Products Presentation
Wolong Electric Group Liaoning Rongxin Electric Drive Co., Ltd
In 1984 Wolong was founded by Mr. Jiancheng Chen in Zhejiang.

WOLONG HOLDING GROUP CO. LTD

3 Division:
- Manufacturing: Wolong Electric Group Co., Ltd.
- Finance/Invest: Wolong Capital
- Real Estate: Wolong Real Estate Group Co., Ltd.

Overview:
- $5.1 billion sales revenue in 2017
- $4.3 billion total asset
- 61 holding subsidiaries
- 15,000 employees

Public Trade Companies:
- Wolong Electric SH600580
- Wolong Real Estate SH600173
- Brook Crompton Holding (Singapore)
Wolong Electric – Manufacturing Division - Business Units

WOLONG ELECTRIC

Motor and Drives Business Unit
88% of total sales

Transformer Business Unit
3% of total sales

Machinery Business Unit
5% of total sales

Power Supply Business Unit
4% of total sales
Rongxin Power Electronic VFD Division
Rongxin drive company, which derives itself from medium voltage VFD division of Rongxin Power Electronic Co., Ltd., has started to research and develop medium voltage VFD products from the year 2002. So far, it possesses over 10 years experiences in the medium voltage VFD industry.

Independent VFD Company
In the February of 2011, the medium voltage VFD division established an independent wholly-owned subsidiary. Its main business is to research and sell products such as medium voltage VFD, DC power transmission and inverter products.

Wolong Electric Group Liaoning Rongxin Electric Drive Co., Ltd.
In June of 2016, the Rongxin power electronic company has transferred the possession of Rongxin Drive Company, and the Rongxin Drive Company has officially became a member of Wolong Electric Group.

Acquisition of CE Mark on MV VFD Product
During the years from 2015 to 2016, the VFD products has been qualified in the CE certification by TUV Rheinland and BV classification society certification, as well as the type test and low voltage ride through test conducted by a third-party testing agency, ‘China National Center for Quality Supervision and Test of Electrical Control and Distribution Equipment’.
Industrial Medium Voltage Inverters
Overview: The third generation 5000 series products, the second generation 5100 miniaturized products and the 5100 series optimized products will be launched in 2019. The new products have the advantages of small size, high power density, easy installation and maintenance.

<table>
<thead>
<tr>
<th>5000 series products</th>
<th>5100 miniaturized products</th>
<th>5100 Series products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage:</strong> 6-10kV</td>
<td><strong>Voltage:</strong> 3.3-10kV</td>
<td><strong>Voltage:</strong> 3.3-13.8kV</td>
</tr>
<tr>
<td><strong>Current:</strong> 250-1250kVA</td>
<td><strong>Capacity:</strong> 1250-2500kVA</td>
<td><strong>Capacity:</strong> 250-15000kVA</td>
</tr>
<tr>
<td><strong>Size:</strong> 1800<em>1500</em>2450</td>
<td><strong>Size:</strong> 2900<em>1700</em>2760</td>
<td><strong>Size:</strong> Depending on capacity</td>
</tr>
<tr>
<td></td>
<td>2100<em>1500</em>2450</td>
<td></td>
</tr>
</tbody>
</table>
Multi-level VSI Type (Metal Film Capacitor)

Power Device: IGBT

6kV VFD as example

Output Voltage Waveform

Output Current Waveform
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 kV &amp; 3.3 kV</td>
<td><img src="image1" alt="Diagram" /></td>
</tr>
<tr>
<td>4.16 kV</td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td>6 kV</td>
<td><img src="image3" alt="Diagram" /></td>
</tr>
<tr>
<td>6.6 kV</td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td>10 kV</td>
<td><img src="image5" alt="Diagram" /></td>
</tr>
<tr>
<td>11 kV</td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
</tbody>
</table>
The multiple pulse rectification technology can realize automatic harmonic elimination below 29/35/47 order, which meets the strict requirements for current/voltage harmonic distortion from IEEE and GB standards. No need to add filters on the power grid side.
The Multilevel drive has great harmonic performance also on the output side, which is extremely close to the standard sine wave, it can save the cost and space of output filter for customers, minimize torque ripple on motor shaft, lower the motor noise, increase motor service life; it has also an advanced feature of smaller dv/dt value, no special requirements for the motor.
## Overview

High-power water-cooled inverter product capacity range 15MVA-40MVA, using power cell modular assembly design, power cell water cooling, high power density, easy maintenance and installation, suitable for LNG, wind tunnel, Long-distance pipeline, chemical, metallurgical and other fields.

### Product Parameter

- Voltage 6-10kV
- Capacity 15MVA-40MVA
- Power 12MW-32MW

### Product Demonstration

![Product Demonstration](image)

### Product Feature

- Quick Plug Design
- Flexibility
- Remote Monitoring Interface

![Product Feature](image)
Product Innovation and Advancement

- High Voltage IGBT (4500V, 3300V)
- Power Cell Modular Design and Dual Waterway Design
- Initial Position Identification of Synchronous Motor Rotor

Main Application Industry

- LNG
- Wind Tunnel
- Natural Gas Transportation
- Blast Furnace Blower
Overview: The high-reliability inverter is designed for high service life and high reliability and suitable for high reliability applications such as nuclear power and blast furnace fans. The inverter has air-cooled and water-cooled type. Take the 4000kW air-cooled high-reliability inverter as an example.

### Product Parameter

<table>
<thead>
<tr>
<th>Voltage</th>
<th>6-10kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>250KVA-28MVA</td>
</tr>
<tr>
<td>Power</td>
<td>200KW-22MW</td>
</tr>
</tbody>
</table>

### Product Demonstration

![Product Demonstration Images]

### Product Feature

- High Reliability
- High Service Life
- IGBT Fiber Transmission
Product Innovation and Advancement

- Cell Bypass Redundancy Design
- Control System Redundancy Design
- Fan Redundancy Design
- Drive Power Redundancy Design

Main Application Industry

- Nuclear Power Main Pump
- Blast Furnace Fan
- Power Plant Feed Pump
Certificate of Conformity

Registration No.: AK 5832138 0001
Report No.: 1809801 001

Holder: RongShen Drive Technology Co., Ltd.
Address: No. 273, Dongguan Road, Yidi District, Hangzhou 310000, Zhejiang, China

Product: Encoder (Resolution: 1024 pulses/rev)

Identification: Type designation: WH1505-4C-00H

Tested acc. to: TÜV 1505-3-1-1/2007

TÜV Rheinland LGA Products GmbH

Date: 2013-09-18

Certificate Body: Zhe Xiaohua

TUVTüV Rheinland

Whole Machine Safety EN 61800-5-1
Type Test EN 61800-4
Shored Based Power Supply and Special Power Supply
Wolong Electric - Special Power Supply Product Series

Wolong Electric

- Multi-phase Inverter
- Shore-based Variable Frequency Power Supply
- Special Variable Frequency Power Supply
- Special Inverter for Scraper Machine
Multi-phase Inverter Product Introduction

Main Technical Parameters:
- Input Voltage: 10kV/6kV
- Capacity: 1MVA~40MVA
- Output Voltage: 1140V/3300V
- Number of Phases: 6/9/12/15/21/24
- Cooling Method: Water cooling, Air Cooling
- Main Circuit: Three-level, Two-level

Product Features:
- Frequency Conversion
- Flying Start
- Phase Loss Operation
- Synchronous Transfer Bypass
Multi-phase Inverter Solution

Phase-shifted Independent Power Supply
Uncontrollable Rectification Topology

The world-leading invention patent "a high-low voltage conversion star type multi-phase variable frequency drive system topology" passed the identification of China National Machinery Association.
Shore-based Variable Frequency Power Supply

1) The use of shore power will reduce the emission of harmful gases, improve air quality and protect the environment. On the one hand, the port has benefits due to the provision of electricity. On the other hand, it has improved the function of the port and enhanced the core competitiveness of the port.

2) For the ship owners, by using the shore power, the auxiliary machine can be switched off during berthing period, so that the cost is reduced and the economic benefits are very significant.
Shore-based Variable Frequency Power Supply Product Introduction

Main Technical Parameters:

- Input Voltage: 10kV/6kV
- Capacity: 800kVA~20MVA
- Output Voltage: 440V/6.6kV/11kV
- Output Frequency: 50/60Hz
- Cooling Method: Water-cooling, Air-conditioning, Air-cooling
- Structure: Cabinet, Container
**Special Variable Frequency Power Supply**

<table>
<thead>
<tr>
<th>Main Technical Parameters:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Input Voltage: 10kV/6kV</td>
</tr>
<tr>
<td>- Capacity: 1MVA~25MVA</td>
</tr>
<tr>
<td>- Output Voltage: 400V~13.8kV</td>
</tr>
<tr>
<td>- Output Phase Number: Single Phase / Three Phase</td>
</tr>
<tr>
<td>- Cooling Method: Water cooling, Air Conditioning, Air Cooling</td>
</tr>
<tr>
<td>- Structure: Cabinet, Container</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Motor Test Station</td>
</tr>
<tr>
<td>- Transformer Test Station</td>
</tr>
<tr>
<td>- Air Conditioning Test Station</td>
</tr>
<tr>
<td>- Pump Test Station</td>
</tr>
</tbody>
</table>
Scraper Variable Frequency Inverter

Main Technical Parameters:
- Input Voltage: 10kV/6kV/3.3kV
- Capacity: 500kVA~2000kVA
- Output Voltage: 3300V
- Drive Motor Power: 400/525/700/855/1000/1250/1600kW
- Cooling Method: Water Cooling
- Main Circuit: Three-level, Cascaded Multilevel

Applications:
- Variable Frequency Regulation
- Heavy Load Start
- Master-slave Power Balance
- One Drive Two Motor Solution

Three-level Scraper Inverter

Cascaded Multi-level Scraper Inverter
Three-level Scraper Inverter Topology

Dual Combination Three-level Scraper Inverter
Medium Voltage Soft Starters
Medium Voltage Soft starter Introduction

Main Component:
- Full Digital Controller and HMI
- Circuit Breaker
- Power Unit
- Bypass Vacuum Contactor
- Earthing Knife-switch

Technical Parameters:
- Voltage: 6(6.6)-10(11)kV
- Starting Power: <=3500kW
- Starting Current: 2-4Ie

Innovation and Advancement:
- Short-time withstand current increased from 12kA to 40kA.
- The operating time of protection is shortened from s level to ms level.
- Arc Protection
# Soft Starter Series

<table>
<thead>
<tr>
<th>Medium and Small Power Series</th>
<th>High Power Series</th>
<th>Explosion-proof Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage:</strong> 6-10kV</td>
<td><strong>Voltage:</strong> 6-10kV</td>
<td><strong>Voltage:</strong> 6-10kV</td>
</tr>
<tr>
<td><strong>Power:</strong> ≤4000-5000kW</td>
<td><strong>Power:</strong> ≤10000kW</td>
<td><strong>Current:</strong> 400A</td>
</tr>
<tr>
<td><strong>Dimension:</strong> 1050<em>1500</em>2300</td>
<td><strong>Dimension:</strong> 1600<em>1500</em>2300</td>
<td><strong>Dimension:</strong> 2000<em>1016</em>1600</td>
</tr>
</tbody>
</table>
Ultra-high Power Customized Type Soft Starter Introduction

Technical Parameters:
- Voltage 6-10kV
- Power 10-50MW
- Starting Current 2-4 I_n

Typical Application Cases:
- Yanshan Steel 10kV 18MW Blast Furnace Blower
- Xining Special Steel 10kV 16MW Blast Furnace Blower

Competitive Advantages:
- Powerful technology platforms for SCR applications.
- Successful application cases for ultra-high power medium voltage soft starter
Flame Proof Inverters and Electrical System
The energy efficiency control system collects the signal (coal amount) of the upstream belt flow sensor, adjusts the belt speed in real time, realizes the "Concentrated Remote Control" "Start-up In Direct Coal Flow", "High Speed at Heavy Load, Low Speed at Light Load "Drive With Coal, Standby Without Coal" of the belt transportation chain to save the belt running mileage, energy saving, and efficiency increasing.
Integrated belt conveyor eight comprehensive protection, realize centralized remote monitoring and operation of belt transportation system, realize single-person operation, single-person inspection, and less people on duty.
The video monitoring management system and the centralized control system work together to maximize unattended, cost-effective, and increase efficiency.
Coal Mine Comprehensive Monitoring and Management System

Construction the mine optical fiber ring network system, all kinds of centralized control and management systems in the underground can be connected to the ring network, which can realize comprehensive real-time mine production process monitoring and management in the ground monitoring center, ensuring productivity, early warning of failure, and ensuring mine safety.
Overview: Our company combines mature and advanced SVG and APF technology into explosion-proof technology, and successfully developed a mine static var generator - referred to as explosion-proof SVG.

**Mine Explosion-proof SVG Series**

- **Technical Parameters:**
  - Voltage: 660V/1140V/3.3kV/6kV/10kV
  - Power: 300kVar-5000kVar

- **Product Features:**
  - Compensation for reactive power, improve power factor, improve transformer and cable utilization, save energy and reduce consumption
  - Realize long-distance power supply of the system and stabilize the terminal supply voltage
  - Guarantee device overload start
  - Power grid harmonics control (5/7/11/13 times)

- **Competitive advantages:**
  - Industry Leader, Technology Pioneer
  - Cooling method: Low Voltage: Air Cooling, High Voltage: Water Cooling

**Product and Application**

**Main Application Places**

- Placed with large reactive power or low power factor, such as the substation in a mining area;

- Placed with long-distance power supply (>3KM) or equipment startup difficulty, such as driving face, fully mechanized mining face;

- Placed with high content of harmonics site conditions where has serious interference to the on site equipments.
Other Series of Mine Explosion-proof Electrical Products

Mine Explosion-proof Inverter Series Products
Voltage: 660V, 1140V
Power: 60-1000KW
Structure: Single Type, Multiple combination
Cooling method: Self-cooling / Air Cooling / Water Cooling
Load: Belt, Conveyor, Scraper, Crusher, Reversed Loader, Winch, Aerial Ropeway for Underground Mining, Emulsion Pump, etc.

Mine Local Fan Inverter Series
Voltage: 660V, 1140V
Power: 30-132KW
Structure: Single type, Twin combined
Cooling method: Self-cooling
Load: Mine Local Gas Ventilator

Mine Automation Control System

Planned Product Series
1. Mine Inverter & Motor
   Integrated Type.
   Voltage: 1140V, 3.3kV
2. Inverter for Mine Low Speed Permanent Magnet Motor
3. Inverter for Mine Shield Machine (Heading Machine)
4. Smart Mines, Digital Mines, Intelligent Inspections, Smart Troubleshooting