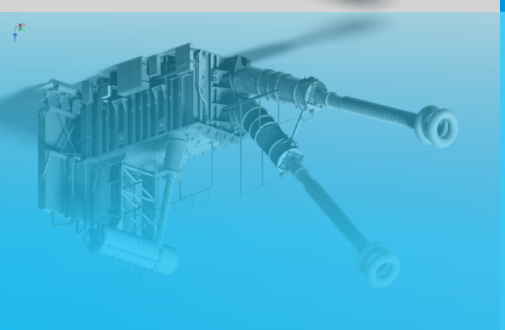


通用电气高压设备(武汉)有限公司

GE High Voltage Equipment (Wuhan) Co., Ltd.

通用电气信念

GE Beliefs

唯客户 定成败
CUSTOMERS DETERMINE OUR SUCCESS

求精益 拼速度
STAY LEAN TO GO FAST

学以恒 善应变
LEARN AND ADAPT TO WIN

敢授权 互激励
EMPOWER AND INSPIRE EACH OTHER

闯未知 展佳绩
DELIVER RESULTS IN AN UNCERTAIN WORLD

目 录

Contents

前言 PREFACE

总经理致辞 By General Manager

以高质量保证，最好的解决方案，满足您的需求。

Offer top class quality and best solution to meet your needs and requirements.

“我们的技术覆盖所有产品范围，从110kV到1200kV交流及±1100kV高压直流全系列变压器以及110kV~500kV电抗器”

“Our expertise extends to all levels from 110kV to 1200kV UHVAC and ±1100kV HVDC transformers and 110kV to 500kV reactors.”

通用电气高压设备(武汉)有限公司，配备了最尖端、最精良的设备，能够设计和生产从普通变压器到现在世界上最复杂最重的电力变压器，包括特高压交流及高压直流变压器。

通过共享GE电网解决方案全球技术支持和网络，地处华中地区的通用电气高压设备（武汉）公司可以通过有效并完整的河运、陆运和海运运输网络将我们的产品运送到世界上的任何国家。我们有高技能的人员和先进的培训系统，保证产品有可靠的质量和交付能力，提供有竞争力的价格，并以安全和环境保护为至上承诺。

在接下来的页面里，我们期望能提供给您更多的关于工厂架构及生产能力的信息。真诚的期望能为您，我们尊敬的客户，生产下一台变压器！

通用电气电网解决方案，作为您身边输电领域的全球专家，我们拥有骄人的业绩，最大机组容量2750MVA，可以满足您全方位的需求。无论何时何地，只要您需要，我们就会在您身边。

GE Grid Solutions, as your global specialist in power transmission, our expertise is beyond all your needs with strong references up to 2750MVA. We are there whenever and wherever you need us.

GE High Voltage Equipment (Wuhan) Co., Ltd. is a high end manufacturing facility, installed with state-of-the-art equipment and able to design and manufacture from standard products up to the most complex and heaviest power transformers existing in the world, including UHVAC and HVDC.

Sharing GE Grid Solutions Global network and technology support, this unit, located in Central China is able to deliver products through an efficient and integrated pluvial, terrestrial and maritime network to any country in the world. With high skilled staff and advanced training system, it can ensure reliable products in terms of Quality and delivery at competitive costs, having Safety and Environmental Protection as upmost commitment.

In the next pages we expect to provide you with some more information about our organization and capabilities, we are sincerely looking forward to produce the next transformer, having you, as our valuable customer.

公司简介

Company Introduction

通用电气高压设备(武汉)有限公司由美国通用电气公司独资，成立于2007年12月26日，总投资约6000万欧元，作为全球8个变压器生产厂家之一。公司位于湖北省武汉市阳逻经济开发区，占地面积128328m²，厂区占地面积26700m²，变压器年生产能力25000MVA。

公司全面引进GE 电网解决方案先进的设计、制造技术及先进的管理方式，可以设计、生产单机最大容量为1400MVA的各种类型的电力变压器，包括110kV及以上大型、超大型/高压、超高压、1200kV特高压交流及±1100kV高压直流变压器。国际领先的关键生产工装设备和试验设备，作为保证产品质量、提升企业市场竞争优势的保障。公司实施和采用全球一体化的技术及标准，愿意竭诚为国内外广大用户提供国际一流的产品和服务。

GE High Voltage Equipment（Wuhan）Co., Ltd., whole owned by GE, is founded on 26 Dec. 2007 with the total capital of about 60 mEuros, as one of 8 group transformer factories in the world. Our company is located in Yangluo Development Zone, Wuhan City, Hubei Province, P.R. China, covering the land 128,328m². The factory area is 26,700 m² and annual production capacity is 25, 000MVA.

By fully bringing in comprehensive design, manufacturing technology and advanced anagement methods from GE Grid Solutions, GE High Voltage Equipment (Wuhan) Co., Ltd. is able to design and produce a full range of power transformers with largest capacity of 1400MVA, including large, ultra-large/ high voltage, ultra-high voltage transformers from 110kV up to 1200kV AC and HVDC transformers up to ± 1100kV. International leading key production & test equipments guarantee product quality and enhance competitive advantage in the market. GE High Voltage Equipment (Wuhan) Co., Ltd. is willing wholeheartedly to serve worldwide customers with world-class products and services by implementing and applying advanced global integration technologies and standards.

地理优势

Logistic Advantage

通用电气高压设备(武汉)有限公司坐落在武汉市阳逻经济开发区内，是汉江与长江交汇之地，是我国内陆最大的水陆空交通枢纽和我国最大的“通汇达海”内河港口之一，公路、铁路、航空、水运畅通，具有“承东启西、接南纳北”的战略地位。

Wuhan Yangluo development Zone is where our company is located, this is at the converging point of Yangtze River and Han River, the biggest China inland traffic hinge of land/ water/air, as well as one of the biggest China inland freshwater harbours connecting with river and sea. Yangluo development zone enjoys the strategic geographic position of a nexus from east to west and north to south based on clear highroad, railway, airway and water carriages.

◆ 水域优势：深水港水深达7米，岸线平直，水流平稳，河床稳定，常年不淤，深水良港，上距武汉关约为28公里，下距吴淞口约1015公里，港前江宽1600–1800米，经长江4天左右可以到达上海港口。

◆ Hydrological and channel advantages,Deepwater port with a minimum water depth of 7m, straight shoreline and steady river bed with the absence of sediment problems, 28km downstream from Wuhan Customs and 1,015km upstream from WUSONG mouth (Shanghai) with a port width of 1,600-1,800m, about 4 days transportation from Yangluo port to Shanghai port through this Yangtze River.

◆ 交通便利：地处武汉三环线的外环线北段，陆路距市中心23公里。

◆ Convenient transportation: Located at the North of Wuhan outer-Ring highway, which is only 23km from Wuhan downtown.

◆ 路网发达：京珠高速、沪蓉高速、106（北京–广州）、107（北京–深圳）、316（福州–兰州）、318（上海–聂拉木）国道交汇于此，京九铁路，京广铁路、沪蓉铁路夹境而过。经过公路平均3天左右可以到达华南和华东地区，平均5天左右可以到达西南和西北地区，全国范围内基本上在7天左右的时间内均可到达。

◆ Well-developed highway network: 6 highways intersecting in Wuhan, including Beijing-Zhuhai Highway, Shanghai-Chengdu Highway, 106 (Beijing-Guangzhou), 107 (Beijing-Shenzhen), 316 (Fuzhou-Lanzhou) and 318 (Shanghai-Nielamu). Also, 3 railways passing through Wuhan,including Beijing-Kowloon Railway, Beijing-Guangzhou Railway and Shanghai-Chengdu Railway. Therefore, it is estimated that about 3 days' highway transportation from Wuhan to South China and East China areas, about 5 days to Southwest and Northwest areas; basically about 7 days to other national wide areas.

公司历史
Company History

2015–11–2
加入通用电气能源互联集团/电网解决方案
Presently GE Energy Connections / Grid Solutions

2010–6–1
并购入阿尔斯通
Joined ALSTOM

2009–5–6
开业庆典
Opening Ceremony

2008–1–8
启动打桩工程
Piling

2008–1–18
奠基典礼
Ground breaking ceremony

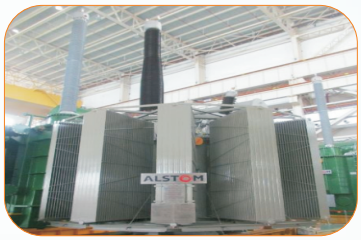
重点项目

Key Projects

2017–3
鄂州电厂3期项目试验一次性通过。该订单含2台1220MVA 525kV升压变，是超大容量的变压器
Ezhou Power Plant Phase 3 Generator transformer successful FAT. Scope is 2 pcs 1220MVA 525kV Generator transformer which are the super capacity transformers

2016–3
智利项目500kV变压器和电抗器顺利通过试验
该订单包含7台变压器，36台电抗器
500 kV transformers and reactors for Chile project passed the test successfully. This order contains 7 transformers and 36 reactors

2015–11
新加坡电力公司 三相并联电抗器
（100MVAR/230 kV）顺利通过试验
Singapore Power Group 3 Phase Shunt Reactor （100MVAR/230 kV）passed the test successfully



2014–3
与合作伙伴共同生产的±800kV 苏南 – 锦屏高压直流的国网项目顺利通过试验
SGCC Sunan–Jinping HVDC project working with partner SPEC passed the test successfully

2013–10
南网云南太安500kV电站投运
Commercial operation for Yunnan Tai'an 500kV s/s, CSG

2013–9
广东阳西电厂780MVA 500kV升压变试运行通过
Certificate of Guangdong Yangxi Power Plant 780MVA 500kV GT withstand 168h Pilot Run

重点项目
Key Projects

2013–3
马来西亚Tangjun Bin T4单相450MVA 500kV升压变试验通过
Test approved for single phase 450MVA 500kV GT of Tangjun Bin T4 project in Malaysia

2012–12
墨西哥400kV电站试运行
Commissioning of 400kV substation in Mexico

2012–10
巴西Rio Madeira项目
±600kV换流变试验成功庆典
Rio Madeira ±600kV HVDC Convertor Transformer Successful Test Ceremony

2010–10
内蒙古电网包头高新4#主变250MVA 500kV变压器投运
Commercial operation of 1st 500kV Transformer for Inner Mongolia EPC

2010–7
±800kV直流样机试验通过
±800kV HVDC Prototype test approval

2009–7
公司首台变压器(220kV)顺利出厂交付使用
Celebration for dispatch of first transformer (220kV)

技术介绍
Technique Introduction

我公司具备设计和生产高达1200kV交流和±1100kV高压直流大型及特大型电力变压器的能力。变压器的设计和生产结合集团内全球主要变压器工厂的技术特长和丰富经验，采用集团的最新设计手册和计算软件，并严格按照集团的制造工艺和质量控制程序，为客户提供品质优良、可靠性高的电力变压器和电抗器。

Our company is capable of designing and manufacturing up to 1200kV AC and ± 1100kV HVDC large and extra large power transformers. The transformer design and manufacture combines the technical expertise and experiences from worldwide major transformer factories within the group, using the latest design software and manuals with strict adherence to Group manufacturing processes and quality control procedures, dedicated to provide good-quality and high-reliability power transformers and shunt reactors to our customers.

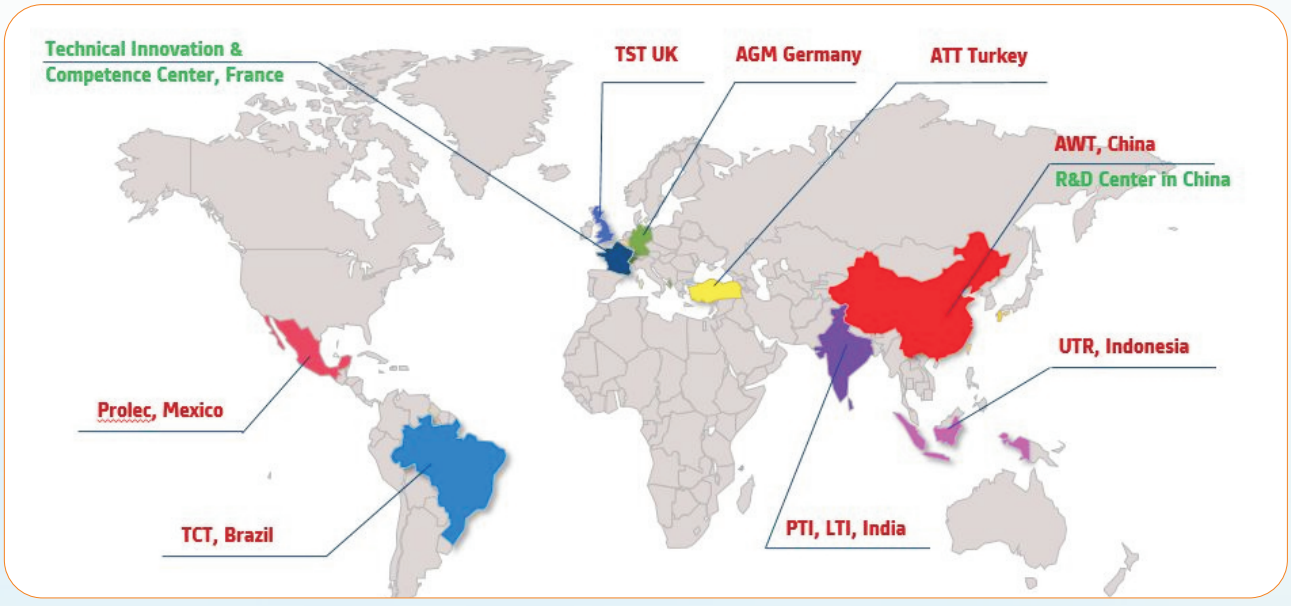
我们致力于产品的优化设计与可靠运行
Our expertise for optimized design, performance & reliability.

技术来自法国的研发中心和技术中心，通过共享数据库即时更新，保持与全球最先进设计技术的同步。
Network communication with Technical Innovation & Competence Center in France.

作为电网解决方案重要工厂之一，我们以法国研发中心为龙头，联合位于英国，德国，土耳其和巴西等工厂实现相互支持，技术经验共享。

As one of the most important factories of GE Grid Solution group, under the leadership of the France R&D center, we join UK, Germany, Turkey, Brazil and other factories to achieve mutual support and technical experience sharing.

全球制造厂家
Worldwide Manufacturing Facilities



技术介绍
Technique Introduction

我们拥有先进的设计程序及计算软件，高速图形工作站，三维计算机辅助设计系统。

我们为每一台产品均进行全面而详细的电气和机械强度设计计算，根据计算结果进行相应的部件和细节设计，确保产品在电气上和机械上的耐受能力，并留有充分的安全裕度。

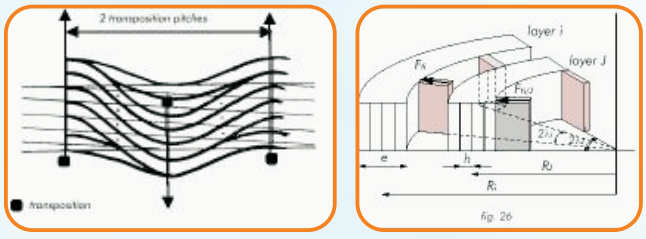
GE High Voltage Equipment (Wuhan) Co., Ltd. has advanced design software and calculation program; Graphic Workstations and 3D CAD Systems.

Each product is performed comprehensive electrical and mechanical design calculations. Based on the calculation results and details, transformer is designed to withstand the electrical and mechanical stress, meanwhile sufficient safety margin is taken into consideration.

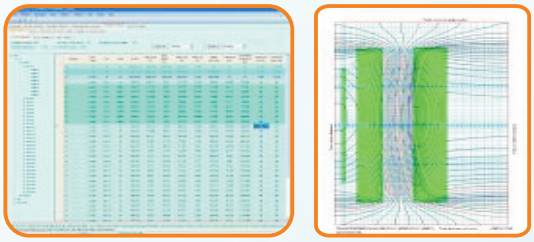
电气设计，包括主绝缘距离选取、空载和负载损耗计算、阻抗计算、短路电流及短路力计算、冲击梯度分布计算及纵绝缘的选取、温升和冷却计算、噪音计算等。

Electrical design, including the design of the clearances, calculation of no-load and load losses, impedance calculations, short-circuit current and short circuit force calculation, impact of gradient calculation, selection of vertical insulation, thermal and cooling calculation, noise calculation, etc.

▼ **短路机械力和应力计算**
Short Circuit Force & Stress Calculation



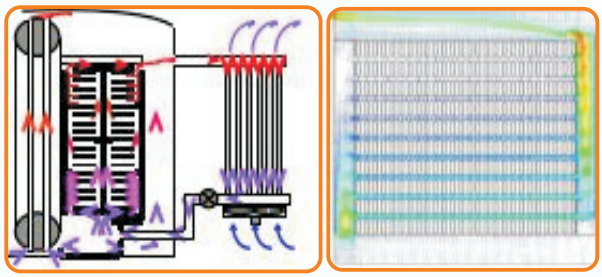
▼ **基于有限元法漏磁场及杂散损耗计算分析**
Stray losses calculation based on analysis.



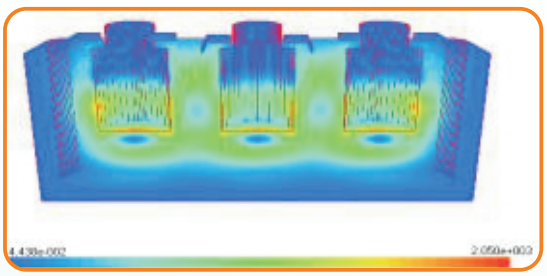
技术介绍

Technique Introduction

▼ 温升计算
Temperature rise calculation

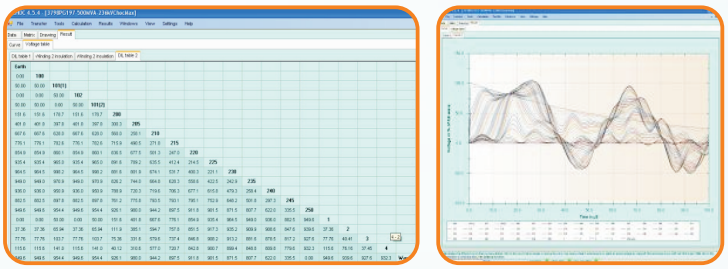


▼ 油箱壁温升，漏磁损耗密度分布计算
Tank heating analysis

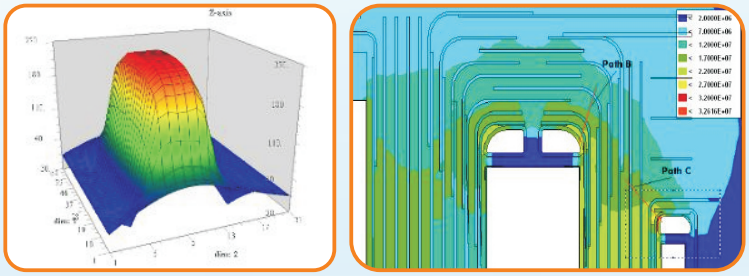


▼ 验证电压分布
Verification of voltage distribution and withstand

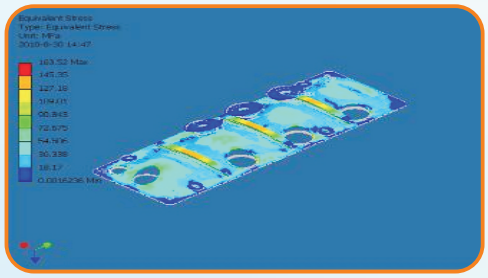
▼ 冲击计算
Impulse analysis



▼ 电场强度，磁场强度有限元分析
FEM Analysis - electrical



▼ 基于有限元分析的油箱机械强度计算
FEM Analysis - Mechanical



产品特点
Product Features

结构合理，技术先进，性能稳定，维护简单

Reasonable Design, Advanced Technology, Perfect Performance,Simple Maintenance.

◆ **结构合理**—利用电网解决方案的先进技术及计算机软件对电、磁、热、力进行量化分析以确定绕组形式、绝缘结构、油箱屏蔽、引线布置，使产品结构完美。例如：绕组各部位的场强进行计算分析，反复调整各区电容量参数以达到最佳配合，使之取得理想的电位分布和冲击梯度分布。

◆ **Efficient Design-** By drawing upon GS advanced technology, our company is able to make an efficient design. Computer software calculation of electric, magnetic, thermal and mechanical strength assist engineers to complete the design of winding, insulation, tank shielding and leads layout. For example: electrical field stress calculation of the various parts of a winding, to repeatedly adjust various parameters in order to determine the best fit for achieving the desired potential distribution and impact gradient.

◆ **技术先进** — 损耗控制已达国际先进水平，阻抗电压可满足用户不同需要，局部放电量低于国家标准数值。例如：杂散损耗低、效率高、无局部过热。根据漏磁场数值计算结果，确定绕组的换位方案，设置完善的磁屏蔽结构。

◆ **Advanced Technology -** The losses control has reached international advanced level, impedance can be designed to meet the different needs of customers. Also partial discharge is below the National standard value. For example: low stray losses, high efficiency, no partial overheating. Based on the result of leakage magnetic calculation, winding transposition design can be followed by perfect layout of the magnetic shunt.

◆ **性能稳定**—对冷却系统的油流场和温度场进行计算分析，以确定合理的油路结构及对温升的有效控制。例如：通过对器身内部的油流分布进行量化计算及最优化调整，严格控制油流速度，使高流速避开高场强区，避免油流带电。

◆ **Perfect Performance –** For oil cooling system,flow field calculation is used to determine the oil flow path,and temperature field calculation assists engineers to reasonably control the temperature rise. For example: In order to prevent oil flow from being charged,engineers firstly have to calculate the optimal oil flow distribution enabling them to strictly control the oil flow speed,they can then direct the high flow oil to avoid high field strength areas.

◆ **维护简单**—易安装、维护，良好机械强度，高效售后服务。箱体结构合理，外形美观，强化组件安装规程，提高整体安装质量。

◆ **Simple Maintenance -** Easy to be installed and maintained, good mechanical strength and efficient after-sales service. Reasonable structure of Tank and final assembly. An enhanced component installation procedure improves the overall quality of the installation.

产品介绍
Product Introduction

发电机变压器Generator Step–up Transformers

鄂州电厂3期项目
Ezhou Power Plant Phase 3
2台1220MVA 525kV升压变。
2 units of 1220MVA 525kV Generator transformer.
该产品是超大容量的变压器。
The product is super capacity transformer.

电网变压器 Interconnection Transformers

内蒙古包头高新4#主变扩建工程
Inner Mongolia Baotou Gaoxin No 4 Extension s/s
3台ODFPSZ–250MVA/500kV变压器于2010年10月26日投运，产品性能可靠，满足安全运行要求。
Operation status: Three transformers (type: 250MVA 500kV auto transformer) have been outstanding in performance and reliability since they were energized on 26 Oct 2010.
电网变压器能满足连接不同电压等级电网的特定要求。量身定制的设计将适应各种物理限制如运输限制。
These utility transformers have been designed to meet all the specified demands of different voltage rate network. Our customized design will adapt all specific physical constraints such as transport limitations.

高压直流换流变压器Converter Transformer

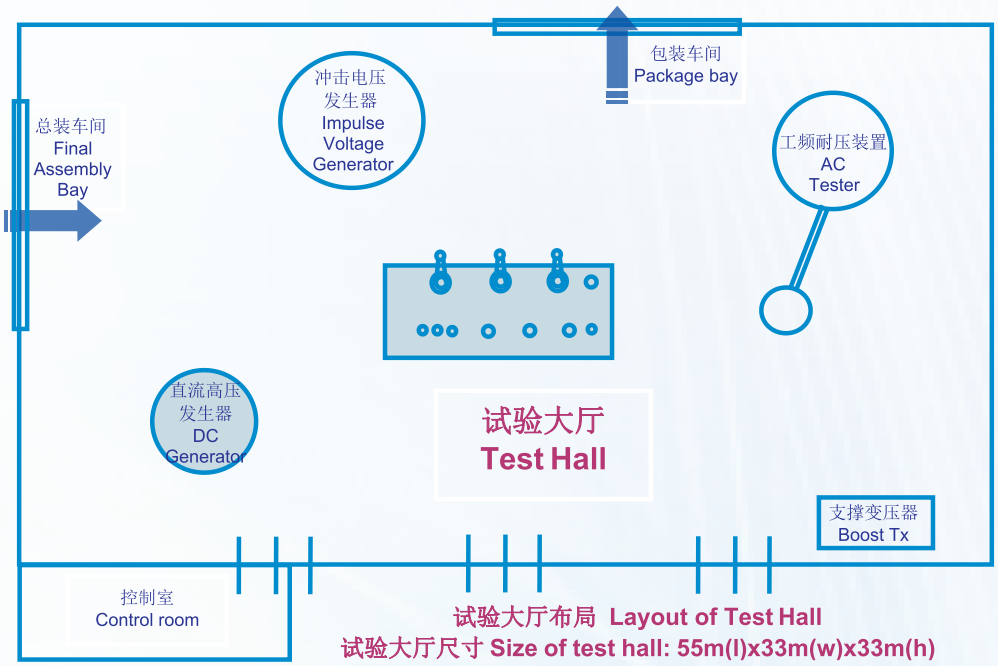
巴西Rio Madeira项目
Brazil Rio Madeira project
4台319.66MVA ±600/±300kV高压直流变压器。
4 units of 319.66MVA ±600/±300kV convertor transformer.
项目属于巴西一个大型输变电计划的一部分，为世界上最长的直流输电工程–巴西亚马逊州至圣保罗互联线路提供换流变压器。
The project is part of a large power transmission plan of Brazil, which is the longest HVDC transmission project in the world, from Porto Velho collector substation to Araraquara phase II substation.

三相并联电抗器 3 Phase Shunt Reactor

新加坡电力公司项目
Singapore Power Group Project
1台100MVAR/230 kV 并联电抗器。
1 unit of 100MVAR/230 kV Shunt Reactor.
这是第一台进入新加坡SPPG的项目，也是目前在公司生产的最大的在运行三相并联电抗器。损耗小，噪音低。
This is the first project entered into SPPG market, and is the largest in running 3–phase shunt reactor currently manufactured by our company, low losses and low noise.

特高压试验室

UHV Test Lab



试验大厅布局 Layout of Test Hall
试验大厅尺寸 Size of test hall: 55m(l)x33m(w)x33m(h)

特高压实验室

背景噪音≤48dB，背景局放≤5pC
双门设计，变压器试验过程无回流。 大门尺寸：15m(h)x13m(w)
一个大门通往装配车间，用于变压器运入大厅，一个大门通往包装车间，将变压器运出大厅进入包装车间。

UHV Test Lab

Background noise is less than 48dB,
Background PD is less than 5pC.
Two doors, no transformer flow back during test process
Door dimension is 15m (h) x 13m (w)
One door for transformer in, and another door for transformer out to packing area after test, no need to back assembly area

特高压试验室

UHV Test Lab

冲击电压发生器

4000kV 600kJ冲击电压发生器
400kV分压器
3600kV多级截断装置
TR–AS 200 三通道测量系统

Impulse Voltage Generator

4000kV 600kJ impulse voltage generator,
400kV divider,
3600kV chopping device,
TR–AS200 three–channel measurement system.

工频试验变压器

1200kV 4800kVA工频试验变压器
1200kV电容分压器
输出电压0–1200kV，最大电流4A

AC Testing Transformer

1200kV 4800kVA testing transformer,
1200kV capacitor divider,
Output voltage is from 0 to 1200kV,
maximum current is 4A.

直流发生器

2000kV 30mA直流发生器
最高电压2000kV，最大电流30mA，局放水平小于100pC

DC Generator

2000kV 30mA DC generator
Maximum voltage is 2000 kV, maximum output current is 30mA, partial discharge less than 100pC.

质量管理体系简介
Quality Management System

以顾客为关注焦点Customer Focus

本公司秉承生产高质量、高价值的电力变压器和电抗器，以满足客户的期望、价值及有关标准要求，借助管理评审、客户满意度调查等实现以顾客为中心的战略思想。

Our company holds the quality policy that produces power transformers and reactors of high quality and value to meet customer expectations and values as well as the relevant standards and we strive to achieve the strategic concept of customer-orientation by means of management reviews, and customer satisfaction surveys, etc.

质量方针Quality Policy

协调发展，持续改进，为顾客提供创新、可靠、高效的产品、技术和优质服务。
Through sustainable development and continuous improvement we offer innovative reliable efficient products, technology and comprehensive services to our customers.

本公司的质量方针是与本公司的战略和总目标相一致的。我们的目标是在任何情况下都为顾客提供最满意的服务，并成为电力变压器行业的领先者。

我们的力量源泉是：现代化的装备，先进的技术，高素质的员工以及与之相连的，由公司全体员工共同推进的质量管理体系。我们通过提供高质量产品并持续改进确保自己的未来。

根据GE电网解决方案的指标,结合本公司中长期规划，通过GE电网解决方案PD系统，每年将目标分解至各功能层次。

The Quality Policy is defined in accordance with the strategy and the general objectives of our company.

Our ambition is to provide full customer satisfaction in any circumstances and become a leader in the field of power transformers. Our strength includes modern equipments, advanced technology, qualified staff associated with a quality management system undertaken by all personnel in his/her daily individual or team work.

Based on the target of GE Grid Solution and medium-long-term objective, the objectives will be deployed into departmental levels by GE Grid Solution PD system every year.

质量管理体系过程Quality management system process

本公司质量管理体系采用过程方法进行管理,主要过程包括业务过程,支持过程及改进过程.

The quality management system of our company is based on the process method. The main processes include a business process, improvement process and a support process.

质量是企业得以生存和发展的根本。我公司始终把产品质量放在经营管理的首要地位，一如既往的为广大用户提供高质量的变压器产品及相关服务。

Quality is the footstone of survival and development of our company. We always give priority to quality in our business operation. And we will continuously provide high quality products and service to our customers.

绿色工厂

Green factory

我公司是全球第一家获得绿色工厂认证的变压器生产厂家，于2009年5月获得集团在法国巴黎召开的ASDA绿色工厂大奖，并于2009年11月份，获得USGBC颁发的LEED绿色建筑认证。

Our company is the First power transformer factory in the world to be a certified green factory. In May 2009, ASDA is awarded in the group meeting held in Paris France. In November 2009, our company was accredited by USGBC the LEED certification.

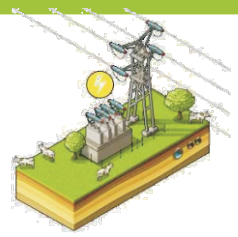
武汉首家绿色工厂

The first green factory in Wuhan

Green material 绿色原材料

- Seek and bring up green suppliers
  寻找和培养绿色的供应商
- Strictly stop any non–environmental friendly material
  严格杜绝非环保类的原材料入厂

Green product 绿色产品

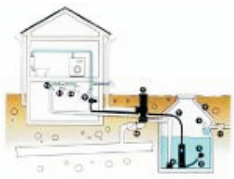


- Low–noise
  噪音低
- Minimum waste
  损耗少
- Non–pollution materials
  无污染材料

Green service 绿色服务

- Be customer focused
  以客户为中心
- Zero accident
  零事故
- On–time delivery
  及时的交货
- Always looking for perfect
  不断追求完美

Green facility 绿色设施



- No–boiler 无锅炉
  No diesel generator
  无柴油发电机
- Rainwater Collection and Storage System
  雨水搜集系统
- Solar Energy Light for Exterior Lighting
  室外太阳能照明灯

打造绿色工厂标杆 Be benchmark of modern green factory

我们的客户

Our Customers