



# AC Drives Introduction

## Shanghai STEP Electric Corporation



Introduction



R&D



Marketing



Business Scope

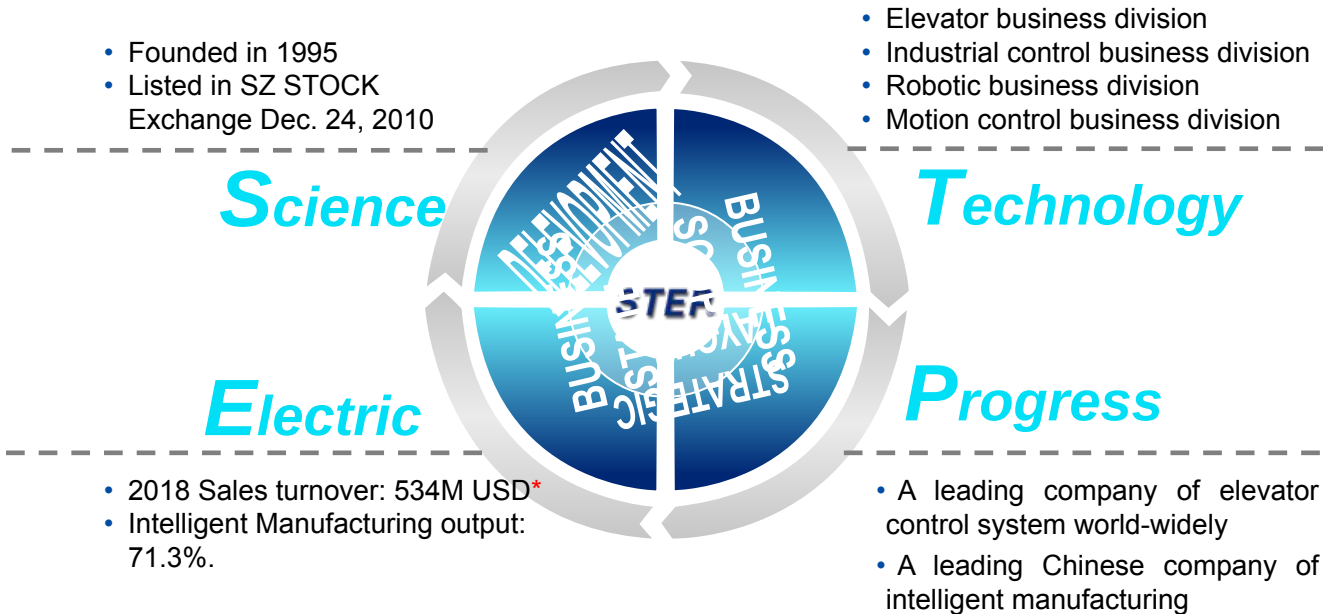


Enterprise Culture



# Company Introduction

## Brief Introduction



\* Average exchange rate of 2018: 1USD=6.6174CNY

## Road Map

2011-2020  
Four Business Divisions

2006-2010  
Further  
Development

2001-2005  
Core Technologies

1995-2000  
Starting-up

- **Robotics Business Division:** Industrial Robots and Automation integration
- **Servo Business Division:** Servo drive and servo motor
- **Elevator Business Division:** Electric control system and STAR IoT.
- **Industrial Control Business Division:**  
Industrial control, High/Med./Low voltage
- **Industrial inverters:** Air Conditioning, Rubber Machinery, Harbor Machinery
- **Servo control systems:** Machine Tool, Electronic, Packaging and Food Mechanics
- Top 1 in internal mixer market
- Breakthrough of **VVVF** Core Technology
- Among Few Enterprises Who Own Core Technologies of Elevator Control and Drive Both
- **Q+3** certification from USA UTC Group
- **No. 1 Brand** in elevator control system market
- Redundant technique & **CANBUS**
- **First domestic supplier for International Elevator Brand**
- Transmission from Elevator Basic Modernization to **Control System R&D**

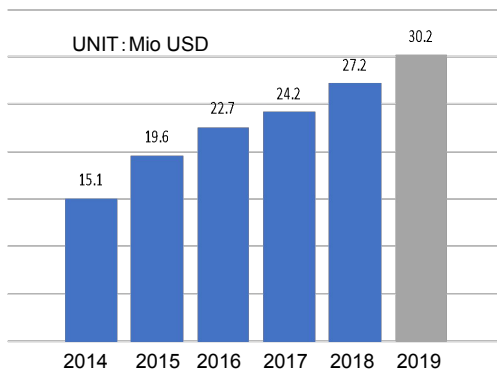


**R & D**

## R&D

### R&D Investment

- 108.8M USD in recent five years.



### Capabilities of scientific research

- National Enterprise Technology Center
- Post-Doctoral Research Center
- National Innovative Enterprise
- CNAS and UL certificated laboratory.



(National Enterprise Technology Center)

### R&D team

- R&D centers in Shanghai, Shenzhen, Beijing, Germany and Japan.
- 715 R&D employees, 30% of total employees.
- Numbers of Doctors and Masters are 228.
- one person achieves Special government allowances of the State Council

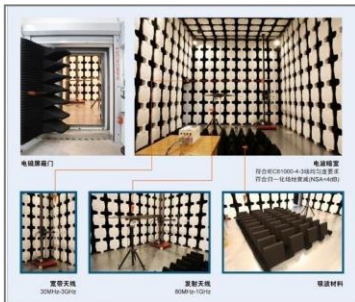
### Patents and Projects

- 3 National Programs
- 435 Patents
- 25 National Technology Standard items drafting and amending
- one of the first batch of China Robot certificated enterprises.
- Member of National Robotics Standardization General Working Group of China.

## R&D



CNAS-L6430



Anechoic Chamber



Shielding Room





## Certificate

S



European Safety



European EN81



North America Safety



US UL



US NRTL



ISO 9001



ISO 14001



OHSMS 18001



China Robot



Q+ 3 LEVEL



China 3C



CNAS L6430



# Marketing

## Domestic Market Network



- **Divisions**

North China, East China, South China, West China and Zhejiang Division

- **28 offices**

Shanghai, Beijing, Tianjin, Chongqing, Jiangsu, Anhui, Guangdong, etc.

## Worldwide Market Network



- |   |  |  |
|---|--|--|
| <span style="color: yellow;">■</span> <b>Products and Services</b>                              | <span style="color: red;">■</span> <b>Subsidiary</b>   | <span style="color: blue;">■</span> <b>Joint Ventures</b>  |
| 65+ countries and regions in Asia, Europe, North America, South America, Africa, Oceania , etc. | <ul style="list-style-type: none"> <li><span style="color: red;">■</span> Hong Kong</li> <li><span style="color: red;">■</span> Germany</li> </ul> | <ul style="list-style-type: none"> <li><span style="color: blue;">■</span> Brazil</li> <li><span style="color: blue;">■</span> Malaysia</li> </ul> |

## Our Partners

**OTIS**



**Schindler**



**KLEEMANN**<sup>™</sup>



**ESCON**



**CPT**

**SODIMAS**<sup>®</sup>

**HISA**





## Product Portfolio

## Industrial Drive and Energy



**Energy  
Saving**



**Rubber**



**Weight-li  
fting**

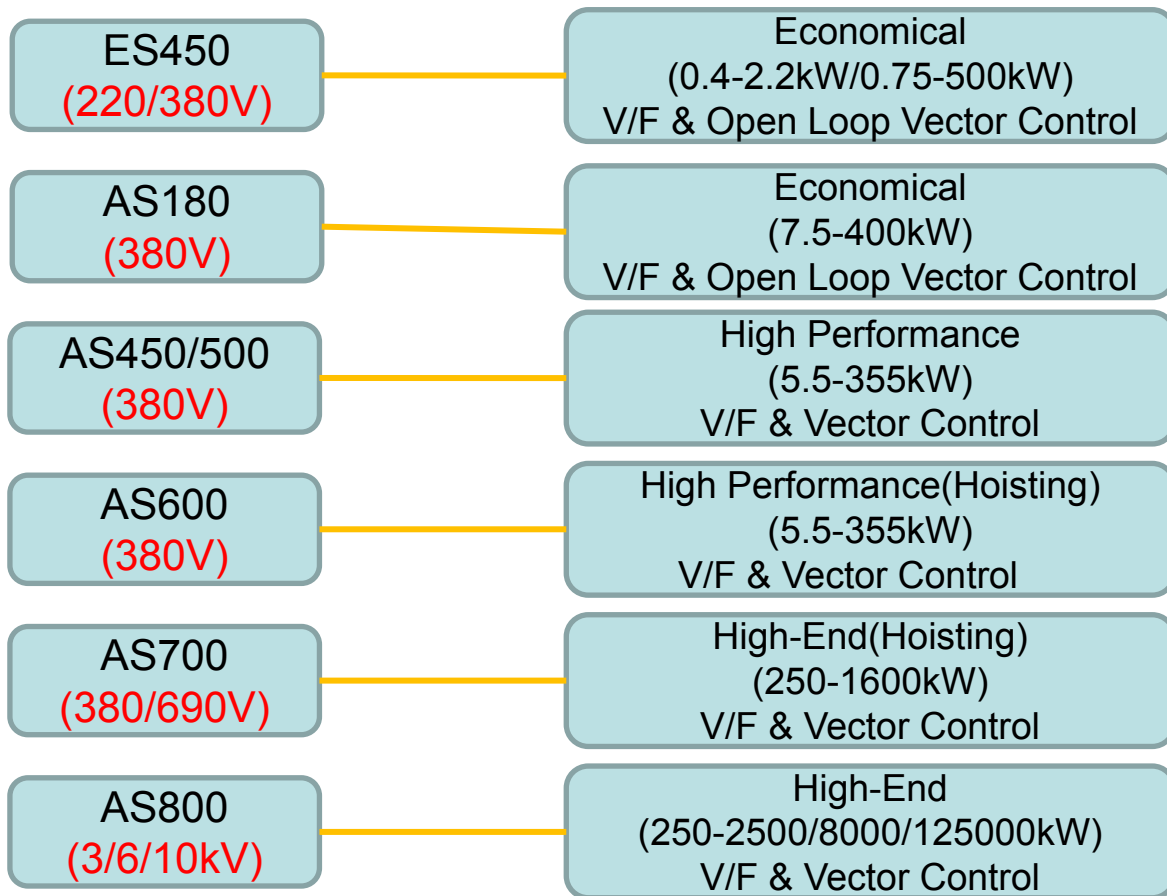


**Air-condition  
ing**



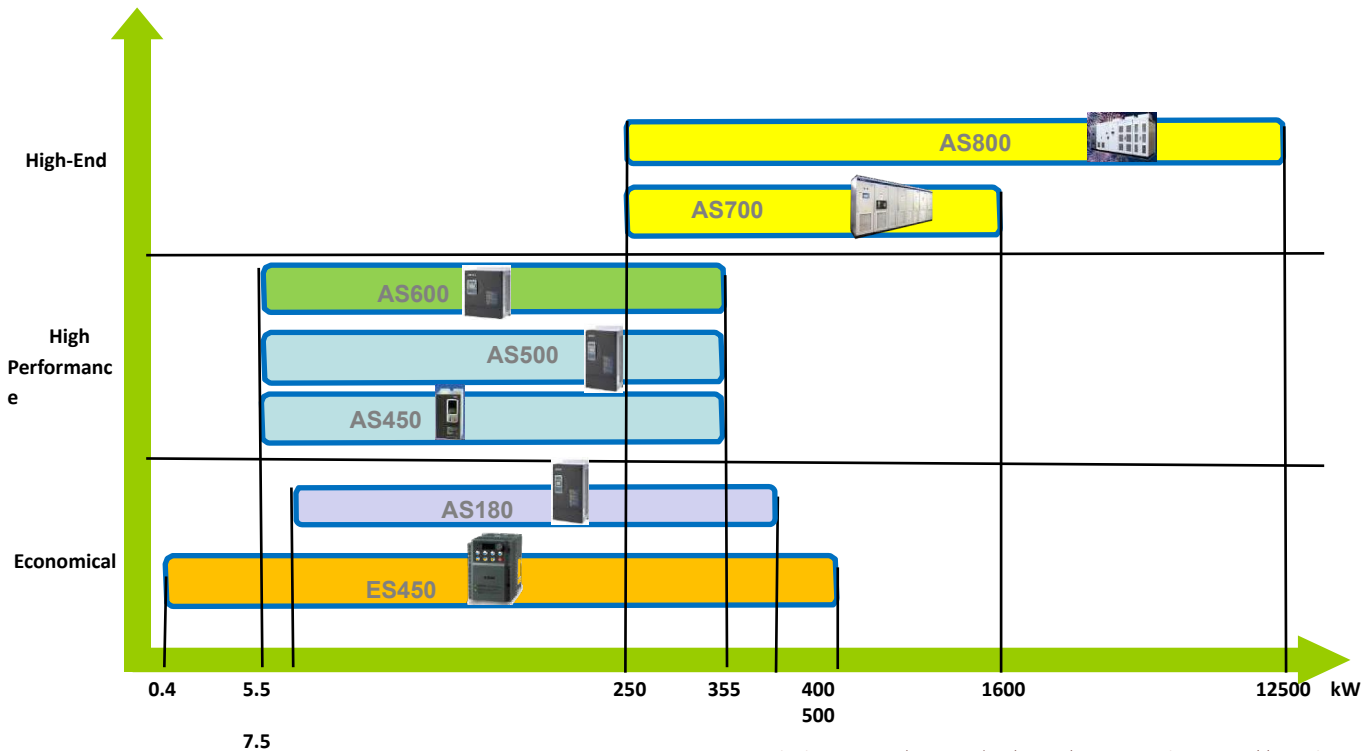
**New  
Energy**







# Product Positioning



## ES450 Series

- Economical Type(0.4-500 kW)
- Three Phase Asynchronous Motor
- Control Mode: v/f Control, Open Loop vector Control.
- Target Industry: Light Industry

| Fan

| Water Pump |

Machine Tool |

Engraving

| Textile



## AS180 Series

- High Performance v/f Type (7.5-630kW)
- Three Phase Asynchronous Motor
- Target Industry: Light Industry Standard Load (120% Overload)
  - | Fan-Exhaust Fan, Blower
  - | Water Pump-Constant Pressure Water Supply, Drainage
  - | HVAC-Heating, Air Conditioning



## AS180 Series

Braking Unit	<p>≤30kW: Internally Equipped</p> <p>Braking Resistor: Externally, Optional Accessory</p> <p>&gt; 30kW: Externally, Optional Accessory</p> <p>Braking Resistor: Externally, Optional Accessory</p>
DC Reactor	<p>&gt; 30kW: Internally Equipped</p> <p>≤30kW: Externally, Optional Accessory</p>
Input/Output AC Reactor	External, Optional Accessory
Input/Output Filter	External, Optional Accessory

## AS450 Series

- General Vector Type (5.5-500 kW)
- Three Phase Asynchronous Motor
- Target Industry: Light Industry Heavy Load(150% Overload)
  - | Compressor-Screw/Centrifugal Compressor
  - | Roots Blower
  - | Heavy Medium Pump
  - | Food Extruder
  - | Wood Engraving Machine
  - | Centrifugal Industrial Washing Machine



## AS450 Series

Braking Unit	<p>≤22kW: Internally Equipped</p> <p>Braking Resistor: Externally, Optional Accessory</p> <p>&gt; 22kW: Externally, Optional Accessory</p> <p>Braking Resistor: Externally, Optional Accessory</p>
DC Reactor	<p>&gt; 22kW: Internally Equipped</p> <p>≤22kW: Externally, Optional Accessory</p>
Input/Output AC Reactor	External, Optional Accessory
Input/Output Filter	External, Optional Accessory

## AS500 Series

- High Performance Vector Type (5.5-500 kW)
- Applicable to:
  - | Permanent Magnet Synchronous Motor (Strongest Advantage)
  - | Three-Phase Asynchronous Motor



## AS500 Series

- Target Industry: Heavy Industry, Construction Machinery (150% Overload)
  - | PMSM-Compressor, Food Extruder
  - | Metal Processing-Tube Expander, Punching Machine,  
Forging Machine, Lathe, etc.
  - | Concrete Mixer, Ball Mill, Mine Lift
  - | Material Storage-Belt Conveyor, In/Out Brick Machine
  - | Petrochemical-Liquid Mixer





## AS500 Series

Braking Unit	<p>≤22kW: Internally Equipped</p> <p>Braking Resistor: Externally, Optional Accessory</p> <p>&gt; 22kW: Externally, Optional Accessory</p> <p>Braking Resistor: Externally, Optional Accessory</p>
DC Reactor	<p>&gt; 22kW: Internally Equipped</p> <p>≤22kW: Externally, Optional Accessory</p>
Input/Output AC Reactor	External, Optional Accessory
Input/Output Filter	External, Optional Accessory

## AS600 Series

- High-End Hoisting Type(5.5-355 kW)
- Three Phase Asynchronous Motor, Permanent Magnet Synchronous Motor
- Target Industry:
  - I Port Machinery - Shore Bridge Crane, Tire Crane
  - I Standard Lifting - Bridge/Door Crane, Belt Conveyor
  - I Construction Lifting - Tower Crane



## AS600 Series

### AS600 Series Inverter

Braking Unit	<p>≤75kW: Internally Equipped</p> <p>Braking Resistor: Externally, Optional Accessory</p> <p>&gt;75kW: Externally, Optional Accessory</p> <p>Braking Resistor: Externally, Optional Accessory</p>
DC Reactor	<p>&gt;75kW: Internally Equipped</p> <p>≤75kW: Externally, Optional Accessory</p>
Input/Output AC Reactor	External, Optional Accessory
Input/Output Filter	External, Optional Accessory

## AS700 Series

- High-End Large Power Type (250-3300 kW)
- Voltage Class: 380V, 690V
- Modular Design
- AC Asynchronous Motor, Permanent Magnet Synchronous Motor



# AS700 Series

## AS700 Series Inverter

- Target Industry:
  - | Hoisting Machinery |
  - Coal Mine Machinery |
  - Metal Processing | Air
  - Conditioning
  - | Oil Drilling



## AS800 Series

- Power range
  - 3kV/250-2500kW
  - 6kV/280-8000kW
  - 10kV/280-12000kW
- Control model
  - V/F control
  - Vector control, Open/Closed loop
- Compatible motor
  - Asynchronous motor
  - Synchronous motor (Excitation/PMSM)
- Flexible configuration
  - Manual/automatic bypass system
  - Start-up cabinet

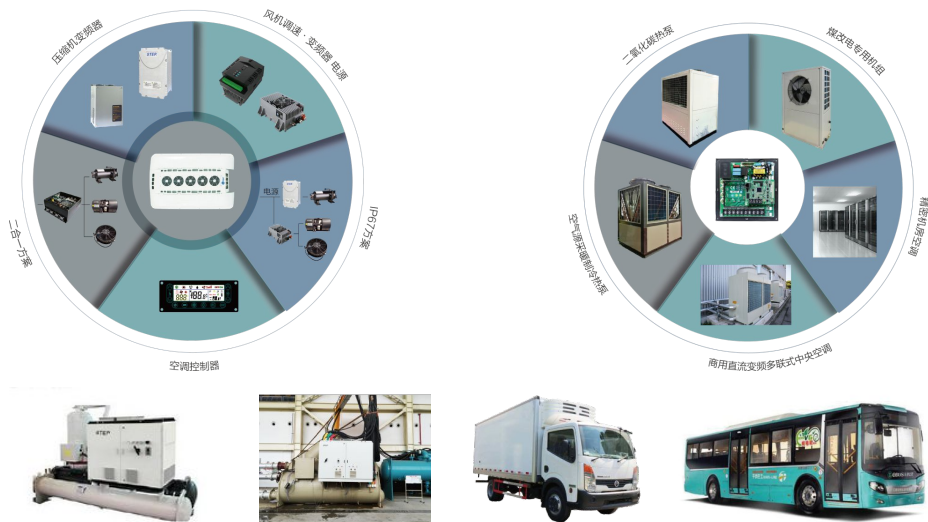




## Application & Reference

## Industrial Drive |

## HVAC



- Adapt to various of air-conditioning applications like new-energy bus, central centrifuge, central screw machine, thermal fan, etc.
- Full and comprehensive air conditioning variable frequency drive and control solutions provided to customers.
- Market shares over 27.8%

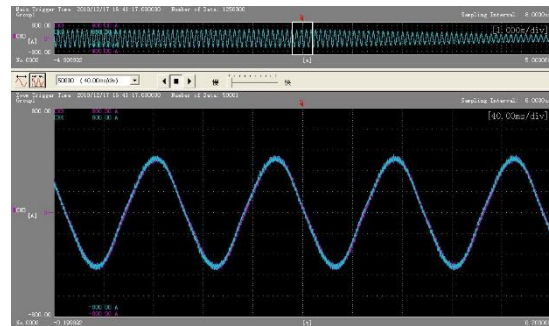
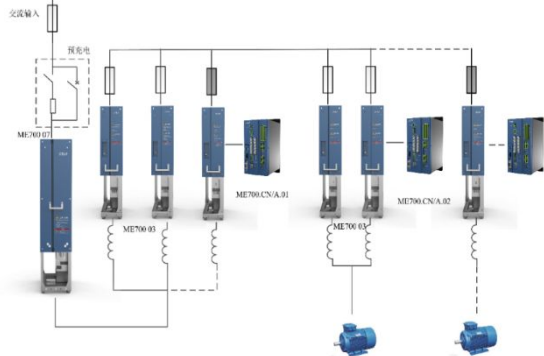


## Industrial Drive: Port machinery

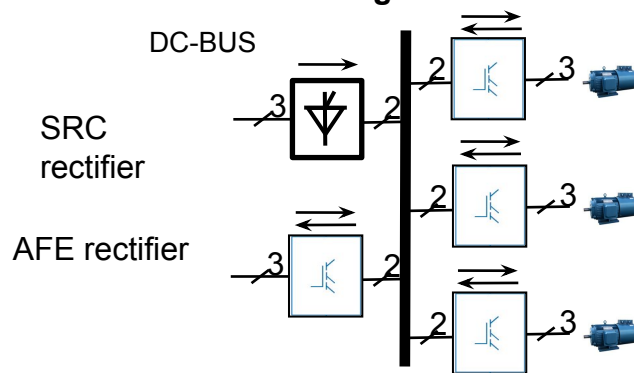


Shanghai WQ Quay Crane

## Industrial Drive: Port machinery



**Good average current control**



## Industrial Drive: 690V Inverter



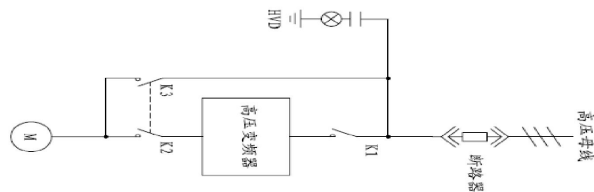
Internal-mixer  
application in  
Shanghai  
Double-Coin Tyres

13 sets HV Inverters in  
Shanghai  
Laogang Renewable  
Energy



12 MW HV inverter for the first nuclear pump test  
station in Shanghai Apollo

## Industrial Drive: Renewable Energy



13 sets HV Inverters in Shan  
Laogang Renewable Energy

## Industrial Drive: Coal chemical industry

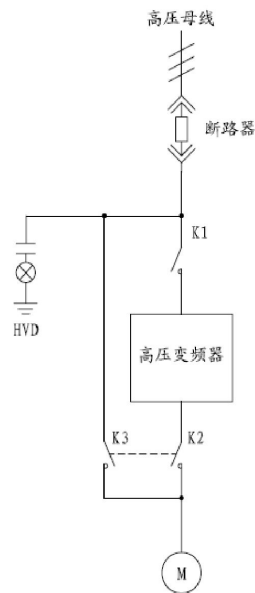


EU: Henan Coal&Chemical Group

Loas: Fan, mill

Motor: 10kV **560kW \* 9;**

**9**



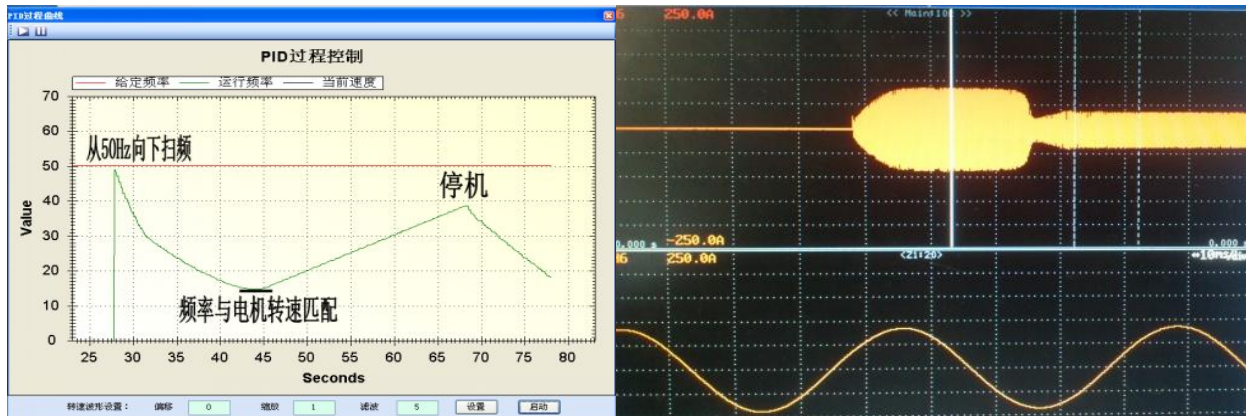


## Industrial Drive: cement



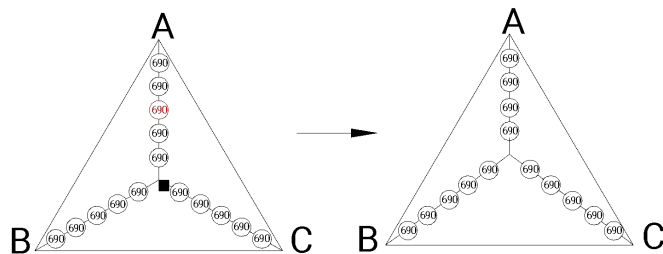
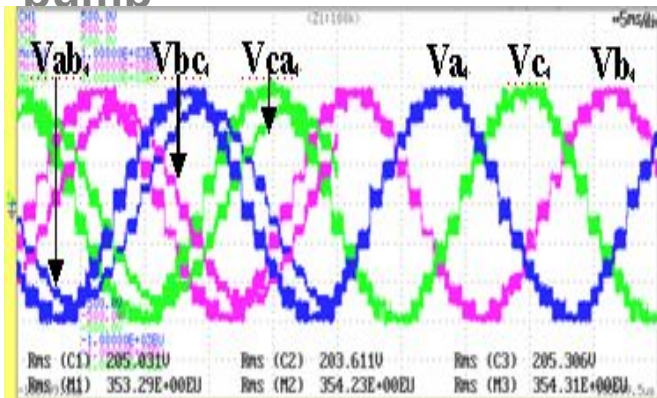
STEP MVD solutions to SCG Concrete Project . SCG Group, a leading business conglomerate in the ASEAN region.

## Industrial Drive: Application characteristics of fan and pump



Runaway Starting : Reduce the starting current of Fan application effectively, make the motor start smoothly when have torque speed.

## Industrial Drive: Application characteristics of fan and pump



**Power unit bypass: Automatically bypass the failure and keep running.**



## Industrial Drive:The steel mill



**EU:SIAMSTEEL**

**Application: Mill**

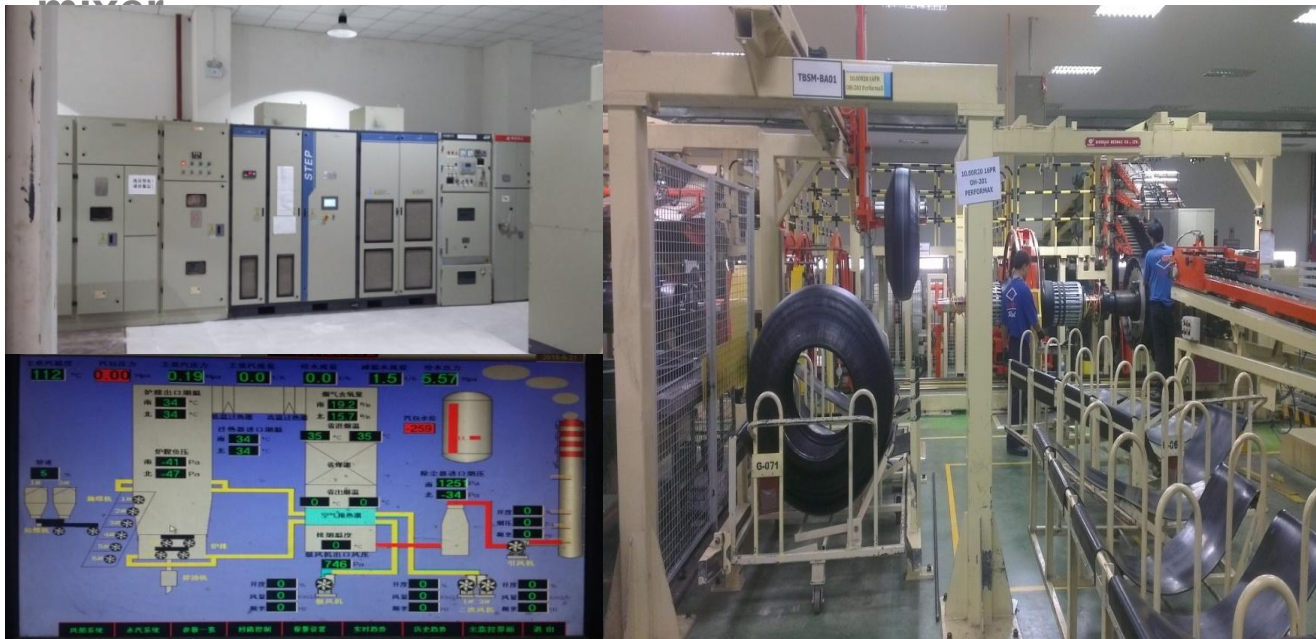
**Motr:  
6.6kV 1600kW**

## Industrial Drive: Sugar Crusher mill



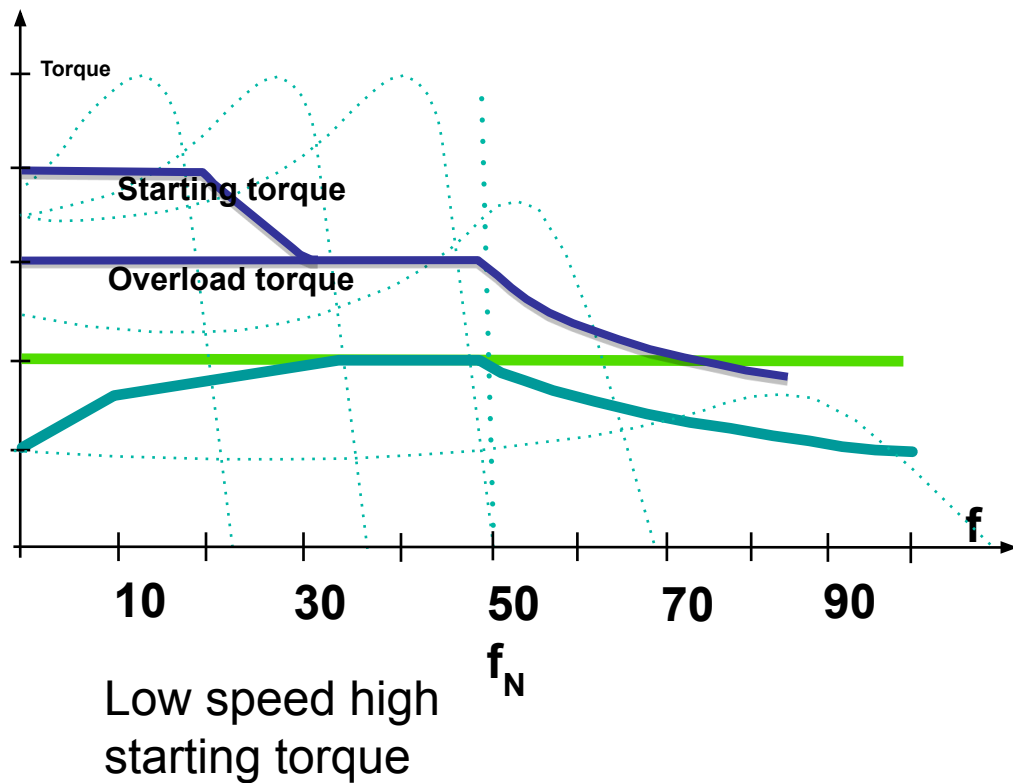
**EU: Thai Udorn Sugar,  
Application: Crusher Mill, Pressure Feed  
Motor: 1500kW / 6.6kV、630kW / 6.6kV**

## Industrial Drive : Rubber mixer



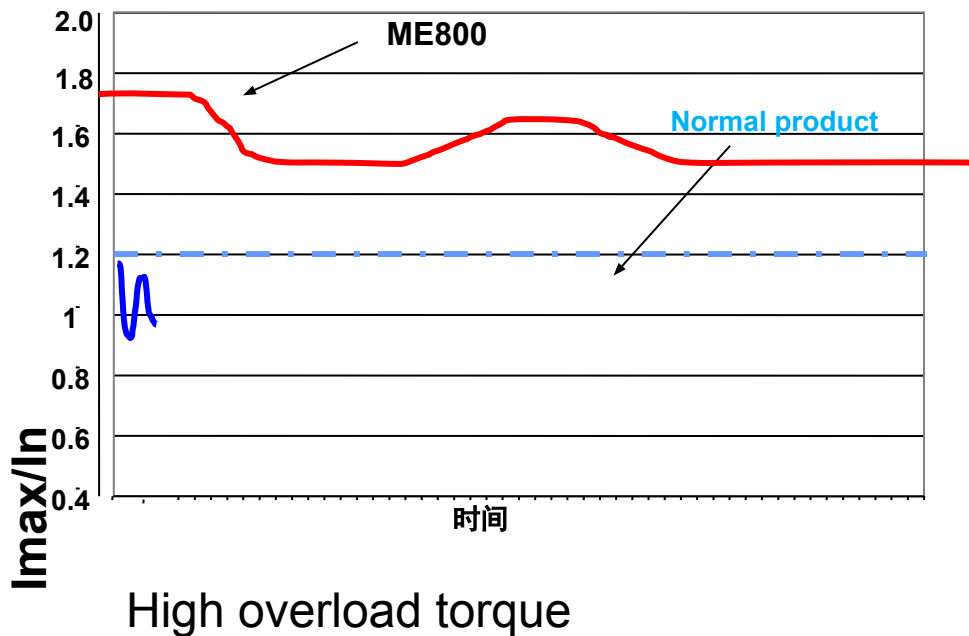
## Internal-mixer application in tyre manufacturing

## Industrial Drive: mill



## Industrial Drive: mill

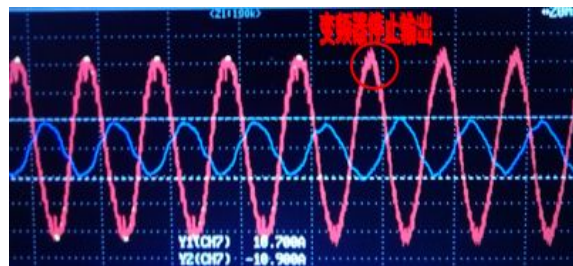
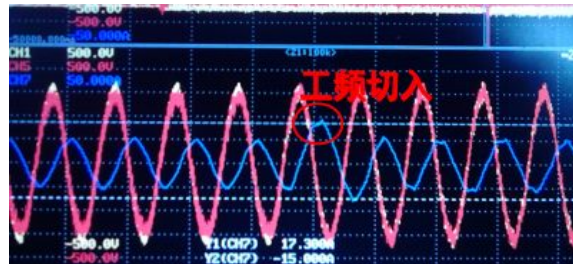
### Driving Capability: **High torque** VS **Standard torque**



## Nuclear power industry: Main engine cooling pump



12 MW HV inverter for the first nuclear pump test station in Shanghai Apollo



Unique undisturbed switching technics between inverter and power grid



**STEP**<sup>®</sup> |

Step by Step, Dreams Come True

