



Rongxin Huiko Electric Co., Ltd.

Rongxin Huiko Electric Co., Ltd.

Tel.:+86 400-616-7077

E-mail:public@rxhk.com

Zip code:114051

Website:www.rxhk.com

Add.:No. 212, Yueling Road, Tiedong District,
Anshan City, Liaoning Province,China.



Company profile

Rongxin Huiko Electric Co., Ltd. (RXHK) is a high-tech enterprise specializing in the R&D, manufacturing, sales, and service of core equipment for new type power systems, providing customers with flexible power transmission systems, high-power converters, and other cutting-edge equipment and technical services, which are widely applied across the entire 'generation-grid-load-storage' spectrum of next-generation power systems, including key industries and major projects in high-efficiency power generation, transmission and distribution, oil/gas pipelines, energy storage, shipbuilding, metallurgy and chemical industries. RXHK is committed to facilitate the building up of the next-generation power system based on new energy and promote the technological innovation of high-end power equipment in the world.

VSC-HVDC (Voltage Source Converter based High Voltage Direct Current Transmission), as a new generation of DC transmission technology, is currently the preferred technical route for large-scale transmission of new energy generation. VSC-HVDC converter valve is the core equipment of the HVDC transmission system, which is one of the most complex and technically advanced equipments. The VSC-HVDC converter valves developed by RXHK have been applied in a number of high-voltage power transmission projects, offshore wind power transmission projects and regional power grid interconnection projects at China and abroad. By undertaking the development of Saudi Arabia COA-WOA HVDC converter valves, RXHK has successfully realised the major breakthrough of VSC-HVDC product in overseas market with independent intellectual property rights in high-end VSC-HVDC technology, standards and manufacturing.

Flexible AC power transmission equipments integrate power electronics technology and advanced control technology to improve and enhance the performance of AC power transmission system, and the main products include GFM-STATCOM (Grid Forming STATCOM), WBO-SR (Wideband Oscillation Suppressor), HAPF (High Voltage Active Power Filter) and FESC (Flexible Energy Storage Converter). The GFM-STATCOM can quickly provide inertia, voltage and frequency support for the power grid, mainly for overseas markets and new energy AC grid-connected international customers, the product is compliant with the IEC standard, has been exported to Europe, Africa, Oceania and North America and other regions. The WBO-SR realises real-time detection and suppression and elimination of system oscillations, enhances the stability of the new power system, and for the application of power plant customers, it can effectively suppress the occurrence of sub-synchronous resonance, prevent damage to the machine's shaft system, and ensure the safety of power generation. The HAPF is an advanced equipment for harmonic management and power quality optimisation, which is applied in the field of high-voltage DC transmission, and is able to effectively solve the harmonic problem of the converter station, and ensure the stable operation of the DC system. The FESC is the core equipment of the energy storage system, through the hybrid AC and DC regulation and intelligent technology, it realises the active support for high proportion of new energy connected to the grid, and promotes the development of the power system in the direction of flexibility and high efficiency.

High-power converter is the core equipment to promote the green and low-carbon transformation of energy and ensure the safe and stable operation of electric power in the new power system, and the main products include high-power cascade inverter, high-power four-quadrant inverter, high-power three-level inverter and high-power flexible power supply. High-power cascade inverters are widely used in the 'China-Russia East Line' and other natural gas pipeline projects, and the typical capacity is 10kV/25MVA; the inverter used for aerodynamic test breaks through the core technical difficulties such as ultra-high power, high rotational accuracy and high dynamic response; air compression energy storage inverter innovative through the compressed air to store energy, can effectively balance the supply and demand of the power grid; energy storage traction inverter is applied in the field of rail transit and electric traction, solving the technical problem of short-time ultra-high-power output under weak grid conditions. High-power four-quadrant inverters are widely used in multi-million-unit thermal power plants to achieve technological innovation in power generation, realise the return of excess energy to the grid, and improve power generation efficiency and revenue. High-power three-level inverters are widely used in medium and high-voltage, high-power fields, such as renewable energy power generation and ship propulsion. High-power flexible power supply is mainly used in green transformation of metallurgy and controlled nuclear fusion, the new electric arc furnace power supply developed by RXHK has been popularised and applied in overseas projects such as the world's first green steel plant, Stegra (5 million tonnes/year) in Sweden., etc; controlled nuclear fusion technology is regarded as the 'ultimate solution' for future clean energy, RXHK has undertaken the design and development of several magnet power supply projects.

Energy equipment industry base

Under China's strategic vision of building a new type power system primarily based on new energy, high-capacity power conversion equipment, represented by VSC-HVDC technology, is experiencing unprecedented growth. To meet surging market demand and expand scale of business, RXHK is building an enhanced energy equipment manufacturing base in Anshan's High-tech District harnessing intelligent manufacturing technologies orientated to the demanding high-end requirements of the transmission and distribution industry

This new base includes a manufacturing centre, production and test centre and R & D centre, which collectively undertakes the full spectrum of R&D, design and manufacturing tasks of the company's VSC-HVDC transmission converter valves and other products, the core equipments for the new type power system.

The base covers an area of 100,000 square meters. Within this area, the production and test centre, obtained with CNAS (China National Accreditation Service for Conformity Assessment) certification, houses industry-leading high-end intelligent testing facilities, including 1100kV ultra high-voltage dielectric test hall, automatic power module test bench, full-condition converter valve operation test platform and high-power converter integrated test platform. The manufacturing centre has achieved comprehensive integration of industrial IoT platforms and intelligent equipments such as robotic workstations and Automated Guided Vehicles (AGV) via 5G network technology. Through intelligent upgrades across all production processes and the incorporation of a digital quality management system, it has significantly enhanced production efficiency while ensuring robust product quality control.



Robot workstation for power stack pressing



Power module production centre



Comprehensive test platform for tightness of power module cooling circuit

- Man-machine cooperation
The robot workstation uses teaching technology which makes programming easier and easy to use. Parametric assembly can be realized by inputting simple data into the teaching panel.
- Multi-mode
The feeding slide of the workstation is equipped with high-precision sensors which can identify power stack of different heights, it also supports a variety of working modes to meet different working conditions.
- Intelligence, integration and digitalisation
The workstation detects the travel of the disc spring through high-precision sensor with the cumulative measurement accuracy of <math>< 0.1\text{mm}</math>.

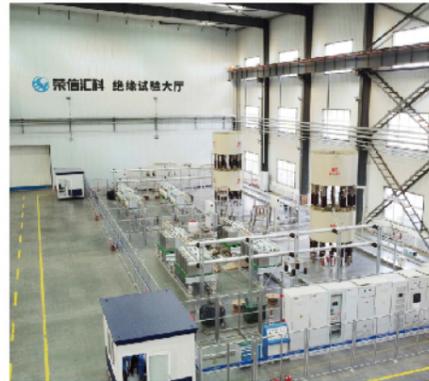
The power module production centre is professionally designed and tailored to meet the needs of the company's products. The facility can carry out the assembly, wiring and inspection of the whole power module starting from parts and components.

The cooling circuit test platform provides air tightness and dynamic liquid stability testing. The liquid tightness test can simulate the actual working conditions of hydrodynamics and dynamically control the environmental variables. After passing the systematic test of this platform, the converter valve cooling circuit can fully meet the stringent requirements of the whole life cycle reliability of power grid and industrial operational scenarios.



Power module test platform

The power module test platform provides a highly automated intelligent test environment in which both specific and generic tests can be performed. The components of the test environment include the test object isolation room, relocatable test console and water cooling system. Test objects can include power modules made up from different types of power devices, power module topologies such as half-bridge, full-bridge, three-level, five-level as well as those with multiple voltage, current and conversion functions. Functional tests, communication tests, control and protection tests, device characterisation testing, operational tests and other R&D test, type test and routine test can all be accommodated in an environment characterised by high test accuracy, efficiency, safety, multi-functionality and convenient operation.



Valve section operation test platform

Consisting of an operational test circuit, short-circuit current injection circuit, power supply system, water cooling system, control protection and monitoring system, measurement system, etc. All type tests required on valve assembly levels that are needed to demonstrate compliance with requirements of GB/T 33348, IEC 62501 and IEC 62927 standards can be carried out, including maximum continuous operation load test, maximum transient overload operation test, maximum voltage continuous operation test, minimum DC voltage test, short-circuit current test, etc., as well as the routine operation test of power module and valve assembly. The test parameters can cover the test requirements up to those required for a 5000MW flexible HVDC converter valve, and will have the test extension ability for power modules and valve components of higher capacity in the future.



High voltage shielding laboratory

The high voltage shielding laboratory is equipped with power frequency voltage generator, DC voltage generator, AC/DC partial discharge tester, water cooling system and other test equipment. It has superior shielding performance and can carry out flexible HVDC converter valve insulation test items such as AC voltage test between valve terminals, DC voltage test between valve terminals and AC-DC voltage test between valve terminals, complying with GB/T 33348, IEC 62501, IEC 62927 GB/T 16927.1 and other relevant standards.



Production Test Centre

The RXHK production test centre comprises an area of approximately 20,000 square meters and is equipped with advanced testing facilities including a comprehensive power module testing platform, environmental laboratory, valve section operation testing platform, multi terminal flexible DC testing system, low-power-consumption high-power inverter testing platform, and facilities to test a fully assembled FACTS systems.



The test centre provides a complete facility for the testing of RXHK's three major product lines: HVDC Smart, FACTS, MaxiVert and new products such as energy storage systems, by providing multi-faceted and full working condition testing conditions for components, sub-assemblies and complete systems. As well as supporting production the facility further enhances and expands RXHK's research and development capabilities for leading edge high-capacity energy conversion systems for future power networks built on renewable energy sources.



1100kV Ultra-high Voltage Dielectric Test Hall

RXHK's 1100kV ultra-high voltage dielectric test hall covers an area of about 5,000 square meters, with a building height of 48.2m. It is equipped with a 2400kV DC voltage generator, 1800kV power frequency test transformer, 4800kV impulse voltage generator, 1800kV radio interference measurement device, and AC compensation circuit matching equipment. It can carry out valve section DC withstand voltage test, AC withstand voltage test, and operation functional tests. All insulation test items for flexible DC converter valves specified in IEC and national standards, such as lightning impulse test on valve supports and AC-DC withstand voltage test between valve ends, have a voltage level of 1100kV, which meets the international advanced level of ultra-high voltage. This provides strong test conditions support for the RXHK flexible DC transmission complete set of equipment products.



| Num. | Name | Test Equipment Function Description |
|------|--|---|
| 1 | DC voltage generator | Output DC voltage to meet the DC withstand voltage test between valve bracket and valve end |
| 2 | AC voltage generator | Output AC voltage to meet the AC withstand voltage test between valve bracket and valve end |
| 3 | Impulse voltage generator | Output lightning and operation impulse test voltage to meet impulse withstand voltage test requirements |
| 4 | Radio interference measurement test device | Can be used as a coupling capacitor for radio interference measurement tests, a coupling capacitor for partial discharge measurement, and a capacitive voltage divider for AC voltage measurement |
| 5 | Compensation circuit device | Adjust the parameters of the test circuit |



HVDC Smart

Technical advantages

- High voltage level and large capacity: the highest voltage level is $\pm 800\text{kV}$, the maximum capacity has been put into operation is 5000MW, and the maximum capacity can be designed 16000MW.
- High operating efficiency: the efficiency of the new generation of low loss PP-IGBT converter valve is higher than 99.3%.
- High reliability: full link redundant valve control system to avoid a single board failure resulting in power module bypass, multi-level redundant intrinsically safe and reliable bypass technology to avoid a single power module failure resulting in system lockout and tripping.
- Excellent control performance: control cycle is as low as $25\mu\text{s}$, control link delay is less than $25\mu\text{s}$, supporting real-time control of 512-level modules without grouping in a single control cycle.
- Strong environmental adaptability: the use of fully airtight PP-IGBTs, combined with enhancement design of high ambient temperature, high water temperature, high corrosion, high seismic, and through the salt spray, mould, vibration, and other environmental tests
- Maintainability: easy to maintain power module structure and valve tower design, self-developed converter valve health state expert system, to achieve intelligent operation and maintenance plan based on big data analysis.
- High power density: the development and application of new higher voltage PP-IGBTs, combined with the compact and lightweight design of the power modules and valve towers, converter valve footprint, size, weight and losses are effectively reduced.
- Support for multiple device mixing: multiple manufacturers, multiple types, multiple voltage levels of power devices can be mixed, power modules based on different devices can be fully compatible.

Typical performance of HVDC Smart



Guangdong-Guangxi Multi-Terminal VSC-HVDC Demonstration Project at Wudongde Station of CSG

Based on the Chinese national key R&D program 'Research on key technologies and engineering demonstration application of high voltage and large capacity flexible HVDC transmission', RXHK has successfully developed the $\pm 800\text{kV}/5000\text{MW}$ UHV (Ultra High Voltage) flexible HVDC transmission converter valve.

The $\pm 800\text{kV}/5000\text{MW}$ flexible HVDC transmission converter valve of RXHK adopts symmetrical bipolar, high and low voltage valve bank, full bridge and half bridge hybrid modular multi-level topology, and has the ability of DC fault self-cleaning and online switching off of the valve bank. The converter valve has rated DC voltage of $\pm 800\text{kV}$, rated DC current of 3125A , rated active power of 5000MW and rated

reactive power of 1000MVar .

The RXHK $\pm 800\text{kV}/5000\text{MW}$ flexible HVDC transmission converter valve successfully passed the third party witnessed type tests that compliance with IEC 62501-2014, and certificated by industry. The project listed on first batch of National Energy Administration's first-in-china major technical equipment in energy industry, demonstrated world leading technical competence, which marked RXHK's milestone on R&D and supply capability on $\pm 800\text{kV}/5000\text{MW}$ VSC-HVDC valve for ultra-high voltage flexible DC transmission, highlighted contribution to the leap forward development of ultra-high voltage flexible DC transmission technology of China.



Rudong-Jiangsu Offshore Wind Power VSC-HVDC Transmission Project

The Three Gorges group has built an 800MW (H6, H10) offshore wind power project in Rudong, Jiangsu Province. The project is located in the Huangshayang sea area east of Rudong, with a total investment of about 14.3 billion RMB and 200 sets of 4MW wind turbines with total installed capacity of $800,000\text{kW}$. In parallel CGN built a 300MW (H8) offshore wind power project in Rudong, Jiangsu Province, the project is located also in the sea area east of Rudong, with a total investment of about 6 billion RMB and 67 sets of 4.5MW wind power with total installed capacity of $300,000\text{kW}$.

Three Gorges Group and CGN have jointly built an offshore VSC HVDC grid connection. This is the first time that VSC HVDC transmission technology has been applied to offshore wind power in China. It is also the first $\pm 400\text{kV}$ VSC HVDC transmission offshore wind power project in China, with a capacity of 1100MW and DC submarine cable length of more than 100km , and also being at the time of commissioning the highest voltage level and the

longest transmission distance in China.

The offshore VSC HVDC grid connection for the project includes the construction of an offshore converter station and an onshore converter station. RXHK undertook the development and supply of the $\pm 400\text{kV}/1100\text{MW}$ converter valve for the onshore converter station, and signed the supply contract in October 2019, and listed on first batch of 2021 National Energy Administration's first-in-china major technical equipment in energy industry. Now commissioned, in November 2021, it can achieve an annual on-grid power of 2.4 billion kWh, which can meet the annual power consumption of about 990,000 households. Compared with coal-fired power plants of the same scale, it can save 740,000 tons of standard coal, ~ 1.83 million tons of carbon dioxide and ~ 7.12 million cubic meters of fresh water every year, which has important economic, social and ecological benefits.

Typical performance of HVDC Smart



Guangdong-Hong Kong-Macao Greater Bay Area Back-to-Back HVDC Project

The project significantly improves the mutual power capacity assistance of the southeast and southwest regions of Zhuhai, effectively resolve the problem of the short-circuit current of Guangdong power grid being exceeded, reducing the AC/DC interaction impact of the Guangdong power grid and the risk of large-scale power outage. Thus ensuring the safe and reliable power supply of Dawan district, and helping the economic and social development of Dawan district. Completed in July 2022 the converter stations of the project are the largest indoor back-to-back VSC HVDC converter stations in the world.

RXHK has delivered four sets of $\pm 300\text{kV}/1,500\text{MW}$ VSC HVDC converter valves and auxiliary equipment for the project.



SGCC Baihetan-Jiangsu $\pm 800\text{kV}$ VSC-HVDC project

The project adopts the world's first VSC plus conventional LCC hybrid cascade HVDC transmission technology. The project developed and applies a controllable self-recovery energy absorber that can deliver millisecond energy balance, changing the HVDC scheme from relying on the power grid to supporting the power grid. This alleviates the voltage stability risk caused by the reduction of thermal power units in East China Power Grid, and thus improves the power receiving capacity of East China Power Grid. The Gusu converter station at the receiving end of the project is the world's first converter station with hybrid cascade connection of LCC and VSC HVDC.

RXHK were awarded a contract by SGCC to supply an IGBT converter valve for Gusu converter station of the

project. After the completion of the project in July 2022 large-scale power transmission from Baihetan hydropower station is ensured, which in turn has supported the transformation of Sichuan's resource advantages into economic advantages, and another energy artery from East to West in China has been added.



Typical performance of HVDC Smart



The total transmission capacity of the Yangjiang project is 2000MW, and the submarine cable transmission project adopts VSC-HVDC technology to construct a $\pm 500\text{kV}$ offshore converter station and onshore converter station (centralized control centre). The onshore converter station is planned to be integrated with the onshore centralized control centre of the Qingzhou 6 offshore wind farm project for joint transmission. The power generated by the wind turbine generators is connected to the offshore converter station jointly constructed by Qingzhou 5 and 7 offshore wind farms through a 66kV submarine cable. After boosting and converting, it will be connected to the onshore converter station (centralized control centre) through a 1-circuit 2-pair $\pm 500\text{kV}$ submarine DC cable.

RXHK undertakes the development and supply of $\pm 500\text{kV}/2000\text{MW}$ converter valve for the offshore converter station of this project. The project adopts an asymmetric solution with lower half bridge parallel external whole wafer diode, which has independent intellectual property rights and has been proven by long-term practical engineering. The loss ratio is 0.486%. The solution has excellent performance and high reliability, and can cope with tripping caused by submodule failure and system failure caused by bipolar short circuit. A lightweight, miniaturized, and easy-to-maintain design scheme suitable for offshore stations is adopted to significantly reduce the size and weight of the converter valve as well as the maintenance time.



The total transmission capacity of COA-WOA Interconnection Link in Saudi Arabia is 3000MW with $\pm 500\text{kV}$ rated DC voltage. The transmission distance is 800km with over head line type. It adopts bipolar connection and full-bridge+half-bridge hybrid topology.

This project mainly transmits the surplus electricity from the central and northern area to the west to support the high power density centres such as the Red Sea Tourist City and Yanbu Industrial City. The implementation of this project will enhance the interconnection of the power grid within Saudi Arabia, improve the stability of the country's backbone network, and at the same time lay a foundation for the development and utilization of new energy sources such as solar energy in the central and surrounding regions of Saudi Arabia,

servicing the realization of Saudi Arabia's long-term energy strategy and diversified energy structure goals. It is the first one in which China's VSC-HVDC product has been exported to the Middle East. It is currently the hybrid topology with the highest voltage level and the largest transmission capacity in overseas regions.

RXHK has supplied all four sets of HVDC valves for both ends. This marks the first time that RXHK's HVDC products have been launched in overseas markets, marking a major breakthrough for the company in successfully "going global" with its independently developed high-end HVDC technology, standards and equipment manufacturing. It has laid a solid foundation for the company's continuous development in the future.



FACTS

Technical advantages

- A single set of equipment capacity up to 300MVar, can be connected to the 6-110kV power grid.
- Multi-level structure, small output voltage harmonics, low switching frequency, less than 0.7% loss rate.
- Adoption of PP-IGBTs, long cycle life and high safety.
- Advanced control functions, network control, wideband oscillation suppression, impedance reshaping, active filtering, etc.
- Fast control system response ($<100\mu\text{s}$), dual redundancy and seamless switching.
- Two types of complete sets of solutions, indoor and container type, can be flexibly selected according to project requirements and site conditions.

Typical performance of FACTS



Golden Plains Wind Farm STATCOM, Australia

- Golden Plains wind farm
- Voltage/reactive power control, transient support
- Capacity: $\pm 200\text{MVar}$
- Equipment voltage level: 28kV



Stockyard Hill Wind Farm STATCOM, Australia

- Stockyard Hill wind farm
- Reactive power compensation, transient voltage support
- Capacity: $4 \times \pm 16\text{MVar}$
- Equipment voltage level: 33kV



OZ Minerals Carrapateena STATCOM, Australia

- Carrapateena mine power grid connection
- Stabilize voltage and improve power quality
- Capacity: $2 \times \pm 15\text{MVar}$
- Equipment voltage level: 11kV

Typical performance of FACTS



Ternium Largos Norte STATCOM, Mexico

- Mexican steel plant
- Voltage flicker suppression
- Capacity: $\pm 80\text{MVar}$
- Equipment voltage level: 34.5kV



Vestas Turitea Wind Farm STATCOM, New Zealand

- New Zealand Turitea wind farm
- Reactive power compensation and transient voltage support
- Capacity: $\pm 55\text{MVar}$
- Equipment voltage level: 33kV



Moma B STATCOM, Mozambique

- Kenmare Moma B sands mine power grid connection
- Stabilize voltage and improve power quality
- Capacity: $\pm 15\text{MVar}$
- Equipment voltage level: 10kV



Fengjie Power Plant of Huadian Power International SSR-DS project

- Fengjie power plant
- Suppression of sub-synchronous resonance
- Capacity: $2 \times \pm 14\text{MVA}$
- Equipment voltage level: 10kV



Shenhua Shengli Power Plant SSR-DS project

- Shenhua Shengli $2 \times 660\text{MW}$ power plant
- Suppression of sub-synchronous resonance
- Capacity: $2 \times \pm 25\text{MVA}$
- Equipment voltage level: 10kV



Fujian-Guangdong DC Interconnection Converter Station HAPF project

- Fujian Guangdong interconnection converter station
- High voltage active filter
- Capacity: $2 \times \pm 100\text{MVA}$
- Equipment voltage level: 110kV



MaxiVert

Technical advantages

- Highly reliable engineering design, based on PP-IGBT, small number of devices, high power density, high reliability, explosion-proof and so on.
- Wide range of products, voltage of 3kV-18kV, power of 5MVA-256MVA.
- Wide output frequency range 0-350Hz for integrated compressors or ultra-high speed test benches.
- Modular design, water-cooled self-locking design, easy maintenance.
- Operating loss rate of less than 0.7%, energy efficient.
- Closed deionised water cooling scheme for internal circulation, and various external cooling schemes for different project requirements.
- Flexible configuration options with oil-immersed or dry-type transformers, can drive asynchronous motors, brushless or brush synchronous motors, permanent magnet synchronous motors.
- Excellent control performance, 1 in 10,000 high speed accuracy, fast torque dynamic response, fast braking and stopping.
- Grid adaptability, no shutdown or capacity reduction in the case of large fluctuations in the power grid or instantaneous power loss.
- Optional redundancy and high-compatibility design for higher requirements.

Typical performance of MaxiVert



Four-quadrant converter for BEST (back pressure extraction steam turbine) in million-kilowatt thermal power plants

- Huaneng Ruijin power plant: $2 \times 8\text{kV}/21\text{MVA}$
- Guoneng Yueyang power plant: $2 \times 8\text{kV}/23\text{MVA}$
- Shanxi Coal Yiyang power plant: $2 \times 9\text{kV}/25\text{MVA}$
- Fujian Huadian Kemen power plant: $2 \times 8\text{kV}/25\text{MVA}$



China-Russia Eastern Line Natural Gas Pipeline project

- Tangshan compressor station: $3 \times 10\text{kV}/23\text{MVA}$
- Shenyang compressor station: $4 \times 10\text{kV}/20\text{MVA}$
- Jinzhou compressor station: $2 \times 10\text{kV}/20\text{MVA}$



Petrochemical industry

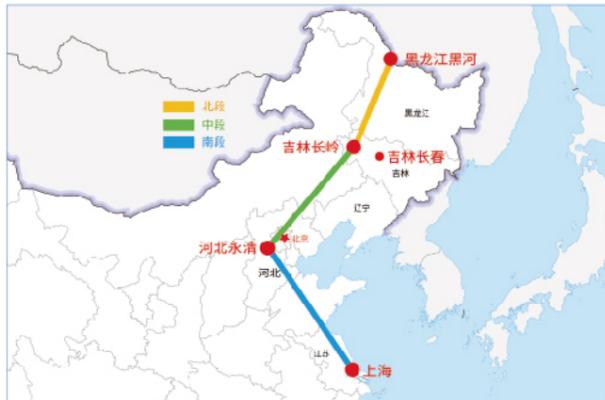
- Jinneng Chemical 900,000 ton PDH project: $10\text{kV}/65\text{MVA}$
- Wanhua Chemical PDH project: $10\text{kV}/44\text{MVA}$

Typical performance of MaxiVert



Shanxi-Beijing Fourth Line Gas Pipeline project

- Hongdunjie Station Phase II: 10kV/21MVA
- Tokto Station: 4×10kV/18.5MVA
- Ulanqab Station: 4×10kV/21MVA
- Ordos Station: 4×10kV/23MVA



China-Russia Eastern Line Natural Gas Pipeline project (Heihe-Changling) mainline

- Wudalianchi gas transmission station: 3×10kV/23MVA
- Mingshui gas transmission station: 4×10kV/23MVA
- Zhaoyuan gas transmission station: 3×10kV/23MVA



Compressed Air Energy Storage (CAES) area

- Tai'an-Shandong CAES project: 10kV/45MVA
- Feicheng-Shandong CAES project: 4×10kV/45MVA



Air Separation Unit (ASU) area

- Guoneng Baotou 105,000Nm³/h ASU project: 2×10kV/22MVA



Test platform

- One typical test platform: 1×10kV/50MVA / 1×10kV/48MW



Flexible power supply for EAF area

- Flexible DC power supply for EAF in US Hybar project: 6×615VDC/81MVA
- Flexible DC power supply for EAF in Sweden H2GS project: 26×1100VDC/377MVA
- Flexible DC power supply for EAF in Germany Plant project: 700VDC/2.5MVA