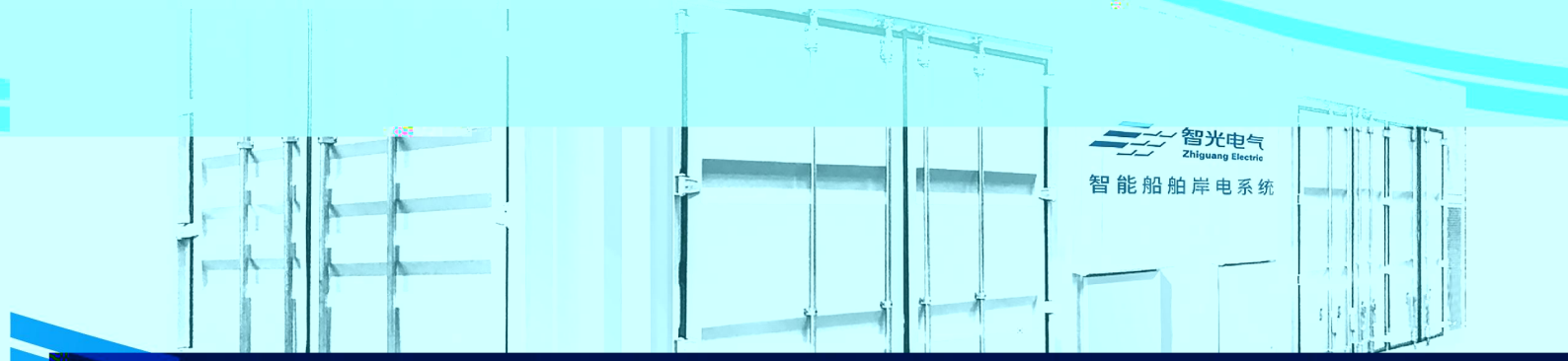
智光电气
Zhiguang Electric

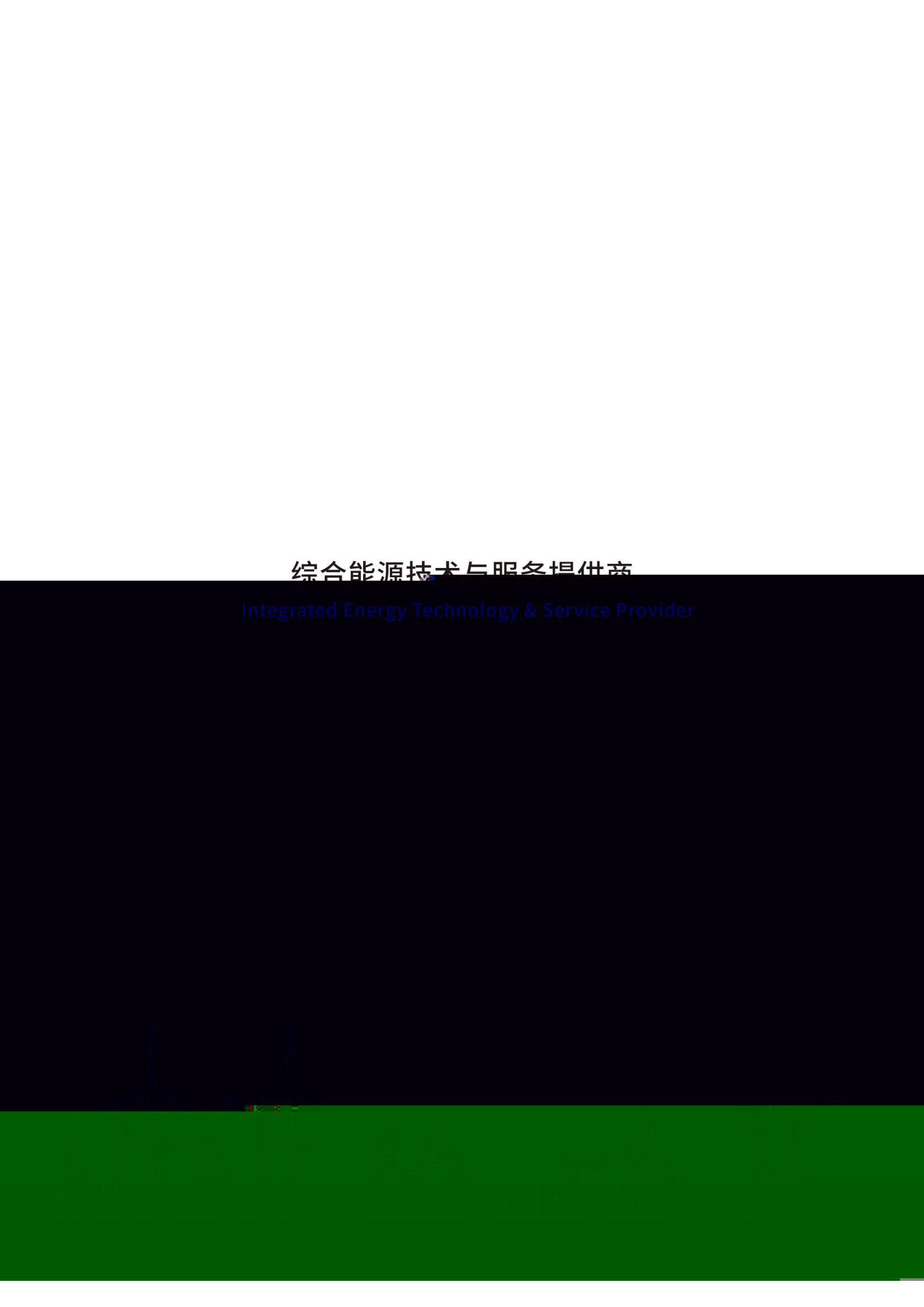



# ZG-SPS智能高压岸电系统

广州智光电气技术有限公司
Guangzhou Zhiguang Electric Technology Co., Ltd.

# 综合能源技术与服务提供商

Integrated Energy Technology & Service Provider



# 目录
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# 公司简介

## Company Profile

广州智光电气技术有限公司成立于 2002 年，注册资金 2 亿元，是广州智光电气股份有限公司【股票代码：002169，以下简称智光】的全资子公司，是智光充控余能源技术与服务战略发展方向专业从事柔性电力技术研究的核心成员企业。

公司自成立以来一直专注于以大功率电力电子为核心技术的电气控制装备技术研究，在智能电网、分布式微网、储

industrial intelligent UPS.

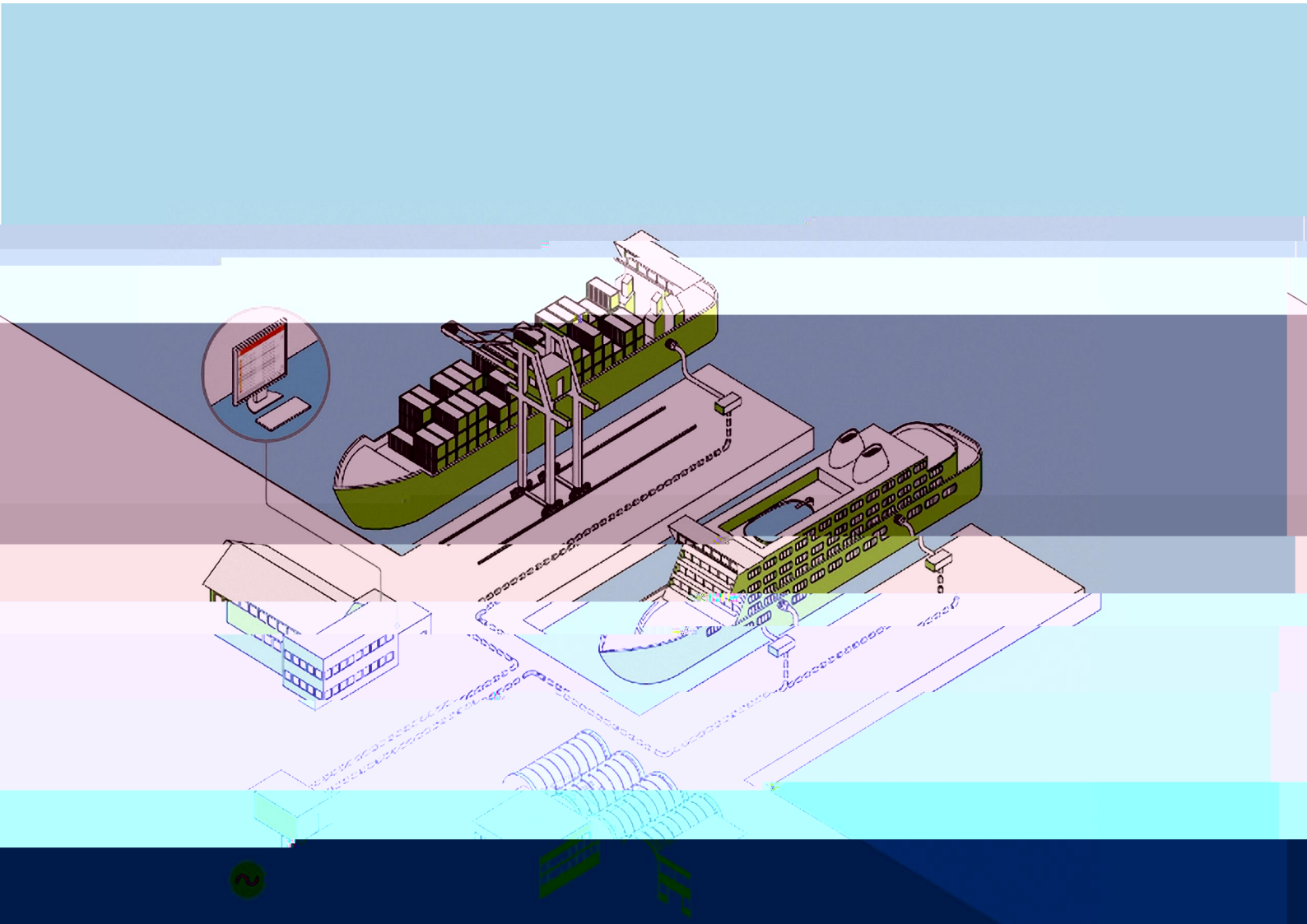
The company's products have achieved regional coverage in the country and are exported to dozens of overseas countries and regions, contributing to the global energy conservation and emission reduction and green energy industry. The company uses the private cloud platform and big data as its technical means to give full play to the advantages of the "Internet +", and establishes a marketing and service platform oriented to key industries, key regions and major customers, providing leading technologies and comprehensive technical solutions to

# 二、产品介绍

## Product Introduction

# ZG-SPS 智能高压岸电系统介绍

## Introduction of ZG-SPS Intelligent High-voltage Shore Power System



## 2.1 各子系统介绍

### The Introduction of Each Subsystem

高低压配电子系统

High and Low Voltage Power Distribution Subsystem

## 变频稳压子系统

Variable Frequency Voltage Regulator Subsystem

变频稳压子系统的核心设备是高压变频电源，其功能特点如下：

采用多脉波、移相叠流技术，输出电压谐波低于1%；采用多电平移相叠加变压变频技术，可直接输出接近正弦

智能高压库电系统采用多脉波叠流技术，电网侧谐波污染小，

## 变压及电网隔离子系统

## Transformer and Power Grid Isolation Subsystem

隔离变压器采用Dy11接法的设计，50/60Hz双[illegible]工作模式，额定电压均为60Hz电制设置，通过设置高频电源输出电压值实现不同频率下系统输出电压切换功能。

The isolation transformer adopts the Dy11 connection design, 50 / 60Hz dual-frequency working mode, the rated voltage is set [illegible]

## 中性点安全接地子系统

Neutral Point Grounding Safety Subsystem

隔离变压器中性点采用电阻接地，并通过中性线与船壳连接，限制岸电供电过程中船侧接地时的故障电流，为船上设备和人员提供安全保护。

The neutral point of the isolation transformer adopts resistance grounding and is connected to the ship's hull through the neutral line to limit the fault current when the ship side is grounded during the shore power supply process and provide safety protection for the equipment and personnel on board.

## 电气综合保护子系统

Electrical Integrated Protection Subsystem

for the dock socket box socket key to ensure that the dock socket cable plug can only be plugged and unplugged when there is no voltage at the socket and the grounding switch of the output switch cabinet is closed.

## 系统温度控制子系统
## Temperature Control Subsystem

系统内部大量的电力电子元件对工作温度比较敏感，因此必须对系统运行的环境温度进行实时监测和控制，在多重设计环节均采用独特高效的散热方案。

A large number of power electronic components inside the system are sensitive to the operating temperature, so the ambient temperature of the system operation must be monitored and controlled in real time. Unique and efficient heat dissipation schemes are adopted in multiple design links.

### 变频电源柜体冷却设计
### Cooling Design of Variable Frequency Power Cabinet

系统采用独特的功率单元体双侧布置设计方案，缩短空气流程、降低空气阻力，提升系统散热效果。

The system adopts a unique double-sided layout design of the power unit body to shorten the air flow, reduce the air resistance, and improve the system's heat dissipation effect.

### 功率单元冷却设计
### Cooling Design of Power Unit

## 船岸连接子系统

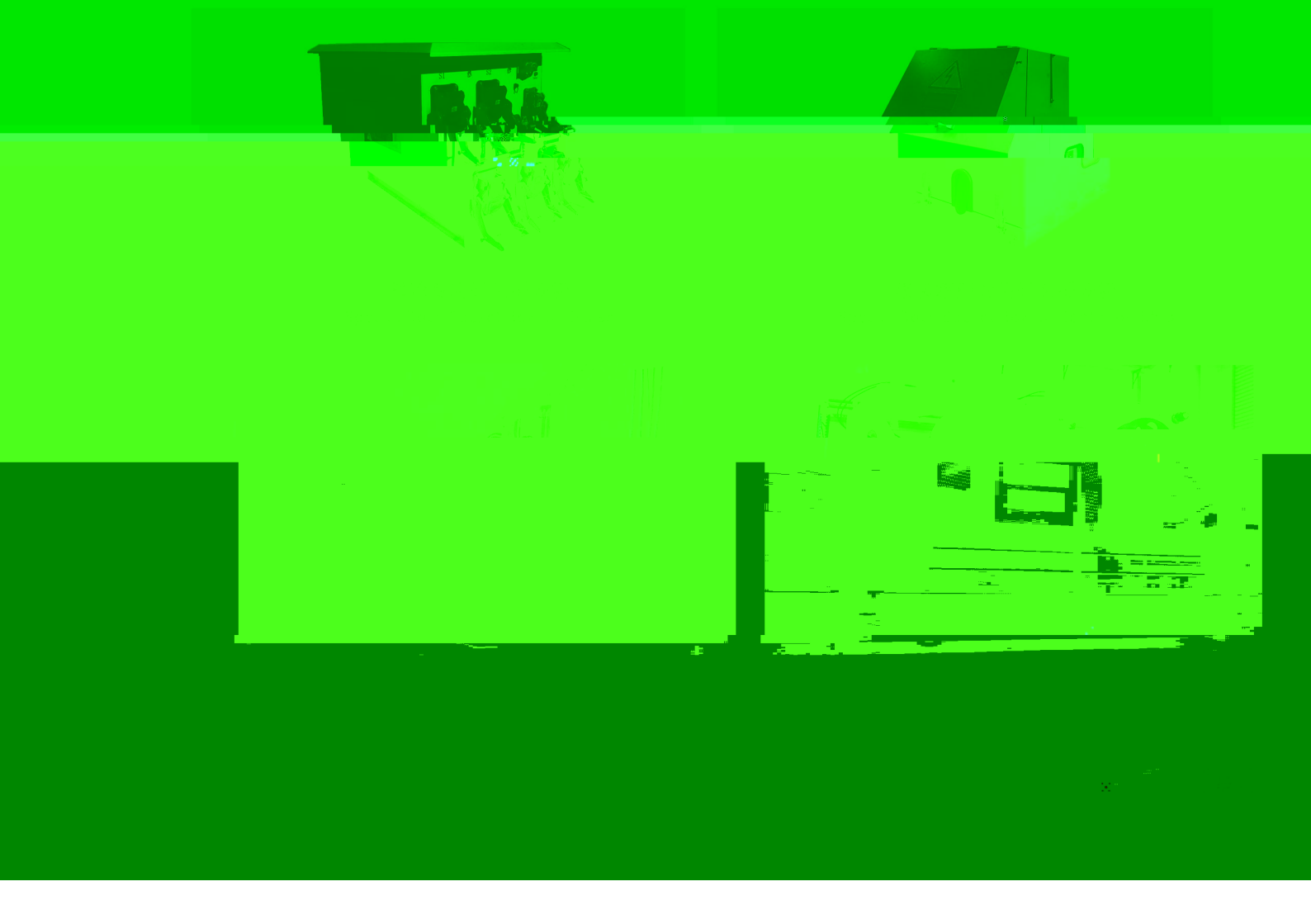
## Ship-shore Connection Subsystem

船岸连接子系统主要包括码头插座箱和电缆管理系统（部分船型需要）两部分。码头插座箱安装在码头前沿，通过插接电缆方式建立船-岸电气回路，缩短接驳时间。码头插座箱检修门设置行程开关，联锁对应输出开关，为检修工作提供联锁保护。

集电力传输、智能控制、安全可靠于一体，由液力耦合驱动单元驱动电缆转盘，实现电缆智能收放，保证收放拉力始终低于电缆最大承受力，保证岸电电缆使用安全；另外电缆转盘带限位动作，输出紧急切断岸电信号，避免电缆带电被拉断。

The ship-shore connection subsystem mainly includes two parts: dock socket box and cable management system (required for some types of ship). The dock socket box is installed at the front of the dock, and the ship-shore electrical circuit is established by plugging in cables to shorten the docking time. The maintenance door of the dock socket box is set with a travel switch, which interlocks the corresponding output switch to provide interlock protection for the maintenance work.

The cable management system that integrates power transmission, intelligent control, safety and reliability and other functions. The hydraulically coupled drive unit drives the cable turntable to realize intelligent cable retraction and ensure that the retraction tension is always lower than the cable's maximum bearing capacity, and the safe use of shore power cables. In addition, the cable turntable has a limit action, which outputs an emergency cut-off shore power signal to avoid the live cable being pulled off.



## 2.2 功能特点

Features

### 电能质量优异

**Excellent Power Quality**

输出电压谐波 < 1%

Output voltage harmonics < 1%

负载稳压率 < 1%

Load regulation < 1%

三相输出电压不平衡度 < 2%

Three-phase output voltage imbalance < 2%

输出频率分辨率 0.01Hz

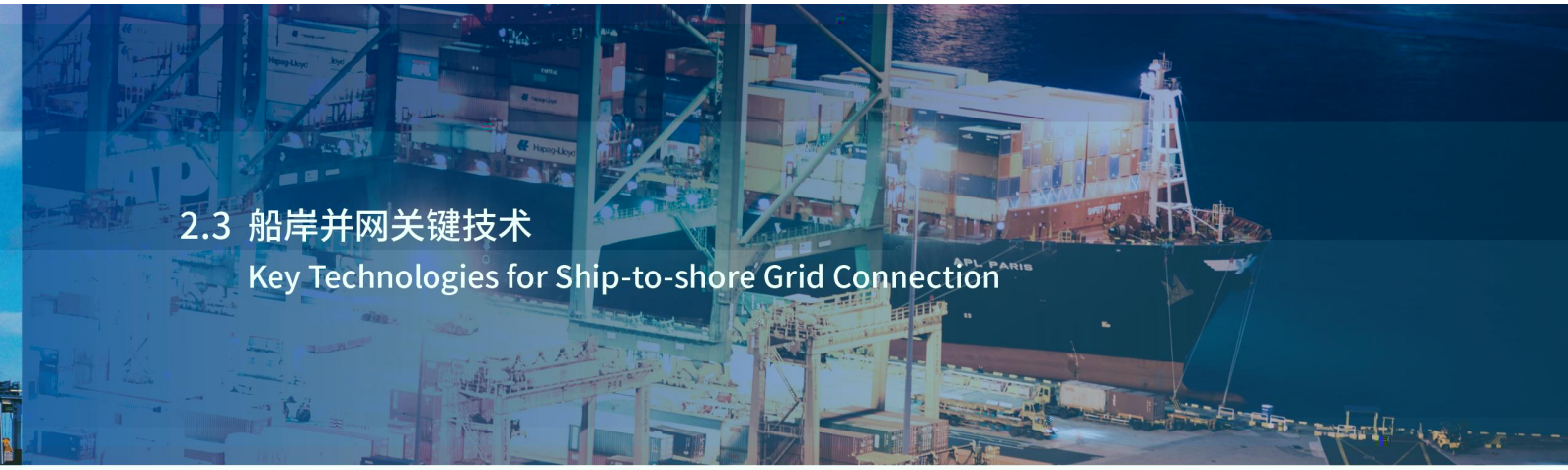
Output frequency resolution 0.01Hz

输入电流谐波 < 3%

Input current harmonics < 3%

输入功率因数 > 97%

Input power factor > 97%



# 2.3 船岸并网关键技术
# Key Technologies for Ship-to-shore Grid Connection

## 可靠的相序检测与整定技术
## Reliable Phase Sequence Detection and Rectification Technology

ZG-SPS智能高压岸电系统默认输出为正序，具备手动调整和自动检测调整输出电压相序的功能。

The default output of ZG-SPS is positive sequence. The system is capable of manually adjusting or automatically detecting and adjusting the output voltage phase sequence.

## 低电压穿越技术
## Low-voltage Ride-through Technology

ZG-SPS智能高压岸电系统在岸上电网电压突降时具备低电压穿越能力，保证供电期间船上设备不受岸侧电网电压暂降的威胁，最大限度地兼顾供电连续性和设备安全性。

The ZG-SPS is capable of low-voltage ride-through capability in case of sudden voltage drop in the on-shore power grid, ensuring that the ship's equipment is not affected by the transient voltage drop in the shore-side power grid during the power supply period and maximizing both power supply continuity and equipment safety.

## 高精度稳压稳频控制技术
## High-precision Control Technology for Voltage and Frequency Regulation

ZG-SPS智能高压岸电系统实时检测输出电压和单元直流电压进行分相电压闭环控制，实现输出电压的稳定控制；电源频率由高精度数字量精确控制，输出频率精度达0.01Hz。

with an output frequency accuracy of 0.01Hz.

## 船岸无缝切换技术
## Seamless Ship-to-shore Switching Technology

ZG-SPS智能高压岸电系统可选配船载电源监测装置与岸电电源监测装置，实现船

## 2.4 系统安装方式
### System Installation Form

ZC-SPS智能高压岸电系统

室内安装

Indoor Installation

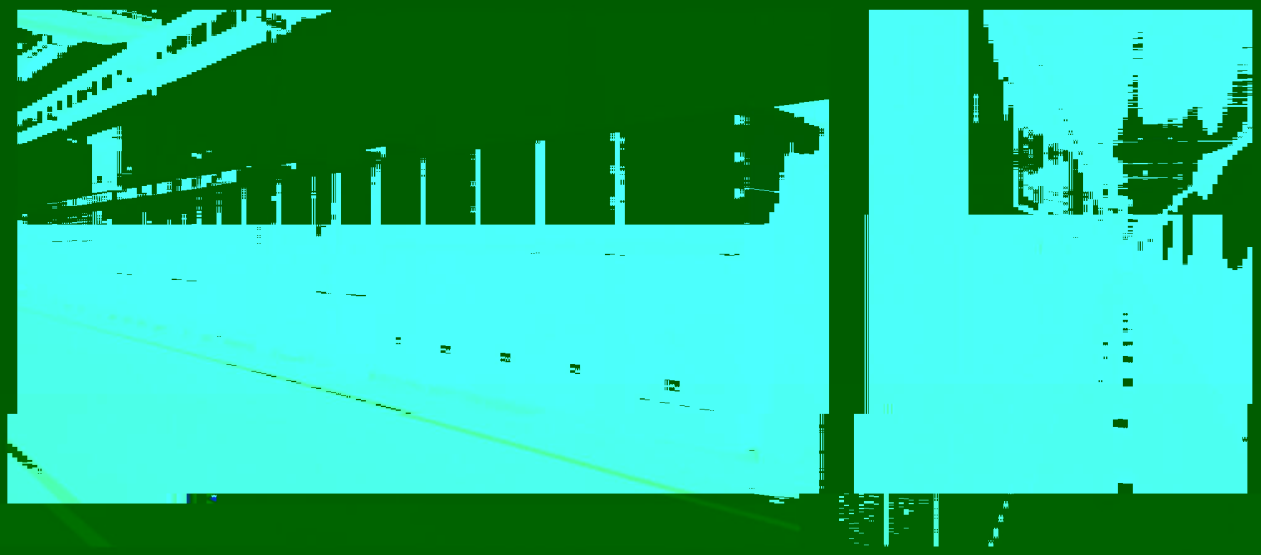
室外集装箱安装

Outdoor Container Installation

# 三、典型应用案例
# Typical Application Case

## 3.1 青岛邮轮母港 16000kVA/11kV 智能高压岸电系统

Qingdao Cruise Terminal 16000kVA/11kV Intelligent High-voltage Shore Power System



## 3.2 辽宁营口港 2000kVA /3000kVA 智能高压岸电系统

## Liaoning Yingkou Port 2000kVA / 3000kVA Intelligent High-voltage Shore Power System

## 3.3 青岛港前湾港区 103 泊位 5000kVA 智能高压岸电系统

Qingdao Qianwan Port Area 103 Berth 5000kVA Intelligent

# 3.4 厦门港嵩屿集装箱码头 5000kVA 智能高压岸电系统

5000kVA Intelligent High-voltage Shore Power System of Songyu Container Terminal in Xiamen Port

# 3.5 深圳蛇口集装箱码头 4000kVA 智能高压岸电系统

## Shenzhen Shekou Container Terminal 4000kVA Intelligent High-voltage Shore Power System

# 四、丰富的连船供电实践经验

## Extensive Practical Experience in Power Supply with Connected Ships

Among them, there are many large container ships over 14000TEU, as well as bulk cargo and ro-ro passenger ships, details are as follows:

成功连接智光高压变频岸电的各型船舶（部分）

Various types of ships (parts) successfully connected to ZG-SPS

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24h Service：**400-8800-233**

智光 Zhiguang

股票代码
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