HOPEWIND

HD8000 Series Medium-Voltage Engineering Variable Frequency Drive System

www.hopewind.com

Corporate Profile

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 electric 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.

In the field of industrial drive, Hopewind provides a wide range of inverters with various voltage and power classes, mainly including HV350 series low-voltage general purpose inverter, HV510 series low-voltage high-performance inverter, HV500 series low-voltage engineering single transmission inverter, HD2000 series low-voltage engineering inverter, HD8000 series medium-voltage engineering inverter, etc., and also provides solutions for 0.75kW~22400kW low-voltage inverter and 4MVA~102MVA (single inverter) medium-voltage inverter. These products can be widely used in metallurgy, petroleum and petrochemical, mining machinery, port lifting, distributed energy generation, large-scale testing platforms, marine equipment, textiles, chemicals, cement, municipal and various other industrial applications.

【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

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

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

HD8000 Series Medium-Voltage Engineering Variable Frequency Drive System

Product Overview

The HD8000 is a high-power drive system independently developed by Hopewind. This system supports single-drive inverters and common DC bus multi-drive inverters. A single inverter can deliver a maximum power of 102 MVA and up to eight inverters can be connected in parallel. The modular hardware and engineering software design enables the variable frequency drive system to handle various complex drive scenarios.

The HD8000 uses pressure-contact integrated gate-commutated thyristors IGCT and Diode, and features high reliability, high power density, and small footprint. The system can be equipped with two-quadrant and four-quadrant rectification products.

The system adopts liquid cooling for heat dissipation, provides a protection rating of IP54 or higher, and exhibits strong environmental adaptability.

- **Flexible design:** Single-drive or common bus multi-drive configuration, providing two-quadrant or four-quadrant functions
- **Modular design:** Tailored for diverse application scenarios and supporting modular maintenance
- **Reliability design:** Ensuring environmental adaptability, load adaptability, and grid adaptability
- **Comprehensive rectifier units:** Supporting multi-pulse basic rectifier units and PWM rectifier units
- **Voltage levels:** 1.65 kV, 2.4 kV, 3.3 kV, 4.16 kV, 6.6 kV, 10 kV, 13.8 kV, 19.8 kV
- **Maximum power:** 102 MVA (single inverter)
- **Motors supported:** Asynchronous induction motor, permanent magnet synchronous motor, electric excitation synchronous motor, doubly-fed induction motor
- **Control modes:** V/F, closed-loop vector control (CLVC), open-loop vector control (OLVC)
- **Cooling modes:** Liquid cooling

Typical Application Fields

Metallurgy

Petroleum and Petrochemical

Test-Bed

Offshore Wind Power

Rail Transit

Mine Hoisting

Ship Propulsion

LNG

Electric Drive Fracturing Equipment for Oil and Gas

Pumped Storage

HD8000 Series Medium-Voltage Engineering Variable Frequency Drive System

Naming Rules

HD8000 - 3 M - 1P10 - 1A10 - 1A12 - X - B···

Series Name:
HD8000: hopeDrive series medium-voltage engineering inverter

Output Voltage Level:
1: 1.65 kV 2: 2.4 kV
3: 3.3 kV 4: 4.16 kV 6: 6.6 kV
A: 10 kV B: 13.8 kV C: 19.8 kV

System Type:
S: Single inverter
M: Multi-drive common bus system
R: Parallel type Q: Inverter skid unit

Rectifier Type:
D: Two-quadrant (12-pulse) T: Two-quadrant (18-pulse)
F: Two-quadrant (24-pulse) S: Two-quadrant (36-pulse)
P: Four-quadrant
1P10: One 10 MVA four-quadrant rectifier
2P12: Two 12 MVA four-quadrant rectifiers
1D10: One 10 MVA two-quadrant 12-pulse rectifier
2F10: Two 10 MVA two-quadrant 24-pulse rectifiers

Inverter Unit Type:
A: Induction motor S: Electric excitation synchronous motor
P: Permanent magnet synchronous motor
F: AC excitation motor for the rotor (doubly-fed motor)
1A08: One 8 MVA inverter unit for induction motor
1A10: One 10 MVA inverter unit for induction motor.....
1S08: One 8 MVA inverter unit for synchronous motor
1S10: One 10 MVA inverter unit for synchronous motor.....
2A14: Two 14 MVA inverter units for induction motor
2S14: Two 14 MVA inverter units for synchronous motor.....

Inverter Unit Type for the Second Motor (Omitted for Single-Drive Systems)

Inverter Unit Type for Other Motors (Omitted for Single-Drive Systems)

Special Notes:
F: Includes the input filter cabinet B: Includes the braking unit
L: Includes the output reactor I: Includes insulation detection

Notes:
1. HD8000 series high-power engineering inverters support voltage customization. For details, consult Hopewind technical support personnel.
2. If a common bus multi-drive system is equipped with multiple motors, all inverter unit types need to be listed in the model number, for example, "HD8000-3M-1P10-1A08-1A08-1A08".
3. "Special Notes" list optional devices for the inverter; "empty" indicates no optional devices configured. If multiple optional devices are equipped, all the letter codes should be listed.

Technical Specifications of HD8000 Series Products

Basic rectifier	Input frequency	45 Hz ~ 66 Hz
	Fundamental power factor	≥ 95% (based on 12-pulse and above, rated current, and 2% current input reactor)
PWM rectifier	Input frequency	45 Hz ~ 66 Hz
	Power factor	1 (can be set continuously)
	Protection functions	Overload protection, overheating protection, short circuit protection, fault prediction
Inverter	Output voltage	1: 1.65 kV; 2: 2.4 kV; 3: 3.3 kV; 4: 4.16 kV; 6: 6.6 kV; A: 10 kV; B: 13.8 kV; C: 19.8 kV
	Output frequency	0 ~ 110 Hz (higher output frequencies can be customized as required)
	Speed stability	OLVC: 0.2% CLVC: 0.01%
	Speed fluctuation	OLVC: 0.4% CLVC: 0.2%
	Starting torque	OLVC: 150% CLVC: 200%
	Torque control	V/F: Supported OLVC: Supported CLVC: Supported
	Torque accuracy	OLVC: 5% CLVC: 2% (customizable)
	Torque response time	≤ 5 ms
	Speed response time	OLVC: 100 ms CLVC: 100 ms
	Dynamic speed drop equivalent	OLVC: 0.5%*s CLVC: 0.25%*s
System	Efficiency	Two-quadrant: ≥ 99% (excluding the rectifier transformer) Four-quadrant: ≥98.5% (excluding the rectifier transformer)
	Temperature	Water inlet temperature ≤ 35℃ (external water)
	Altitude	≤ 2000m (derating required for 2000m ~ 4000m)
	IP rating	IP54
	Cooling mode	Liquid cooling
	Corrosion resistance class	C4-M

HD8000 Series Product Selection

Inverter (Including the Liquid-Cooled Cabinet)

1.65 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-1S-1D04-1A04	4	1400	4600*1300*2434
HD8000-1S-1D05-1A05	5	1750	4600*1300*2434
HD8000-1S-1D06-1A06	6	2100	4600*1300*2434
HD8000-1S-1D07-1A07	7	2450	4600*1300*2434
HD8000-1S-1D08-1A08	8	2975	4600*1300*2434

1.65 kV Four-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-1S-1P04-1A04	4	1400	4600*1300*2434
HD8000-1S-1P05-1A05	5	1750	4600*1300*2434
HD8000-1S-1P06-1A06	6	2100	4600*1300*2434
HD8000-1S-1P07-1A07	7	2450	4600*1300*2434
HD8000-1S-1P08-1A08	8	2975	4600*1300*2434

2.4 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-2M-1D10-2A05	2*5	2*1400	5600*1300*2434
HD8000-2M-1D14-2A07	2*7	2*1750	5600*1300*2434
HD8000-2M-1D17-2A08	2*8	2*2100	5600*1300*2434
HD8000-2M-2D10-2A10	2*10	2*2450	6600*1300*2434
HD8000-2M-2D12-2A12	2*12	2*2975	6600*1300*2434

3.3 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-3S-1D06-1A06	6	1050	4600*1300*2434
HD8000-3S-1D08-1A08	8	1400	4600*1300*2434
HD8000-3S-1D10-1A10	10	1750	4600*1300*2434
HD8000-3S-1D12-1A12	12	2100	4600*1300*2434
HD8000-3S-1D14-1A14	14	2450	4600*1300*2434
HD8000-3S-1D17-1A17	17	2975	4600*1300*2434
HD8000-3R-2D10-2A10	20	1750*2	8700*1300*2434
HD8000-3R-2D12-2A12	24	2100*2	8700*1300*2434
HD8000-3R-2D14-2A14	28	2450*2	8700*1300*2434
HD8000-3R-2D17-2A17	34	2975*2	8700*1300*2434
HD8000-3R-3D14-3A14	42	2450*3	12300*1300*2434
HD8000-3R-3D17-3A17	51	2975*3	12300*1300*2434

3.3 kV Four-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-3S-1P06-1A06	6	1050	4600*1300*2434
HD8000-3S-1P08-1A08	8	1400	4600*1300*2434
HD8000-3S-1P10-1A10	10	1750	4600*1300*2434
HD8000-3S-1P12-1A12	12	2100	4600*1300*2434
HD8000-3S-1P14-1A14	14	2450	4600*1300*2434
HD8000-3S-1P17-1A17	17	2975	4600*1300*2434
HD8000-3R-2P10-2A10	20	1750*2	8700*1300*2434
HD8000-3R-2P12-2A12	24	2100*2	8700*1300*2434
HD8000-3R-2P14-2A14	28	2450*2	8700*1300*2434
HD8000-3R-2P17-2A17	34	2975*2	8700*1300*2434
HD8000-3R-3P14-3A14	42	2450*3	12300*1300*2434
HD8000-3R-3P17-3A17	51	2975*3	12300*1300*2434

4.16 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-4S-1D10-1A10	10	1400	5200*1600*2434
HD8000-4S-1D12-1A12	12	1750	5200*1600*2434

HD8000 Series Product Selection

4.16 kV Four-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-4S-1P10-1A10	10	1400	5200*1600*2434
HD8000-4S-1P12-1A12	12	1750	5200*1600*2434

6.6 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-6S-1S16-1A16	16	1400	11600*1300*2434
HD8000-6S-1S20-1A20	20	1750	11600*1300*2434
HD8000-6S-1S24-1A24	24	2100	11600*1300*2434
HD8000-6S-1S28-1A28	28	2450	11600*1300*2434
HD8000-6S-1S34-1A34	34	2975	11600*1300*2434
HD8000-6R-2S20-2A20	40	1750*2	20000*1300*2434
HD8000-6R-2S24-2A24	48	2100*2	20000*1300*2434
HD8000-6R-2S28-2A28	56	2450*2	20000*1300*2434
HD8000-6R-2S34-2A34	68	2975*2	20000*1300*2434

6.6 kV Four-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-6S-1P16-1A16	16	1400	14600*1300*2434
HD8000-6S-1P20-1A20	20	1750	14600*1300*2434
HD8000-6S-1P24-1A24	24	2100	14600*1300*2434
HD8000-6S-1P28-1A28	28	2450	14600*1300*2434
HD8000-6S-1P34-1A34	34	2975	14600*1300*2434
HD8000-6R-2P20-2A20	40	1750*2	26000*1300*2434
HD8000-6R-2P24-2A24	48	2100*2	26000*1300*2434
HD8000-6R-2P28-2A28	56	2450*2	26000*1300*2434
HD8000-6R-2P34-2A34	68	2975*2	26000*1300*2434

10 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-AS-1S24-1A24	24	1400	12800*1600*2434
HD8000-AS-1S30-1A30	30	1750	12800*1600*2434
HD8000-AS-1S36-1A36	36	2100	17600*1600*2434
HD8000-AS-1S42-1A42	42	2450	17600*1600*2434
HD8000-AS-1S51-1A51	51	2975	17600*1600*2434
HD8000-AR-2S30-2A30	60	1750*2	22900*1600*2434
HD8000-AR-2S36-2A36	72	2100*2	35200*1600*2434
HD8000-AR-2S42-2A42	84	2450*2	35200*1600*2434
HD8000-AR-2S51-2A51	102	2975*2	35200*1600*2434

10 kV Four-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-AS-1P24-1A24	24	1400	16400*1600*2434
HD8000-AS-1P30-1A30	30	1750	16400*1600*2434
HD8000-AS-1P36-1A36	36	2100	20000*1600*2434
HD8000-AS-1P42-1A42	42	2450	20000*1600*2434
HD8000-AS-1P51-1A51	51	2975	20000*1600*2434
HD8000-AR-2P30-2A30	60	1750*2	30100*1600*2434
HD8000-AR-2P36-2A36	72	2100*2	40000*1600*2434
HD8000-AR-2P42-2A42	84	2450*2	40000*1600*2434
HD8000-AR-2P51-2A51	102	2975*2	40000*1600*2434

HD8000 Series Product Selection

■ 13.8 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-BS-1S33-1A33	33	1400	11600*2600*2434
HD8000-BS-1S41-1A41	41	1750	11600*2600*2434
HD8000-BS-1S50-1A50	50	2100	11600*2600*2434
HD8000-BS-1S58-1A58	58	2450	11600*2600*2434
HD8000-BS-1S71-1A71	71	2975	11600*2600*2434

■ 19.8 kV Two-Quadrant Series

Model	Rated Capacity MVA	Rated Current A	Dimensions (W*D*H)mm
HD8000-CS-1S48-1A48	48	1400	/
HD8000-CS-1S60-1A60	60	1750	/
HD8000-CS-1S72-1A72	72	2100	/
HD8000-CS-1S84-1A84	84	2450	/
HD8000-CS-1S102-1A102	102	2975	/

Notes: 1. The dimensions indicated above do not include the pre-magnetizing cabinet and output isolation cabinet.
2. The 19.8 kV series are customized models. For their dimensions, consult Hopewind technical personnel.

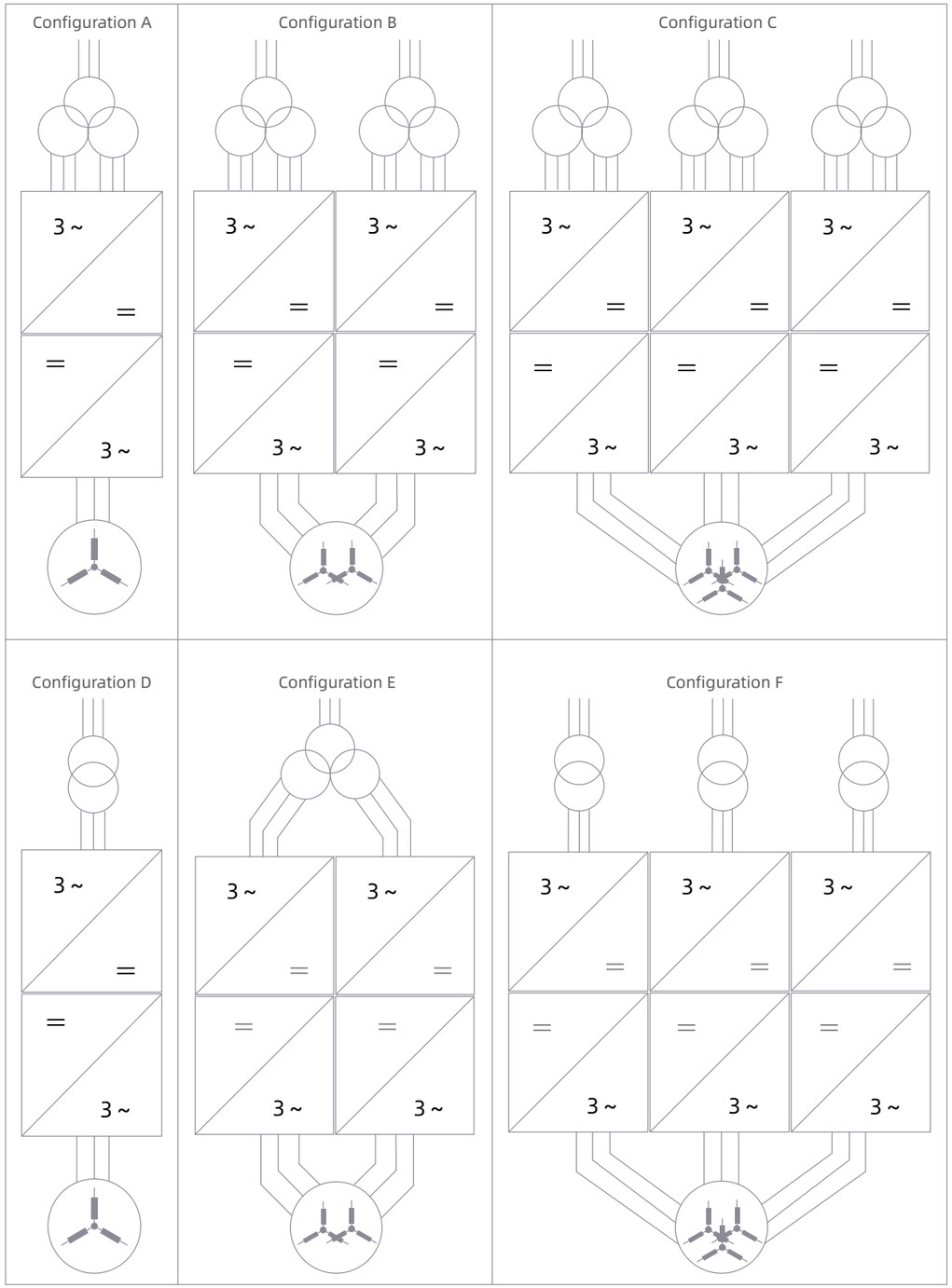
◉ Exciter Selection

Model	Parameter	Dimensions	Remarks
HDEXC-850-1	Input: 380 V Output: 850 A	800*1300*2480	/
HDEXC-850-2			Including the temperature controller components and external 380 V power supply component
HDEXC-850-3			Including the temperature controller components
HDEXC-850-4			Including the external 380 V power supply component
HDEXC-1200-1	Input: 380 V Output: 1,200 A	800*1300*2480	/
HDEXC-1200-2			Including the temperature controller components and external 380 V power supply component
HDEXC-1200-3			Including the temperature controller components
HDEXC-1200-4			Including the external 380 V power supply component
HDEXC-1500-1	Input: 690 V Output: 1,500 A	800*1300*2480	/
HDEXC-1500-2			Including the temperature controller components and external 380 V power supply component
HDEXC-1500-3			Including the temperature controller components
HDEXC-1500-4			Including the external 380 V power supply component
HDEXC-2600-1	Input: 690 V Output: 2,600 A	1000*1300*2480	/
HDEXC-2600-2			Including the temperature controller components and external 380 V power supply component
HDEXC-2600-3			Including the temperature controller components
HDEXC-2600-4			Including the external 380 V power supply component

Note: The cabinet height includes the base and top beam.

System Configuration Examples

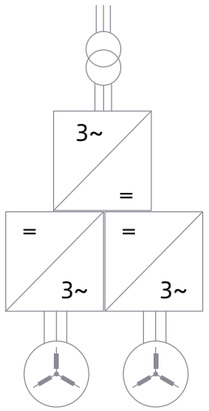
◉ Single-Drive/Parallel System Configuration Examples



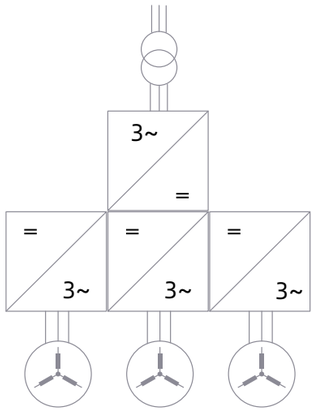
System Configuration Examples

Multi-Drive System Configuration Examples

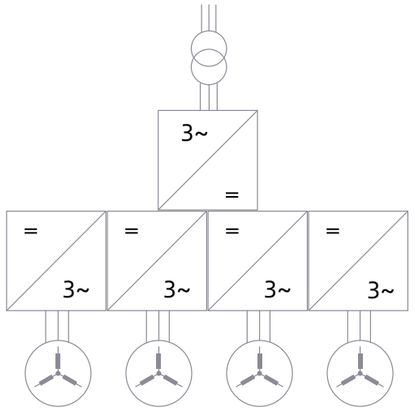
Configuration G



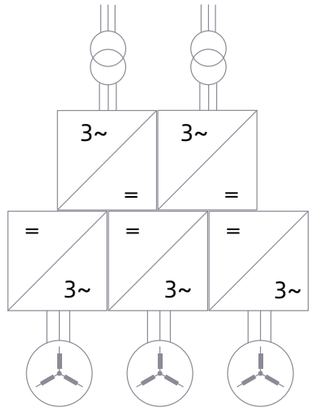
Configuration H



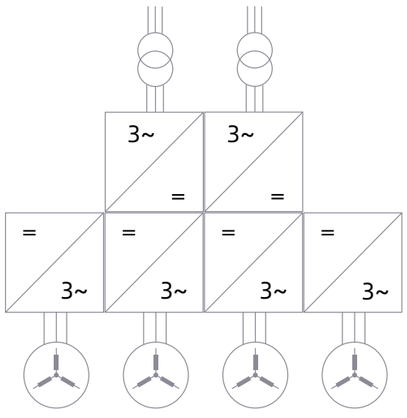
Configuration I



Configuration J



Configuration K



Features of HD8000 Series Engineering Inverters

Internationally Leading Technologies

· The HD8000 series products passed the appraisal of China Machinery Industry Federation.

· A High-Power IGCT AC-DC-AC Variable Frequency Speed Regulating Device" and "Key Technologies and Applications of Variable Frequency Speed Regulating System" passed the scientific and technological achievement appraisal and the result is internationally advanced, with some technologies appraised as internationally leading.

Reliable Engineering Design

· Precise mechanical design to enhance seismic resistance

· Use of fully controlled IGCTs for extraordinary performance and reliability in the power system

· Use of double-sided pressure-contact power devices to ensure higher reliability and power density

· High-altitude design: No need for derating within the altitude of 2,000 m

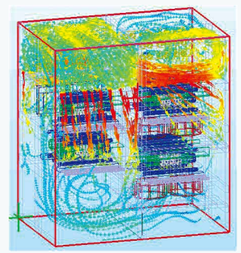
· Redundancy and error tolerance design for key components, reducing the system breakdown probability

· IP54 protection design and C4-M corrosion resistance design, enabling the system to have strong environmental adaptability

· First-class fault protection system, providing sound protection for the system

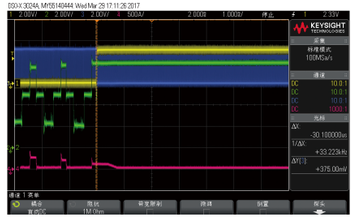
· Robust monitoring system for real-time monitoring of internal data, waveforms, and other information

· Grid adaptability design, enabling the system to adapt to grid unbalance, grid harmonics, grid frequency flickering, transient grid voltage drops, and high/low voltage ride through



Features of HD8000 Series Engineering Inverters

■ Cutting-Edge Core Protection Strategies in the Industry



· IGCT fault pre-judgment and bridge arm shoot-through protection technologies

· Real-time detection of instantaneous current at the AC end, preventing shutdown caused by heavy current

■ Flexible and Diverse Design

· Flexible system configuration design tailored for specific applications

· Single-motor drive configuration: Typically used for scenarios using large-capacity single-winding motor drive systems, supporting parallel connection of multiple systems

· Multi-motor drive configuration: Typically used for scenarios using common DC bus multi-drive systems

■ Excellent Control Performance

· Four-quadrant operation capability, supporting energy feedback during motor driving and braking

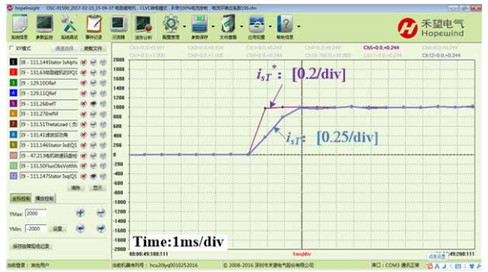
· Supporting various types of motors (including induction motors, permanent magnet synchronous motors, and electric excitation synchronous motors)

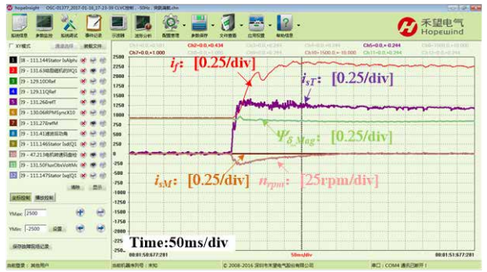
· Fast dynamic torque response, meeting system requirements for suppressing mechanical resonance

· Torsional vibration suppression: Eliminating or significantly reducing torque vibration by enhancing the damping force of the shafting with load observers

· Segmented synchronous modulation of motors, meeting requirements for wider speed regulating range of rolling mills and hoists

· Selective harmonic elimination pulse width modulation (SHEPWM), effectively mitigating motor heating and noise issues



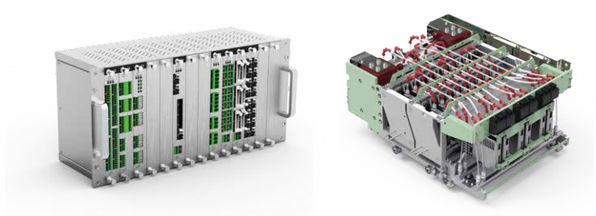


■ Modular Design for Easy Maintenance

· Intelligent fault diagnosis system for fast fault locating

· Modular design for key components, facilitating easy maintenance and enhancing system reliability

· Easy maintenance, with only 15 minutes required for phase module assembly/disassembly



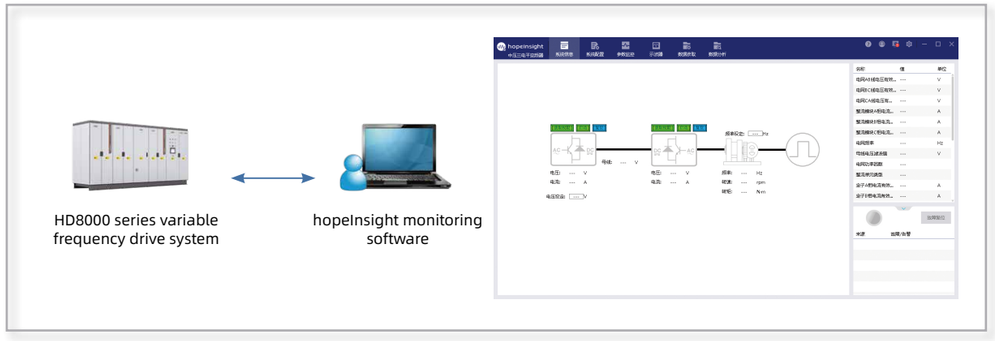
■ Customizable Communication Protocols

· Supporting customizable communication protocols through optional modules

· Compatible with various industrial buses, such as Profibus-DP, CANopen, Profinet IO, Modbus RTU, Modbus TCP, EtherCAT, Ethernet/IP, achieving interconnectivity of industrial devices

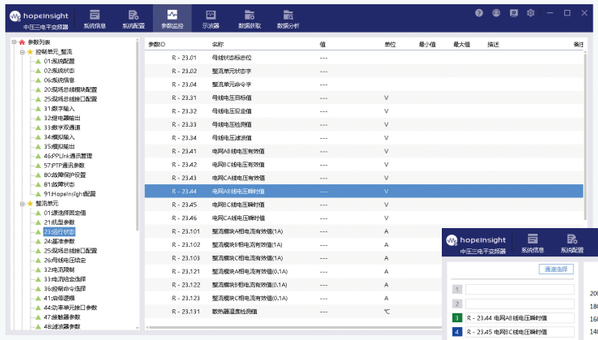
◎ hopeInsight Background Rapid Commissioning Software

hopeInsight is a rapid commissioning tool designed by Hopewind for drive systems. It can be connected to the PC backend through optical fibers. The software offers a wide range of commissioning functions, including batch parameter setting, fault data downloading and waveform analysis, 12-channel high-speed oscilloscope, and editing. The working diagram is as follows:

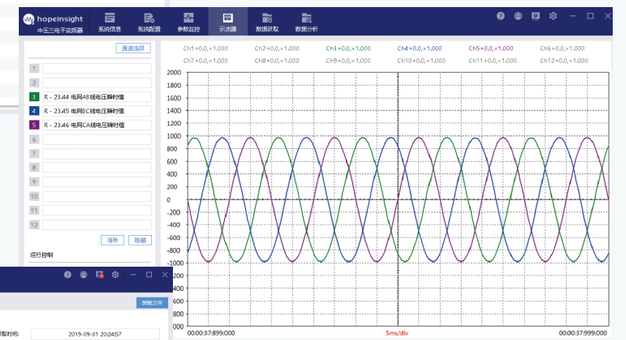


(Working Diagram of hopeInsight Monitoring Software)

▼ The UI is displayed in Chinese by default and English is supported.
The user-friendly UI is convenient for operations.



▼ The 12-channel high-speed oscilloscope provides sound functions, serving as an essential tool for commissioning personnel.



▼ The robust fault waveform recording function plus detailed event logging greatly facilitates fault diagnosis.

HD8000 Reliability Assurance

■ Research and Development

· Control algorithm simulation platform
· Advanced simulation and verification platform
· Industry-leading drive test platform
· Finite element thermal, magnetic field, and force simulation platform
· Experienced core technical team
· Continuous and stable operation of over 45,000 megawatt-level inverters across the world

■ Standardized Production and Factory Testing

· Automatic control of testing processes, with lifecycle traceable
· 100% full-voltage full-power aging testing for all products before delivery
· Sound MES management system, ensuring production efficiency
· Industry-leading dedicated test platform, meeting full-load testing requirements for inverters at different voltage levels and rectification modes, and ensuring top-notch product quality

Liquid Cooling System of the Inverter

Product Overview

The liquid cooling system of the HD8000 adopts the deionized liquid cooling mode, and is controlled by a dedicated PLC. The cooling medium with a constant pressure and flow rate undergoes heat exchange with external circulating cooling water through a plate heat exchanger, and enters the variable frequency system. This process effectively removes heat from the system. When the heat load or internal/external water flow changes, the PLC controls the flow of water entering the plate heat exchanger based on the temperature of the external water, thereby accurately controlling the system temperature.

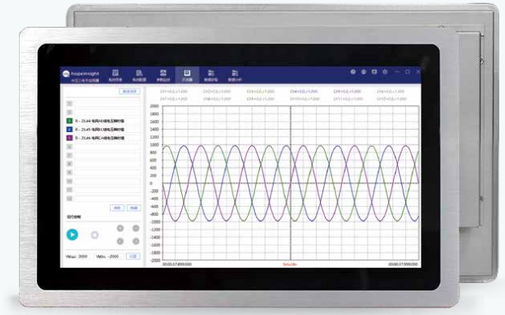
·The liquid cooling system adopts dual-pump redundancy (with one active and the other standby) design, with pump switching controlled by a configurable switching time to ensure reliability.

· The liquid cooling system is equipped with a pressure stabilizing system, in which the PLC automatically starts the air refilling pump based on pressure transmitter readings, to maintain the pressure of the cooling medium. In addition, an automatic electric heater is installed to provide automatic heating of external water during startup in cold weather.

① Main circulating pump 1
② Main circulating pump 2
③ Deionized water tank
④ Expansion tank
⑤ Liquid cooling indicator
⑥ Liquid cooling system touchscreen

Human-Machine Interface (HMI)

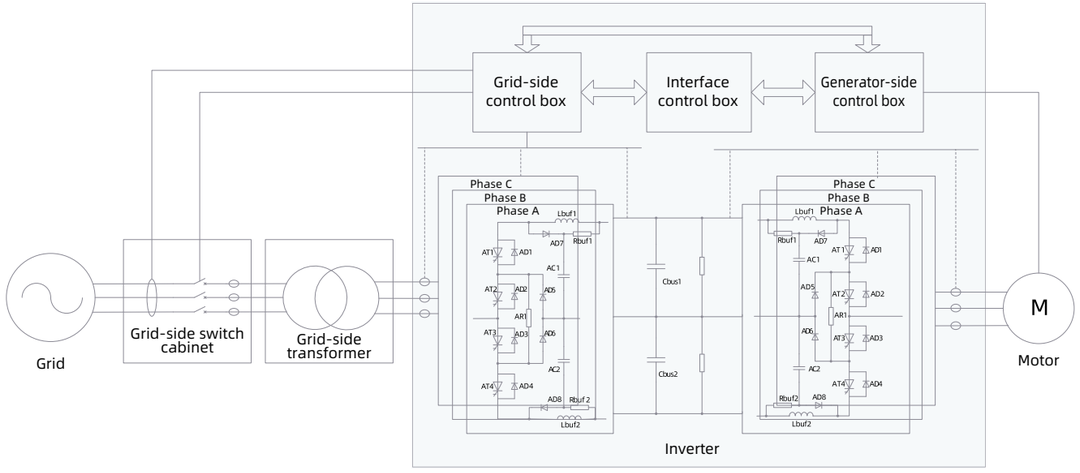
· The 15.6-inch industrial-grade LCD touch screen offers sensitive and precise touch control with a high definition and long service life. With a low power consumption design, it supports 24-hour continuous operation.
· The HMI utilizes a seamless display panel with an IP54 protection rating, making it dust-proof, waterproof, and shock-proof and suitable for various harsh working environments.
· The HMI incorporates a 12-channel high-speed oscilloscope and considerable professional commissioning function modules, supporting batch parameter setting and fault waveform recording, to guarantee the long-term stable operation of the equipment.



HD8000 Typical Solutions

HD8000 Series Three-Level Medium-Voltage Inverters

▶ Solution Topology (Example)

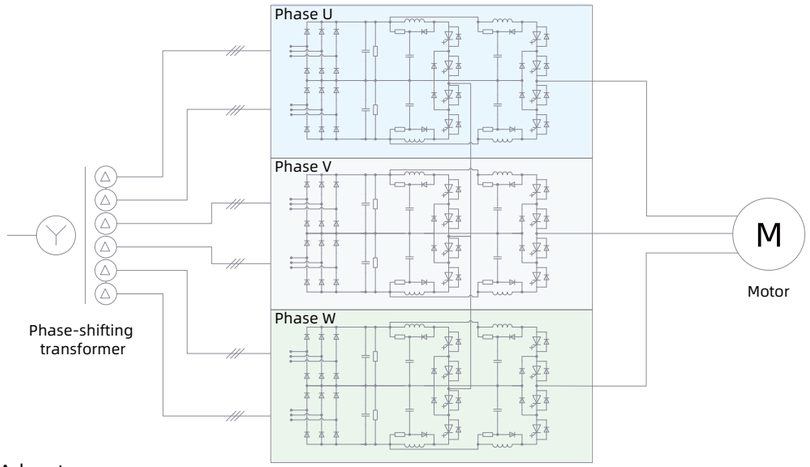


▶ Solution Advantages

· High overall efficiency
· Simple system structure using fewer components, ensuring high reliability
· Large single-inverter capacity, with high power density and small footprint
· Multi-pulse rectifier or PWM rectifier available for the grid side, providing strong flexibility
· Lower impact of grid harmonics

HD8000 Series Five-Level Medium-Voltage Inverters

▶ Solution Topology (Example)

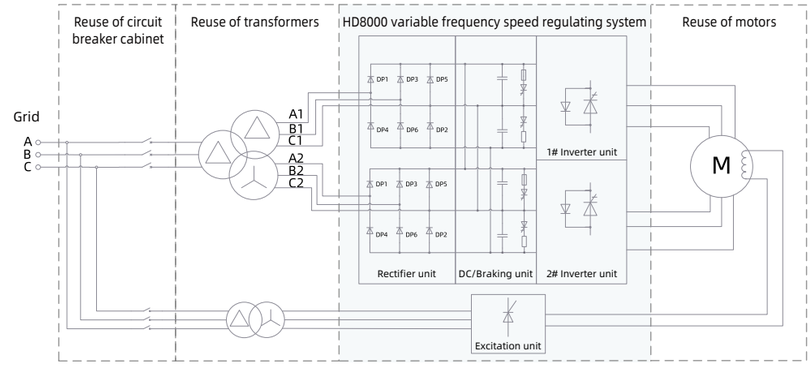


▶ Solution Advantages

- Simple system structure using fewer components, ensuring high reliability
- High power density and small footprint
- Space vector pulse width modulation (SVPWM) algorithm for five-level system and segmented synchronous modulation algorithm
- Lower impact of grid harmonics
- Smaller voltage jump at the output and lower voltage harmonic content
- Lower motor port voltage and reduced impact on the insulation of motors and power cables

Metallurgy – LCI Transformation

▶ Solution Topology (Example)

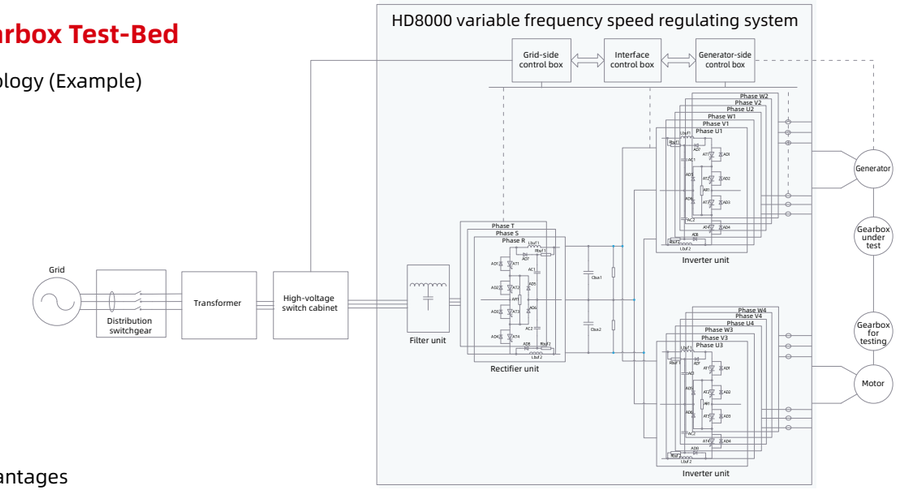


▶ Solution Advantages

- Replacing SCR thyristor load commutated inverter (LCI) with high-voltage fully-controlled IGCT inverter to achieve high reliability
- Reusable existing transformers and six-phase motors with phase difference
- Seamless compatibility with the PLC during Profibus-DP communication
- Significant reduction in motor temperature rise, grid-side harmonics, inverter noise, and dynamic speed drop during strip biting
- Notable improvement in power factor, efficiency, speed accuracy, and torque response
- High IP rating to ensure strong environmental adaptability
- Reduced head and tail losses to improve rolling efficiency

Large Gearbox Test-Bed

▶ Solution Topology (Example)



▶ Solution Advantages

- Energy storage and transmission via the common DC bus system
- Capable of tracking grid voltage, frequency, and phase on the rectifier side to reduce grid-connection impact current
- Supporting open-loop and closed-loop control of speed and torque
- High precision speed and torque control, with torque control response time less than 5 ms
- Adopting shaft system torsional vibration suppression technology of test-bed
- Combination of LCL filters and notch filters, along with grid-side harmonic elimination algorithm, effectively reducing grid harmonics

Metallurgy

Case 1: 177 Seamless Stainless Steel Pipe Piercing Mill

Location: A steel plant in Liaoning Province

Hopewind's variable frequency speed-regulating system for seamless stainless steel pipe piercing mill helps the large state-owned steel enterprise with overall transformation. Traditional DC speed regulating systems were used prior to project transformation. DC motors were prone to malfunction, leading to high maintenance costs. In this transformation, two piercing mills are equipped with AC motors, and two Hopewind HD8000 series engineering medium-voltage AC-DC-AC inverters (10 MVA for each) are used. The inverters use a four-quadrant rectifier solution to transmit regenerated energy to the grid, effectively saving energy during production. The trial production of steel is successful at the first attempt, and the production line operates stably under various extreme conditions. No fault occurs since the system is put into production. The process quality surpasses customer requirements, and the transformation has yielded significant improvements, receiving positive feedback from the steel plant leadership and production workers. The performance and reliability have been consistently recognized.

HD8000 Typical Application Cases

Case 2: High Speed Wire Rod Finishing Mill

Location: A steel plant in Inner Mongolia

The original system used an imported brand of AC-AC inverters, which had been in operation for over 10 years. In recent years, the system failure rate had risen significantly, greatly increasing the risk of downtime. Hopewind has mature and reliable solutions and application cases in LCI system transformation. For this project, Hopewind uses HD8000 series AC-DC-AC medium-voltage voltage source inverters, with a system capacity of 2*10 MVA. The system has been running stably since it is put into operation, significantly improving process indicators for the customer. The performance improvement is evident, ultimately earning high recognition from the customer.


Case 3: High Speed Wire Rod Finishing Mill

Location: A steel plant in Hebei Province

The original system used an imported brand of medium-voltage inverters. After more than a decade of operation, the system had aged significantly, resulting in a high failure rate and causing substantial production losses due to reduced and halted operation. Hopewind project team, based on the original LCI system, proposes a targeted upgrade solution using the HD8000 series AC-DC-AC medium-voltage voltage source inverters (2*8 MVA), to comprehensively enhance the performance of the main drive system of the rolling mill. The system has been running stably since it is put into production and has received high praise from the customer.


Case 4: High Speed Wire Rod Finishing Mill

Location: A steel plant in Tianjin

After the original imported inverters broke down, the customer faced daily losses of tens or millions of yuan due to reduced production. To resume production in a short time, Hopewind was requested to complete the replacement of the original system for production commencement within 11 days from the signing of the contract. Project team members worked overnight and in shifts for consecutive 11 days to complete the inverter assembly, engineering construction, formulation of the control and logic solutions, signal sorting of the original system, and commissioning. After the system is successfully put into production, it runs stably, showing outstanding comprehensive performance and earning high praise from the customer.


Case 5: Main Rolling Mill for Cold Rolling of 1,780 mm High-Precision Automobile Sheet

Location: A steel plant in Hebei Province

The plant's cold rolling production line for 1,780 mm automobile sheet originally used the main rolling mill equipped with branded medium-voltage AC inverters. With the increase in operating time, the product failure rate rose year by year and the repair time of phase modules was long, leading to high costs. This project uses Hopewind HD8000 series 10 MW medium-voltage inverter for replacement and transformation. Hopewind technical team developed a comprehensive commissioning solution and completed equipment commissioning within 48 hours. The system has been running stably with outstanding performance, and has received high praise from the customer.


HD8000 Typical Application Cases

Case 6: Roughing Rolling Mill for Hot Rolling of 850 mm High-Performance Strip

Location: A steel plant in Hebei Province

This project uses five Hopewind HD8000 series medium-voltage three-level variable frequency drive systems, with a voltage level of 3,300 V and a inverter capacity of 7 MVA. The system was put into operation in May 2021. It has been running stably without any faults or abnormalities. The variable frequency system fully meets the process requirements for the roughing mill in terms of speed control accuracy, torque control response, dynamic speed drop, dynamic speed drop equivalent, and overload capacity, improving the rolling efficiency.

Case 7: 1,200 mm Single-Stand Six-Roller Reversible Main Rolling Mill

Location: Suqian, Jiangsu Province

This project uses Hopewind HD8000 series medium-voltage three-level high-power inverters, which are applied on the left coiling device (8 MVA), main rolling mill (10 MVA), and right coiling device (8 MVA) of the 1,200 mm single-stand six-roller reversible rolling mill. After the project was put into production in May 2023, the system has been running stably and reliably without any faults, delivering precise control and superior performance. The process quality fully meets requirements. The system has greatly improved the production capacity and is highly praised by the customer.

Case 8: Single-Stand 20-Roller Reversible Main Rolling Mill

Location: Baotou, Inner Mongolia

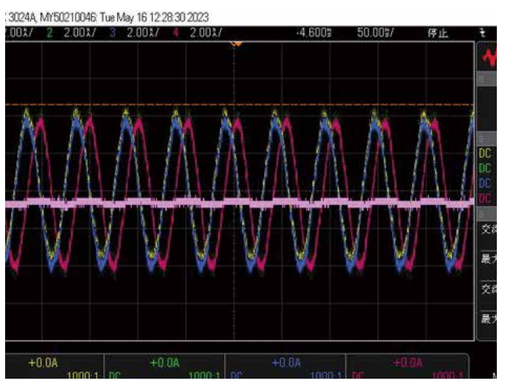
This project uses Hopewind HD8000 series medium-voltage three-level high-power inverters, which are applied on the left coiling device (8 MVA), main rolling mill (10 MVA), and right coiling device (8 MVA) of the single-stand 20-roller reversible rolling mill. After the project was put into production in 2023, the system has been running stably and reliably without any faults, delivering excellent control performance, and high control precision. It fully meets the cold rolling process control requirements. Since put into operation, the system has significantly improved the customer's production efficiency, thereby receiving high praise from the customer.

Large Test-Bed

Case 1: Large Gearbox Test-Bed

Location: Tianjin

This project uses Hopewind HD8000 series medium-voltage three-level variable frequency drive systems, with a voltage level of 3,300 V, motor power of 2*26,400 kW, and capacity of 2*34 MVA. The system was put into operation in May 2023. It provides testing services for gearbox test-beds of 26.4 MW or below, meeting the requirements for bearing load testings under different conditions. The entire equipment demonstrates excellent control performance, fully meeting customer requirements in speed control accuracy, torque control accuracy, and torque response time. It runs stably and reliably, with high power density and easy maintenance, receiving high recognition from the customer.

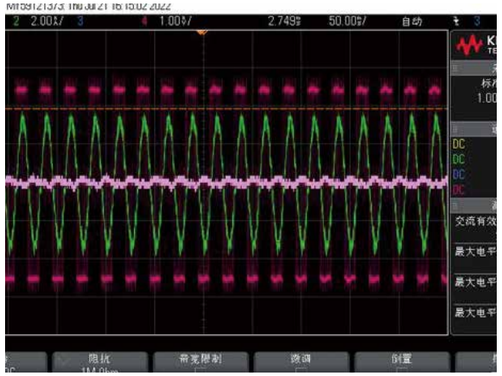


HD8000 Typical Application Cases

Case 2: Large Gearbox Test-Bed

Location: Nanjing, Jiangsu Province

This project uses Hopewind HD8000 series medium-voltage three-level variable frequency drive systems. Based on the common DC bus topology, the variable frequency drive system integrates hardware of the test-bed's distribution system, drive system, and energy feedback system into one set of equipment, with the inverter capacity of 2*28 MVA. The variable frequency drive system meets circulating current testing requirements, and can store and transfer energy through the common DC bus. After put into service, Hopewind equipment runs stably with excellent performance, meeting or surpassing key performance indicators of similar imported inverters. The equipment complies with testing process requirements and is highly acclaimed by the customer.



Petroleum and Petrochemical

Case 1: Natural Gas Pipeline Compressor Project by PipeChina

Location: A compressor station in Gansu Province

This project uses Hopewind HD8000 series 21 MVA medium-voltage five-level variable frequency drive systems, with a voltage level of 10,000 V, motor power of 18,000 kW, and high-speed synchronous motor. Since the commissioning was completed and the system was put into operation in September 2021, the entire equipment has been running stably without any faults. It delivers excellent control performance, and meets or surpasses design requirements in grid adaptability, startup characteristics, power factor, device efficiency, speed accuracy, output du/dt, noise, and other aspects. The system fully meets the motor drive commissioning process requirements for pipeline compressors, receiving high recognition from the customer.

Case 2: LNG

Location: Yan'an, Shaanxi Province

The original system used an imported brand of medium-voltage AC inverters. After nearly 10 years of operation, the high failure rate caused significant losses to the customer due to suspended production. The project uses Hopewind HD8000 series 24 MVA medium-voltage five-level inverters, with a voltage level of 6,600 V. The on-site construction and commissioning takes a total of 15 days, with existing motors and cables reused and the UCS unchanged. Since the project transformation was completed and the system was put into operation in 2021, no fault occurs, and the system runs properly. The compressor noise, vibration, losses, bearing temperature, and the reliability of the anti-fluctuation system have all been improved. Significant energy savings have greatly reduced the production costs for the enterprise, bringing substantial benefits to the customer.

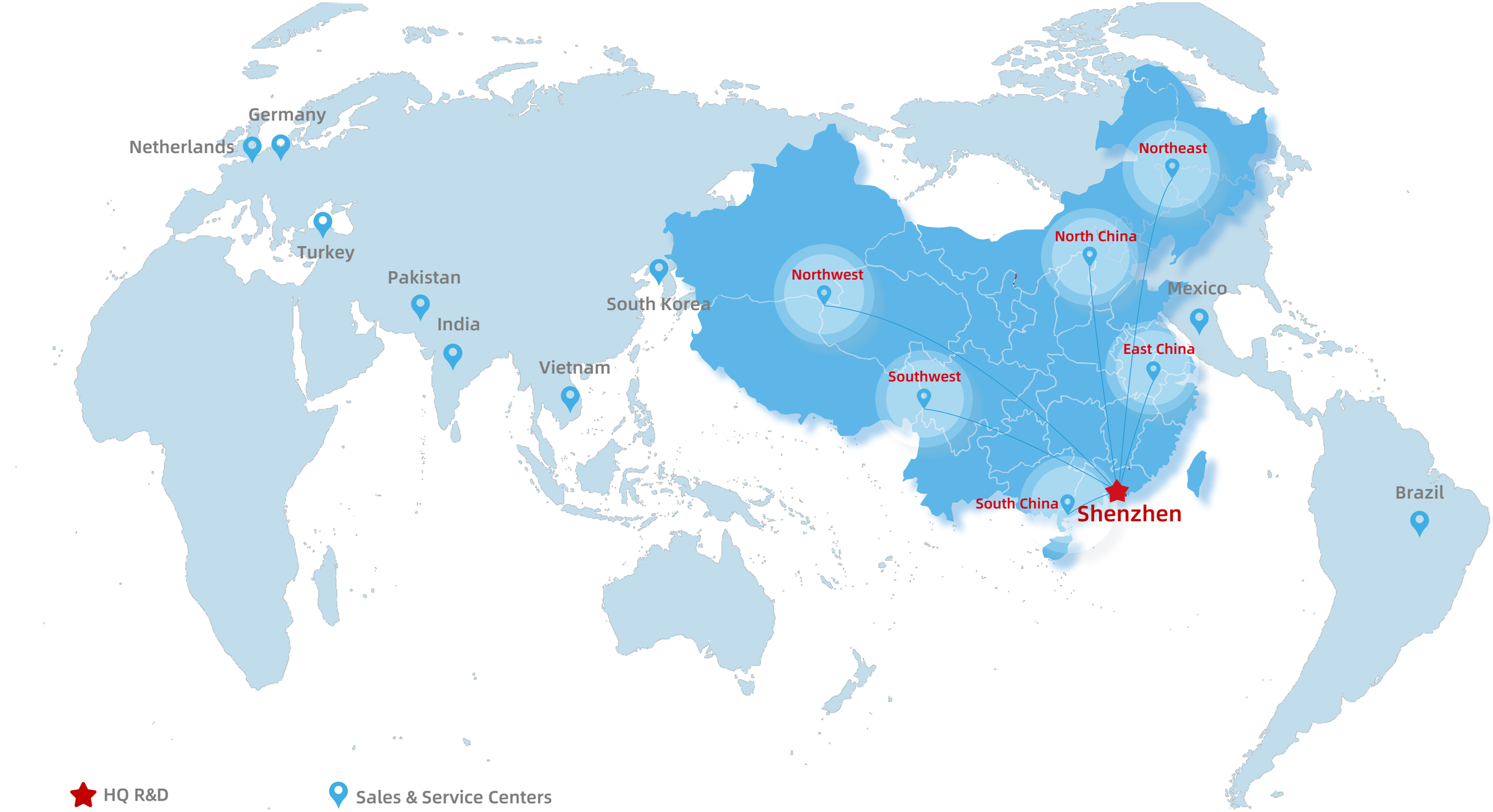
Case 3: Electric Drive Fracturing Equipment for Oil and Gas

Location: Xinjiang/Sichuan-Chongqing

For the application environment in the electric drive fracturing equipment for oil and gas field, Hopewind has developed a fracturing inverter skid unit offering dual IP54 protection. The accumulated order quantity has exceeded 60 sets in recent years. In addition, Hopewind is capable of providing separate 1-to-1 or 1-to-2 medium-voltage inverter solutions for electric drive fracturing skid unit. Hopewind HD8000 series medium-voltage three-level inverter skid units provide a voltage level of 3,300 V and power of 8 MVA/2*8 MVA. Since the first inverter skid unit was put into operation in 2021, the system has been running stably. The system boasts strong environmental adaptability, grid adaptability, redundancy design of key components, modular and easy-to-maintain design of the entire equipment, and sound protection, earning high praise from the customer.

An Expert in Manufacturing High-end Intelligent Drive Products

- 24/7 fast response
- High quality, fast and efficient



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