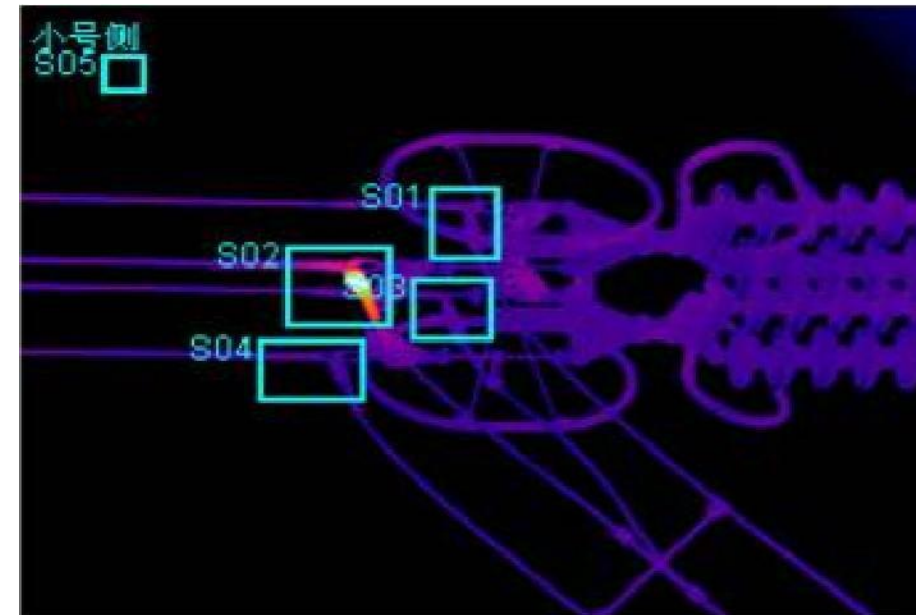
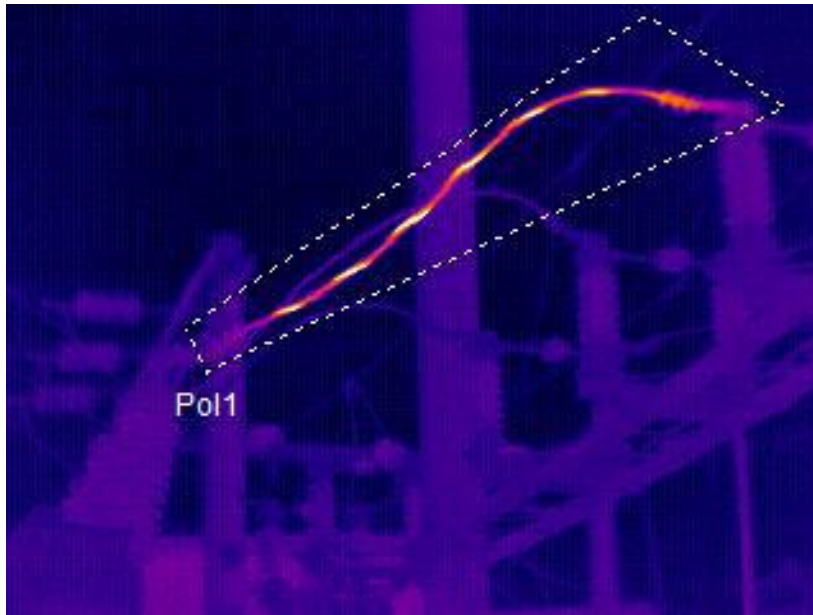
Temperature Abnormality Caused by Heating of Cable Joints

What Type of Faults Will Show Up on PX Series



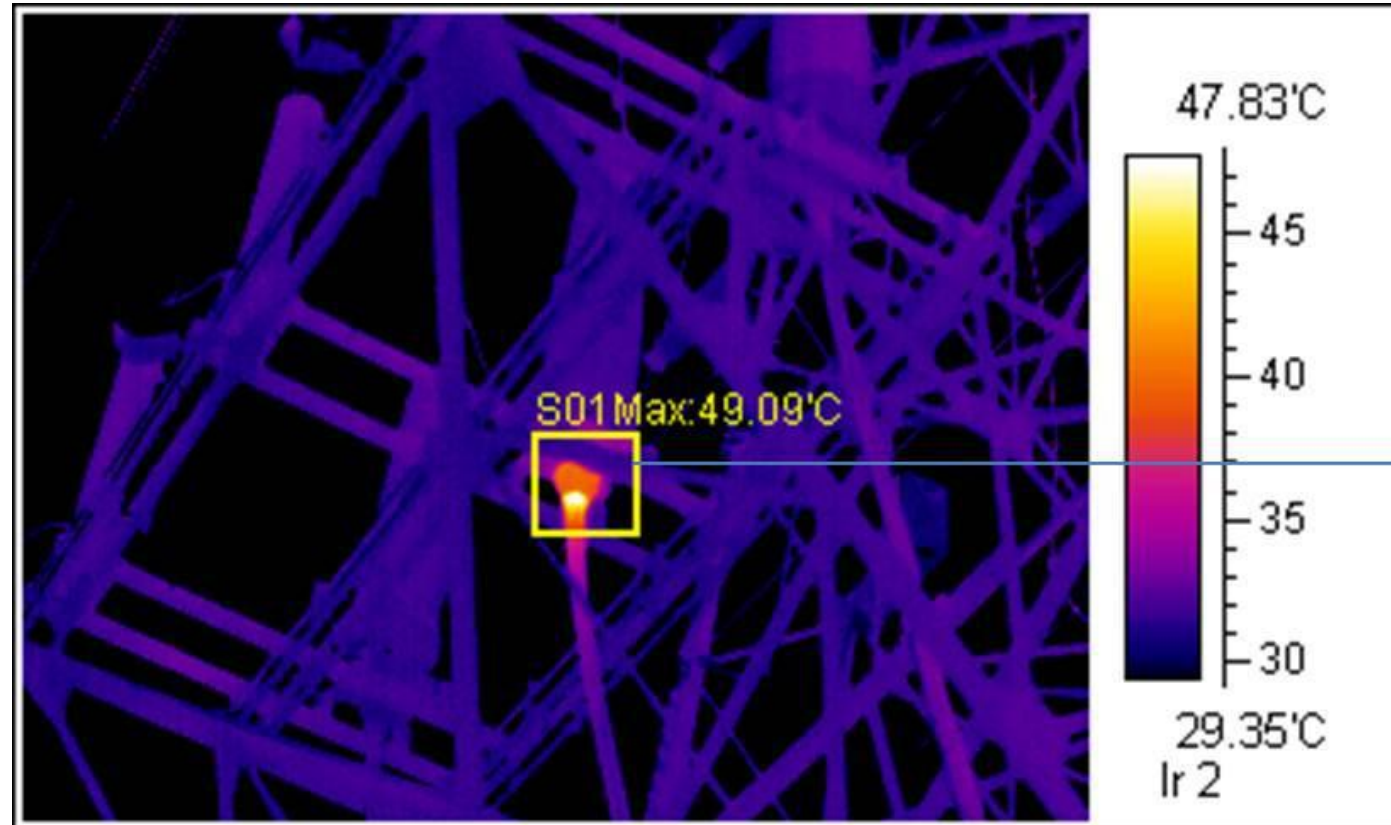
Casing Load and Joint Heating

What Type of Faults Will Show Up on PX Series



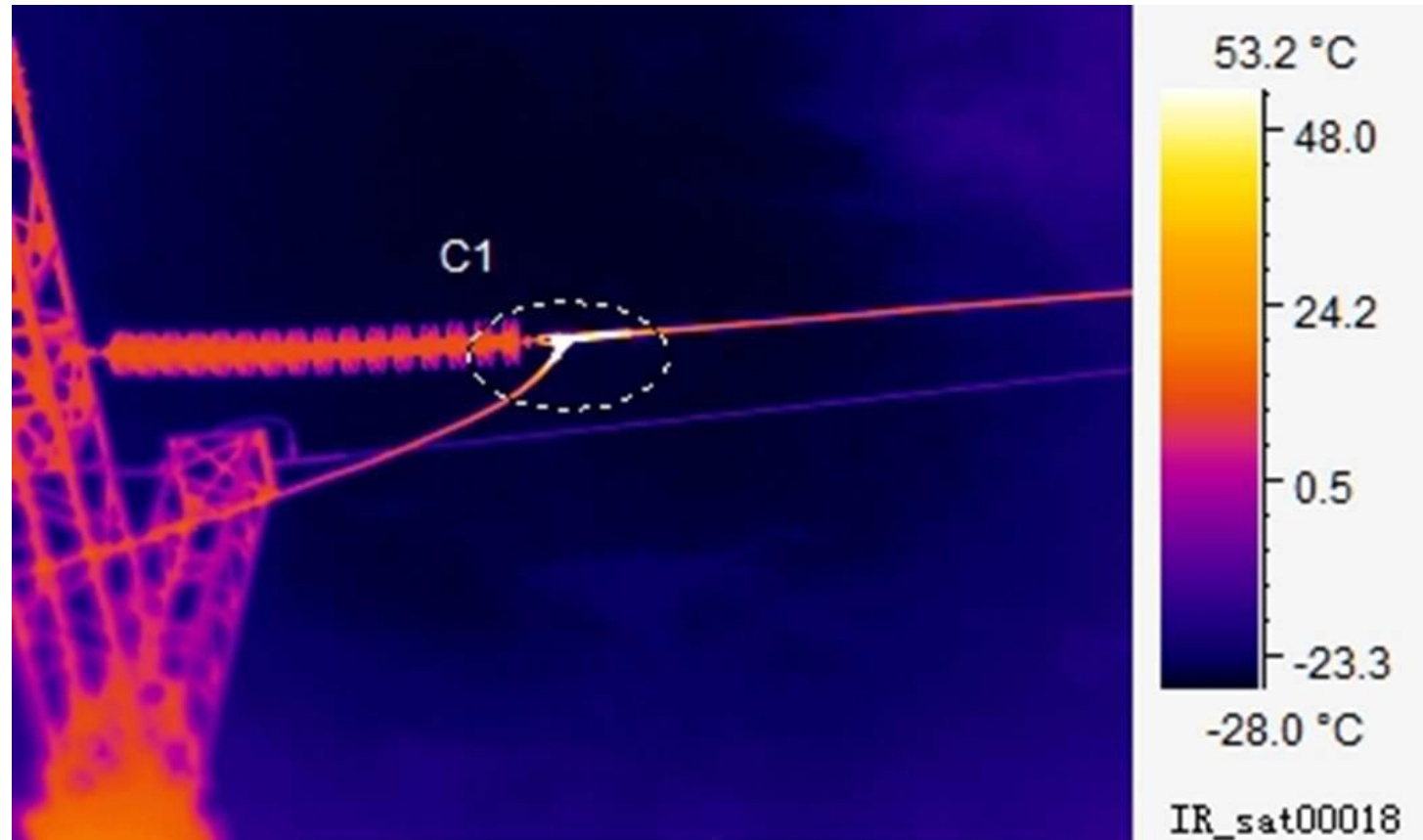
Cable Strand Breakage and Joint Heating

What Type of Faults Will Show Up on PX Series



Thermal Defects Caused by Oil Leakage in 110KV Cable Joints

What Type of Faults Will Show Up on PX Series

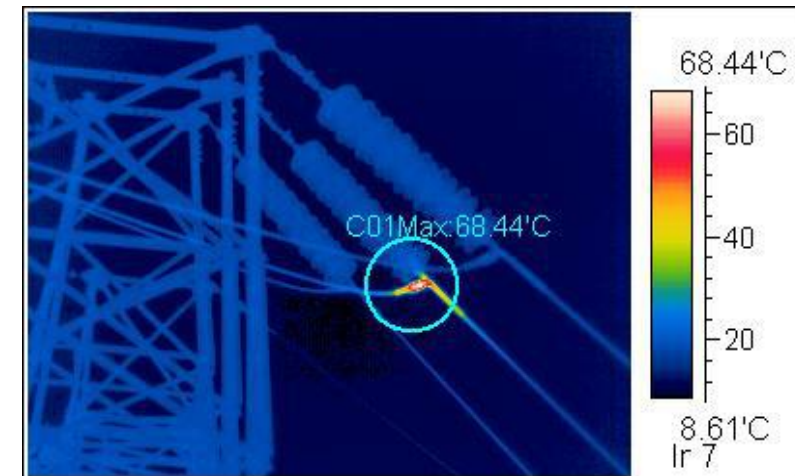
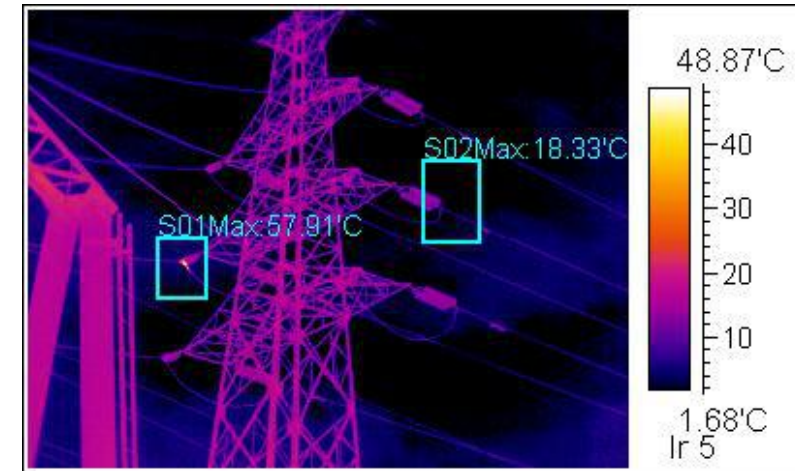


110KV Transmission Line B Phase Clamp Overheating

What Type of Faults Will Show Up on PX Series

220KV Pressure Pipe

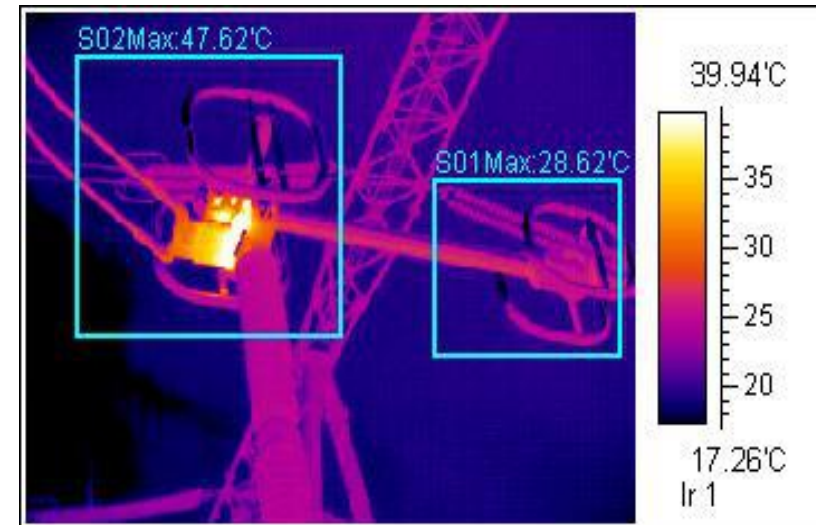
Poor Contact or Aging Causes the Insulation Layer to Fall Off



What Type of Faults Will Show Up on PX Series

**500KV Substation
No. 2 Main
Transformer
Tianbei Line
50322 Knife
Switch A Phase**

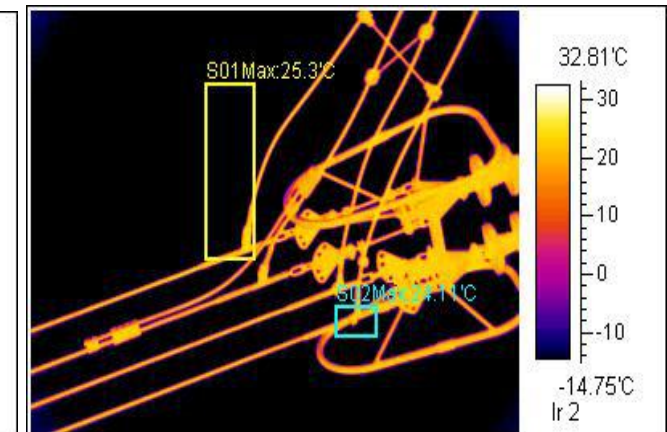
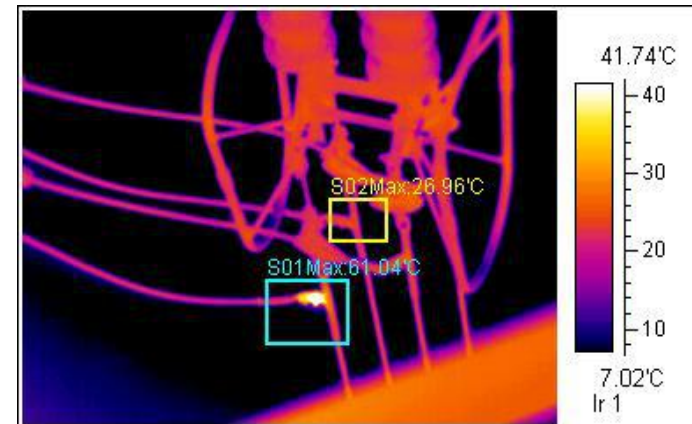
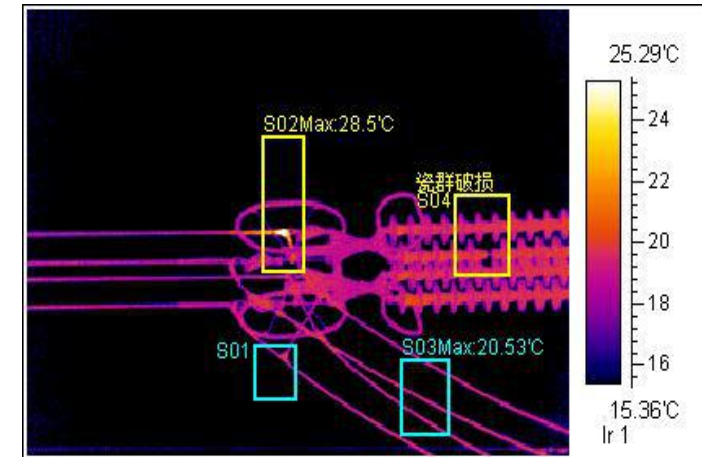
The thermal images show notable heat generation at the interface, with a temperature difference of about 20°C.



What Type of Faults Will Show Up on PX Series

5.500KV Tianlan Line

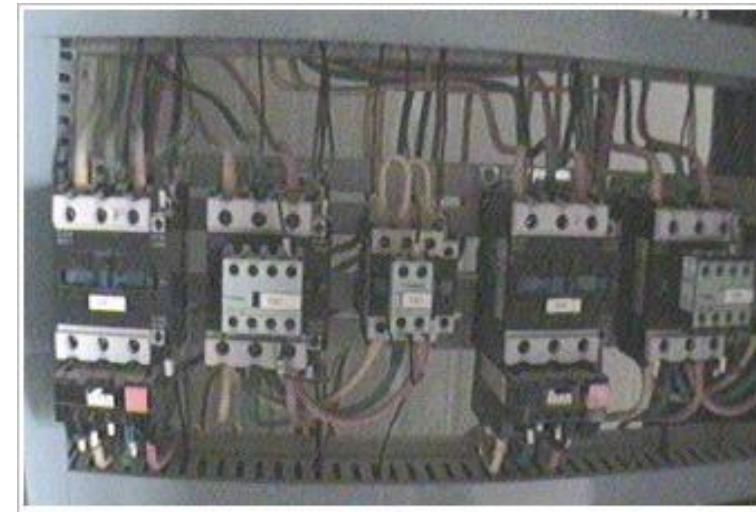
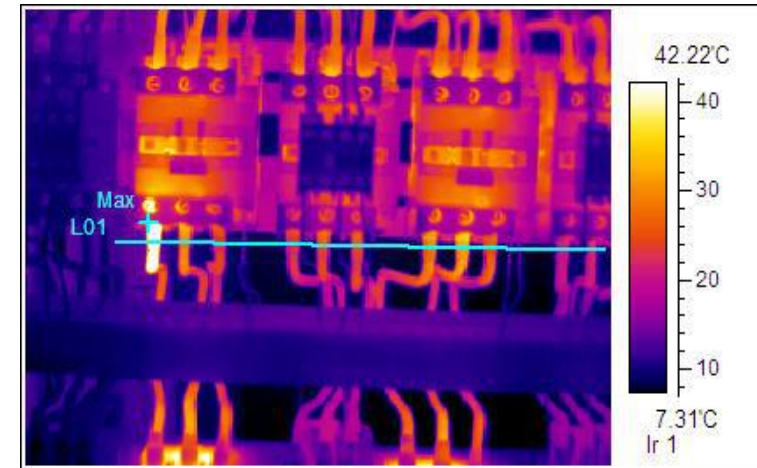
The thermal images reveal that the wire clamps are mainly heated, with a temperature difference of about 40° C. This issue should be addressed during maintenance.



What Type of Faults Will Show Up on PX Series

Power Cabinet

The thermal imagers show a temperature difference exceeding 20°C at the phase joint, warranting attention during maintenance.



THANKS