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Power Grid System Solution Service Provider



CATALOG

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Hunan Fullde Electric Co., Ltd.


Guangdong Fullde Electronics Co., Ltd.


Zhuzhou Fullde Rail Transit Research Institute Co., Ltd.

ABOUT US

▲ **Guangdong Fullde Electronics Co., Ltd.** (hereinafter referred to as "Fullde Electric") was established in June 2006 with a registered capital of RMB25 million. It is a national-level SRDI "little giant" enterprise engaged in the R&D and manufacturing of power and electronics integrated systems. The company is located in Dongguan city of Guangdong Province which is near Guangzhou port and Shenzhen port, with great advantage in export transportation;

▲ Fullde Electric has two wholly-owned subsidiaries - Zhuzhou Fullde Rail Transit Research Institute Co., Ltd. and Hunan Fullde Electric Co., Ltd., which have a total area of 120,000 square meters.As an industry-leading R&D and manufacturing enterprise of power and electronics integrated systems, the company mainly produces and sells UHV filter resistors, flexible DC starting resistors, intelligent load testing systems, new energy power battery detection systems, rail transit locomotive braking resistors, DC solid-state Circuit breakers, special power supplies, wind power low voltage ride-through protection systems and other products. Products are widely used in UHV, smart power grid, load testing, data center, ship drive, rail transit, new energy vehicles, wind power, industrial frequency conversion and other core areas of national strategic emerging industries.

▲ In the field of data centers, Fullde Electric mainly produces intelligent load banks, neutral grounding resistors, containers for diesel generator sets, power distribution cabinets, DC panels, etc. Has now become strategic partners of Huawei, Tencent, Ali, Cummins, Kohler, Carter, MITU, Weichai and other enterprises.

▲ In the past three years, the company's R&D investment accounted for an average of 8.58% of its sales revenue, which provided strong support for the company's scientific research activities. A total of 500 patents have been applied, including 160 pieces of invention patents, and more than 20pieces have been used in production. After ten years of sharpening a sword, Fullde Electric takes resistance technology and power supply technology with completely independent intellectual property rights as its core competitiveness, and builds a unique business model from multiple business structure directions. Looking forward to the future, Fullde Electric will continue to focus on strategic advantages and continuous technological innovation to make greater contributions to the Chinese high-end intelligent equipment industry!

COMPANY HONOR

Guangdong Fullde Electronics Co., Ltd.

▲ National-level SRID “little giant” enterprise
▲ National High-Tech Enterprise
▲ National Intellectual Property Patent Advantage Enterprise
▲ National Electric Energy Conversion and Control Engineering Technology Research Center
▲ State Grid DC Construction Department Equipment Construction Group
▲ Guangdong Engineering Technology Research Center
▲ Guangdong Province Trustworthy Enterprise
▲ Dongguan City Multiplication Plan Pilot Enterprise
▲ Dongguan Listed Backup Enterprises
▲ Dongguan Engineering Technology Research Center
▲ Dongguan City Patent Advantage Enterprise
▲ Dongguan Academician Workstation

Hunan Fullde Electric Co., Ltd.

▲ National High-Tech Enterprise
▲ Hunan Province Little Giant Enterprise
▲ Hunan Province Accredited Academician and Expert Workstation
▲ National-level SRID “little giant” enterprise

Zhuzhou Fullde Rail Transit Research Institute Co., Ltd.

▲ National High-Tech Enterprise
▲ Hunan Province Little Giant Enterprise

PATENT CERTIFICATE


•313 Utility patents


•115 Invention patents


•10 Appearance patents


•23 Software copyrights

ENTERPRISE CULTURE

Obiect

·To Be Leader Of Global Brake Industry

Spirit

·Keep Up With Dreams,one Step In Advance

Mission

·Guiding The Future Of Brake Industry,initiate The LifeOf Green & Energy Saving

Vision

·Fullde Brighter Life ,prevail Better Word

Service

·To provide customers with real valuable services

Talent

·Talent is the source of our company's continuous creation of economic and human value

Brand

·Quality comes from technology

DEVELOPMENT COURSE

2006

·东莞总部成立
广东福德电子有限公司

·Dongguan headquarters was established in 2006 Guangdong Fullde Electronics Co.,Ltd

2011

·涉足电力领域
·被认定为省民营科技企业

·Involved in the field of electricity
·Was identified as the provincial private technology enterprises

2012

·成立新能源技术研发中心
·被认定为高新技术企业

·The establishment of new energy technology research and development center
·Was identified as high-tech enterprises

2013

·风力发电用栅格结构Crowbar电阻被科技部创新创业基金立项

·Wind power grid structure Crowbar resistance by the Ministry of Science and Technology innovation Venture Fund project

2014

·成立轨道交通制动电阻装置研发中心
·设立全资子公司湖南福德电气有限公司

·Establishment of R & D Center for Braking Resistance of Rail Transit
·Set up a wholly owned subsidiary -- Hunan Ford Electric Co., Ltd

2015

·高新技术企业复审认定通过

·High-tech enterprise review approved by

2016

·被认定为东莞市上市后备企业
·广东省创新创业大赛三等奖
·湖南子公司被认定为高新技术企业及湖南省省级企业技术中心

·Was identified as listed companies in Dongguan City
·Won the Guangdong Provincial innovation and Entrepreneurship Competition third prize.
·Hunan subsidiary was identified as Hunan provincial enterprise technology center

2017

·被认定为东莞市倍增计划试点企业
·东莞市知识产权保护重点企业
·省守合同重信用企业

·Was identified as Dongguan City.doubled plans pilot enterprises.
·Named as the key enterprise of intellectual property protection in Dongguan.
·Won the title of provincial contract-abiding and creditworthy enterprise.

2018

·被认定为东莞市工程技术中心
·东莞市专利优势企业
·广东省工程技术中心

· Identified as Dongguan Engineering Technology Center .
·Won the title of Dongguan Patent Advantage Enterprise .
·Won the title of Guangdong Engineering Technology Center.

2019

·成立东莞院士工作站
·湖南省院士工作站
·湖南省科技进步一等奖
·国家级小巨人企业
·国家知识产权优势企业
·省创新创业大赛三等奖

·Set up Dongguan Academician Workstation.
·Set up Hunan Academician workstation.
·Won the first prize of Hunan Science and Technology Progress.
·Won the title of national Small Giant Enterprise
·Won the national intellectual property advantage enterprise .
·Won the third prize of the provincial Innovation and Entrepreneurship Competition

2020

·在疫情期间实现了逆势增长，营业收入同比增长60%
·被认定为广东省博士工作站

·The business revenue increased by 60% year-on-year during the epidemic period.
·Recognized as a doctoral workstation in Guangdong Province

2021

·子公司福德电气被认定为第一批重点支持的国家级专精特新“小巨人”企业
·通过IRIS（国际铁路兴业标准）体系认证
·子公司株洲福德被认定为湖南省小巨人企业
·湖南省服务业发展专项项目
·湖南省两化融合管理体系贯标试点企业

·The subsidiary was identified as the first batch of state-level specialized special "little giant" enterprises to be supported.
·Passed IRIS(International Railway Industrial Standard) system certification.
·Its subsidiary Zhuzhoufford was recognized as a Small Giant Enterprise in Hunan Province
·Special Project of Service industry Development in Hunan Province
·Hunan Province two integration management system implementation pilot enterprises

2022

·国家专精特新“小巨人”企业
·子公司被认定国家知识产权优势企业

·Obtained the national specialized special new "little giant" enterprise.
·The subsidiary was identified as the national intellectual property advantage enterprise

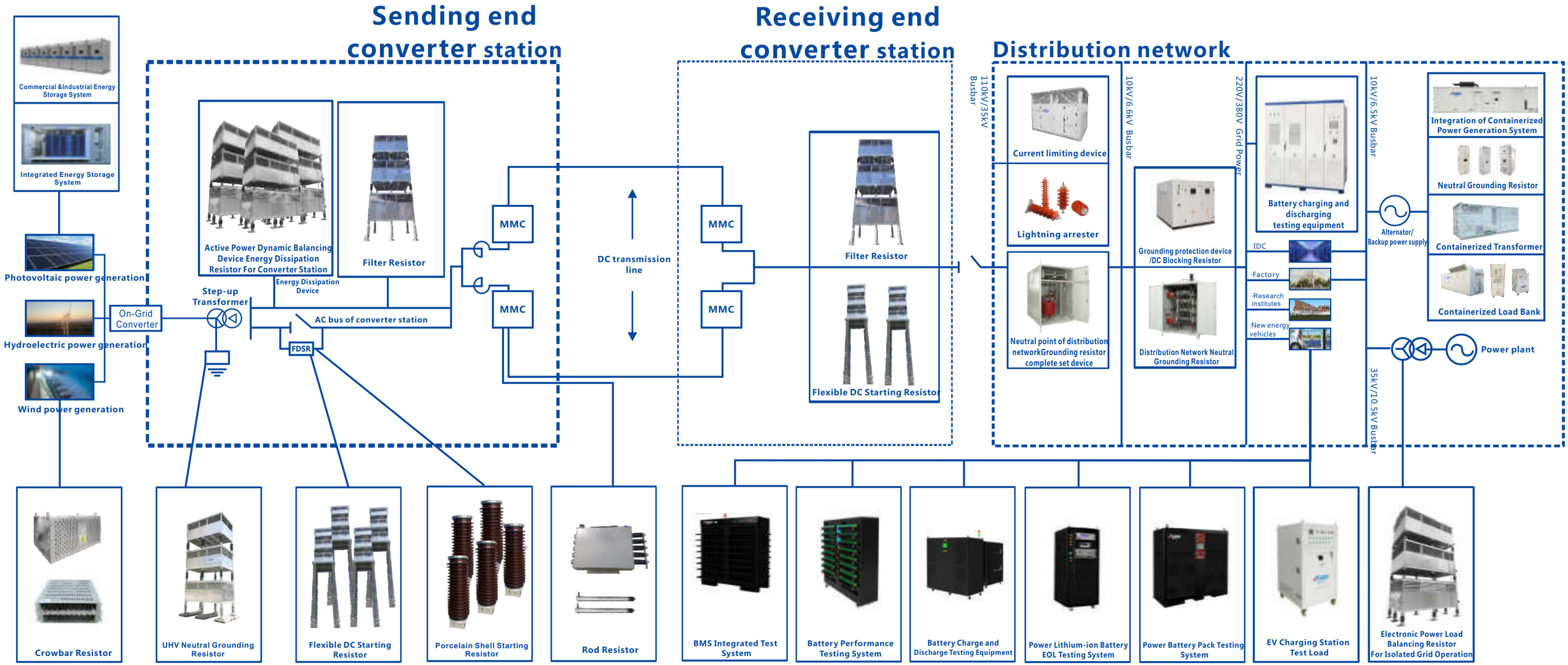
2023

·坚守可持续发展的不变梦想

·Adhere to the dream of sustainable development

Fullde Electric 广东福德电子有限公司 GUANGDONG FULLDE ELECTRONICS CO.,LTD.

Product Overview Diagram





Transmission and Distribution Grid Series Products

- UHV AC and DC Filter Resistors、Flexible DC Starting Resistor
- Active Power Dynamic Balancing Device Energy Dissipation Resistor For Converter Station
- UHV Neutral Grounding Resistor
- Electronic Power Load Balancing Resistor For Isolated Grid Operation
- SVG Starting Resistor
- Porcelain Shell Starting Resistor
- Neutral Grounding Resistor Generator/Distribution Network Neutral Grounding Resistor Complete Set
- Transformer Neutral Point Gap Grounding Protection Complete Device
- DC Component Limiting Resistor Complete Set/DC Blocking Resistor
- Arc Suppression Coil Complete Set
- Crowbar/Chopper Resistor
- Rod Resistor
- Lightning Arrester
- Intelligent Load Test System

UHV AC and DC filter resistors

Description

In UHVDC or HVDC transmission systems, harmonics generated by conversion have a significant impact on transmission quality. To eliminate these harmonic effects, filters are generally installed at converter stations. Filter resistors are an important component of these filters, primarily used in high-voltage/ultra-high-voltage transmission and distribution systems, factory power supply and distribution systems, as well as other damping filter circuits or reactive power compensation circuits. Their function is to eliminate or reduce harmonics.

Key Features

1. The manufacturing process is unique, with resistance units in the form of sheets or networks.
2. Special nickel-chromium alloy material is used as the raw material for resistance sheets or resistance wires, with a maximum operating temperature of 1200°C.
3. The resistance units have high power ratings, with individual units reaching up to 1800W and single cabinet modules reaching up to 1.3MW.
4. The resistance value has minimal variation, and the resistance change rate can be controlled to ±5% under rated high-temperature conditions.
5. The product has strong reliability and multiple insulation measures, with special insulating and support materials used both inside and outside the resistance, as well as for the resistance components themselves.
6. The product has a high pollution resistance rating and reliable heat dissipation, ensuring insulating performance in severe outdoor environments.





Product Model

Resistor	Model/Specification						
	Resistance Type	Resistance form	Rated Voltage	Power	Resistance	Accuracy	IP Grade
	FR: Filter Resistors	RP: Grid Type RX: Wirewound type	kV	Kw	R	F:±1% G:±2% I:±3% J:±5% K:±10%	00: IP00 23: IP23 2X: IP2X
Eg.	FR,RP,500kV,500kW,500R,J,23,FD-FR.xxx.xxx						

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Parameters Table

NO.	Item	Unit	Parameter values	Parameter values
1	25℃ rating	Ω	3050	4050
1.1	Resistance deviation of normal working current	%	± 5	± 5
1.2	maximum deviation	%	± 10	± 10
2	resonant frequency	Hz	100/600	100/600
3	The inductance value at the resonant frequency	mH	<5	<5
4	rated current			
4.1	Maximum continuous operating current I_{Cont}	A_{rms}	22	52
	Principal harmonic	n/Arms	12\18.46	2\49.86
			2\9.47	12\10.36
			24\3.48	6\3.88
			36\1.97	3\1.45
			33\1.65	10\0.73
			27\1.60	14\0.56
4.2	extracurrent			
4.2.1	Maximum temporary current for 10 minutes	A_{rms}	25	55
4.2.2	Maximum temporary current for 30 seconds	A_{rms}	28	55
4.3	running current	A_{rms}	ICont×0.7	ICont×0.7
5	transient current	kAcrest	0.216	0.163
5.1	time	ms	35	85
6	impact energy	kJ	500	1000
7	Lightning wave tolerance level (LIWL)			
	high voltage terminal	kVcrest	1480	1005
	interterminal	kVcrest	851	958
	low-pressure end	kVcrest	1005	650
8	Operating Wave Tolerance Level (SILW)			
	High voltage end to ground	kVcrest	1270	838
	interterminal	kVcrest	666	790
	Low pressure end to ground	kVcrest	838	550
9	Voltage for creep calculation			
	interterminal	kVrms	70	210
	High voltage end to ground	kVrms	250	220
	High voltage end-to-end (DC)	kVdc	90	90
	Low voltage end to ground	kVrms	220	30
	Low voltage end to ground	kVdc	90	90
10	RIV test voltage	kV	258	239

Flexible DC Starting Resistor







Description

Flexible direct current transmission technology is an important part of China's smart grid technology, and it will make great progress in the fields of renewable energy grid-connected, distributed generation grid-connected, island power supply, urban power grid supply, and AC power grid interconnection in China. In the flexible direct current transmission system, our company can independently design and produce the ultra-high voltage start-up resistance of the converter valve. This resistance can withstand the short-term high current voltage impact generated during the start-up of the converter valve. Our company can select different forms of resistors according to the size of the impact current and voltage during the start-up of the power grid. High resistance resistors can adopt metal mesh form, and low resistance resistors can adopt stainless steel sheet form. Volume constraints can be matched with epoxy resin resistors, and the design is flexible and diverse.

Key Features

1. The resistance is designed with a small volume, good heat dissipation, and high insulation performance.
2. The resistance has a strong ability to withstand instantaneous impacts.
3. The overall structural design is reliable, and the product performance is stable.
4. Components such as stainless steel sheet resistors, metal mesh resistors, and epoxy resin-mounted resistors can all be selected.

Product Model

Resistor	Model/Specification						
	Resistance Type	Resistance form	Rated Voltage	Energy/Current	Resistance	Accuracy	IP Grade
	SR: Starting Resistor	RP: Grid Type RX: Wirewound Type SM: Solid Type	kV	MJ/A	R	F:±1% G:±2% I:±3% J:±5% K:±10%	00: IP00 23: IP23 2X: IP2X
Eg.	SR,RP,500kV,30MJ,3000R,J,23,FD-SR.xxx.xxx						

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Product Showcases







Parameters Table

NO.	Name	Unit	parameter values
1	value of resistance	Ω	6000
2	Tolerance of resistance value	%	0~10
3	impact energy	MJ	15
4	Cooling Type		NA cooling
5	Maximum operating voltage (terminal to terminal and terminal to ground)	kV	450/sqrt(3)
6	Peak impulse current	Apeak	80
7	Steady state post-shock current (duration S)	Arms	8
8	Sound level	Db	< 50
9	Operation shock (terminal to terminal andterminal to ground)	kV	950
10	Lightning resistance (interterminal and terminal to ground)	kV	1175
11	power frequency withstand voltage	kV	585
12	creepage distance	mm/kV	43.3

Active Power Dynamic Balancing Device Energy Dissipation Resistor For Converter Station



Description

This product is used to maintain voltage stability in AC/DC systems. When the AC voltage of the system exceeds the threshold, the product will be put into operation, connecting the resistive angle to the three-phase line. By consuming energy, it reduces the AC/DC bus voltage, prevents the system from experiencing overvoltage, and enables the fault ride-through of the transmission system.

Key Features

1. The boxes are connected in a tower-like manner, resulting in a compact structure that significantly reduces volume and floor space.
2. The use of porcelain insulators for insulation and support ensures high reliability of insulation.
3. The internal structure of the box is designed with symmetry, providing high earthquake resistance and strong corrosion resistance.

Product Model

Resistor	Model/Specification					
	Resistance Type	Rated Voltage	Peak impulse current	Impulse current time	Resistance	IP Grade
	FER: Energy-consuming resistance	kV	kA	s	R	00: IP00 23: IP23 2X: IP2X XX:huskless
Eg.	FER,72.5kV,2.5kA,1.5s,30R,23,FD-ER.XXX.XXX					

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UHV Neutral Grounding Resistor





Description

In UHVDC or VHVDC transmission systems, the neutral grounding resistors on one side of the converter station valves can prevent damage to high-voltage cables and other electrical equipment caused by sudden short circuits, intermittent arc grounding, overvoltages, and other conditions. This enhances the reliability of power system operation and improves system safety levels.

Key Features

1. The current directions of adjacent resistors inside the resistor sheet are opposite, cancelling out the magnetic fields they generate, resulting in low operational noise.
2. The unique processing technology increases the effective energy and thermal capacity of the resistor sheet, with a single unit rated power up to 2000W.
3. Special insulating materials are used between the resistor sheets to separate them, providing excellent insulation performance.
4. The resistor sheets are made of nickel-chromium alloy steel, ensuring durability and resistance to breakage over time.

Product Model

Resistor	Model/Specification					
	Resistance Type	Rated Voltage	Energy/Current	Resistance	Generalized time	IP Grade
	FNGR：Neutral Grounding Resistor	kV	MJ/kA	R	ms	00: IP00 23: IP23 2X: IP2X XX: huskless
Eg.	FNGR,80kV,260MJ,15R,30ms,J,23,FD-FNGR.xxx.xxx					

Wudongde Power Station Power Transmission Guangdong Guangxi UHV Multi-terminal DC Demonstration Project

The Wudongde Hydropower Station - Guangdong and Guangxi Ultra-High Voltage Multi-Terminal Direct Current Demonstration Project is the world's first ±800 kV ultra-high voltage multi-terminal flexible DC transmission "highway," with a total length of 1,452 kilometers. Upon completion, the project will establish 17 world records, including the world's first ±800 kV ultra-high voltage flexible DC transmission project, the world's largest single-station capacity for flexible DC transmission, and the world's first flexible DC transmission project with the capability of overhead line fault self-clearance and restart.

Product supplied: UHV Flexible DC Starting Resistor





Qinghai-Henan ±800 kV Ultra-High Voltage Direct Current Power Transmission Project

The Qinghai-Henan ±800 kV Ultra-High Voltage Direct Current Power Transmission Project passes through Qinghai, Gansu, Shaanxi, and Henan provinces, with a total length of 1,587 kilometers. It was completed and put into operation in 2020. The Qinghai-Henan Project relies entirely on the complementary capabilities of clean energy for independent power supply, and will be the first ultra-high voltage corridor specifically built for the transmission of clean energy. It represents a significant innovation in China's development and application of ultra-high voltage transmission technology to promote large-scale development and utilization of new energy sources.

Product supplied: Filter Resistors






Baihetan - Jiangsu ±800 kV Ultra-High Voltage Direct Current Transmission Project

The Baihetan - Jiangsu Project is the world's first hybrid cascaded ultra-high voltage direct current project, which is the first to apply the hybrid cascaded ultra-high voltage direct current transmission technology combining conventional DC and flexible DC during construction. The project has a rated voltage of ±800 kV and a rated transmission capacity of 8 million kW, and construction began in December 2020. The Yucheng Converter Station in Jiangsu is the "terminal station" of the Baihetan - Jiangsu Project. Unlike conventional ultra-high voltage converter stations, the low-end part of the Yucheng Converter Station adopts internationally advanced flexible DC technology, while the high-end part uses conventional DC technology. The combination of the two can effectively enhance the safe and stable operation capacity of the power grid.

Product supplied: Starting Resistor








State Grid Zarud-Qingzhou Ultra-High Voltage Construction Project

The Zarud-Qingzhou ±800 kV Ultra-High Voltage Direct Current (UHVDC) Project is the first batch of UHVDC projects in China, with a voltage rating of ±800 kV, a rated transmission capacity of 10 million kW, and a receiving end that is integrated into both 500 kV and 1000 kV AC power grids. The construction of this project demonstrates China's strong capability in the field of UHVDC engineering. As the first major UHV power transmission corridor in the Northeast region, it plays a crucial role in promoting coordinated power development in the area. The project is significant in addressing the issue of "trapped electricity" in the Northeast, enabling a wider consumption of clean energy such as wind power, ensuring reliable power supply in Shandong, and effectively promoting the prevention and control of air pollution. The main equipment and systems of the project have been fully domesticated, representing the highest international level in UHVDC design and manufacturing.

Product supplied: UHV AC and DC Filter Resistors





China Southern Power Grid Corporation | ±500kV Guizhong Converter Station Limiting Resistor Installation Project

The ±500kV Guizhong Converter Station has been in operation since May 2016, delivering approximately over 14 billion kWh of clean energy to Guangxi every year. This provides important support for the high-quality development of Guangxi's social economy.



Product supplied:
DC Component Limiting Resistor Complete Set

Fullde Electric 广东福德电子有限公司 GUANGDONG FULLDE ELECTRONICS CO.,LTD.

Zhangbei Flexible Direct Current (DC) Grid Test and Demonstration Project

The Zhangbei Flexible DC Grid Project is the world's first flexible DC grid project, as well as the flexible DC project with the highest voltage level and the largest transmission capacity in the world. With a rated voltage of ±500 kV, the project involves the construction of 666 kilometers of DC transmission lines and four new converter stations, with a total conversion capacity of 9 million kW. The conversion capacities of the four converter stations are 3000 MW for Zhangbei Station, 1500 MW for Kangbao Station, 3000 MW for Beijing Station, and 1500 MW for Fengning Station. Startup resistors and grounding resistors are installed at all four stations. Energy-consuming device resistors are mainly installed at Zhangbei Station and Kangbao Station.

Product supplied: UHV Flexible DC Starting Resistor、UHV Neutral Grounding Resistor、
Active Power Dynamic Balancing Device Energy Dissipation Resistor For Converter Station














The ±500kV Nanqiao Station Phase I Comprehensive Renovation Project

The Gezhouba-Nanqiao DC Power Transmission Project is China's first ±500 kV DC transmission line. The station was officially completed and put into operation in 1989. Over the past 34 years, it has delivered an average of 5.5 billion kWh of clean hydropower to the Shanghai power grid each year, making significant contributions to the economic and social development of the city. In November 2022, in order to further improve the reliability of equipment operation at the "landing point" for importing clean hydropower into Shanghai and better serve the city's economic and social development, State Grid Shanghai Electric Power began a large-scale overall renovation of the core DC equipment at the Nanqiao Converter Station. On June 18, 2023, the ±500 kV Gezhouba-Shanghai Nanqiao DC Power Transmission Renovation Project was officially put into operation. The project adopts the world's first controllable commutation converter valve (CLCC) technology with full independent intellectual property rights, achieving another milestone leap in DC power transmission technology and fully demonstrating China's original innovation capabilities in the power industry.

Product supplied: Filter Resistors








Electronic Power Load Balancing Resistor For Isolated Grid Operation

Description

In an islanded power system, which operates in an isolated manner (also known as islanding), the electronic power load balancing resistor (commonly referred to as the "balancing resistor" or "damping resistor") plays a crucial role. In such systems, maintaining a real-time balance between power supply and demand becomes particularly crucial, necessitating the use of balancing resistors to stabilize the system's frequency and voltage. The balancing resistor serves to balance any excess or insufficient power in the system by absorbing or providing the necessary power, thereby preventing significant fluctuations in the system frequency.

Parameters Table

NO.	Name	parameter values
1	nominal voltage	10kV
2	Maximum operating voltage of the system	12 kV
3	Rated power (hot)	30MW
4	connection type	delta connection
5	Cold power	great than or equal to 30MW
6	Hot power	great than or equal to 30MW
7	Resistance type	metallic resistance
8	run time	Capable of long-term operation at no more than 30MW of power
9	Resistance change requirements	The hot resistance value is not greater than 1.4 times the cold resistance value
10	60S overload capability	Hot state 1.1 times the rated power operation, the temperature does not exceed the allowable value
11	Maximum long-term temperature rise	Not greater than 450K
12	Long-term hot spot temperature rise	No more than 650K
13	canning material	Box frame: carbon steel + hot-dip galvanized Box panel and top: stainless steel 304 (or above) metal
14	type of cooling	Air cooling by natural convection

Product Model

	Model/Specification						
	Resistance Type	Resistance form	Rated Voltage	Power	Resistance	Accuracy	IP Grade
Resistor	FR: Filter Resistors	RP: Grid Type RX: Wirewound type	kV	MW	R	F:±1% G:±2% I:±3% J:±5% K:±10%	00: IP00 23: IP23 2X: IP2X
Eg.	FR,RP,10.5kV,1.11MW,75R,J,23,FD-FR.xxx.xxx						

Baise Regional Power Grid Electronic Load Power Balancing System Project

As the pillar industry of Baise's regional economic development, aluminum industry is seriously restricted by the high power supply price of aluminum water production at present. Therefore, the aluminum industrial enterprises in Baise independently build the aluminum industry project's regional power grid, and integrate the advantageous location and resource conditions of Baise based on the regional power grid to build the 220kV line project of Baise's ecological aluminum industry regional power grid, providing power and price guarantee for the aluminum water production enterprises to expand production scale.

Product supplied: Electronic Power Load Balancing Resistor For Isolated Grid Operation





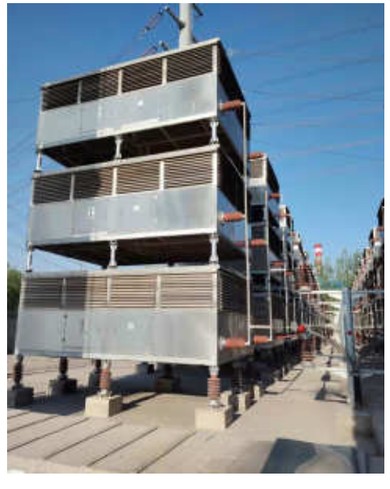


660MW unit 35KV electronic load starter resistor project

The 6×660MW unit expansion project of Chiping Xinyuan Power Plant is a heating power generation unit project invested and constructed by Shandong Xinfa Group. The unit adopts the "high-efficiency ultra-supercritical" power generation technology, with a main steam pressure of 295 kg, which is the first project in China to adopt this technology. The coal consumption for power generation is 248 grams per kilowatt-hour, and the annual savings of coal funds can reach more than 4 billion yuan. The investment in environmental protection facilities of the unit is up to 1.3 billion yuan, which is built according to the most advanced, environmentally friendly and energy-saving standards in the world. All pollution emission indicators are better than the relevant national standards, and the emission efficiency of sulfur dioxide, nitrogen oxides and smoke dust is nearly zero.

Product supplied: Electronic Power Load Balancing Resistor For Isolated Grid Operation





Indonesia Integrated Industrial Park Power Plant Electronic Load Project

In the Indonesia Integrated Industrial Park 2*65MW coal-fired power plant project, the resistors supplied by our company have provided power security for the smelting of nickel ore by local Indonesian enterprises after installation, commissioning and operation. Due to the large power load generated by the smelting of nickel ore in the integrated industrial park power plant, generators often experience tripping. The cost of starting and stopping the generator is very high. Since the project was put into operation, production efficiency has been greatly improved. This has realized the integrated "going out" of China's UHV power transmission technology, electrical equipment, engineering general contracting, and operation management. UHV power transmission technology has become another high-tech business card of China after high-speed rail and nuclear power.

Product supplied: Electronic Power Load Balancing Resistor For Isolated Grid Operation







SVG Starting Resistor

Description

Limiting the charging current of the submodule DC energy storage capacitor in the power grid can protect the converter valve and related equipment from the impact of high current stress and high current change stress, ensuring the safety of the equipment. The starting resistor will be deactivated after the system starts. Currently, typical applications of high-voltage starting resistors are in Flexible HVDC systems and SVG reactive power compensation systems.

Key Features

1. The current directions of adjacent resistors inside the resistor sheet are opposite, cancelling out the magnetic fields they generate, resulting in low operational noise.
2. The unique processing technology increases the effective energy and thermal capacity of the resistor sheet, with a single unit rated power up to 2000W.
3. Special insulating materials are used between the resistor sheets to separate them, providing excellent insulation performance.
4. The resistor sheets are made of nickel-chromium alloy steel, ensuring durability and resistance to breakage over time.

Product Showcases





Porcelain Shell Starting Resistor

Description

Porcelain-cased starting resistors are suitable for SVG, STATCOM, and flexible DC transmission systems. During the startup of these systems, they instantaneously generate several times the surge current, which can cause damage to the power grid and equipment. The installation of starting resistors can effectively reduce the starting current of the equipment, ensuring its safe operation. After the startup process is completed, the resistors are removed through a bypass switch. For systems with rectifying components at the rear end, the starting resistors can limit the charging current of the DC energy storage capacitors of the submodules from the power grid, protecting the converter valves and related equipment from high current stress and energy surges caused by rapid changes in current, thereby ensuring the safety of the equipment.



Key Features

1. Small volume and high power
2. Sturdy structure and high stability
3. High protection rating, suitable for outdoor installation
4. Ceramic and composite silicone rubber are used, with excellent insulation performance
5. Complies with lead-free/RoHS requirements

Product Model

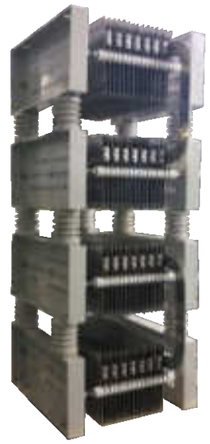
	Model/Specification						
	Resistance Type	Resistance form	Rated Voltage	Energy	Resistance	Accuracy	IP Grade
Resistor	SR: Starting Resistor	RP: Grid Type RX: Wirewound Type SM: Solid Type	kV	kJ	R	F:±1% G:±2% I:±3% J:±5% K:±10%	00: IP00 23: IP23 2X: IP2X
Eg.	SR,RX,35kV,100kJ,3000R,J,55,FD-SR.xxx.xxx						

Product Showcases





Neutral Grounding Resistor







Description

The neutral grounding resistor is a special type of electrical resistance equipment used to ground the neutral point of a power system. Its primary function is to provide a controllable resistance value between the neutral point and the ground, limiting fault currents and protecting equipment within the system. Neutral grounding resistors are commonly used in large-scale power systems such as power plants and substations. They are crucial for ensuring the safety, stability, and reliable operation of power systems.

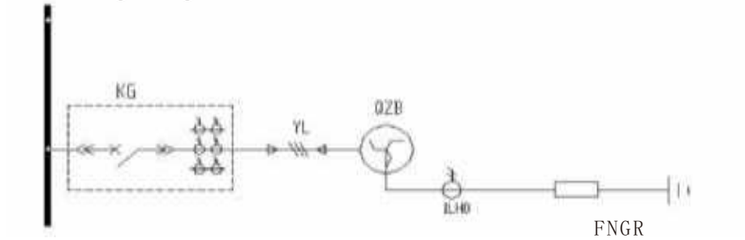
Key Features

1. Unique steel grate structure design for easy heat dissipation
2. The rated power of single resistor chip can reach 1200 watts
3. Small resistance deviation: The manufacturing tolerance of the resistor chip can be less than ±5%
4. Wide adjustment range of resistance value of resistor chip: single chip range of 0.005 to 20Ω
5. Strong insulation performance of resistor chip: The withstand voltage of the resistor BANK and the support can reach 8.3KV
6. Small change rate of resistance value in thermal state: The resistor chip adopts imported stainless steel material from abroad, with low temperature coefficient, and the change rate of resistance value in thermal state can be no higher than 20%
7. Strong resistance to vibration: The resistance chip is connected by stainless steel bolts, which is strong in resistance to vibration
8. Strong corrosion resistance: The resistor chip adopts high-temperature alloy material, which has strong corrosion resistance

Technical Specifications

1. Fault current: 1 to 5000A
2. System voltage: 0.38kV to 110kV(3,610,35)
3. Fault duration: 5s, 10s, 30s, 60s, continous
4. Resistance value (at 20℃):0.01 to 1500Ω
5. Temperature rise: short-term temperature rise (10 to 30S) does not exceed 760℃ continuously; maximum continuous temperature rise for 2 hours does not exceed 385℃
6. Enclosure protection rating:IP20-IP56
7. Optional accessories include disconnect switches, auxiliary switches, heaters, CTs, monitors, etc

Wiring Diagram





Classic Product Case Studies

product model	kV	A	Ω	S	K	sustained current A	Size mm			IP Grade
FNGR6.3kV-100A-36Ω-10S	6.3	100	36	10	700	5	750	950	950	IP2X~5X
FNGR6.3kV-600A-6.1Ω-10S	6.3	100	6.1	10	700	10	750	950	1000	
FNGR6.3kV-1000A-3.6Ω-10S	6.3	100	3.6	10	700	50	850	1000	1200	
FNGR10.5kV-100A-60.6Ω-10S	10.5	100	60.6	10	700	5	850	1000	1500	
FNGR10.5kV-600A-10Ω-10S	10.5	600	106.1	10	700	10	1000	1000	1850	
FNGR10.5kV-1000A-6.1Ω-10S	10.5	1000	11.5	10	700	50	1000	1000	2000	
FNGR20kV-100A-11.5Ω-10S	20	100	19.2	10	700	5	1600	2600	2000	
FNGR20KY-600A-19.2Ω-10S	20	600	8.8	10	700	10	1600	2600	2000	
FNGR20kV-1300A-8.8Ω-10S	20	1300	20	10	700	65	1600	2600	2000	
FNGR35kV-100A-202Ω-10S	35	100	23	10	700	5	1600	2600	2400	
FNGR35kV-600A-33.7Ω-10S	35	600	3.7	10	700	10	1600	2600	2400	
FNGR35kV-1300A-15.5Ω-10S	35	1300	15.5	10	700	65	1600	2600	2400	

Product Showcases







Generator Neutral Grounding Resistor



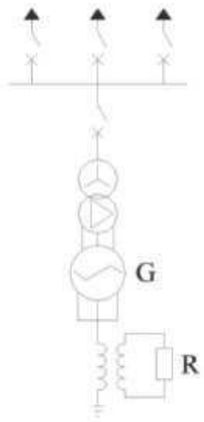
Description

The generator neutral grounding resistor kit is a complete set of equipment specifically designed for the high-resistance grounding of generator neutral points in power plants. The main function of this equipment is to inject resistive current into the fault point, limiting the grounding current to a very small value and effectively suppressing the arc grounding transient overvoltage.

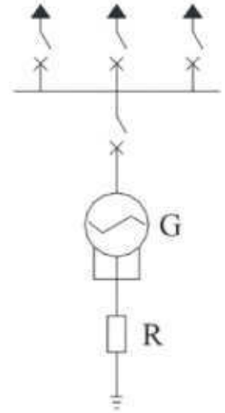
Key Features

1. High-quality stainless steel nickel-chromium alloy or non-metallic materials are used, which have high electrical conductivity and high temperature coefficient, and can withstand high temperatures up to 1600□.
2. The grounding transformer inside the cabinet adopts a dry-type transformer with large capacity and impact resistance.
3. It can be equipped with transformers, zero-sequence CTs, single-phase isolation switches, online resistor monitoring devices, heaters, and temperature and humidity controllers, which can effectively monitor grounding fault currents and voltages, and provide switching and alarm contacts.

Wiring Diagram



Generator N point Grounding via single phase/high resistance



Generaor N point Grouding via high resistance

Compliance Standards

DL/T 780-2001 Grounding Resistor for Neutral Point in Distribution System
GB 6450-1986 Dry-Type Power Transformer
DL/T 620-1997 Overvoltage Protection and Insulation Coordination of AC Electrical Installations
GB 763-1990 Heating of AC High-Voltage Apparatus under Long-Term Operating Conditions
GB/T 16927-2011 High-Voltage Test Techniques
GB 1208-2006 Current Transformer
GB/T 4208-2017 Degrees of Protection Provided by Enclosures (IP Code)
IEEE 32-1977 Technical, Terminology, and Testing of Neutral Grounding Devices
GB 311-2012 Insulation Coordination
GB 11022-2011 Common Technical Requirements for Standards of High-Voltage Switchgear and Controlgear
JB/T 10777-2018 Neutral Grounding Resistor

Product Showcases












Parameters Table

No.	Name	Model/Specification	Qty	Unit	Remark
1	Neutral Grounding Resistor	FNGR,10.5kV,100A,58.5 R,10s,20	1	set	Fault current range: 10A ~ 400A
1.1	Enclosure	1050*1000*2280m, galvanized sheet + cold-rolled steel sheet, sprayed RAL7035	1	set	KYN28 /GCK /galvanized sheet + cold-rolled cabinet
1.2	Resistor	100A,58.5Ω,10s,760K	1	set	The resistance element is high-quality stainless steel which has advantages of high electrical conductivity, high temperature coefficient, high temperature resistance up to 1400 °C, corrosion resistance and good stability
1.3	The resistance element is high-quality stainless steel which has advantages of high electrical conductivity, high temperature coefficient, high temperature resistance up to 1400 °C, corrosion resistance and good stability				

Distribution Network Neutral Grounding Resistor Complete Set

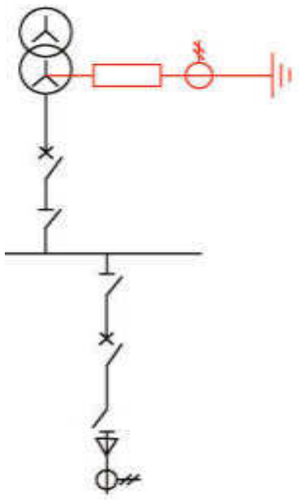
Description

The principle of the neutral grounding resistance kit for distribution networks is to limit the fault current by means of the instantaneous heating damping and energy dissipation effect of the resistance element, thereby limiting the system overvoltage level and enabling rapid and accurate line selection in the case of single-phase grounding faults. The product can be professionally customized or combined according to different working conditions, wiring methods, or specific requirements: conventional configurations include cabinet housings, resistance elements, current transformers, etc.; optional configurations include grounding transformers, isolation switches, auxiliary switches, intelligent monitoring devices, etc.
The NGR series of neutral grounding resistance devices are primarily used in important power transmission and distribution systems such as urban distribution networks, large industrial parks, offshore platform power systems, steel, petrochemical, airport, port, subway, and other systems primarily composed of cable lines below 66kV, as well as generator and utility systems in power

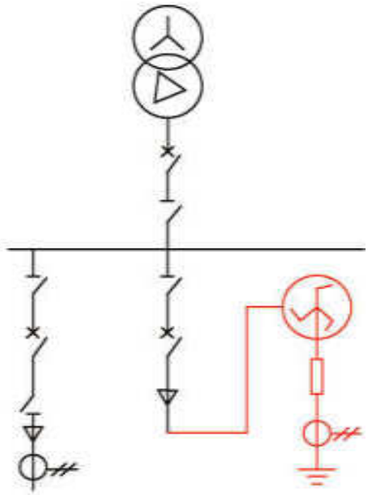
Key Features

1. The cabinet housing is made of cold-rolled steel plate or stainless steel material, which is treated with a strict spraying process, resulting in an aesthetically pleasing appearance and strong corrosion resistance.
2. It adopts a unique internal structure design, providing excellent cooling and heat dissipation paths.
3. The resistance elements have a large thermal capacity, high temperature resistance, strong oxidation resistance, and high tensile strength.
4. The resistance temperature coefficient is low, resulting in a small change rate of resistance value during thermal conditions and stable resistance.
5. The product is serialized, with modularized, standardized resistance elements that can be combined freely. The complete range of specifications meets the requirements of various parameters.

Wiring Diagram



The transformer is star-connected with a neutral point leading out.



The neutral point is connected in delta configuration, and the grounding resistance of the neutral point is connected through a grounding transformer.

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Parameters Table

Product model	system voltage kV	rated resistance Ω	Rated Current A	flow-time S	Ground change capacity kVA	IP Grade
FNGR10.5kV-600A-10S	10.5	10	600	10	400	IP2X~5X
FNGR20kV-600A-10S	20	19.2	600	10	1000	
FNGR35kV-600A-10S	35	33.6	600	10	400	
FNGR35kV-1000A-10S	35	20.2	1000	10	2000	
FNGR35kV-1300A-10S	35	15.5	1300	10	2200	

Product Showcases



FNGR10.5kV-600A-10Ω-10S-20
(DKSC-10.5/400)



FNGR35kV-600A-60Ω-10S-54
(DKSC-800/35-200/0.4)



FNGR20kV-600A-19.2Ω-10S-44
(DKSC-400/20)

Transformer Neutral Point Gap Grounding Protection Complete Device





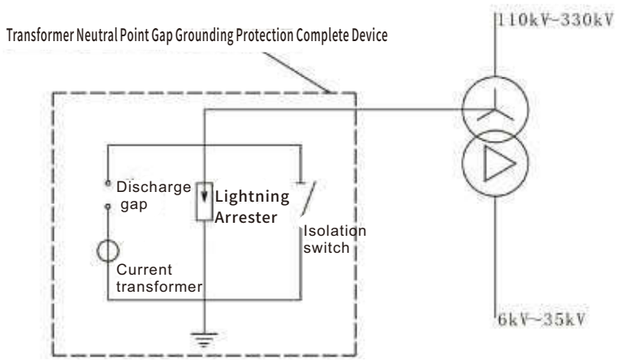
Description

The transformer neutral gap protection device is specifically designed for overvoltage protection of 110KV, 220KV, 330KV, and 500KV transformer neutral points. It utilizes the phenomenon that air can be ionized and broken down under high voltage. Two metal needles are installed with an air gap between them, one grounded and the other connected to the protection equipment. When the voltage on the equipment rises sharply to a dangerous level, the air gap between the needles ionizes and breaks down, causing a discharge current to flow, thereby reducing the overvoltage. After the overvoltage is reduced, the insulation strength of the air gap recovers, and the discharge current is stopped, protecting the equipment from the threat of overvoltage breakdown. This product is suitable for overvoltage protection of neutral points of ungrounded transformers in effectively grounded power networks of 110KV, 220KV, 330KV, and 500KV. It is widely used in the fields of electricity, metallurgy, petrochemicals, mining, construction, environmental protection, and more.

Key Features

1. Stable gap discharge voltage with easy adjustment of gap distance.
2. The use of stainless steel precision machining electrodes results in a surface that is resistant to corrosion.
3. Convenient installation, debugging, and operation, with a simple and aesthetically pleasing layout.

Wiring Diagram



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Parameters Table

model	voltage KV	withstand voltage		disconnector		zinc oxide arrester			discharging gap	CT	
		Lightning full wave and cut wave withstand voltage KV (peak)	1min power frequency kV	rated current A	operating mechanism	Continuous operating voltage kV	Dc 1mA Reference electricity voltage kV No less than	Lightning impulse Current residual voltage kV (peak)	Power frequency discharge voltage kV±10%	type	Ratio
FNGR - JXB-110	110	250	95	400	CS8-5 (Manual or CJ6(Motorized)	72	58	103	186	83	Epoxy resin Poured full seal Closed strut
FNGR - JXB-220	220	320	200	600		144	116	205	320	166	10kV 100/5 200/5 300/5 400/5 500/5 600/5
FNGR - JXB-330	330	440	292	600	Cj6 (Motorized)	207	166	292	440	252	

Installation Dimensions

model	length	breadth	height	Base aperture	Base hole pitch
FNGR-JXB - 110	1315	370	1300	4X 20	450 X 450
FNGR -JXB-220	1900	370	1300	4X 20	450 X 450
FNGR -JXB-330	According to site conditions				

Product Showcases







DC Component Limiting Resistor Complete Set/DC Blocking Resistor





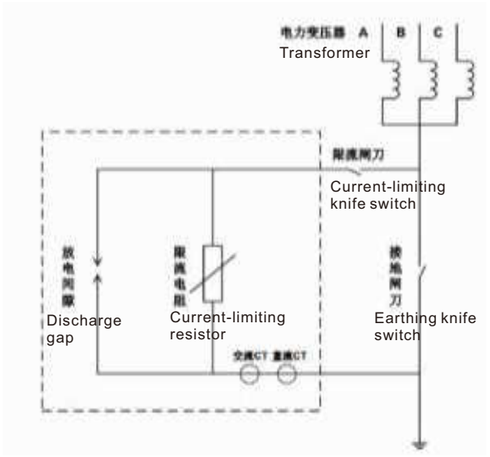

Description

The complete set of DC component limiting resistance devices, also known as transformer neutral point DC isolation resistance current limiting devices, are primarily used in high-voltage tests to limit the DC component of short-circuit test currents in impulse generator systems. Additionally, they can suppress DC bias currents in transformer neutral points caused by DC single-ground return line operation between the transformer neutral point and the earth. Their function is to avoid the harm caused by DC currents to transformers.

Key Features

1. Our resistance products are small in size, have good heat dissipation, and high insulation.
2. Strong ability to withstand large instantaneous current surges; low temperature rise.
3. The resistance material is selected for high melting point, stable resistance, low temperature coefficient, and high thermal capacity.
4.High reliability, multiple insulation, and special insulating and support materials are used for both the interior and exterior of the resistance, as well as for the resistance components.

Wiring Diagram



Parameters Table

NO.	Name	Unit	parameter values
1	nominal voltage	kV	35
2	rated frequency	Hz	50
3	rated resistance	Ω	3 ±5%
4	Heat stabilized current Ib		10kA/1s
5	Long-term working current IW	A	100A
6	dynamic current		25kA(peak) /200ms
7	Resistance value accuracy	%	±5
8	The whole group of resistors is voltage resistant to the housing (ground) power frequency	kV	85(valid, 1min)
9	Lightning impulse overvoltage	kV	185(peak)
10	Temperature rise limit, long-term flow		≤385K
11	Temperature rise limit, short-term flow		≤760K
12	step size		0.2Ω is an adjustable step
13	Maximum short-time terminal voltage	kV	30(valid value, 1s)
14	temperature coefficient of resistance	Ω/℃	$\leq 5.6\times10^{-4}$
15	Temperature rise limit 8kA/1s	K	≤800K
16	Temperature rise limit 100A/4h(AC)	K	≤385K
17	Rated voltage of resistor post insulator	kV	40.5kV Resistance platform bottom support
	Resistor bottom post insulator creepage distance	mm	1256
	Resistor post insulator material		knob insulator
18	protective gap		Graphite gap, flow capacity 10kA/1s; Operating wave impulse operating voltage is not more than 10kV; Power frequency breakdown voltage 3kV~5kV square mean root value
19	box		Cold-rolled steel plate, spraying: RAL7035

Arc Suppression Coil Complete Set





Description

The arc suppression coil complete equipment belongs to the power grid safety and control equipment category. This equipment is installed at the neutral point of the 6kV-66kV distribution network. When a single-phase grounding fault occurs in the power grid, the equipment automatically adjusts the inductance value to control the single-phase grounding current within the allowable range, preventing the generation of an arc at the grounding point and avoiding harm to personnel and equipment. Additionally, it can quickly select the fault line, identify the faulty line for convenient maintenance, and improve the reliability and safety of power supply in the power grid. The product is widely used in power supply systems in various industries such as power grid company substations, scientific research, military, metallurgy, petrochemicals, mining, electricity, aerospace, aviation, machinery, electrified railways, and building materials.

Key Features

1. Large adjustment range, dynamic compensation, no need for damping resistors.
2. Wave recording function: The equipment can record the neutral point voltage and neutral point current during a single-phase grounding event, and supports historical data query and analysis, including the display of recorded waveforms and the output of recorded data.
3. Flexible communication methods: The controller has RS-232, RS-422, RS-485 serial interfaces and communication components, with telemetry, telesignaling, and remote control functions, supporting 61850 communication.
4. Parallel neutral resistance line selection: This function enables overvoltage suppression and single-phase grounding fault transfer line selection, providing multiple line selection methods such as "fundamental wave amplitude", "active power method", "parallel neutral resistance", and "residual current increment method".

Application Scenarios

1. The altitude should not exceed 3000 meters.
2. The relative humidity of the air should not be greater than 90%, and there should be no conductive dust present.
3. There should be no gases or vapors that corrode metals or damage insulation.
4. The ambient temperature should range from -5℃ to +40℃, and ventilation should be good.
5. There should be no risk of fire or explosion.
6. There should be no severe vibration or impact, and the vertical tilt should not exceed 5 degrees.

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Parameters Table

35kV Arc Suppression Coil Complete Set Parameter Table		
Name		values
complete equipments	nominal voltage	35kV
	rated frequency	50Hz
	insulation level	Power frequency (1min) withstand voltage (RMS) : 85kV
		Lightning impulse withstand voltage (peak) : 200kV
	Rated capacity of arc suppression coil	315kVA
	Rated current of arc suppression coil	15.2A
	Capacitance current measurement error	-2~+2%
	residual current	≤5A
	Install the neutral displacement voltage of the dot network	Not more than 15% of the nominal phase voltage
	Grounding compensation in place time	< 60ms
	Inbound and outbound cable mode	cable
arc suppression coil	rated capacity	315kVA
	rated current	15.2A
	accommodation mode	Turn modulation
	Current regulation range	30~100%
	Insulation mode	dry-type
	Volt-ampere characteristic linear range	0~110%Un
	Rated short-time (1min) power frequency withstand voltage (RMS)	85kV
	Rated lightning impulse withstand voltage (peak)	200kV
	Rated current at least continuous operation time	2h
	Cooling Type	Self-cooling (with temperature display, temperature control and remote transmission function)
	Outer insulation creepage ratio	≥31mm/kV (outdoors)
	noise	≤55dB
	Tap-changer The electrical life of the switch contact	Not less than 200,000 movements
	Mechanical life of the tap-changer switch contact	No less than 800,000 movements

Crowbar/Chopper Resistor



RGCB-2.5MJ-0.75Q-J



RGCB-2080KW-0.75Q-J



RGCB-700KJ-0.4Q-J



RGCB-11KW-1.5Q-J

Description

The Crowbar/chopper resistor is primarily applied in the low voltage ride-through technology of wind turbine inverters. It is used on the rotor side of wind turbines to bypass the rotor-side converter. During low voltage disturbances in the power grid, the Crowbar resistor prevents excessive DC bus voltage and rotor current. The Crowbar resistor can dissipate up to 80% of the巨大 energy instantaneously. Generally, the CROWBAR is designed as a small resistor to protect the frequency converter components from releasing large currents during power grid faults. Additionally, the low voltage ride-through function of wind turbines is also implemented within the CROWBAR. This is primarily used for the instantaneous release of large amounts of energy during low voltage ride-through in the wind energy generation field.

Key Features

1. Suitable for harsh operating environments of wind power converters.
2.Made of high-quality silver-nickel alloy resistor material, it has strong heat dissipation and can withstand continuous impacts.
3.Adopting a grid-type trial production method, it has a small size and strong short-term impact energy.

Rod Resistor



Description

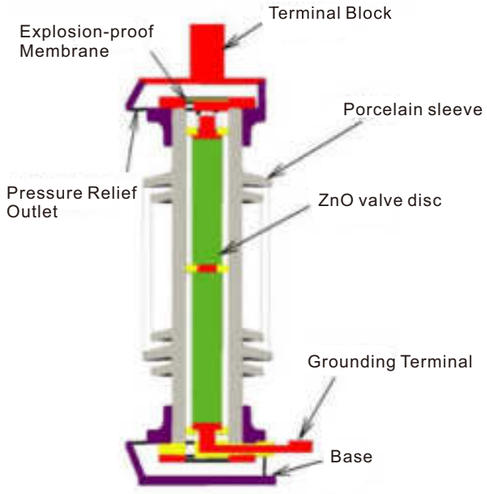
The rod resistor for the converter valve is a high-power resistor made of stainless steel metal tubes, which is used as the damping resistor in the damping circuit of the converter valve.

Key Features

1. Simple appearance and easy to operate.
2. Smooth external structure without jamming.
3. Made of high-quality steel welding, with good rigidity and no deformation.
4. Long service life.

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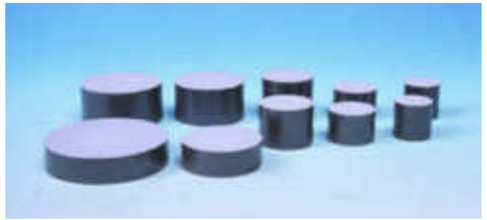
Lightning Arrester



▲ Internal Structure Diagram of AC Gapless Metal Oxide Surge Arrester



▲ Porcelain-housed AC metal oxide surge arresters for low and medium voltage ratings



▲ Zinc Oxide Non-linear Resistor

Description

To suppress the overvoltage caused by lightning surges or switching surges invading the system, nonlinear resistors (resistors with decreasing resistance values as current or voltage increases) are used to limit the terminal overvoltage of equipment and machines, in order to prevent the insulation level (LIWV) of electrical equipment and machines from exceeding the acceptable limit. Porcelain-housed AC gapless metal oxide surge arresters can be applied in different operating conditions such as substations, distribution networks, electrified railways, and transformer neutral point protection. The voltage ratings currently cover AC 35kV-220kV, and will further expand to higher AC voltage ratings and DC transmission systems in the future.

Key Features

1. The high-performance zinc oxide nonlinear resistors produced using the technology jointly developed by the company's research and development department and the scientific research team from Shanghai University feature large current-carrying capacity, low residual voltage under high current impulses, and excellent protective performance.
2. A novel explosion-proof structure is employed, which allows for the release of internal pressure through a pressure relief device when a rapid increase in pressure occurs due to internal faults in the product.

Product Showcases







Intelligent Load Test System





Description

The Intelligent Load Test System provides users with an efficient and reliable option to meet the need for load testing of generator sets. The load testing system is composed of two major parts: the control system and the load box. It mainly includes the load box body, electrical parameter data acquisition system, automatic loading and unloading control system, cooling device, auxiliary control, PLC, and spare parts. Our independently developed electrical load testing equipment combines dry load modules with automated measurement and control modules, enabling precise detection of the output power and load carrying capacity of various generator sets. The system can be used in conjunction with computers to achieve intelligent control, automatically complete specialized tests on all electrical parameters of generator sets, generate tables, graphs, and standard test reports, and support printing. It completely eliminates cumbersome manual operations, providing scientific and efficient testing methods for high-power generator sets.

Parameters Table

NO.	Specification	Capacity and step	Voltage	Dimension (mm)
1	LB-1000kW-10.5kV	1000kW， 50kW 1step	AC10.5kV	4000*2350*2591
2	LB-1500kW-10.5kV	1500kW， 50kW 1step	AC10.5kV	4000*2350*2591
3	LB-1800kW-10.5kV	1800kW， 50kW 1step	AC10.5kV	6058*2350*2591
4	LB-2000kW-10.5kV	2000kW， 50kW 1step	AC10.5kV	6058*2350*2591
5	LB-2000kW-1350kvar-10.5kV	2000kW-1350kvar，50kW 1step	AC10.5kV	8000*2438*2591
6	LB-2200kW-10.5kV	2200kW， 50kW 1step	AC10.5kV	6058*2350*2591
7	LB-2500kW-10.5kV	2500kW， 50kW 1step	AC10.5kV	7000*2438*2591
8	LB-3000kW-10.5kV	3000kW， 50kW 1step	AC10.5kV	7000*2438*2591
9	LB-3500kW-10.5kV	3500kW， 50kW 1step	AC10.5kV	8000*2438*2591
10	LB-4000kW-10.5kV	4000kW， 50kW 1step	AC10.5kV	9000*2438*2591

Fullde Electric 广东福德电子有限公司 GUANGDONG FULLDE ELECTRONICS CO.,LTD.

Product Showcases

Tencent Qingyuan Data Center Project



Weichai Generator Set Test Load Project



Shanghai Haitong Securities Data Center Project



Harbin Unicom Cloud Data Center Project



Jiangtian Data Center Project



Fuchun Cloud Generator Testing Project



A Laboratory Project in Hangzhou



Nanjing Vertiv Data Center Project



Production, sales and research capabilities

Possessing a 60,000 square meter production base and 3 large modern factories




Possessing efficient automated production lines








Partial Display of Production Equipment and Processes








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Partner



中广核 CGN
XEMC 湘电集团
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中国中车 CRRC
国家电网 STATE GRID
智光电气 Zhiguang Electric
ENVISION 远景能源
CSCEC 中国能建
日风电气 HRV ELECTRIC
三一重工 Sany heavy industry
EMERSON Network Power 艾默生电气 Emerson network power
美国GE
Sieyuan
禾望电气 Hopewind
REN 瑞能电气 RENergy Electric
明珠电气 PEARL ELECTRIC
中国神华神东 CHINA SHENHUA SHENDONG
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SANY
EMERSON
MINGYANG ELECTRIC 明阳电气
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