

# ZINVERT

## 智能高压变频调速系统产品手册

ZINVERT Intelligent High-voltage Variable Frequency Device  
Product Brochure







# Company Introduction

PCS (SVG) / UPS

Guangzhou Zhiguang Electric Technology Co., Ltd. is a core member enterprise of Guangzhou Zhiguang Electric Co., Ltd. specializing in the research of flexible power technology in the strategic development direction of integrated energy technology and services.

Since its establishment, the company has been focusing on the research of electrical control equipment technology with high-power power electronics as the core technology, and has carried out technological research and industrial application in the fields of smart grid, distributed microgrid, energy storage, motor control and energy conservation, power quality control, advanced power supply technology, etc. The main products include neutral point grounding devices for distribution networks, high-voltage variable frequency speed regulation devices, energy storage PCS systems, static var generators (SVG), port shore power systems, high/low-voltage power quality management, and large industrial intelligent UPS, etc.

Enterprise Vision

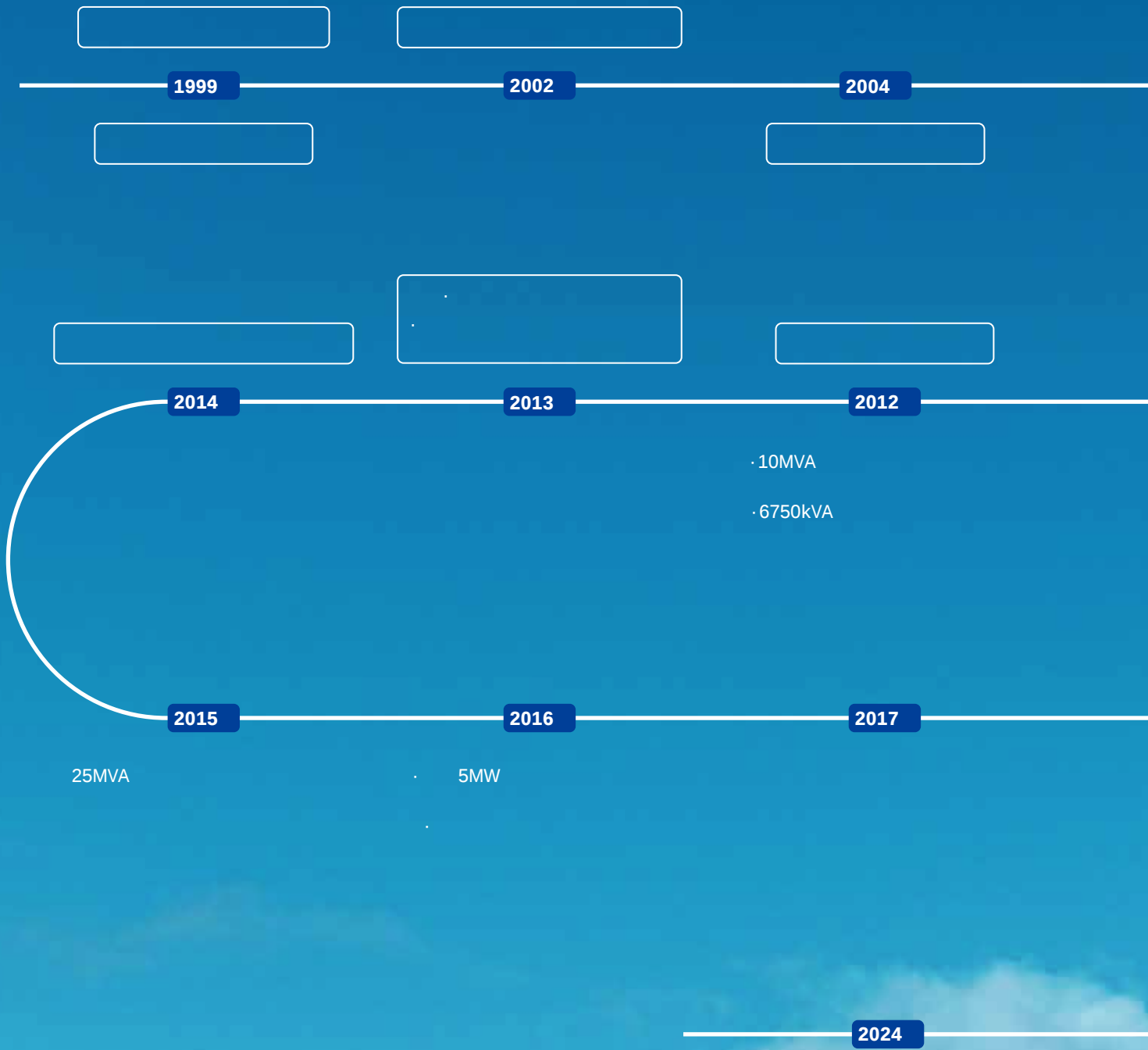
“ An Expert in Technological Innovation of High-power Electronics. ”

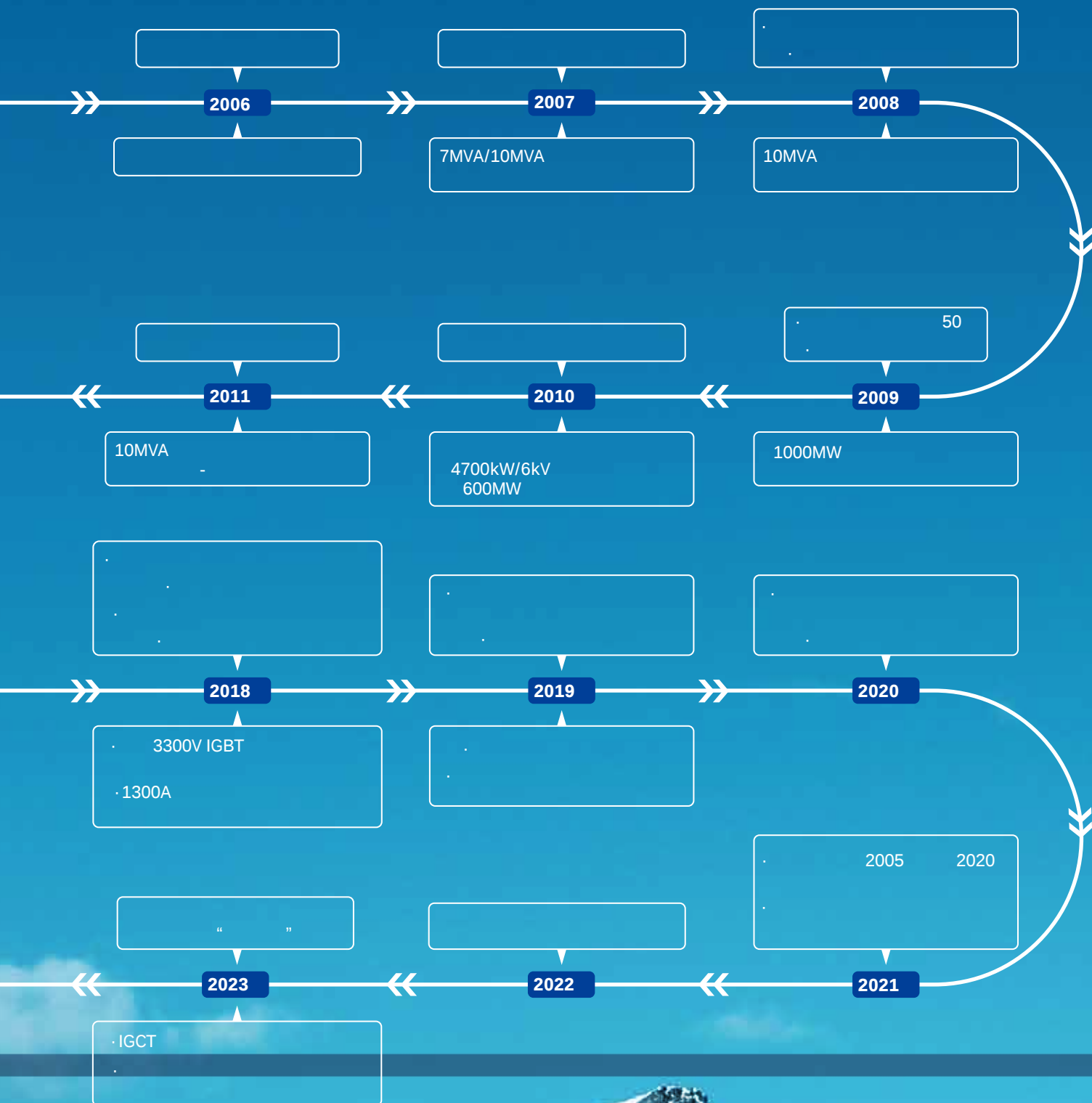
Enterprise Mission

“ To Help Customers Use Energy Safely, Efficiently and Comfortably. ”

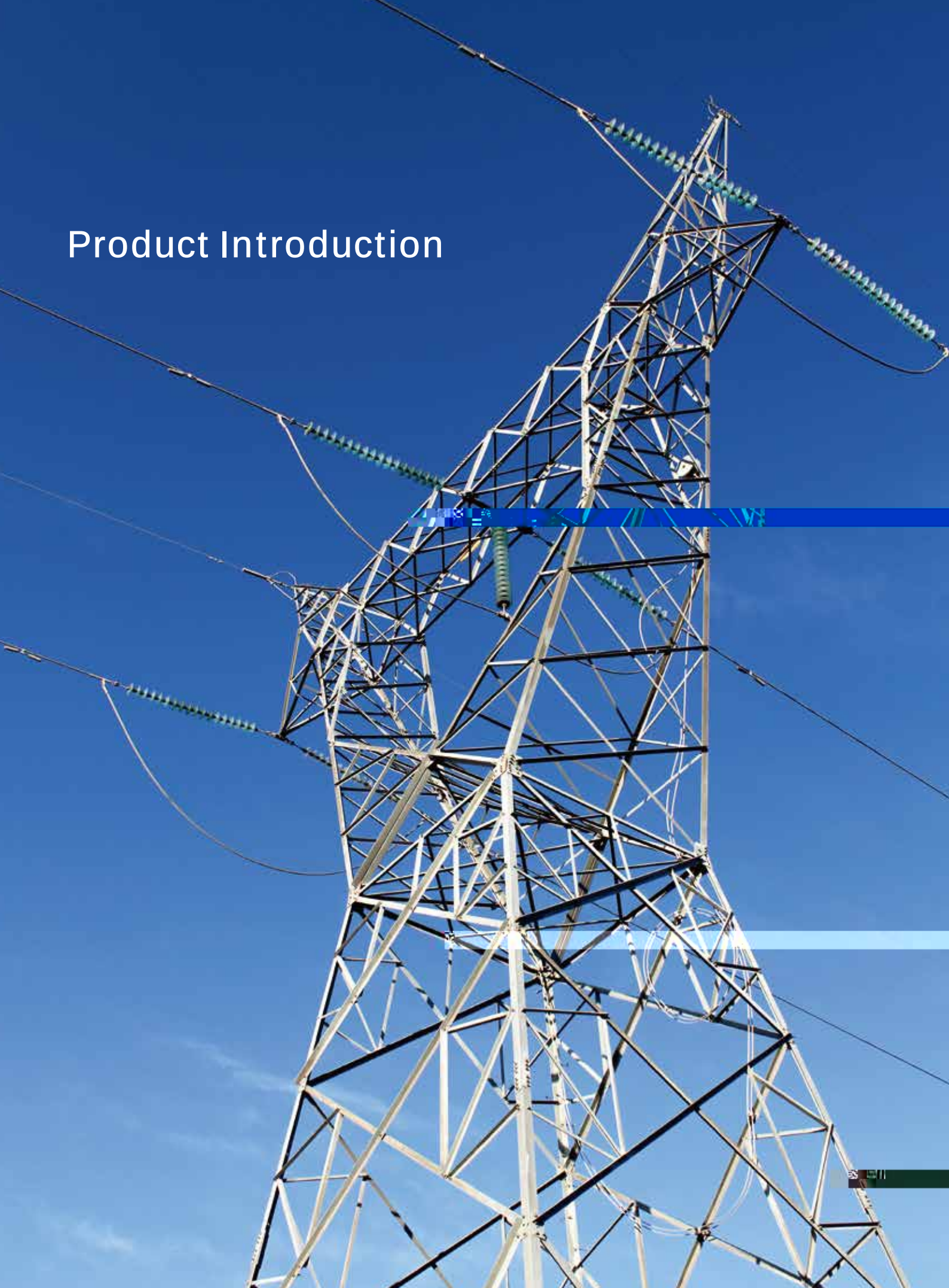
|                          |                                      |                                                        |                                                   |
|--------------------------|--------------------------------------|--------------------------------------------------------|---------------------------------------------------|
| Establishment Time: 2002 | Registered Capital: 200 million yuan | Wholly-owned subsidiary of Zhiguang Electric Co., Ltd. | More than 300 patents and honorary qualifications |
|--------------------------|--------------------------------------|--------------------------------------------------------|---------------------------------------------------|

# 1.1





# Product Introduction



2.1 ZINVERT

ZINVERT Intelligent High-voltage Variable Frequency Device(HVFD) Introduction

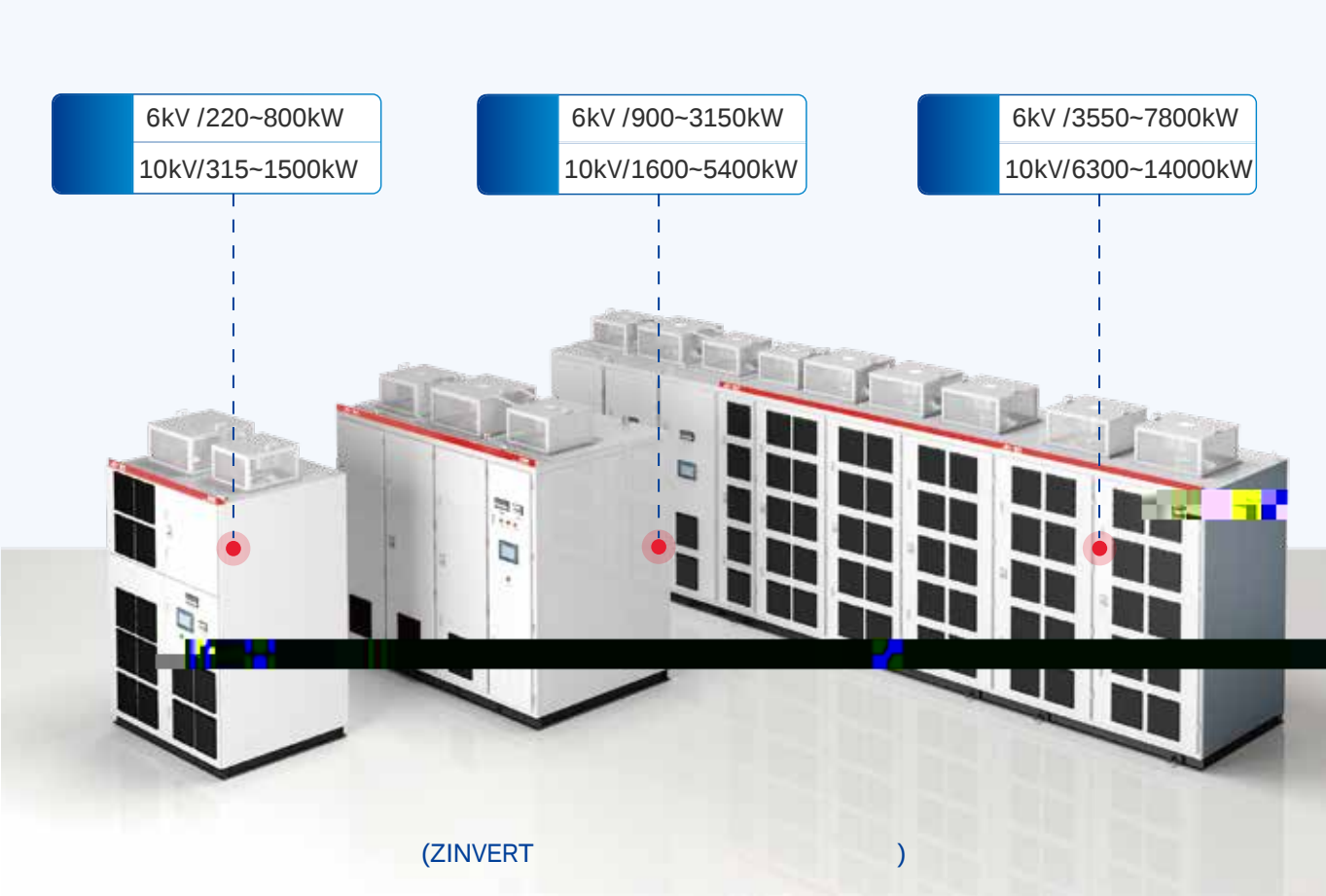
ZINVERT

10kV 6kV

-

HVFD through the phase shifting transformer on the input 10kV or 6kV voltage after phase shifting step-down, by the power unit rectifier inverter and superposition of each phase after the output, to achieve the real high-high frequency conversion speed control.

- High power density all-in-one cabinet type, chassis type power unit, suitable for single person maintenance operation;
- Advanced speed tracking algorithm, real-time monitoring of unit operation and maintenance, to ensure rapid start-up in full working conditions;
- Optimised system-wide logic control strategy, which ensures fast restart after high voltage loss;
- Rigorous thermal analysis design, which not only ensures heat dissipation but also greatly reduces installation space and infrastructure costs.
- Adopting multi-stage H-bridge power unit box cascade to realise the perfect waveform output of high voltage, it can directly drag ordinary asynchronous motor without boosting.
- Without adding any filter, and the harmonic index meets the most severe requirements of IEC and national standard on grid harmonics.



## 2.2 ZINVERT

### HVFD Eight Advantages



Superior high and low voltage ride-through technology

65 115  $U_e$

60s

It does not shut down in the range of 65% to 115%  $U_e$  fluctuation of the grid-side voltage, and within 60s of the grid-side voltage dropout, it starts by itself without shock and drags the motor to the state before the power dropout.



“ STT ”

Direct starting of rotating loads with proprietary "STT" technology

“ STT ”

Adopting the original "STT" algorithm, it ensures that the motor can be started without stopping at any speed within the speed range, and can be started directly without impact, which has been verified by the test of the national organizations.



“ SCP ”

High-voltage output sudden short-circuit "SCP" protection technology

“ SPC ”

Adopting the patented "SPC" protection technology with multiple short-circuit protection functions, it can effectively protect the safety of the motor and the system.



Separate power supply technology for transformers with high short-circuit insulation impedance

Low-voltage debugging mode enables convenient debugging and easy problem troubleshooting, shortens the debugging cycle, and improves reliability.



Adaptive acceleration and deceleration adjustment

Improve the short-circuit resistance of the transformer, guarantee the stability of the power supply of the unit, reduce the losses generated by daily operation, and save energy and increase efficiency.



Unique cooling structure adapts to air-cooled and water-cooled flexible design

Adopting special structural design, high heat dissipation efficiency, small system volume, low requirements for temperature, humidity, dust, gas and other environmental requirements, air-cooled, water-cooled to meet the needs of customers in multiple scenarios.



Low power sensitivity and high operational stability

Adopt three-way power supply circuit design, low sensitivity to power supply. Adopt software and hardware multiple anti-interference technology to ensure the stability of system operation.



The whole machine is self-developed and produced to ensure quality and cost competitiveness.

Based on Zhiguang's many years of high-power electronics technology and patented technology, self-developed and produced of power units, phase-shifting transformers, control systems and other core components, to ensure product quality and cost advantages.



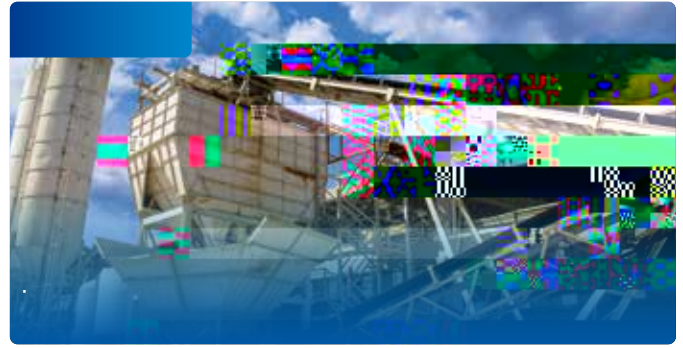
|                  |                           |
|------------------|---------------------------|
| 0.1 10Hz         |                           |
| /                | / 16 1 5                  |
| RS232 RS485 RJ45 |                           |
| 0.1% ± 2%        |                           |
| >97%             | rated >96% 20% >20% rated |
| 0~10%Un          | configurable              |
| 0 3000s          | configurable              |
| 0.1 30s )        |                           |
| PLC              | PID /                     |
|                  |                           |
| IGBT             |                           |
|                  |                           |
| <75dB all        |                           |
|                  | 5000m 1200 1200-5000      |
|                  | < .55                     |
| /                | -5~+45 20~95%             |
|                  | 10~150HZ 0.5g             |
|                  | -20~70                    |

## 2.4 Business Models

### 2.4.1 Application Scenarios



**Thermal power generation:** induced draft fan, supply fan, dust-absorbing fan, booster fan, compressor, condensate pump, feed water pump, make-up water pump, grey slurry pump, and so on.



**Cement manufacturing:** kiln head exhaust fan, kiln tail exhaust fan, high-temperature fan, main dust-absorbing fan, cooler dust-absorbing fan, cooler exhaust fan, preheating tower fan, sorter fan, etc.



**Metallurgy:** main extractor fan, blast furnace blower, dust removal fan, slurry pump, descaling pump, centrifugal feed pump, elevator, semi-automatic mill, etc.



**Mines:** Main ventilation fans, pressurised fans, extractor fans, air compressors, pumps, belt conveyors, mills, etc.



**Municipalities:** sewage pumps, clean water pumps, purification pumps, biological crude treatment tower pumps, oxygen delivery blowers, etc.



**Papermaking:** pulper, grinder, pulveriser, papermaking machine, rewinder, etc.



**Petrochemical:** induced draft fan, gas compressor, water injection pump, submersible oil pump, main pipeline pressurised pump, boiler feed pump, brine pump, mixer, squeezer, etc.



**Others:** Synchronous belt drive mechanical devices, mine hoist, wind turbine, energy return laboratory, drag control, wind tunnel, rubber, military and other industries.





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| 220 |  | 30 |

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|----|------|---------------------|------|-------|-------|------|------|-------|-------|
| 33 |      | Zinvert-A6H5600/06  |      | 9200  | 10800 | 2910 | 1586 | 13776 | 15276 |
| 34 | 4500 | Zinvert-A5H5600/06  | 540  | 9200  | 10800 | 2910 | 1586 | 13317 | 14817 |
| 35 |      | Zinvert-A6H6300/06  |      | 9400  | 10800 | 2910 | 1586 | 15438 | 16938 |
| 36 | 5000 | Zinvert-A5H6300/06  | 600  | 9400  | 10800 | 2910 | 1586 | 14979 | 16479 |
| 37 |      | Zinvert-A6H7000/06  |      | 9400  | 11000 | 2910 | 1586 | 15438 | 16938 |
| 38 | 5600 | Zinvert-A5H7000/06  | 720  | 9400  | 10800 | 2910 | 1586 | 14979 | 16479 |
| 39 |      | Zinvert-A6H8000/06  |      | 11000 | 12600 | 2910 | 1586 | 20850 | 22350 |
| 40 | 6300 | Zinvert-A5H8000/06  | 800  | 11000 | 12600 | 2910 | 1586 | 20250 | 21750 |
| 41 | 7100 | Zinvert-A6H9000/06  | 900  | 11000 | 12600 | 2910 | 1586 | 21650 | 23150 |
| 42 | 7800 | Zinvert-A6H10000/06 | 1050 | 13000 | 14600 | 2910 | 1586 | 23950 | 25450 |

► 3kV

3kV HVFD Selection Table

| NO. | Motor Capacity | Inverter Model     | A<br>Rated output<br>current | Total Length |           | Height<br>(mm) | Total Depth<br>(mm) | kg<br>Total Weight |           |
|-----|----------------|--------------------|------------------------------|--------------|-----------|----------------|---------------------|--------------------|-----------|
|     | (kW)           |                    |                              | Manual       | Automatic |                |                     | Manual             | Automatic |
| 1   | 250            | Zinvert-A3H315/03  | 60                           | 2600         | 3200      | 2675           | 1586                | 2010               | 2310      |
| 2   | 315            | Zinvert-A3H400/03  | 75                           | 2950         | 3550      | 2675           | 1586                | 2262               | 2562      |
| 3   | 355            | Zinvert-A3H450/03  | 105                          | 2950         | 3550      | 2675           | 1586                | 2502               | 2802      |
| 4   | 400            | Zinvert-A3H500/03  | 105                          | 2950         | 3550      | 2675           | 1586                | 2563               | 2863      |
| 5   | 450            | Zinvert-A3H560/03  | 105                          | 2950         | 3550      | 2675           | 1586                | 2643               | 2943      |
| 6   | 500            | Zinvert-A3H630/03  | 120                          | 2950         | 3550      | 2675           | 1586                | 2713               | 3013      |
| 7   | 560            | Zinvert-A3H700/03  | 150                          | 2950         | 3550      | 2675           | 1586                | 2844               | 3144      |
| 8   | 630            | Zinvert-A3H800/03  | 150                          | 2950         | 3550      | 2675           | 1586                | 2935               | 3235      |
| 9   | 710            | Zinvert-A3H900/03  | 180                          | 2950         | 3550      | 2675           | 1586                | 3035               | 3335      |
| 10  | 800            | Zinvert-A3H1000/03 | 210                          | 2950         | 3550      | 2675           | 1586                | 3255               | 3555      |
| 11  | 900            | Zinvert-A3H1150/03 | 245                          | 2950         | 3550      | 2675           | 1586                | 3591               | 3891      |
| 12  | 1000           | Zinvert-A3H1250/03 | 245                          | 2950         | 3550      | 2675           | 1586                | 3841               | 4141      |
| 13  | 1120           | Zinvert-A4H1400/03 | 270                          | 4800         | 5400      | 2675           | 1200                | 4386               | 4686      |
| 14  | 1250           | Zinvert-A4H1550/03 | 300                          | 4800         | 5400      | 2675           | 1200                | 4586               | 4886      |
| 15  | 1400           | Zinvert-A4H1800/03 | 360                          | 4800         | 5400      | 2675           | 1200                | 4999               | 5299      |
| 16  | 1600           | Zinvert-A4H2000/03 | 400                          | 4800         | 5400      | 2675           | 1200                | 5598               | 5898      |
| 17  | 1800           | Zinvert-A4H2250/03 | 480                          | 6680         | 7280      | 2675           | 1586                | 6898               | 7198      |
| 18  | 2000           | Zinvert-A4H2500/03 | 480                          | 6680         | 7280      | 2675           | 1586                | 7198               | 7498      |
| 19  | 2250           | Zinvert-A4H2800/03 | 540                          | 7200         | 7800      | 2710           | 1586                | 7623               | 7632      |
| 20  | 2500           | Zinvert-A4H3150/03 | 600                          | 7200         | 7800      | 2710           | 1586                | 8123               | 8177      |
| 21  | 2800           | Zinvert-A4H3500/03 | 720                          | 7200         | 7800      | 2710           | 1586                | 8323               | 8623      |
| 22  | 3150           | Zinvert-A4H4000/03 | 800                          | 7200         | 7800      | 2710           | 1586                | 8623               | 8923      |

► Ultra-large capacity HVFD Selection Table

| NO. | Transformer Capacity | Inverter Model       | A<br>Rated unit current output | Unit configuration     |
|-----|----------------------|----------------------|--------------------------------|------------------------|
|     | (kVA)                |                      |                                |                        |
| 1   | 20000                | Zinvert-S4H20000/10F | 1150                           | ZINVU-1150/45F-175D-C1 |
| 2   | 25000                | Zinvert-S4H25000/10F | 1450                           | ZINVU-1450/45F-175D-C1 |
| 3   | 30000                | Zinvert-S4H30000/10F | 1750                           | ZINVU-1750/45F-175D-C1 |
| 4   | 40000                | Zinvert-S4H40000/10F | 2300                           | ZINVU-2300/45F-175D-C1 |
| 5   | 50000                | Zinvert-S4H50000/10F | 2900                           | ZINVU-2900/45F-175D-C1 |
| 6   | 60000                | Zinvert-S4H60000/10F | 3500                           | ZINVU-3500/45F-175D-C1 |
| 7   | 12000                | Zinvert-S2H12000/06F | 1150                           | ZINVU-1150/45F-175D-C1 |
| 8   | 15000                | Zinvert-S2H15000/06F | 1450                           | ZINVU-1450/45F-175D-C1 |
| 9   | 18200                | Zinvert-S2H18200/06F | 1750                           | ZINVU-1750/45F-175D-C1 |
| 10  | 24000                | Zinvert-S2H24000/06F | 2300                           | ZINVU-2300/45F-175D-C1 |
| 11  | 30000                | Zinvert-S2H30000/06F | 2900                           | ZINVU-2900/45F-175D-C1 |
| 12  | 36400                | Zinvert-S2H36400/06F | 3500                           | ZINVU-3500/45F-175D-C1 |
| 13  | 6000                 | Zinvert-S1H6000/03F  | 1150                           | ZINVU-1150/45F-175D-C1 |
| 14  | 7500                 | Zinvert-S1H7500/03F  | 1450                           | ZINVU-1450/45F-175D-C1 |
| 15  | 9000                 | Zinvert-S1H9000/03F  | 1750                           | ZINVU-1750/45F-175D-C1 |
| 16  | 12000                | Zinvert-S1H12000/03F | 2300                           | ZINVU-2300/45F-175D-C1 |
| 17  | 15000                | Zinvert-S1H15000/03F | 2900                           | ZINVU-2900/45F-175D-C1 |
| 18  | 18000                | Zinvert-S1H18000/03F | 3500                           | ZINVU-3500/45F-175D-C1 |



## 3.2

## Typical Performance

| NO.   | Contract | Device Model          | Motor power | load | Industry | runtime |
|-------|----------|-----------------------|-------------|------|----------|---------|
| 1     | 100MW    | Zinvert-S9H18000/10   | 15000       |      |          | 2025    |
| 2     | 100MW    | Zinvert-S9H18000/10   | 15000       |      |          | 2025    |
| 3     | LNG      | Zinvert-A9H16500/10   | 13200       |      |          | 2025    |
| 4     | LNG      | Zinvert-R8H13200/10   | 13200       |      |          | 2025    |
| 5     | LNG      | Zinvert-A9H16250/10Y  | 13000       |      |          | 2024    |
| 6     | LNG      | Zinvert-R8H13000/10Y  | 13000       |      |          | 2024    |
| 7     |          | Zinvert-R8H11000/10Y  | 11000       |      |          | 2023    |
| 8     |          | ZGMVS-10/14000        | 10600       |      |          | 2024    |
| 9     |          | ZGMVS-10/14000        | 10600       |      |          | 2024    |
| 10    |          | Zinvert-R8H5600/10Y   | 10500       |      |          | 2022    |
| 11    |          | Zinvert-R8H8700/10Y   | 8700        |      |          | 2023    |
| 12    |          | Zinvert-A8H11250/10Y  | 8500        |      |          | 2024    |
| 13    |          | Zinvert-S10H12500/10Y | 8000        |      |          | 2022    |
| 14    |          | Zinvert-A8H10000/10   | 7600        |      |          | 2024    |
| 15    |          | ZGMVS-10/8900         | 7200        |      |          | 2022    |
| 16    |          | Zinvert-A8H8900/10Y   | 7100        |      |          | 2025    |
| 17    |          | Zinvert-A8H8900/10Y   | 6900        |      |          | 2022    |
| 18    |          | Zinvert-A8H7800/10    | 6300        |      |          | 2024    |
| 19    | 3#       | Zinvert-A6H7800/06Y   | 6300        |      |          | 2014    |
| 20    | #3       | Zinvert-A6H6900/06Y   | 6000        |      |          | 2016    |
| 21    | SJ15000  | Zinvert-S8H6750/10Y   | 5800        |      |          | 2019    |
| 22    |          | Zinvert-A6H7000/06Y   | 5600        |      |          | 2015    |
| 23    | 4#       | Zinvert-A6H6900/06Y   | 5500        | /    |          | 2015    |
| 24    |          | Zinvert-A6H6300/06Y   | 5200        |      |          | 2019    |
| 25    |          | Zinvert-A9H7000/10Y   | 5000        |      |          | 2019    |
| 26    | 3#       | Zinvert-A8H5600/10Y   | 4300        |      |          | 2020    |
| 27    |          | Zinvert-R8H5000/10Y   | 3400        |      |          | 2022    |
| 28    |          | Zinvert-A8H3150/10Y   | 2500        |      |          | 2020    |
| 29    |          | Zinvert-A8H1250/10B   | 800         |      |          | 2016    |
| 30    |          | Zinvert-A8H450/10B    | 355         |      |          | 2017    |
| 20000 |          |                       |             |      |          |         |

### 3.2.1

#### Special load

| NO. | Project Name | Device Model        | Motor power | ( / )<br>Classification of inverter application<br>loads(Other fan/pump loads) | Industry | Year |
|-----|--------------|---------------------|-------------|--------------------------------------------------------------------------------|----------|------|
| 1   |              | Zinvert-A8H1800/10B | 1400        |                                                                                |          | 2015 |
| 2   |              | Zinvert-A8H4500/10Y | 6300        |                                                                                |          | 2016 |
| 3   |              | Zinvert-A8H1500/10B | 1250        |                                                                                |          | 2017 |
| 4   |              | Zinvert-A8H2000/10Y | 1600        |                                                                                |          | 2018 |
| 5   |              | TRQ-1250            | 1250        |                                                                                |          | 2018 |
| 6   |              | Zinvert-A8H2500/10Y | 1600        |                                                                                |          | 2018 |
| 7   |              | Zinvert-A8H6300/10Y | 5000        |                                                                                |          | 2018 |
| 8   |              | Zinvert-A8H6300/10Y | 5000        |                                                                                |          | 2019 |
| 9   |              | Zinvert-A6H500/10B  | 320         |                                                                                |          | 2019 |
| 10  |              | Zinvert-A5H900/06B  | 710         |                                                                                |          | 2019 |
| 11  |              | Zinvert-A6H560/06B  | 400         |                                                                                |          | 2019 |
| 12  |              | Zinvert-A9H5600/10Y | 4500        |                                                                                |          | 2020 |
| 13  |              | Zinvert-S6H6300/06Y | 4850        |                                                                                |          | 2020 |
| 14  |              | Zinvert-A9H4000/10Y | 2600        |                                                                                |          | 2020 |
| 15  |              | Zinvert-A5H1150/06B | 710         |                                                                                |          | 2020 |
| 16  | 1#           | Zinvert-A8H1800/10B | 3550        |                                                                                |          | 2020 |
| 17  |              | Zinvert-R8H800/10B  | 630         |                                                                                |          | 2021 |
| 18  |              | Zinvert-A5H3500/06Y | 2500        |                                                                                |          | 2021 |
| 19  |              | Zinvert-A9H1150/10B | 710         |                                                                                |          | 2022 |
| 20  |              | Zinvert-A8H4500/10Y | 3550        |                                                                                |          | 2022 |
| 21  |              | Zinvert-S9H4500/10Y | 2100        |                                                                                |          | 2023 |
| 22  |              | Zinvert-A8H5000/10Y | 3550        |                                                                                |          | 2023 |

### 3.3

#### Typical Applications

##### LNG

Zinvert-R8H11000/10Y

LNG

LNG

LNG

LNG



Project Name: Inverter Project for the Natural Gas Storage and Peak Regulation of Jingbian by Yanchang Petroleum and the Supporting LNG Configuration

Product Specification: Zinvert-R8H11000/10Y

Project Highlights: The working conditions of natural gas storage and peak regulation as well as LNG production are complex and changeable, and this device endows the system with a powerful adjustment capability. In terms of natural gas storage and peak regulation, it can quickly adjust the operating parameters of the compressor according to the gas consumption peaks and valleys in different seasons and at different times of the day and night, so as to achieve precise gas storage and efficient gas supply. In the LNG production process, it can timely adjust the motor speed in response to the slight changes in process parameters such as the refrigeration temperature and pressure, ensuring that LNG production is always in the best state and flexibly meeting the diverse demands of the market for natural gas and LNG products.

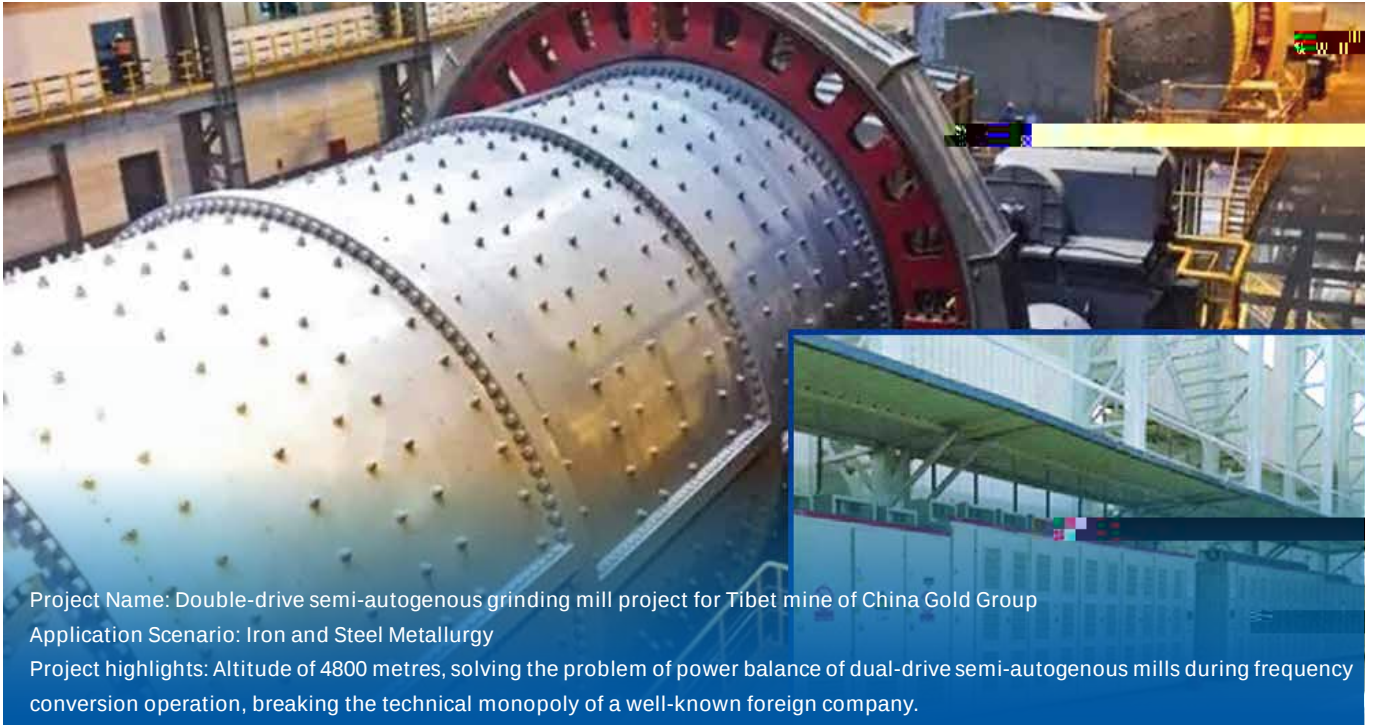
##### 600MW

Project name: Datang Group 600MW unit combined induced draft fan frequency conversion transformation project

Application scenario: thermal power generation induced draft fan

Project highlights: After the transformation, the frequency conversion equipment operates stably, has good regulation characteristics, and the energy-saving effect is obvious.

4800



Project Name: Double-drive semi-autogenous grinding mill project for Tibet mine of China Gold Group

Application Scenario: Iron and Steel Metallurgy

Project highlights: Altitude of 4800 metres, solving the problem of power balance of dual-drive semi-autogenous mills during frequency conversion operation, breaking the technical monopoly of a well-known foreign company.

600MW

1%

6500h

75%

25%

2000



Project name: Datang Group thermal power plant 600MW unit electric feedwater pump frequency conversion transformation project

Application Scenario: Thermal power generation feedwater pump

Project highlights: Under the premise that the unit runs for 6500h and the average load rate is 75%, the comprehensive power saving rate can be up to 25%, and it is expected that the average annual power saving will be over 20 million kWh, and the comprehensive plant power rate will be reduced by nearly 1%.



Project Name: Nation's First! Successful Operation of Zhiguang's "One-to-Nine" High-Voltage Frequency Conversion Project

Application Scenario: Thermal Power Plant Fans

Project Highlights: The successful operation of this project has overcome numerous technical challenges faced by high-voltage frequency converters in a one-to-many configuration, such as motor matching, protection, wiring layout, and length. It not only optimizes the operational efficiency of the fans but also reduces energy consumption and maintenance costs, enhancing the system's stability and safety.



20000kVA

150

250



Project name: Guangxi large-scale paper-making enterprise synchronous motor special converter drive pulp mill project

Application Scenario: Pulp Mill for Paper Making Industry

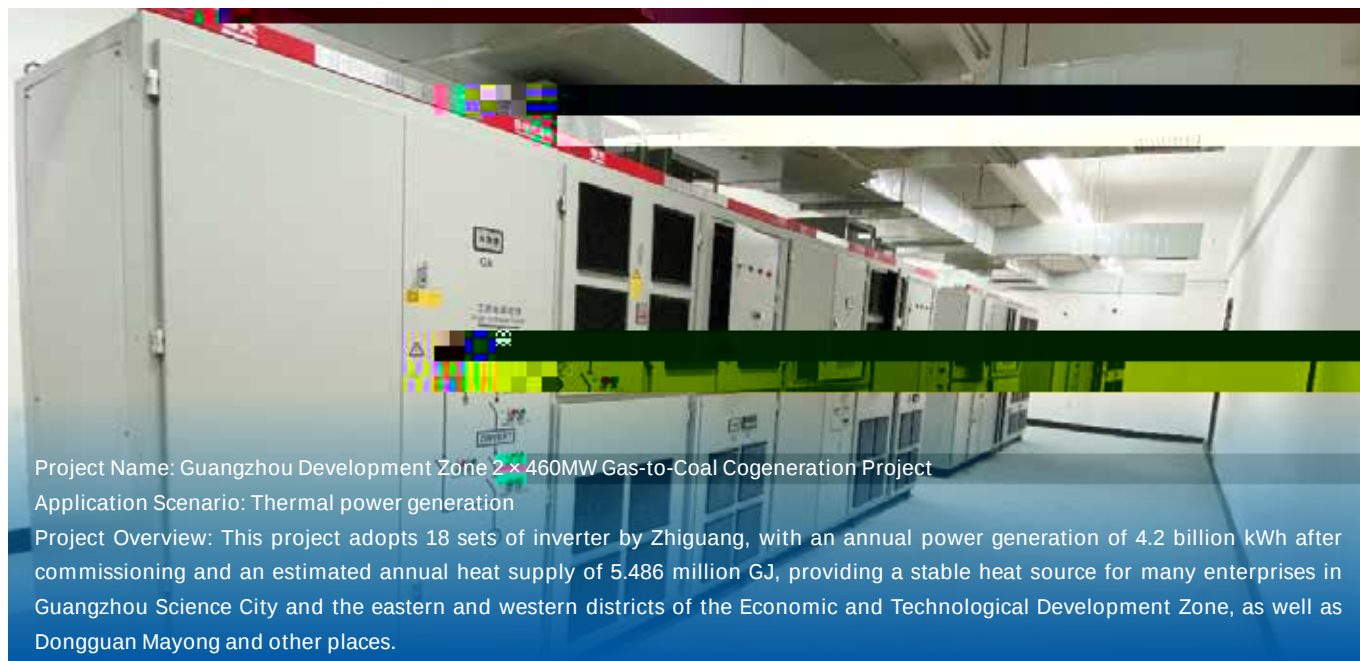
Project highlights: 20000kVA motor, using Zhiguang high-voltage inverter one-two start-up solution, can achieve an annual output of 1.5 million tons of raw pulp and 2.5 million tons of paper.

2 × 460MW “ ”

18

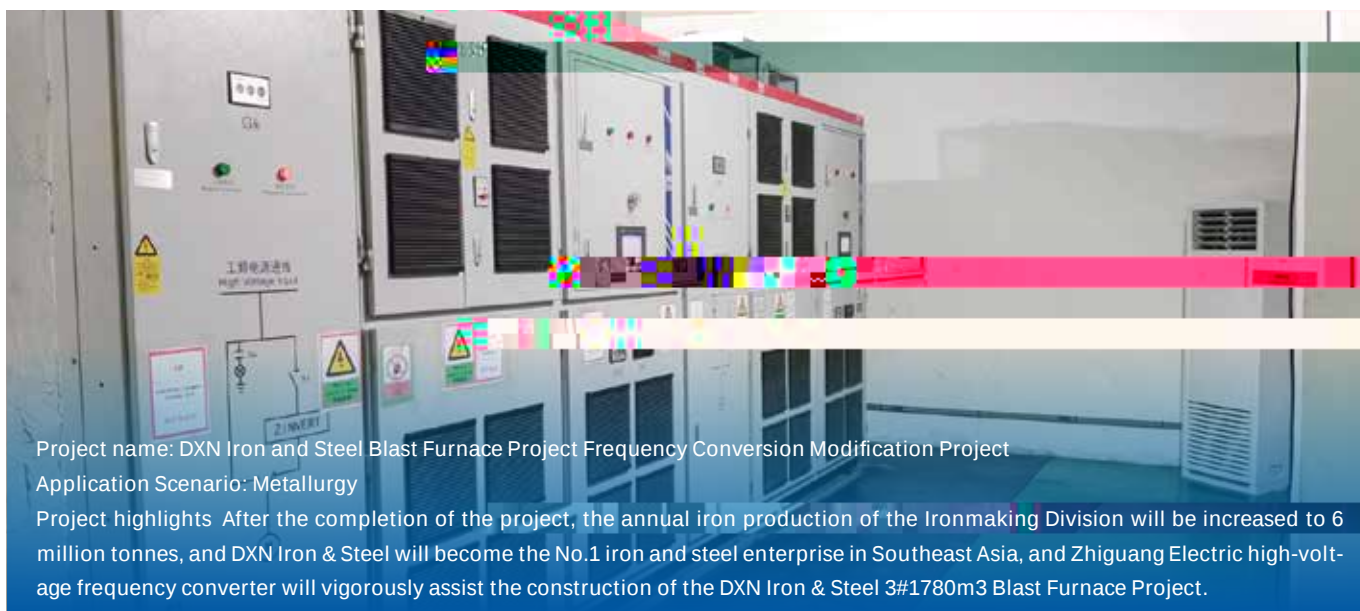
42 kWh

548.6 GJ



3#1780m3

600





Five-star after-sales service to ensure the stable operation of equipment in various scenarios around the world.



Professional Efficient Comprehensive

## 7大服务中心 Service Center

Zhiguang has established seven major regional service centres with Guangzhou, Beijing, Shanghai, Xi'an, Chongqing, Wuhan and Hangzhou as the core, and on the basis of which it has set up a service network covering all major customer service points and project departments across the country, which can provide faster, more convenient and comprehensive and considerate high-quality services for customers and partners.

## 2服务范围 Service Scope

Standardised Warranty: pre-commissioning, installation and commissioning, preventive maintenance, spare parts supply, on-site service, optimisation service, intelligent O&M.  
Customised services: customised programme design, multiple cooperation models, training services.

## 2/48服务承诺 Service Commitment

2 48

Respond within 2 hours after receiving the service demand, and personnel arrive at the site within 48 hours.

## 1 Service Platform

"Comprehensive Energy Service Industrial Internet Platform" empowers the core aspects of comprehensive energy service products, such as technology research and development, product manufacturing, system integration, equipment operation and maintenance, energy efficiency improvement, energy trading, etc., with big data, and helps customers realise the transformation and upgrade from factor-driven to data-driven.



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