HOPEWIND

Stock Code: SSE-603063

Catalog SVG/STATCOM

Power Quality Product

www.hopewind.com

Shenzhen Hopewind Electric Co., Ltd. (Stock Code: 603063) focuses on the R&D, manufacturing, sales and services of renewable energy & electric drive products, including products for wind power generation, photovoltaic generation, energy storage, hydrogen production power supply,power quality and Variable-frequency Drive. Furthermore, Hopewind owns integrated independent R&D and testing platforms of high-power power electrical equipment and monitoring systems. Through innovation in technology and service, Hopewind continuously creates value for customers, and has become one of China's most competitive enterprises in the renewable energy field.

【Honors】

National Science and Technology Progress Award

Laboratory Qualification Approved by CNAS

National High-tech Enterprise

【Quality System】

Quality Management System

Environmental Management System

Occupational Health and Safety Management System

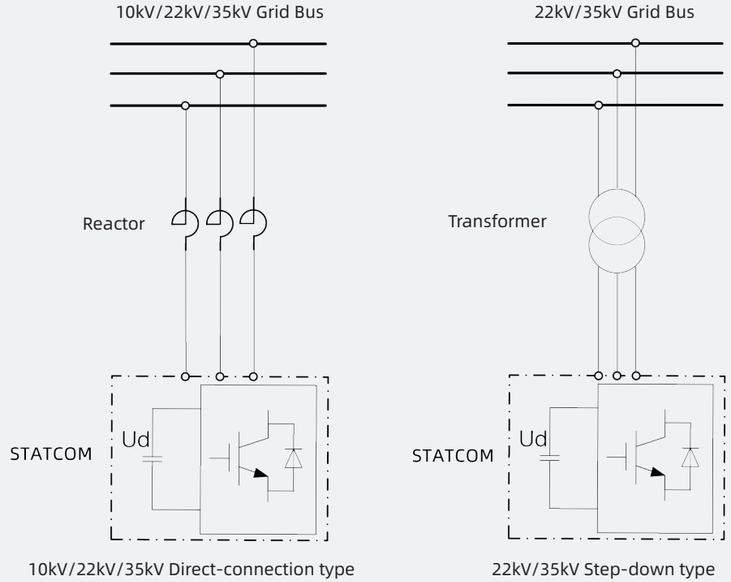
Headquarter-Shenzhen

5 major R&D and manufacturing bases: Shenzhen, Suzhou, Xi'an, Heyuan, Wuhan

30 service bases: Deployed worldwide and providing comprehensive services for global customers

A new generation of high-voltage static synchronous compensator (STATCOM) independently developed by Hopewind, based on the actual needs of reactive power compensation, helps enterprises and institutions such as power generation, transmission, and power consumption to eliminate grid disturbance, stabilize grid voltage, and improve power quality and transmission capacity. The product has completely independent intellectual property rights, with air-cooled and liquid-cooled methods. The single-unit power covers 1.0Mvar~64Mvar, and it supports multiple parallel expansion.

Hopewind's STATCOM uses IGBT power module to form a self-commutated bridge circuit, which is connected in parallel to the grid through a transformer or reactor. The STATCOM uses PWM technology to automatically adjust the phase and amplitude of the AC side output voltage of the bridge circuit, or directly adjusts the AC side current, so that the bridge circuit absorbs or emits reactive current that meets the requirements to achieve the purpose of dynamic reactive power compensation. Its connection with the grid bus is as follows (take 11kV, 22kV and 33kV as examples):

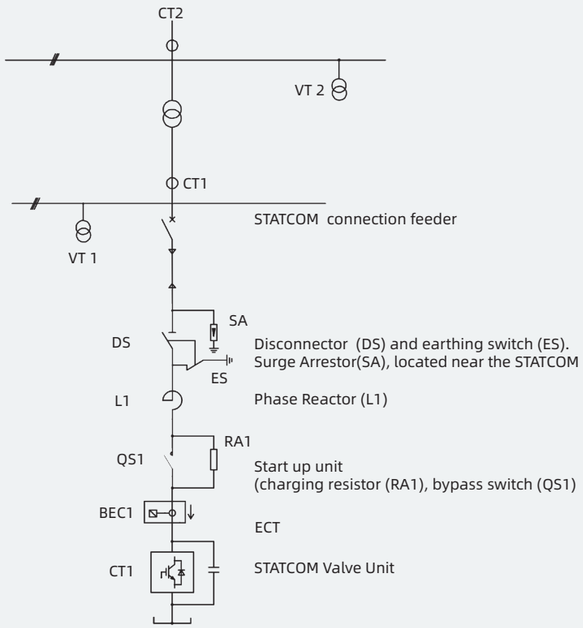


10kV/22kV/35kV Direct-connection type

22kV/35kV Step-down type

STATCOM is composed of startup, control, cooling and power part. The startup section consists of a startup switch and startup resistor, which pre-charges the capacitor of power part before the STATCOM working. The control system completes functions such as detecting grid voltage and load current, generating control commands, and responding to dispatch commands. For the cooling type, STATCOM has liquid-cooled and air-cooled type. The power part, main reactive power modulation of the STATCOM, is composed of multiple power modules connected in series. The STATCOM is connected in parallel to the power grid and acts as a variable reactive current source. STATCOM has the function of system reactive power modulation and can meet the high-voltage and low-voltage ride-through requirements of wind farms and solar power plants.

The STATCOM main circuit adopts a chain topology structure. Products of different power levels are connected in series by different numbers of power modules, which connected in a Y-shape. The connection diagram is as follows.



Naming Rule

H STATCOM 1 - 10 - 4000

Company Name:
H-hopewind

Product Name:
STATCOM- Static Synchronous Compensator

Product Series Code:
0-low voltage, 1-high voltage

On-grid Voltage:
10kV, 33kV, 35kV...

Rated Capacity:
1000-1Mvar...4000-4Mvar...10000-10Mvar...

>> Excellent Performance & Industry Leading

Supporting reactive power compensation, power factor compensation, voltage stabilization, low-voltage ride-through and high-voltage ride-through technology for new energy and grid requirements.

Fixd Reactive Power Compensation

In this mode, the output reactive power of STATCOM is manually set by the user or controlled by commands issued by the host computer.

Voltage Regulation

STATCOM can effectively control the positive sequence componentof the fundamental frequency voltage during the steady state and dynamic operation.

Real-time tracking, quick response

Control respond time: ≤5ms
Current step response time: ≤20ms

Voltage Interval Control

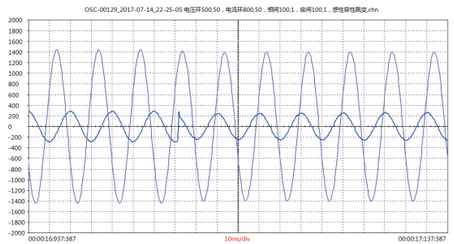
This mode also has the function of power factor compensation or reactive power output while voltage control mode.

Two-way continuous dynamic reactive power compensation

Smooth adjustment from inductive reactive power to capacitive reactive power.

Power Factor Improvement

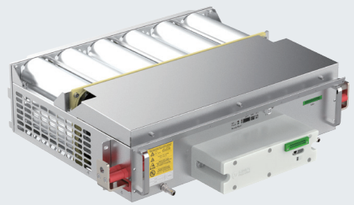
STATCOM can improve the power factor of a system by injecting or absorbing reactive power as needed.



(From inductive reactive power to capacitive reactive power)

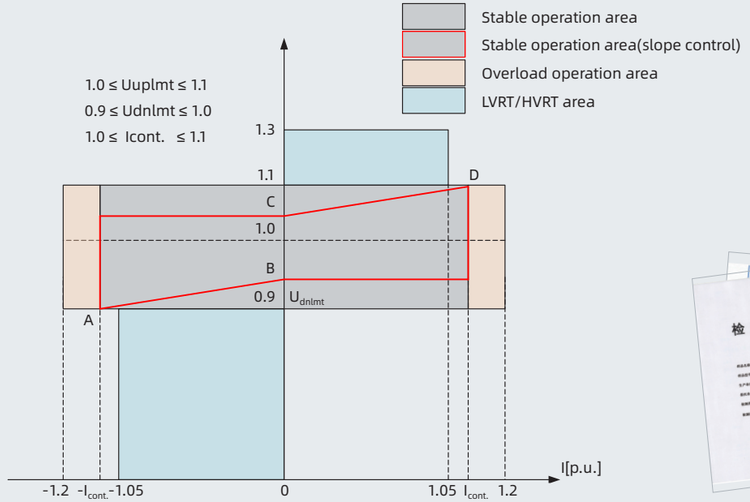
Sub-module Automatic Bypass Function (Optional)

In the STATCOM system, if a sub-module fails, the system will automatically bypass the faulty sub-module and continue operating with the remaining sub-modules.



STATCOM LVRT Function

When an abnormal grid voltage dip occurs, Hopewind STATCOM rapidly generates its rated reactive current to reduce the rate and magnitude of voltage drop at the compensation point, thereby preventing repeated disconnection and connection of renewable energy stations. Additionally, during voltage recovery, it helps the grid voltage to quickly restore to its normal level, ensuring system stability.



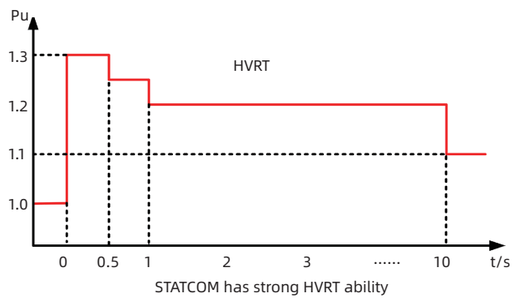
STATCOM has zero voltage ride through ability

CEPRI LVRT certification report

STATCOM HVRT Function

After the grid voltage drops, a large number of devices on the grid will go off the grid, which will cause the local grid voltage to rise. This phenomenon is particularly prominent in the new energy field. This requires STATCOM in the new energy field to have HVRT ability after the LVRT.

When the high voltage of the grid occurs after the LVRT is detected, STATCOM quickly provides inductive reactive current to the grid, and at the same time software means are used to balance the active power of each phase of the STATCOM, to keep the DC bus voltage of the STATCOM power module stable and the complete set of equipments running reliably, to moderate the rate and amplitude of the grid voltage rise at the STATCOM compensation point, and to avoid the frequent disconnection and connection of a large number of power equipment during the high-voltage period of the grid.



STATCOM has strong HVRT ability

CEPRI HVRT certification report

Note: LVRT/HVRT is not limited to new energy stations. In applications such as oil and gas fields, coal mines, steel mills, industrial grid terminals, etc., due to the weak power grid, when a large load (such as a motor) starts and stops, it will be accompanied by flicker fluctuations of the grid voltage, and STATCOM with LVRT/HVRT function can effectively stabilize the grid voltage and improve system utilization.

>> Reasonable Design, Stable and Efficient

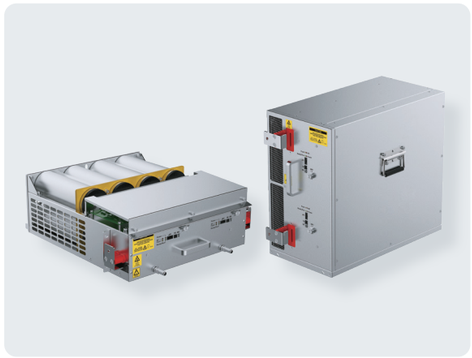
High power density, deployable in tight spaces

The power density is as high as 757kvar/m^3, saving space to the greatest extent for customers

Strict testing to ensure product reliability and stability

Before leaving the factory, the products have undergone reliability experiments and tests, and the electrical and mechanical properties are in full compliance with relevant national standards.

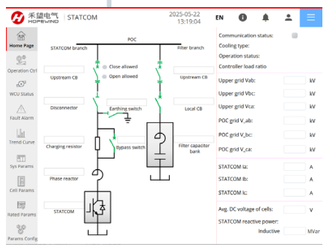
Modular design makes installation and maintenance more convenient



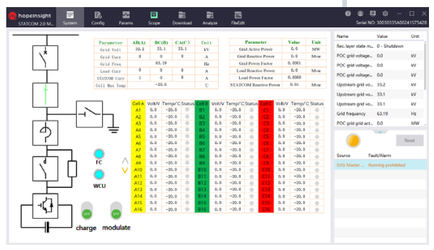
Advanced human-machine interaction, easy operation and maintenance

Account tiered management, safe and reliable

Different levels of accounts have different permissions



The touch screen supports parameter viewing, parameter setting, fault viewing, operation control and other operations.



With the hopeInsight software, the product can be operated and maintained on the PC.

>> Product Specification

The 10kV direct-connection STATCOM is directly connected to the 10kV grid through a 10kV reactor, and the single unit power level is 1.0Mvar~12.0Mvar.

Technical Parameters

10kV series product (direct-connection type)												
Rated Capacity (Mvar)		1	2	3	4	5	6	7	8	9	10	11	12
Main Parameters	On-grid Point Voltage Range	(90%~110%) Un (long-term operation)											
	On-grid Point Frequency Range	47.5Hz~52.5Hz / 57.5Hz~62.5Hz (long-term operation)											
	On-grid Point Distortion Rate	THDu≤5% (grid adaptability)											
	On-grid Point Unbalance	ε≤8% (grid adaptability)											
	Reactive Power Output Range	Rated capacitive to rated inductive, continuous adjustment											
	VSC Efficiency	≥99%											
	Reactive Power Response Time	≤20ms											
	Overload Capacity	110% continuous overload, 120% overload for 1min											
	Operation Mode	Reactive power compensation, power factor compensation, voltage stabilization, etc.											
	Human-machine Interaction	LCD touch screen											
Control Power Supply	Supply System	1P+N											
	Voltage	220V AC±10%											
Auxiliary Power	Supply System	3P4W											
	Voltage	380V AC±10%											
Operation Control Feature	Operation and Control	Panel Control Remote Control Upstream CB status Control Monitor Control											
Communication	Interface	RJ45, RS485, etc.											
	Protocol	Modbus TCP/RTU, IEC61850, etc.											
Environmental Parameters	Altitude	≤2000m, higher than 2000m need to be customized											
	Operating Environment Temperature	-40℃~+55℃ (>40℃, derating 2% every 1℃ rising)											
	Relative Humidity	≤70%, no condensation											
	Storage Temperature	-40℃~+55℃											
	Installation Environment	Indoor or container											
	Cooling Method	Air-cooled/ liquid-cooled											

>> Product Specification

The 35kV step-down STATCOM is connected to the 35kV grid through a 35kV/10kV step-down transformer, and the single unit power level is 1.0Mvar~15.0Mvar.

Technical Parameters

35kV series product (step-down type)																
Rated Capacity (Mvar)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Main Parameters	On-grid Point Voltage Range	(90%~110%) Un (long-term operation)														
	On-grid Point Frequency Range	45Hz~55Hz / 55Hz~65Hz (long-term operation)														
	On-grid Point Distortion Rate	THDu≤10% (grid adaptability)														
	On-grid Point Unbalance	ε≤8% (grid adaptability)														
	Reactive Power Output Range	Rated capacitive to rated inductive, continuous adjustment														
	VSC Efficiency	≥99%														
	Reactive Power Response Time	≤20ms														
	Overload Capacity	110% continuous overload, 120% overload for 1min														
	Operation Mode	Reactive power compensation, power factor compensation, voltage stabilization, etc.														
	Human-machine Interaction	LCD touch screen														
Control Power Supply	Supply System	1P+N														
	Voltage	220V AC±10%														
Auxiliary Power	Supply System	3P4W														
	Voltage	380V AC±10%														
Operation Control Feature	Operation and Control	Panel Control Remote Control Upstream CB status Control Monitor Control														
Communication	Interface	RJ45, RS485, etc.														
	Protocol	Modbus / 103 / 104 protocol, IEC61850, etc.														
Environmental Parameters	Altitude	≤2000m, higher than 2000m need to be customized														
	Operating Environment Temperature	-40℃~+55℃ (>40℃, derating 2% every 1℃ rising)														
	Relative Humidity	≤70%, no condensation														
	Storage Temperature	-40℃~+55℃														
	Installation Environment	Indoor or container														
	Cooling Method	Air-cooled/ liquid-cooled														

>> Product Selection

The 35kV direct-connection type STATCOM is directly connected to the 35kV grid through a 35kV reactor, and the single unit power level is 7.0Mvar~100.0Mvar.

Technical Parameters

35kV series product (direct-connection type)																																				
Rated Capacity (Mvar)		7	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	.....	45	.....	60	.....	70													
Main Parameters	On-grid Point Voltage Range	(90%~110%) Un (long-term operation)																																		
	On-grid Point Frequency Range	47.5Hz~52.5Hz / 57.5Hz~62.5Hz (long-term operation)																																		
	On-grid Point Distortion Rate	THDu≤10% (grid adaptability)																																		
	On-grid Point Unbalance	ε≤8% (grid adaptability)																																		
	Reactive Power Output Range	Rated capacitive to rated inductive, continuous adjustment																																		
	Power factor	≥0.99 (within the compensation capacity)																																		
	VSC Efficiency	≥99%																																		
	Reactive Power Response Time	≤20ms																																		
	Overload Capacity	110% continuous overload, 120% overload for 1min																																		
	Operation Mode	Reactive power compensation, power factor compensation, voltage stabilization, etc.																																		
	Human-machine Interaction	LCD touch screen																																		
Control Power Supply	Supply System	1P+N																																		
	Voltage	220V AC±10%																																		
Auxiliary Power	Supply System	3P4W																																		
	Voltage	380V AC±10%																																		
Operation Control Feature	Operation and Control	Panel Control Remote Control Upstream CB status Control Monitor Control																																		
Communication	Interface	RJ45, RS485, etc.																																		
	Protocol	Modbus TCP/RTU, IEC61850, etc.																																		
Environmental Parameters	Altitude	≤2000m (support customization)																																		
	Operating Environment Temperature	-25℃~+40℃ (support customization)																																		
	Relative Humidity	≤70%, no condensation																																		
	Storage Temperature	-40℃~+55℃																																		
	Installation Environment	Indoor or container																																		
	Cooling Method	Air-cooled/ liquid-cooled																																		

Case 1: Wind farm retrofit application case

Time: August, 2021

Location: Weifang city, Shandong Province

The original STATCOM in this wind farm was air-cooled type, with poor heat dissipation, outdated equipment, low reliability, high failure rate and high maintenance cost. In response to the owner's request, Hopewind replaced the original indoor air-cooled STATCOM with an outdoor liquid-cooled STATCOM, which are technologically advanced, with excellent heat dissipation, strong sealing performance, and strong environmental adaptability, thus improving the reliability of the equipment significantly. It also complies with the State Grid's Eighteen Anti-Accident Measures and the entire retrofit scheme was unanimously praised by the owner.

Case 2: Photovoltaic sand control application case

Time: March 2023

Location: Hangjin Banner, Inner Mongolia

The project is located in a desert area with harsh environment, with strong sandstorm, large temperature difference between day and night, and intense solar radiation. The entire STATCOM has been specially designed for the site environment, featuring excellent resistance to sandstorm, high temperature, and corrosion, which enables it to operate stably in harsh conditions without being affected by environmental factors. The high reliability of Hopewind STATCOM provides a reliable guarantee for the long-term stable power generation of this photovoltaic power station.

Case 3: Photovoltaic + Energy storage project application case

Time: October 2022

Location: Xinjiang Uygur Autonomous Region

The region not only features complex climatic conditions, including frequent sandstorms, large temperature difference, and intense solar radiation, but also suffers from a relatively weak grid structure with large voltage fluctuation, posing severe challenges to grid stability and reliability. In response to these problems, Hopewind implemented customized designs in hardware, software, and structural systems, ensuring stable on-site equipment performance. The successful practice of this project has provided valuable experience for Hopewind in addressing complex grid environments in renewable energy projects.

Case 4: Large-capacity multi-STATCOMs in parallel application case

Time: July 2023

Location: Aksu Prefecture, Xinjiang

The project adopted 6 sets of 35kV outdoor direct-connection liquid-cooled STATCOMs. By configuring self-developed coordination control systems and optimizing control algorithms, Hopewind achieved parallel coordination control of multiple STATCOMs in parallel, perfectly meeting the compensation demand of the control target point. During grid operation, Hopewind's STATCOM can rapidly respond to changes in the grid's reactive power demands, providing reactive power compensation. This effectively stabilizes grid voltage, reduces network losses, and improves the operational efficiency and reliability of grid.

Case 5: 10KV air-cooled model application case

Time: October 2024
Location: Conghua, Guangdong
This project is a distributed photovoltaic power station. In response to the voltage fluctuations and considering the site space constraints, it is equipped with Hopewind's 10kV direct-connection air-cooled STATCOM. The equipment adopts an advanced air-cooled heat dissipation system design, ensuring long-term reliable operation even under high temperature and high humidity conditions. Hopewind's STATCOM features multiple intelligent operation modes, which can be flexibly switched according to the actual needs of the power grid. The equipment has operated stably and reliably, significantly improving the voltage eligibility rate at the grid connection point of the power station, providing high-quality power support for the dairy production base, and obtaining high recognition from the owner.

Case 6: 10kV automatic bypass model application case

Time: September 2024
Location: Multiple wind farms in Baicheng City, Jilin Province
The Jilin Provincial Power Grid imposes strict requirements on the reliability of grid-connected equipment at each station and enforces strict assessments on equipment failure rates. Most projects utilize automatic bypass-type STATCOMs to meet this demand. Hopewind supports the N-1 automatic bypass function and features module cross-control capability. With each module equipped with a vacuum contactor as the bypass switch, with any module failure, the system can rapidly bypass the faulty module online, enabling the equipment to continue operating without shutdown. This design not only effectively reduces equipment failure rates but also minimizes the evaluation risks faced by stations due to equipment malfunctions, delivering stable and reliable reactive power support to the stations.

Case 7: 35kV outdoor automatic bypass model case

Time: November 2023
Location: Liangshan Prefecture, Sichuan
The project features high altitude, high humidity and large temperature difference between day and night, and faces challenges such as poor grid stability and large reactive power fluctuations. The project adopts 35kV automatic bypass STATCOM solution, which integrates the N-1 automatic bypass function and module cross-control technology, with each module configured with a vacuum contactor as a bypass switch, which realizes millisecond-level online bypass switch in the event of a module failure. With the program combining intelligent bypass and precise compensation, Hopewind effectively solves the technical challenges, significantly improves the reliability of the system and the adaptability of the grid while reducing the cost of operation and maintenance.

Case 8: High altitude photovoltaic station project application case

Time: October 2024
Location: Lhasa, Tibet Autonomous Region
The project is located at a high altitude of 4200 meters, facing a large temperature difference between day and night, extreme low temperature, thin air and other harsh environments. In response to on-site environmental condition, Hopewind adopted the high-altitude model, strengthened insulation and heat dissipation design, and adopted a modular design for hardware structure to facilitate maintenance, reducing the frequency and difficulty of manual maintenance in the alpine environment. In terms of function, Hopewind STATCOM leverages its millisecond-level dynamic response capability to quickly compensate for reactive power, suppress voltage flicker caused by sudden changes in light intensity or load switching, and ensure the power quality of the grid.

Case 9: Coal mine application case

Time: August 2014, November 2019, August 2021
Location: A coal mine in Hegang City, Heilongjiang Province; A coal mine in Jinzhong City, Shanxi Province
Coal mine power loads are complicated, with low power factor and complicated harmonic content. After Hopewind STATCOM equipment was put into operation, the power factor was improved from 0.78 to 0.99. The mining area avoided fines for low power factor, and the fault rate of electrical equipment was significantly reduced, improving its service life.

Case 10: 5000 attitude application case

Time: September 2021
Location: A wind farm in Shannan City, Tibet Autonomous Region
The site has an average altitude of 5,000 meters, characterized by high altitude, low air density, humidity condensation in rainy season, dry summer, strong thunderstorm and ultraviolet ray, etc. Hopewind STATCOM is strictly in accordance with the relevant standards of GB and IEC for parameter correction, and is perfectly applied in the site, and it is the first 35kV large-capacity direct connection water-cooled STATCOM manufacturer in China for this altitude.

Case 11: Wind farm HVRT/LVRT application case

Time: June 2017; April 2020
Location: Gaoliban Wind Farm in Tongliao City, Inner Mongolia; Zhangbei National Wind Power Technology and Testing Research Center
In November 2017, Hopewind passed the HVRT/LVRT capability test at the Gaoliban wind farm, becoming the first China manufacturer of STATCOM devices with HVRT/LVRT functions to run on the grid.
In April 2020, Hopewind STATCOM passed the China fault voltage ride-through capability test of the wind power technology, which means that Hopewind is the first China STATCOM manufacturer to pass this test and obtain a report.

Case 12: Offshore wind power application case

Time: October 2019
Location: A wind farm in Nantong City, Jiangsu Province
Offshore wind power projects have heavy salt fog, high pollution levels, and humidity up to 90% or more. Hopewind STATCOM follows the more stringent design requirements of offshore wind power converters, adopts C5 anti-corrosion measures, and has strong environmental adaptability. Currently equipment is stably operating without failure in the site environment.

Case 13: Agriculture photovoltaic application case

Time: December 2020
Location: A PV plant in Baoji City, Shaanxi Province
The reactive power ratio accounts for 30% of the station capacity in this site. Large-capacity STATCOM has high requirements for its control system. The main controller independently developed by Hopewind uses an advanced digital signal processor DSP as the control core, which is perfectly applied to the site to meet the needs of large-capacity load reactive power compensation and power quality management.

Case 14: Indoor water-cooled retrofit project application case

Time: October 2020, May 2022
Locations: Bayannur City (Inner Mongolia), Tangshan City (Hebei Province), Zhanjiang City (Guangdong Province), Dezhou City (Shandong Province)
The original STATCOM in these wind farms had been out of service for a long time due to faults and failed to meet the requirements for frequency and voltage withstand capability. In response to the owners' demand to maximize the reuse of existing equipment and minimize costs, Hopewind utilized the original start up devices and indoor space to the greatest extent, thereby reducing the renovation work as much as possible. The entire renovation plan was highly recognized and praised by the owners.

Case 15: High temperature and dust environment application case

Time: March 2019
Location: A PV plant in Buon Ma Thuot, Vietnam
This site has high ambient temperature, high sand and dust, large fluctuations in the power grid, and often under-voltage, under-frequency, etc. during operation, which test the adaptability of STATCOM to the power grid. After Hopewind STATCOM was put into operation, the grid voltage was stabilized, which effectively guaranteed the normal operation of the power station.

Case 16: Petrochemical site application case

Time: January 2018
Location: An oil extraction plant in Puyang City, Henan Province
The start-up current of the high-voltage asynchronous motor with large capacity and direct start at this site is extremely large, which is easy to cause drastic changes in the grid voltage and affect the normal operation of other equipment in the same grid. After Hopewind STATCOM was put into operation, it tracked the voltage fluctuation of the grid in real time and carried out dynamic compensation, which enabled the normal operation of each equipment and gained favorable comments from the owner.

180 GW+

SHIPMENTS WORLDWIDE

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