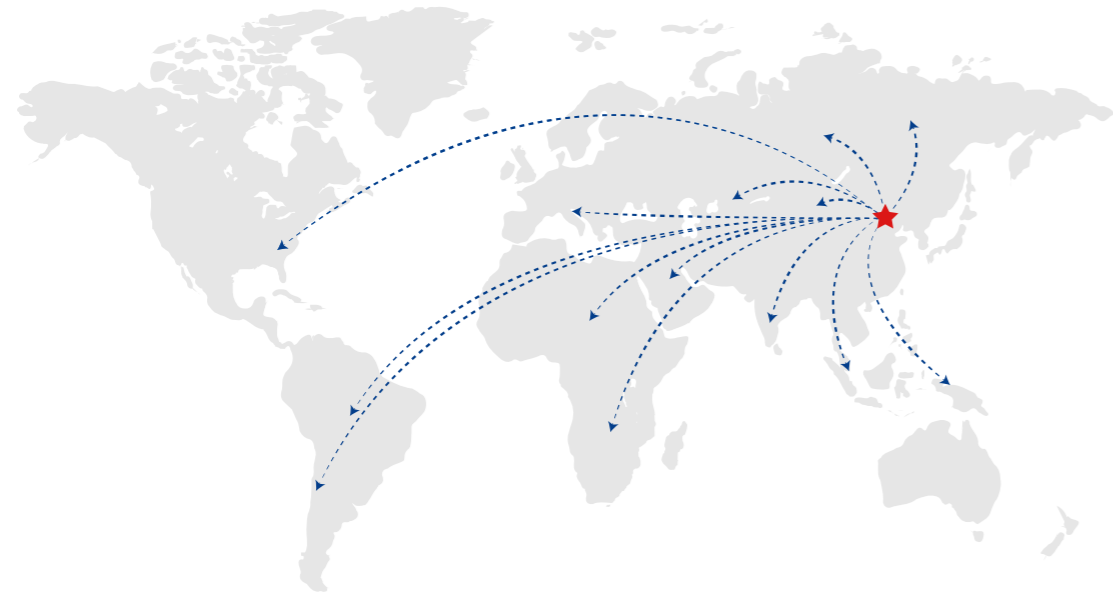




BUSHING(BEIJING) HV ELECTRIC

博世因（北京）高压电气有限公司



博世因（北京）高压电气有限公司

BUSHING(BEIJING) HV ELECTRIC CO.,LTD

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博弈世界

... WORLD ...



因我前行

... FORWARD ...

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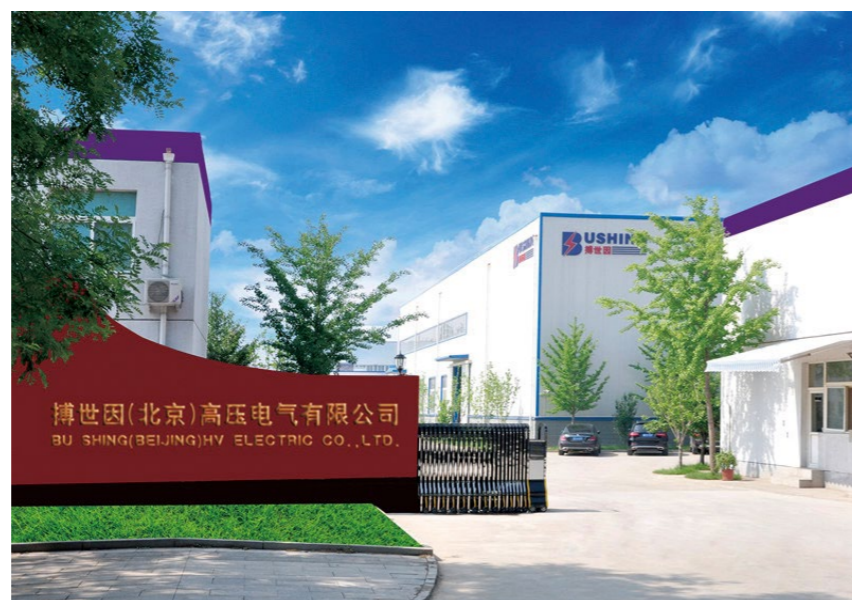
不断创新，追求卓越
WE GREAT WE OUTSTANDING

博世因(北京)高压电气有限公司位于北京密云经济开发区，是一家致力于电力及能源装备制造领域的综合性企业。公司设立营销中心、技术中心、生产中心、财务中心、审计中心、行政中心共计六大中心，其中营销中心国内设立七个销售大区，国际设立多个办事处。

我公司产品广泛应用在百万机组燃煤电厂、千万千瓦级陆地风电/陆地光伏、近远海风电、燃气发电、石油化工、高铁牵引变、钢铁有色整流变等领域。并与国家电网、南方电网、中国华能、中国华电、大唐集团、施耐德、ABB、西门子、阿尔斯通、国际能源集团等达成长期合作。

Bushing (Beijing)HV Electric Co., Ltd. is located in the Miyun Economic Development Zone of Beijing. It is a comprehensive company dedicated to the field of power and energy equipment manufacturing. The company has established six major centers, including marketing center, technology center, production center, financial center, audit center, and administrative center. Among them, the marketing center has seven sales regions in China and multiple international offices.

Our products are widely used in coal-fired power plants, onshore wind power, onshore photovoltaic power, offshore wind power, gas power generation, petrochemical industry, high-speed railway traction transformer, and rectification transformer etc. Our company has long-term cooperation with State Grid of China, China Southern Power Grid, China Huaneng Group Co., Ltd., China Huadian Group Co., Ltd. and Schneider, ABB, Siemens, Hyundai Heavy Industries, Alstom and local energy groups.



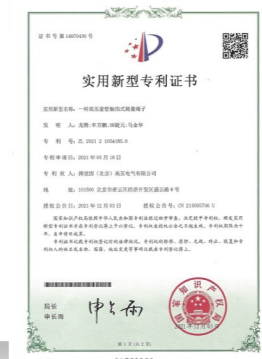
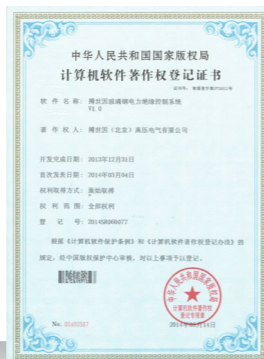
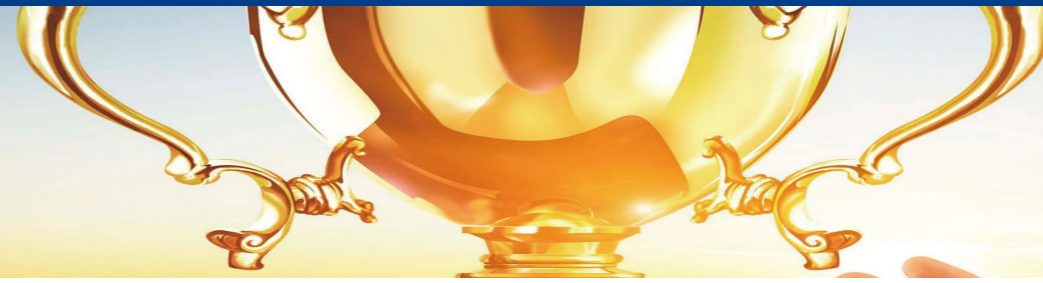
目前国际业务已拓展至俄罗斯、韩国、哈萨克斯坦、乌克兰、巴基斯坦、印度尼西亚、巴西、蒙古、缅甸、埃及、赞比亚、印度、马来西亚、古巴等 20 多个国家和地区。

运行更安全，输送更高效，管理更智能，是博世因人一贯的追求，不忘初心，奋发前进，为客户不断创造更大价值，为中国高端智能化套管贡献力量。

Now days, our international business has expanded to more than 20 countries and regions, including Russia, South Korea, Kazakhstan, Ukraine, Pakistan, Indonesia, Brazil, Mongolia, Myanmar, Egypt, Zambia, India, Malaysia, Cuba, etc.

Safer operation, more efficient transmission, and intelligent management are the consistent pursuit of Bushing (Beijing). We will keep our original intention, work hard to create greater value for our customers, and contribute to China high-end intelligence bushing field.





2013

博世因（北京）高压电气有限公司第一支玻璃钢干式套管诞生。

The first dry-type bushing was manufactured at Bushing(Beijing) .

2015

博世因公司第一支 252kV 变压器套管和 GIS 出线套管投产。

The first 252kV transformer bushing and GIS bushing were put into operation at Bushing (Beijing).

2018

博世因公司 550kV 干式变压器套管首次走出国门，应用于俄罗斯伊尔库茨克。

550kV dry-type transformer bushing of Bushing (Beijing) has been exported to Russia for the first time and applied in Irkutsk.

2020

公司与南方电网公司合作研发世界首台 ±160kV 直流超导限流器在南澳岛成功投运。

The company collaborated with China Southern Power Grid Corporation to develop the world's first ± 160kV DC superconducting current limiter, which was successfully put into operation on Nan'ao Island.

2021

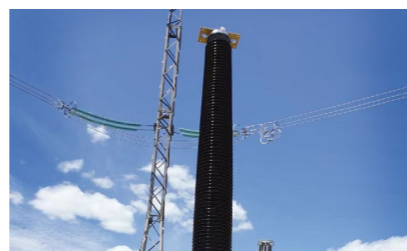
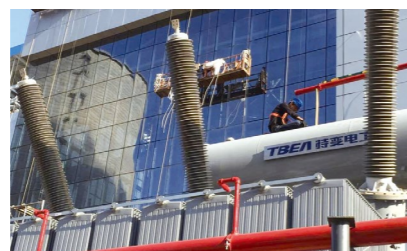
公司购买了 20143.53 平方米的投资项目用地。

The company purchased 20143.53 m² of investment project land.

2023

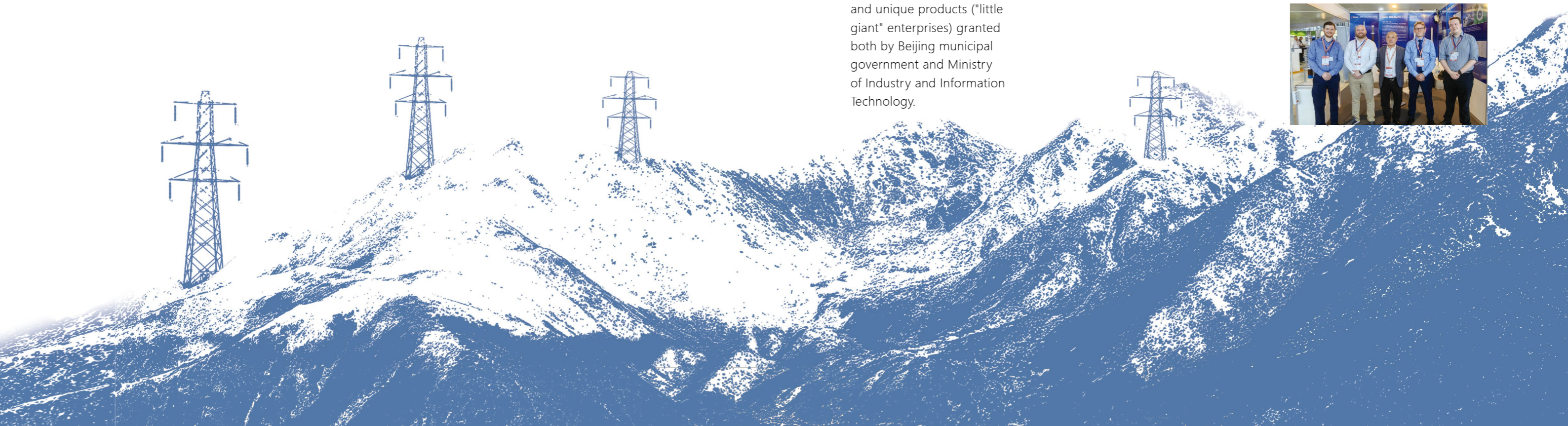
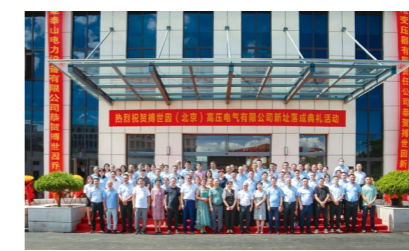
公司先后参加了迪拜，土耳其，意大利，巴西等国际性展会，向全球电力行业继续推广博世因品牌。

The company has successively participated in international exhibitions in Dubai, Turkey, Italy, Brazil, etc., and continued to promote the Bushing brand to the global power industry.

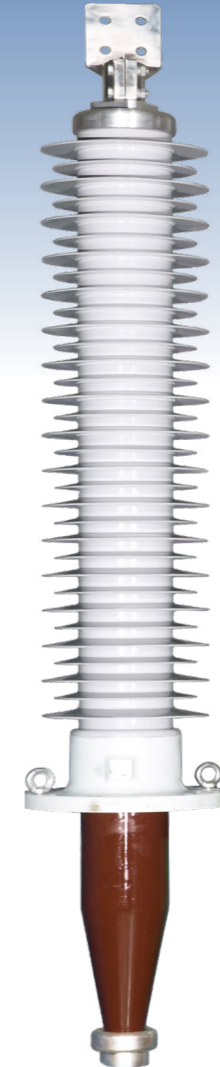


公司被认定为北京市专精特新小巨人企业，工信部专精特新小巨人企业

The company has obtained the certifications of specialized and sophisticated enterprises that produce new and unique products ("little giant" enterprises) granted both by Beijing municipal government and Ministry of Industry and Information Technology.



PRODUCTS



变压器套管

额定电压 (Um): 12kV~1200kV
±12kV~±1200kV
额定电流: 630A~8000A

Transformer Bushing

Voltage(Um) : 12kV~1200kV
±12kV~±1200kV
Current : 630A~8000A

油/SF₆ 套管

额定电压 (Um): 40.5kV~800kV
额定电流: 630A~5000A

Oil/SF₆ Bushing

Voltage(Um) : 40.5kV~800kV
Current : 630A~5000A

换流变套管

额定电压 (Um): ±200~±800kV
额定电流: 6350A

Converter Transformer Bushing

Voltage(Um) : ±200~±800kV
Current : 6350A

油 / 油套管

额定电压 (Um): 72.5kV~800kV
额定电流: 630A~4000A

Oil/Oil Bushing

Voltage(Um) : 72.5kV~800kV
Current : 630A~4000A

断路器套管

额定电压 (Um): 24kV~1100kV
额定电流: 630A~8000A

Circuit Breaker Bushing

Voltage (Um): 24kV~1100kV
Current : 630A~8000A

GIS 出线套管

额定电压 (Um): 40.5kV~1100kV
额定电流: 630A~8000A

GIS Bushing

Voltage(Um) :40.5kV~1100kV
Current :630A~8000A

穿墙套管

额定电压 (Um): 12kV~1200kV
±12kV~±1200kV
额定电流: 630A~8000A

Wall Bushing

Voltage(Um) : 12kV~1200kV
±12kV~±1200kV
Current : 630A~8000A

大电流套管

额定电压 (Um): 12kV~40.5kV
额定电流: 10000A~40000A

High Current Bushing

Voltage(Um) : 12kV~40.5kV
Current : 10000A~40000A



Resin Impregnated Paper



胶浸纸 (RIP) 干式电容型套管

胶浸纸干式电容型套管 (RIP): 胶浸纸干式电容型套管的主绝缘是胶浸纸电容芯子, 按照电场设计要求, 卷制皱纹纸并铺设铝箔电容屏形成串联电容分压结构的电容芯子, 经过真空干燥后进行环氧树脂混合料的真空浸渍, 浸渍后高温固化成型, 并机加成目标尺寸。

RIP Dry-type Condenser Bushing

The insulation is wound with crepe paper and aluminum foil. According to the design of the electric field, crepe paper and aluminum foil are wound alternately to produce the series capacitor voltage distribution structure. The insulation is dried under vacuum and impregnated by epoxy resin. After impregnation, it is cured at high temperature and machined to the target size.



RIF/RIS

Resin Impregnated Fiber

胶浸纤维 (RIF/RIS) 干式电容型套管

采用高绝缘性能玻璃纤维浸渍超低粘度耐高温环氧树脂，微机自动控制缠绕设备按测地线交叉叠加制成电容芯子绝缘层。连接法兰由高强度铝合金制成，与电容芯子胶装成一体。外绝缘由硅橡胶增爬伞裙或瓷绝缘子与法兰密封固定。中间导体载流采用穿缆方式或导杆方式。

基于特种的力学铺层设计，具备优异的机械强度，能够应对复杂的运行环境。具备优异的抗冲击能力及地震耐受能力，水平加速度 0.76g，垂直加速度 0.62g，远远超过 9 级地震烈度 0.4g 的要求。

RIF/RIS Dry-type Condenser Bushing

High insulation performance glass fiber impregnated with epoxy resin, and the winding process is automatically controlled by microcomputer to produce the insulation by crossing stacking according to geodesic. The flange is made of high-strength aluminum alloy and cemented together with the condenser core. The external insulation is sealed and fixed by the silicone rubber shed or porcelain insulator with the flange. The current-carrying conductor selects draw lead or fixed solid bottom connected.

Based on the special mechanical paving design, our products have excellent mechanical strength, can handle with complex operating environment. With excellent impact resistance and seismic tolerance, the product can withstand the impact of horizontal acceleration of 0.76g and vertical acceleration of 0.62g, which obviously exceeds the requirement of 0.4g for magnitude 9 earthquake.





穿墙套管出厂试验
Routine test of 550kV wall bushing



变压器套管安装在变压器上进行出厂试验
Installation of 550kV transformer bushing on the transformer for Routine test



±500kV GLS 出线套管出厂试验
Routine test of 500KV GIS bushing



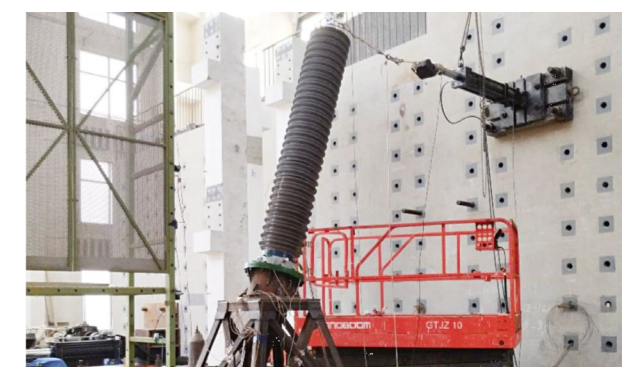
变压器套管出厂试验
Routine test of transformer bushing



±160kV 直流套管随超导直流限流器试验
Routine test of ± 160kV DC bushing with Resistive-type Superconducting Fault Current Limiter



-196°C ~ 室温环境 12 次冷热冲击试验
12 cold and hot shock tests from -196 °C to room temperature



252kV 变压器套管通过了 0.76g 水平加速度、0.62g 垂直加速度的正弦共振拍波地震考核试验
The 252kV transformer bushing passed the sine resonance beat wave seismic assessment test with 0.76g horizontal acceleration and 0.62g vertical acceleration

主要功能特点 Main Functional Characteristics

高可靠性

- 1、双闭合接地回路，确保套管末屏可靠接地。
- 2、防雷保护电路，在各输入端设计了防雷保护电路。确保设备在强电磁干扰和冲击环境下可靠工作。

抗干扰能力强

- 1、传感器采用全封闭金属屏蔽结构。保证了传感器内部感应电路不受外部电磁场及恶劣环境的影响。
- 2、超宽监测频带，能够自动多频点监测套管及变压器信号，有效处理干扰信号。
- 3、独特的 PDCFCA 放电信号分离技术。该系统采用了独特创新的 PDCFCA 放电信号分离技术，能够在一定范围内确定出放电来于套管还是本体。
- 4、传感器标准化设计，可以直接与原末屏接地帽互换，无需进行任何修改和引线，即可直接监测放电信号。
- 5、超长寿命：传感器外壳采用防腐、耐高温材料，内部采用军工级元器件，可在恶劣环境下，保证可靠运行。
- 6、信号提取与末屏引线完全隔离，无电气连接，保证了监测设备安全和人身安全。

软件功能

- A: 可检测数据类型：放电幅值、放电次数、放电相位
- B: 可显示图谱类型：实时波形、趋势图、PRPD 图、红绿黄报警状态图
- C: 历史趋势显示查询
- D: Q Φ T 动态三维图谱显示
- E: 放电严重程度判别
- F: 事件记录查询
- G: 放电超标报警
- H: 远程通讯

主要技术参数

- 通道数量：4 通道
- 测量范围：1pC-10000pc
- 脉冲分辨率：2nS
- 显示屏：4.3 寸彩色工业级液晶屏
- 通讯方式：RS485,TCP /P
- 环境温度：-50-+50
- 环境湿度：95%
- 防护等级：IP65

High Reliability

- 1、Double closed grounding circuit to ensure reliable earthing of bushing end shield.
- 2、Lightning protection circuit, design the lightning protection circuit at the input end, ensure the equipment works reliably in the strong electromagnetic interference and impact environment.

Strong Anti-Interference Ability

- 1、The sensor uses a fully closed metal shielding structure to ensure that the sensor internal induction circuit is not affected by the external electromagnetic field and adverse environment.
- 2、The ultra wide monitoring band, can automatically detect the bushing and transformer signal, and effectively deal with the interference signal.
- 3、Unique PDCFCA discharge signal separation technology. The system uses the unique innovative PDCFCA discharge signal separation technology, which can determine whether the discharge is from the bushing or the body in a certain range.
- 4、The sensor standardization design can be directly connected with the original shield grounding cap, without any modification and lead, the discharge signal can be directly monitored.
- 5、Long running life: the sensor housing adopts corrosion resistant and high temperature resistant materials, internal use of military grade components, can be in harsh environment to ensure reliable operation.
- 6、The signal extraction and the end shield lead are completely isolated, no electrical connection, and ensure the safety and personal safety of the monitoring equipment.

Software Function

- A、The type of data can be detected: discharge amplitude, discharge number, and discharge phase.
- B、The type of map can be displayed: real - time waveform, trend chart, PRPD chart, red - green yellow alarm state diagram
- C、Historical trend shows the query.
- D、Q Φ T dynamic 3d atlas display.
- E、Discrimination of the severity of partial discharge.
- F、Event record query.
- G、Partial discharge exceeding alarm.
- H、Remote communication.

Main Technical Parameters

- Number of channels: 4 channels.
- Measuring range: 1pc-10000pc.
- Pulse resolution: 2nS.
- Display: 4.3 inch color industrial grade LCD screen.
- Communication mode: RS485,TCP/P.
- Ambient temperature:-50-+50.
- Ambient humidity: 95%.
- Protection level:IP65.

容性套管全方位智能实时感知系统

Capacitive Bushing Comprehensive Intelligent Real-time Monitoring System

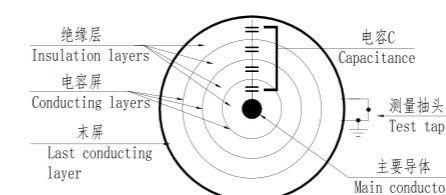
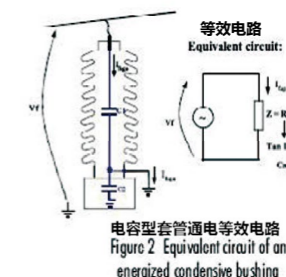


图1-电容型套管构造结构
Figure 1-Constructive structure of condenser bushing



电容型套管通电等效电路
Figure 2 Equivalent circuit of an energized condenser bushing

如图 1 所示，图中给出了典型的电容式套管内的电容分布。所以套管带电后，泄露电流比电压相角提前 90 度（如图 2 所示）。因此，如果绝缘性能下降，泄露电流中则出现与电压相位相同的阻性分量。因此，容性设备电容量和介损的任何改变也导致泄露电流的变化（容性、阻性分量的改变）。在线监测系统通过安装在套管测试抽头的末屏传感器连续检测一组三相套管的泄露电流，随后通过对泄露电流的矢量分析表征电容量及介损的变化，并通过与系统初始值的比较而得到泄露电流在线趋势显示。系统初始值可通过套管的出厂测试或现场的离线测试获得。

As shown in Figure 1, the capacitance distribution in a typical condenser bushing is given. Therefore, after the bushing is energized, the leakage current is 90° ahead of the voltage phase angle (as shown in Figure 2). Therefore, if the insulation performance decreases, a resistive component with the same as the voltage phase appears in the leakage current.

Therefore, any change in capacitance and dielectric loss of capacitive equipment will also lead to changes in leakage current (changes in capacitive and resistive components). Online monitoring system continuously detects the leakage current of a group of three-phase bushings through the end screen sensor installed at the bushing test tap, and then characterizes the change of capacitance and dielectric loss through vector analysis of leakage current, and obtains the online trend display of leakage current by comparing with the initial value of the system. The initial value of the system can be obtained through the routine test or on-site offline test of the bushing.





信发铝电集团有限公司在平信源项目

用户名称: 山东泰开变压器有限公司
产品名称: 252kV 干式变压器套管
运行时间: 2016 年 9 月

Chiping Xinyuan Xinfu Aluminum Power Group Co., Ltd

Customer: Shandong Taikai Transformer Co., Ltd.
Product: 252kV Dry-type Transformer Bushing in September 2016



兰州铁路局吴忠 - 中卫高铁项目

用户名称: 卧龙电气银川变压器有限公司
产品名称: 363kV 干式变压器套管
运行时间: 2017 年 10 月

Wuzhong to Zhongwei High Speed Railway Project of Lanzhou Railway Bureau

Customer: Wolong Electric Yinchuan Transformer Co., Ltd
Product: 363kV Dry-type Transformer Bushing in October 2017



俄罗斯伊尔库茨克国家电网公司项目

用户名称: 欧西能源贸易有限公司
产品名称: 550kV 干式变压器套管
运行时间: 2017 年 10 月

Irkutsk Power Grid Project in Russia

Customer: Oasis Energy Trading Co., Ltd.
Product: 550kV Dry-type Transformer Bushing in October 2017



南昌铁路局南昌 - 赣州高速铁路项目

用户名称: 云南变压器电气股份有限公司
产品名称: 252kV 干式变压器套管
运行时间: 2017 年 12 月

Nanchang to Ganzhou High Speed Railway Project of Nanchang Railway Bureau

Customer: Yunnan Transformer Electric Co., Ltd
Product: 252kV Dry-type Transformer Bushing in December 2017



国网陕西西安供电公司凤州变电站

用户名称: 常州东芝变压器有限公司
产品名称: 363kV 干式变压器套管
运行时间: 2018 年 10 月

Fengzhou Substation of State Grid Shaanxi Xi'an Power Supply Company

Customer: Changzhou Toshiba Transformer Co., Ltd
Product: 363kV Dry-type Transformer Bushing in October 2018



马来西亚国家凯德隆二期项目 (中水八局总包)

用户名称: 特变电工衡阳变压器有限公司
产品名称: 363kV 干式变压器套管
运行时间: 2019 年 3 月

Malaysia Kaidelong Phase II (China Water Eighth Bureau)

Customer: TBEA Hengyang Transformer Co., Ltd
Product: 363kV Dry-type Transformer Bushing in March 2019



中国水利水电第十一工程局有限公司赞比亚下凯富峡 5X150MW 水电站项目

用户名称: 特变电工衡阳变压器有限公司
产品名称: 363kV 干式电容型变压器套管
运行时间: 2020 年 1 月

5x150MW Hydropower Project of China Water Resources and Hydropower 1th Engineering Bureau Co., Ltd. (Kafue Gorge Lower in Zambia)

Customer: TBEA Hengyang Transformer Co., Ltd
Product: 363kV Dry-type Condenser Transformer Bushing in January 2020

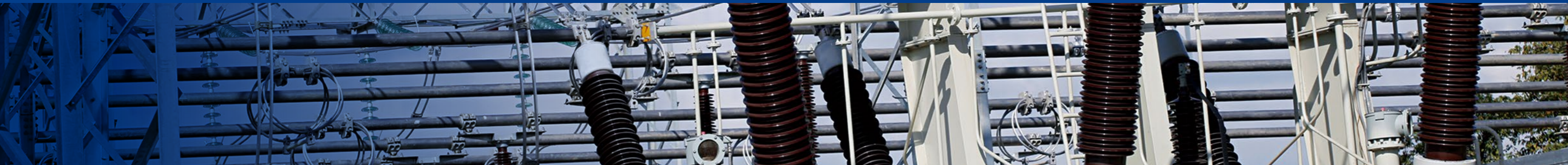


国家电投山西中电神头第二发电有限责任公司二期 2x1000MW 燃煤发电机组工程

用户名称: 特变电工衡阳变压器有限公司
产品名称: 550kV 干式变压器套管
运行时间: 2020 年 3 月

2 x1000MW Coal-fired Power Generation Project of State Power Investment Corporation Shanxi Zhongdian Shentou Di'er Power Generation Co., Ltd. Phase II

Customer: TBEA Hengyang Transformer Co., Ltd
Product: 550kV Dry-type Transformer Bushing In March 2020



中海油集团阜宁热电有限责任公司燃机发电项目

用户名称: 西安西变中特电气有限公司
产品名称: 252kV 干式油/SF₆ 套管
运行时间: 2020 年 8 月

The Gas Turbine Power Generation Project of CNOOC Funing Thermal Power Co., Ltd
Customer: Xi'an Xibian Zhongte Electric Co., Ltd
Product: 252kV Dry-type Oil/SF₆ Bushing in August 2020



广东汕头南澳岛金牛换流站

用户名称: 中国南方电网有限公司
产品名称: ±160kV 超导直流限流器 (直流 1000A)
运行时间: 2020 年 12 月

Jinniu Converter Station on Nan'ao Island, Shantou, Guangdong
Customer: China Southern Power Grid Co., Ltd
Product: ±160kV Resistive-type Superconducting Fault Current Limiter in December 2020(DC 1000A)



埃及国家电网公司斋月十日项目

用户名称: 西安西电开关电气有限公司
产品名称: 252kV 干式电容式 GIS 出线套管
运行时间: 2020 年 10 月

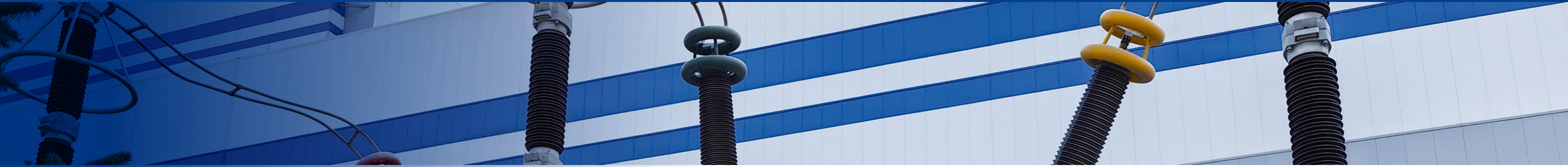
Egypt State Grid Corporation Ramadan 10th Project
Customer: Xi'an XD Switchgear Electric Co., Ltd.
Product : 252kV Condenser GIS Bushing in October 2020



国家能源集团江苏大丰海上风电

用户名称: 上海思源高压开关有限公司
产品名称: 252kV 干式电容式 GIS 出线套管
运行时间: 2021 年 6 月

Jiangsu Dafeng Offshore Wind Power Project of National Energy Group
Customer: Shanghai Siewuan High Voltage Switchgear Co., Ltd
Product: 252kV Dry-type Condenser GIS Bushing in June 2021



国家能源集团国华岳阳电厂 2×1000MW 新建项目

用户名称: 河南平高电气股份有限公司
产品名称: 550kV/4000A 干式电容式 GIS 出线套管
运行时间: 2022 年 5 月

2 x 1000MW New Construction Project of National Energy Group Guohua Yueyang Power Plant

Customer: Henan Pinggao Electric Co., Ltd
Product: 550kV/4000A Dry-type Condenser GIS Bushing in May 2022



山西国际能源裕光煤电有限责任公司孟县电厂 2x1000MW 发电项目

用户名称: 西安西电开关电气有限公司
产品名称: 550kV/4000A 干式电容式 GIS 出线套管
运行时间: 2022 年 10 月

2 x 1000MW Power Generation Project of Shanxi International Energy Yuguang Coal Power Co., Ltd. Yuxian Power Plant

Customer: Xi'an Xidian Switching Electrical Co., Ltd
Product: 550kV/4000A Dry-type Condenser GIS Bushing in October 2022

