

# **Live Maintenance of Power Electrical & Network Communication Equipment**

Fujian Tengdajie Environmental Protection Engineering Co., Ltd.

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01

# Contamination Hazard

# Cases of electric power equipment contamination accidents



## Yantai Zibo

In Zibo and Yantai area (heavy fog), 35 to 220 kv 63 lines trip/power cut, 105 substations trip/power cut , lost 3160000 kwh

## Neimeng Wuhai

When Shunda 220kv Substation (Light rain) of Wuhai Electric Power Bureau charges the 220kv II bus with the 254 switch of Haishun Line, the 254 switch of Haishun Line trips, and the 220kv section bus loses power

## Guanzhong ShannXi

Shaanxi Guanzhong Power Grid (sleet) 35to 330kv 57 lines trip/ power cut, 5 substation trip/ power cut

## HuaBei Liaoning

North China, Liaoning (heavy fog, sleet) 238 lines of 66~500kv tripped/power cut, and 34 substations of 66~500kv tripped/power cut 972 times

## Shanghai

Shanghai (fog) 4 220kv substations trip/ power cut

## Henan

Henan Power Grid (heavy fog) 133 lines above 10kV tripped/power cut 15 lines above 110kv tripped/power cut



# Cases of communication equipment contamination accidents

## Taiwan (fire)

A game server in Taiwan has been unable to log in. After the service provider announced that the two game regions were greatly affected by the fire in the computer room, which caused the problem of unable to log in for a long time

## Hangzhou (equipment noise too loud)

In a university park in Hangzhou, the floor switch of the student dormitory building is seriously polluted by dust, resulting in excessive noise of equipment operation, which affects students' rest

## Henan (high temperature)

Due to the narrow space and poor heat dissipation conditions in the equipment room of an administrative department in Henan Province, the equipment temperature reached 50 °C, and two equipment were burnt down, which affected the normal operation of the department network.

## Hebei (equipment failure)

The Ericsson voice switch equipment of a mobile branch in Hebei Province often has single board failures in winter. After detection, the manufacturer's personnel told the equipment that it was caused by too high static voltage and too much dust



# Contamination Hazard



## Main pollutants affecting equipment operation

Power electrical equipment is polluted by oil, dust, metal particles, acid, alkali, salt and other substances in the environment during long-term use, which is easy to cause failures, and serious accidents will lead to casualties and power outages. However, the network communication equipment is polluted by dust, metal particles and static electricity in the long-term use process, which is easy to cause the fan to stop rotating, the equipment temperature to overheat and cause failure, which will seriously lead to short circuit, hardware damage and even fire.

## Hazards

During the long-term continuous operation of the equipment, it is easy to deposit various dust, oil fume, corrosive gas and other substances on the surface, which will cause serious pollution to the equipment and reduce the insulation of the equipment, short circuit and increase the current leakage. At the same time, it will also hinder the heat removal of equipment. When the temperature rises, the probability of soft failure will increase, and in serious cases, it will lead to a large area power outage, even fire and other disasters. Therefore, regular live cleaning and maintenance of equipment in long-term continuous operation is conducive to safe and reliable normal operation of equipment.

# Contamination Solution

## Traditional maintenance methods



The traditional maintenance and cleaning methods are mainly manual cleaning, live water washing and live chemical cleaning

### Manual cleaning

The manual cleaning is often carried out with the help of force, using rags, brushes and other tools for cleaning, which is inefficient, and requires power failure, so the cleaning is not complete.

### Water flushing

The operation mode of charged water flushing is complex, pollutants will affect the dynamic insulation, and the risk factor is high, so it is not suitable for indoor equipment

### Live cleaning with chemical

Electrochemical cleaning mostly uses acetone and other chemical reagents as the cleaning agent, which is irritating, toxic and harmful. It is also corrosive and has great damage to equipment. Most products are flammable.

# Contamination Solution

Innovative maintenance method



Tengdajie live cleaning and maintenance



Safe

Non-  
Toxic

High  
Insulation

Flame  
Retardant

Non-  
Corrosive

The detergent independently developed by Tengdajie has a strong decontamination and decomposition force, which is cleaned by the mechanical force exerted by the cleaning equipment. With the joint action of dissolution and physics, various pollutants are wrapped, decomposed and stripped to achieve the effect of deep cleaning. Convenient and fast construction without power cut, without affecting the production and manufacturing of user equipment. Therefore, Tengdajie live cleaning and maintenance is a more advanced, scientific and economic maintenance method than traditional cleaning and maintenance

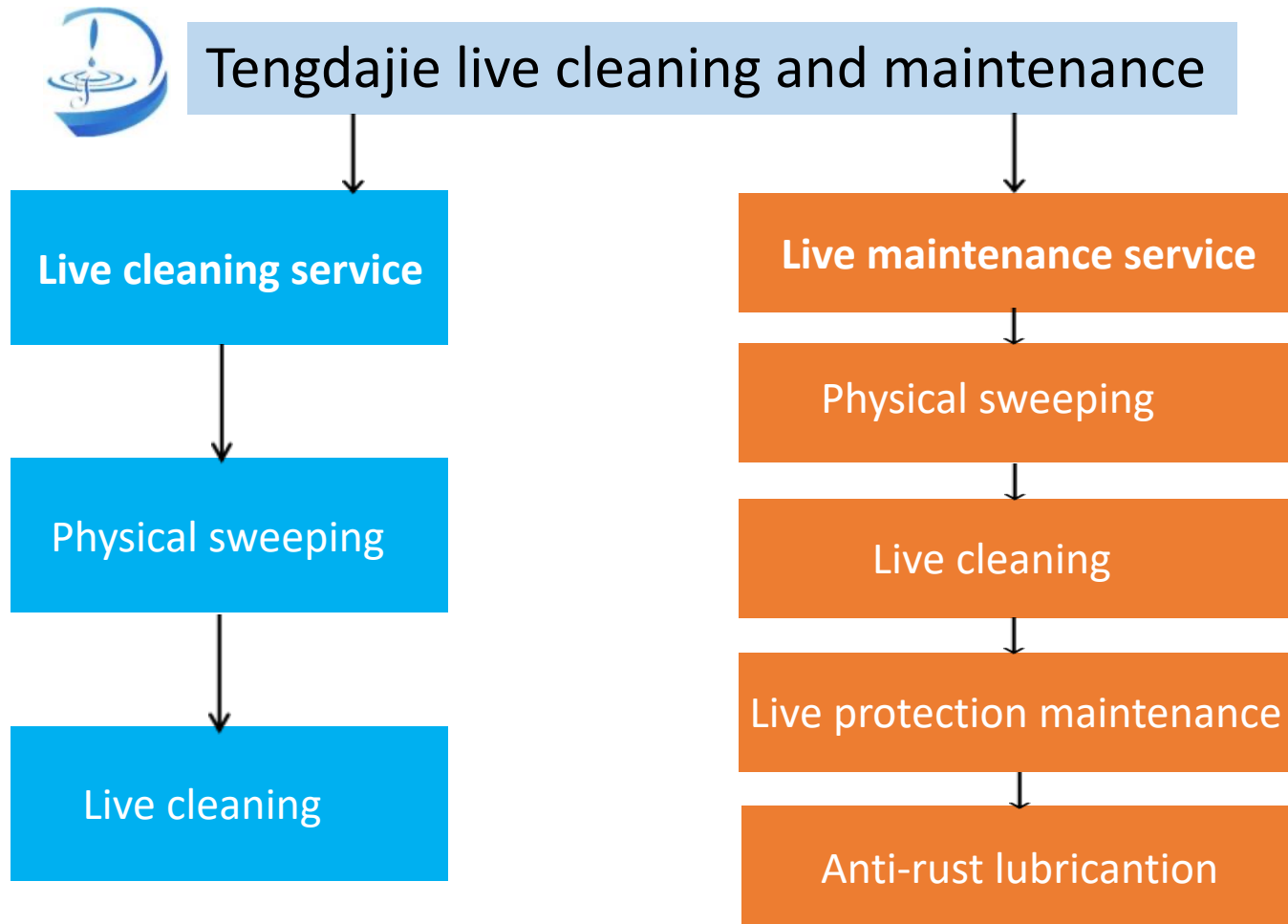




02

# Live Maintenance

# Classification of live maintenance service



Clients can choose different cleaning and maintenance services according to their own needs

# Products for live maintenance service



Finished product sales



Canned product series



Only for live cleaning project  
Not for sale in open market



Barreled product series

# Product feature

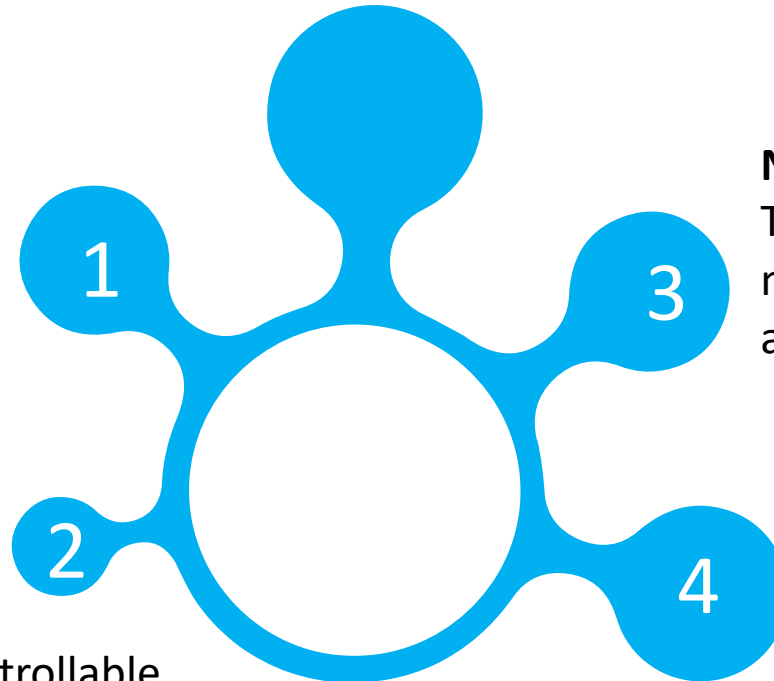


## **Strong decontamination**

The cleaning detergent has strong cleaning ability for pollutants such as oil, dust, metal particles and salt.

## **Non toxic and harmless**

Non toxic and odorless, controllable volatility



## **Non corrosive**

The PH value of cleaning detergent is neutral, not corrosive to equipment and components

## **Safe and reliable**

High insulation, dynamic insulation is relatively close to static insulation

# Product feature

	Feature	Parameter	Remark	Qualification
1	Withstand voltage	42kv/2.5mm	Live maintenance can be carried out for equipment below 500kv	1.Passed test in the 5th Research Institute of Electronics (Saibao Laboratory) of the Ministry of Industry and Information Technology and a test report issued. 2.Several invention patents have been applied. 3. Experimental report from Institute of Applied Toxicology of Nanjing Medical University , non-toxic and harmless to human body. 4.Product liability insurance is underwritten by China Pacific Insurance Group
2	Insulation resistance	$\geq 1 \times 10^{10} \Omega$	Ensure that the product itself is not conductive	
3	Combustibility	High flame retardant without flash point	Avoid safety accidents caused by weak electric sparks	
4	Corrosiveness	Neutral PH value non corrosive	Non corrosive to metals, plastics, ceramics, silicone rubber and other materials	
5	Residue	No residue	Rediue $\leq 0.00001\%$	
6	Dynamic insulation	Dynamic insulation value is consistent with static insulation value	The insulation value of the product will not be affected due to the dissolution of pollutants	
7	Detergency	KB $\geq 56$	Better decontamination effect	
8	Environmental protection	Green product	Does not contain ozone depleting ODS substances such as Freon and carbon tetrachloride	
9	Toxicity	Non toxic & harmless	Experimental report from Institute of Applied Toxicology of Nanjing Medical University , non-toxic and harmless to human body	

# Applicable equipment



Live cleaning and maintenance of electric power equipment and network communication equipment required by various industries can be completed. Up to 500KV high voltage live cleaning can be done. Efficient, fast and safe are our guidelines.

# Benefit of regular live cleaning



1. Clear all electric power communication equipment circuits and related mechanical parts static electricity “, so as to eliminate the resulting soft fault of (data with unknown cause loss, crash, abnormal operation, etc.); eliminate the cause of breakdown of the sensor, so as to reduce the failure rate of equipment, and slow down secondary pollution.



2. Eliminate the "microcircuit" formed by comprehensive pollutants on the communication equipment system, and restore the normal heat dissipation capacity of the equipment. Avoid the "corrosion inhibition" effect of comprehensive pollution on equipment, and extend the service life of equipment.



3. Improve the electrical insulation value of equipment, restore the normal surface impedance of circuit boards and components, and form a special protective effect. Keep the equipment in the best operating state. Effectively improve the contact effect of electrical contacts, avoid faults, and significantly reduce the hard faults caused thereby.

# Benefit to equipment



01

- Remove the surface and deep pollutants of the equipment, and eliminate the short circuit, thermal discharge and other phenomena caused by dust, oil and other pollutants of the equipment

03

- Eliminate static electricity on the equipment and restore 90%~95% of the original insulation value of the equipment

05

- Increase the wind speed at the air inlet and outlet of the equipment and reduce the noise when the fan is running

02

- Reduce the internal and external temperature of equipment, prevent high temperature aging fire, and reduce the incidence of explosion by 30%

04

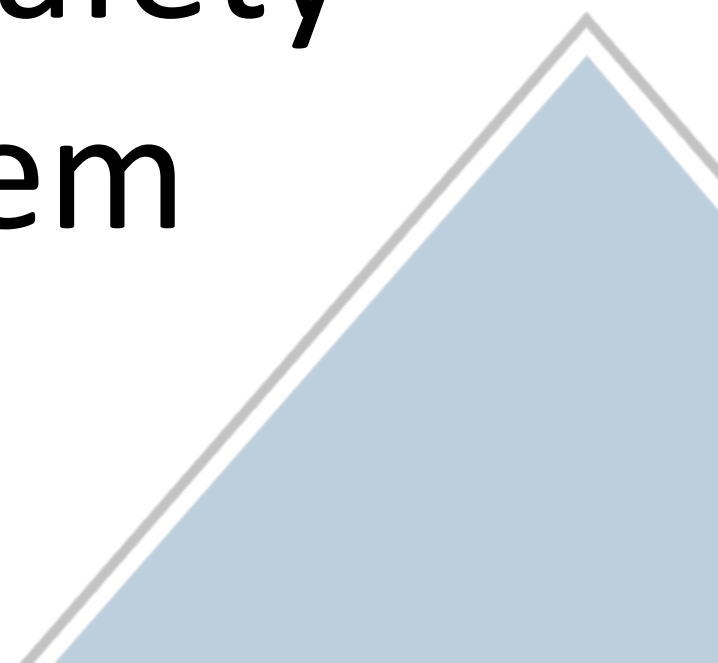
- Anticorrosion protection shall be provided for the equipment to slow down the corrosion speed after cleaning and prolong the service life of the equipment





03

# Implementation Safety Guarantee System



# Five dimensional safety system for live cleaning

## Implementation safety assurance

In the live cleaning maintenance, in order to ensure the personal safety of personnel, equipment safety and maintenance quality, in addition to having excellent products, advanced and standardized maintenance technology, the management elements and related non-technical factors existing in the entire cleaning and maintenance work must be strictly controlled. Tengdajie has been constantly exploring in the long-term live cleaning

To summarize and improve, a complete set of construction process flow has been established. In order to ensure the effective implementation of process procedures, a complete set of construction management system has been established to ensure the quality and safety at the same time



**Fast, Professional, Safe and Reliable**

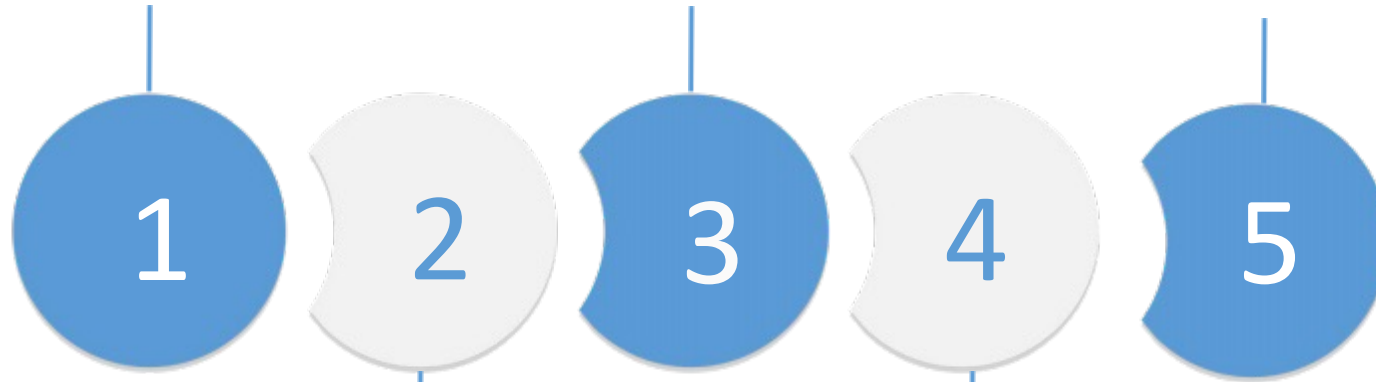
# Five dimensional safety system for live cleaning



Product safety guarantee

Technical service  
personnel guarantee

Process safety guarantee



Tools safety  
guarantee

Implementation  
safety guarantee

# Product safety guarantee



2 series products are independently developed and produced by Tengdajie, namely, cleaning detergent and protective agent, according to the different application fields. It has obtained a number of invention patents issued by the State Intellectual Property Office. In the use process, first use the cleaning detergent to dissolve and decontaminate, and then use the protective agent to protect against corrosion, oxidation, vulcanization, electric leakage and static electricity, so as to achieve the best maintenance effect.

## Test & Insurance



Product characteristics  
tested by the following laboratory



**China CEPREI laboratory**

Product toxicity tested by the  
following laboratory



**Applied Toxicology Institute  
Nanjing Medical University**

Product liability insurance underwritten by China  
Pacific Insurance Group



The withstand voltage tested by the following  
laboratory



**Power Industry Electrical Equipment  
Quality Inspection and Testing Center**

# Tools safety guarantee



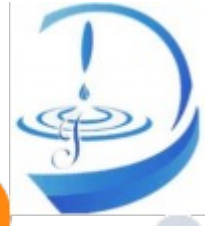
Primary equipment cleaning machine



Secondary equipment cleaning machine

Tengdajie has independently developed a number of live maintenance tools, including primary equipment cleaning machine, secondary equipment cleaning machine, portable network communication equipment live maintenance machine, multi-function live maintenance machine, intelligent network communication equipment live maintenance machine, etc.

# Technical service personnel guarantee



All members of the professional implementation team have passed the training of "Live Maintenance Operation Sign" and passed the examination before taking up their posts. Holding the Certificate of Senior Communication Equipment Maintenance Engineer issued by the Ministry of Industry and Information Technology, the Qualification for Live Working in Power Transmission issued by the State Grid, the Qualification Certificate for Live Working in Power Transmission and Transformation Equipment issued by Wuhan High Voltage Research Institute of the State Grid, the Special Work Permit issued by the Work Safety Administration, the Work at Heights Permit issued by the State Grid, and the Electrician's Work Permit issued by the National Energy Administration and other relevant professional certificates.

Before going on duty, the technicians shall receive safety education, and the maintenance shall be carried out in strict accordance with the Standard for Live Line Maintenance.

# Implementation safety guarantee



The organizational measures to ensure safety include site investigation system, work ticket system, work permit system, work monitoring system, work interruption system, work termination and recovery system, and establishment of live maintenance site safety management system.

Before implementation, make sure project team go to the site to investigate and formulate feasible plans to ensure the success rate of each project.

Before each work, they will receive safety education and be required to maintain in strict accordance with Tengdajie live line maintenance operation standard.

# Process safety guarantee



Reference to relevant national standards



Combined with practical project experience



"Tengdajie Standard Operation Procedure of Electric Power and Network Communication Equipment Live Maintenance "

**Electrostatic balance process**

Using Electrostatic Balancer to Eliminate Accumulated Electrostatic of Equipment

**Live cleaning process**

Live Cleaning and Maintenance Suitable for External Electric Insulation Equipment

**Atomization Maintenance process**

Suitable for thick contamination, first atomizing and curing, then infiltrating, thoroughly decomposing contamination

**Dissolution Maintenance Process**

Maintenance of equipment with efficient and safe live cleaning agent

**Nanomaterial protection process**

Maintenance of equipment against acid, alkali and salt pollution, corrosion and leakage





04

# Introduction of Tengdajie

# Introduction of Tengdajie



## Company Profile

Fujian Tengdajie Environmental Protection Engineering Co., Ltd. is committed to the application of liquid nano material technology. It is a high-tech modern company integrating R&D, production, sales and service. Each series of products has a number of patents and has obtained ISO and OHSAS certificates. Among them, the maintenance test report and the non-toxic and harmless test report on human body have been underwritten by China Pacific Insurance Company. They have the characteristics of non-toxic, non corrosive, high stability, high reliability and other high competitiveness, leading the new trend of industry development.

Tengdajie has successfully provided all-round high-quality cleaning services for various fields, including power system, power generation system, manufacturing, communication operators, education system, etc. It undertakes the mechanical cleaning work and related services for the upstream and downstream companies of large enterprises, such as State Grid Corporation of China, Sinopec, China Tobacco, China Unicom, and Shanghai Metro, Innovative research and development of a series of competitive high-quality cleaning products, supporting systems and perfect service system; Starting from the development of personalized maintenance scheme, Tengdajie combines professional construction teams, professional maintenance products, professional tools and appliances and closed-loop professional maintenance system to create the best safe and efficient market choice, strictly trains professional construction teams with certificates, uses scientific process maintenance system, professional detergent and protective agent collocation, and independently develops safe and reliable professional tools and appliances, In order to provide high-quality material conditions for maintenance, the professional team provides targeted maintenance plans for customers, and the on-site survey, evaluation and return visit and other means cross operate to bring customers the most perfect service system.



# Corporate culture



Innovate  
Cooperate

Serve  
Win-win

## Enterprise tenet:

We always seek to provide power and communication services through high-tech products and professional technologies  
Enterprises provide professional cleaning and maintenance services for China's power and communications  
Safe operation escort

## Social image:

Tengdajie is an enterprise with a number of core technologies and professional construction teams.

## Corporate vision:

Become a pioneer in the industry standard of live cleaning and maintenance and an excellent demonstration enterprise in the industry  
Industrial group, a stage for enterprises to achieve higher career.

## Core values:

Integrity is the root of an enterprise, safety is the guarantee of an enterprise, and innovation is the life of an enterprise  
The team is the soul of the enterprise.

# Company qualifications



- OHSAS18001 Occupational Health and Safety System Certification
- ISO14001 Environmental Management System Certification
- ISO9001 Quality Management System Certification

# Company qualifications



Product test report



Product liability insurance policy



Inspection report of cargo transportation conditions (Road, sea, air, railway)

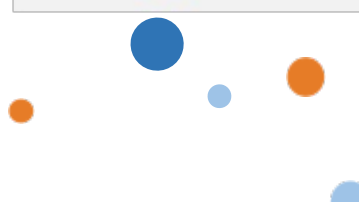
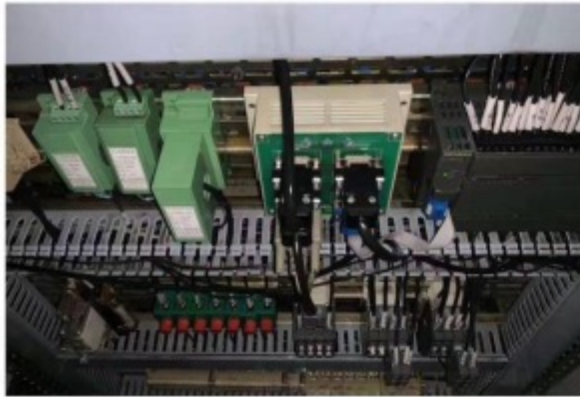
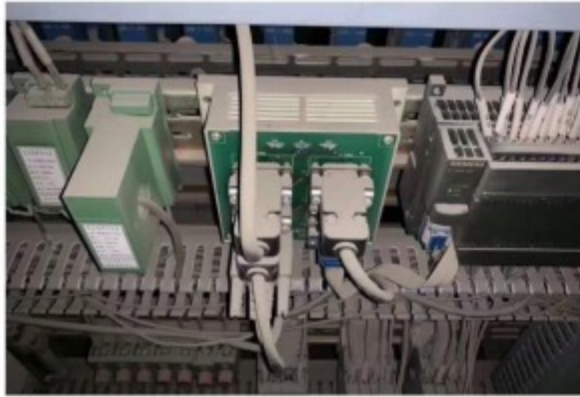


Test Report of Live Maintenance Tools and Instruments

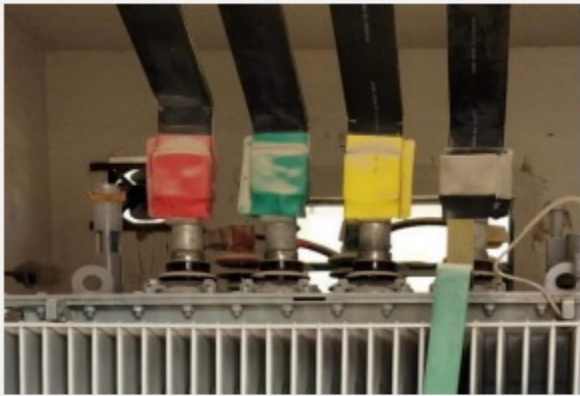


Product MSDS

# Comparison pictures of live cleaning effects



# Comparison pictures of live cleaning effects



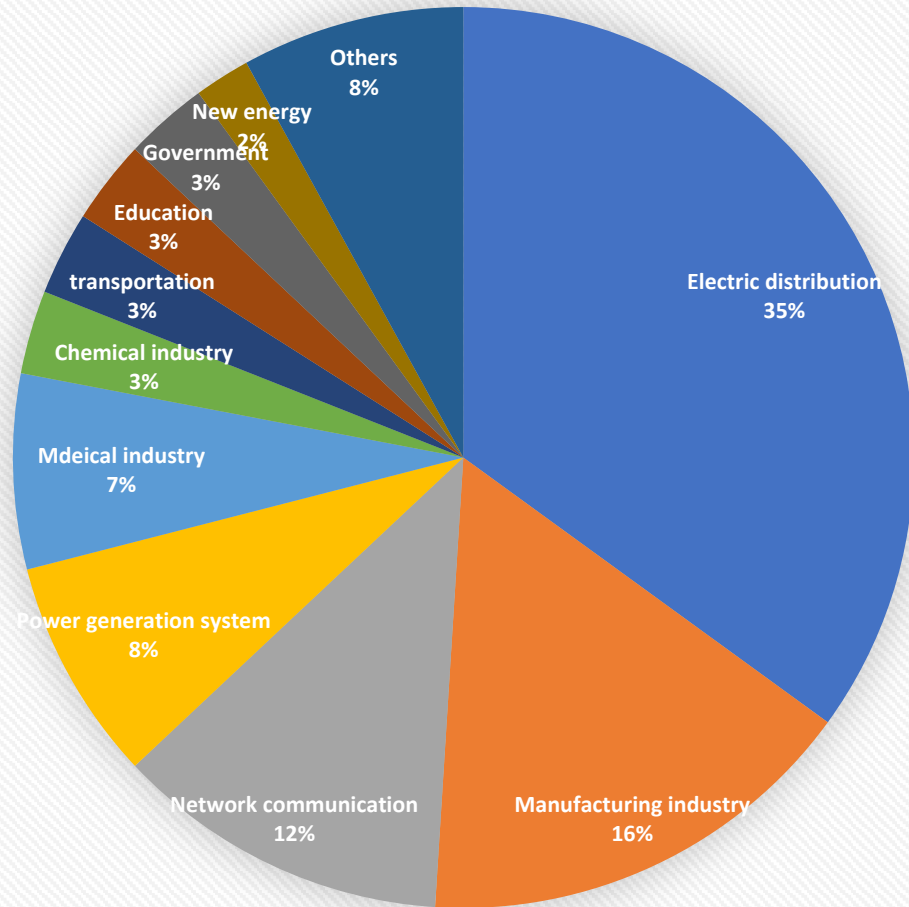
# Business distribution map



Our technical team is all over the country, providing professional and personalized maintenance services for hundreds of customers. In order to solve the customer's pain points, an efficient and safe construction and maintenance plan is formulated. Live cleaning and maintenance technology is widely used in communication, power, petroleum, petrochemical, aviation, aerospace, navigation, transportation, national defense, medical, automation systems, satellite navigation and other fields.



# Business distribution Chart



- Electric distribution
- Manufacturing industry
- Network communication
- Power generation system
- Mdeical industry
- Chemical industry
- transportation
- Education
- Government
- New energy
- Others



# ***THANK YOU!***



## **Manufacturer**

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