

TIANHONG
天宏电力

Tianhong Power Technology

天宏电力科技有限公司

COMPLETE SET SCHEME SOLUTION
PROVIDER FOR THE GLOBAL POWER SYSTEM

全球电力系统成套方案解决商



中国 ● 徐州

China ● Xuzhou

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TIANHONG
天宏电力

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TIANHONG
天宏电力

PART 01

企业篇

ENTERPRISE CHAPTER

天宏电力科技有限公司





天宏电力科技有限公司是一家从事变压器及配套产品生产、研发、销售的高新技术企业。公司坐落于江苏三大都市圈之一、国家综合交通枢纽，华东地区重要的科教、文化、金融、旅游、会展，江苏省重要的经济、商业和对外贸易——徐州市，京沪铁路和陇海铁路在此交汇，交通运输便利。

公司总投资 2.5 亿元，注册资本 1.08 亿元。公司现有员工 500 余人，其中：

工程师 7 人；博士、硕士等中级技术人员 110 余人。

Tianhong Power Technology Co., Ltd. is a high-tech enterprise engaged in the production, research and development and sales of transformers and supporting products. The company is located in one of the three metropolitan areas of Jiangsu Province, the national comprehensive transportation hub, East China's important science and education, culture, finance, tourism, exhibition, Jiangsu Province's important economy, commerce and foreign trade - Xuzhou city, Beijing-Shanghai railway and Longhai Railway in this intersection, transportation is convenient. The total investment of the company is 250 million yuan, and the registered capital is 108 million yuan. The company has 500+ employees, including: engineers 7 people; There are more than 110 intermediate technical personnel such as doctors and masters.



占地面积：107000 m²
规划建筑总面积：80000 m²
已建成厂房面积：50000 m²
已建办公研发楼：4500 m²
已建员工餐厅：2500 m²
在建厂房面积：23000 m²

Land area: 107,000 m²
Planned total floor area: 80,000 m²
Built-up area of completed factory buildings: 50,000 m²
Built-up area of completed office and R&D building:
4,500 m²
Built-up area of completed staff canteen: 2,500 m²
Under construction factory building area: 23,000 m²

企业愿景 Corporate Mission

做时代企业 创百年品牌
Creating a Centennial Brand as a Time
Enterprise.

企业使命

为员工创造幸福 为企业创造效益 为社会创造财富
Creating happiness for employees, benefits for
enterprises, and wealth for society.

经营理念 Business Concept

厚德笃行 和谐鼎新
Benevolent in Virtue, Adhering to Harmony, and
Promoting Innovation.

企业价值观

一切相信群众 一切依靠群众 一切为了群众
Believe in the masses, rely on the masses, and
do
everything for the masses.



500kV及以上, 220kV, 110kV, 35kV, 20kV, 6kV等油浸式变压器 (S13、S20、S22) 系列: 500kV-220kV, 110kV, 35kV, 20kV, 6kV环氧树脂浇注干式变压器(SC(B)12、SC(B)13、SC(B)14、SC(B)18)系列; 非晶合金油浸式配电变压器(SC(B)H15、SC(B)H17、SC(B)H19系列); YB预装式变电站, ZGS型组合式变电站; 光伏发电升压变压器、高过载变压器、有载调压变压器。产品分别通过国家电器质量监督检验中心、并获得注册型号备案证书。产品还通过中国质量认证中心能效产品, 国家电能认证中心的 PCCC 产品认证, 并通过了 GB/T 27922-2021 [商品售后服务评价体系] 标准。

500kV and above, 220kV, 110kV, 35kV, 20kV, 6kV and other oil-immersed transformers (S13, S20, S22) Series: 500kV-220kV, 110kV, 35kV, 20kV, 6kV epoxyresin cast dry-type transformer (SC(B)12, SC(B)13, SC(B)14, SC(B)18) series; amorphous alloy oil-immersed distribu_x0002_tion transformer (SC(B)H15, SC(B)H17, SC(B)H19 series); YB prefabricated substation, ZGS type combined substation; photovoltaic power generation step-up transformer, high overload transformer, on-load voltage regulating transformer. The products have passed the National Electrical Appliance Quality Supervision and Inspection Center and obtained registered model filing certificates. The product has also passed the China Quality Certification Center Energy Efficiency Product and National Electric Energy Certification. The center's PCCC product certification has passed the GB/T 27922-2021 [Commodity After-sales Service Evaluation System] standard.

公司自成立以来, 始终遵循“科技向导, 服务先行, 诚信为本”的经营理念, 坚持以客户的利益为己任, 注重产品的研发投入。严格按照 ISO9000 质量管理体系的标准运行, 求精务实创新奋进, 为各界客户提供符合各区域特点的优异产品及变压器的解决方案。公司以先进的技术、精湛的装备、上乘的质量、满意的服务及良好的信誉, 与广大用户真诚合作, 谋求共同发展, 真诚地欢迎各界人士前来我公司洽谈合作, 共创辉煌!

Since its establishment, Tianhong has always followed the business philosophy of "science and technology guide, service first, integrity_x0002_based", insisting on taking the interests of customers as its own responsibility, and focusing on product research and development investment. We operate in strict accordance with the standards of the ISO9000 quality management system, strive for refinement, prag_x0002_matism, innovation and progress, and provide customers from all walks of life with excellent products and transformer solutions that meet the characteristics of each region. With advanced technology, superb equipment, superior quality, satisfactory service and good reputation, the company sincerely cooperates with users and seeks common development. We sincerely welcome people from all walks of life to come to our company to discuss cooperation and create brilliance together!

- GB 1094 电力变压器
- GB/T 15164 油浸式电力变压器负载导则
- GB/T 6451 三相油浸式电力变压器技术参数和要求
- GB 2536 变压器油
- GB 311.1 高压输变电设备的绝缘配合
- JB/T 501 电力变压器试验导则
- GB 10237 电力变压器绝缘水平和绝缘试验外绝缘的空气间隙
- DL/T 572 变压器运行规程
- IEC 60076 国际电工委员会变压器标准
- GB 1094 Power transformer
- GB/T 15164 Loading Guidelines for Oil-immersed Power Transformers
- GB/T 6451 Technical parameters and requirements for three-phase oil-immersed power transformers
- GB 2536 transformer oil
- GB 311.1 Insulation coordination of high-voltage power transmission and transformation equipment
- JB/T 501 Power Transformer Test Guidelines
- GB 10237 Insulation level of power transformer and air gap of external insulation for insulation test
- DL/T 572 Transformer operating procedures
- IEC 60076 International Electrotechnical Commission Transformer Standard

资质荣誉 QUALIFICATION & HONOR



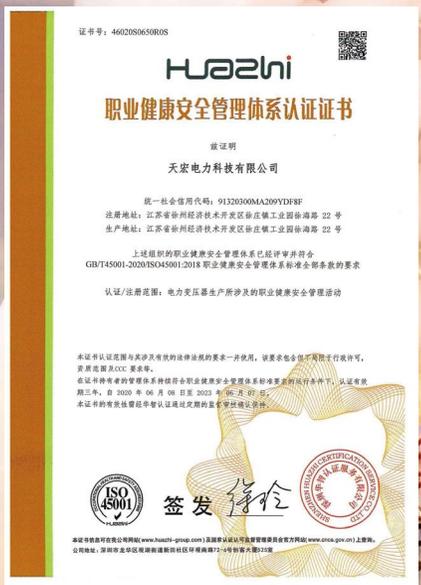
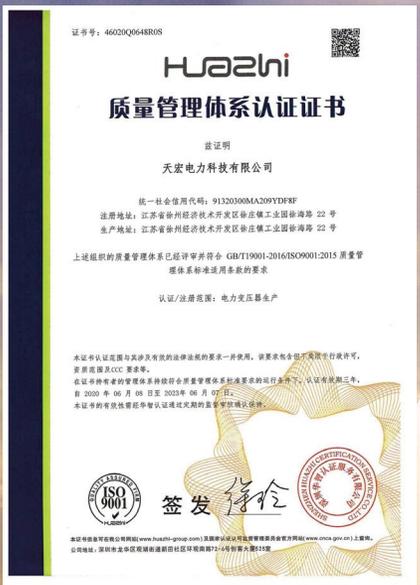
01

营业执照 Business license



02

国网入围证明 State grid finalization certificate



03

三体系认证证书 Three system certification certificate

NEIC No. XG20031059

MA CNAS TESTING CNAS L0107

检验报告 TEST REPORT

样品名称: 油浸式电力变压器
型号: S13-M-315/10
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家高低压电器质量监督检验中心
National High-low Voltage Electrical Apparatus Quality Supervision and Inspection Center
甘肃电器科学研究院
Gansu Electric Apparatus Research Institute

NEIC No. XG20031060

MA CNAS TESTING CNAS L0107

检验报告 TEST REPORT

样品名称: 油浸式电力变压器
型号: S13-M-1000/10
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家高低压电器质量监督检验中心
National High-low Voltage Electrical Apparatus Quality Supervision and Inspection Center
甘肃电器科学研究院
Gansu Electric Apparatus Research Institute

NEIC No. XG20031061

MA CNAS TESTING CNAS L0107

检验报告 TEST REPORT

样品名称: 干式变压器
型号: SCB13-400/10
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家高低压电器质量监督检验中心
National High-low Voltage Electrical Apparatus Quality Supervision and Inspection Center
甘肃电器科学研究院
Gansu Electric Apparatus Research Institute

NEIC No. XG20031062

MA CNAS TESTING CNAS L0107

检验报告 TEST REPORT

样品名称: 干式变压器
型号: SCB13-1600/10
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家高低压电器质量监督检验中心
National High-low Voltage Electrical Apparatus Quality Supervision and Inspection Center
甘肃电器科学研究院
Gansu Electric Apparatus Research Institute

NEIC No. XG21990346

MA CNAS TESTING CNAS L0107

检验报告 TEST REPORT

样品名称: 干式变压器
型号: SCB12-800/10-NX3
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

甘肃电器科学研究院
Gansu Electric Apparatus Research Institute
国家高低压电器质量监督检验中心
National High-low Voltage Electrical Apparatus Quality Supervision and Inspection Center

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210174

产品名称: 油浸式电力变压器
规格型号: S20-M-1600/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210175

产品名称: 干式变压器
规格型号: SCB11-100/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210176

产品名称: 干式变压器
规格型号: SCB11-500/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210177

产品名称: 油浸式电力变压器
规格型号: S20-M-100/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210178

产品名称: 油浸式电力变压器
规格型号: S20-M-800/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210182

产品名称: 干式变压器
规格型号: SCB11-2000/10-NX2
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

MA CNAS TESTING CNAS L0107

型式试验报告 Type Test Report

No.: ZBXKS20210205

产品名称: 油浸式电力变压器
规格型号: S22-M-630/10-NX1
委托单位: 天宏电力科技有限公司
试验类别: 型式试验

国家中低压配电设备质量检验检测中心
China National Center for Quality Testing of Medium Voltage Distribution Equipment
(镇江市产品质量监督检验中心)

公司自成立以来，始终遵循“厚德笃行，和谐鼎新”的经营理念，注重产品的科技研发，严格按照 ISO9001 质量管理体系的标准运行，团结务实，创新奋进。

正确树立人才理念，坚持以人为本，不断加大对员工的全面培养，铸造出一支能打善战、业绩一流的队伍，为客户提供安全、优质、节能的产品和满意的服务。

focused on product technology research and development, strictly operated in accordance with the ISO9001 quality management system standards, united and pragmatic, innovative and progressive.

Correctly establish a talent concept, adhere to people-oriented principles, continuously increase the comprehensive training of employees, and create a team capable of fighting well and achieving first-class performance, providing customers with safe, high-quality, energy-saving products and satisfactory services.



1-10 车间实景 WORKSHOPS LIVEACTION

TIANHONG
天宏电力



光纤激光切割机
Fiber laser cutting machine



上下料库
Up and down stock



数控转塔冲床
CNC turret punch



机械手
manipulator



折弯机
Bending machine



折边机
hemming machine



干式变压器外壳
Dry-type transformer housing





生产车间 Production workshop



油箱生产车间 Fuel tank production workshop



试验区域
Test area



国家标准试验室
National standard



低压箔绕机
Low voltage foil winding machine



高压绕线
High voltage winding



烘箱
Drying oven



浇注罐
Pouring tank



干变装配
Dry transformer assembly



硅钢车间
Silicon steel workshop

1-12 车间实景 WORKSHOPS LIVEACTION

TIANHONG
天宏电力



激光切割机
Laser cutting machine



片式散热器
Chip Radiator



数控折弯机
CNC Bending



数控冲床
CNC Punching machine



干变装配
Dry transformer assembly



硅钢片叠片
Silicon steel sheet lamination



滚剪机
Rolling shear machine



铁芯车间剪铁 检测
Iron core shop shear



硅钢片叠片
Silicon steel sheet lamination



检测
Testing



TIANHONG
天宏电力

PART 02
产品篇

PRODUCT CHAPTER

天宏电力科技有限公司





电站、工厂、医院、机场、隧道、化工厂、核电站最理想选择



1. 高压变压器，采用日本东芝分析软件和我公司独特的计算和验证程序。为了保证产品的性能，我们对变压器铁芯、线圈、机体、引线、油箱等机件进行了设计和测试。
2. 我公司SSZ11-40000/110产品已通过国家变压器质量监督检验中心的短路承受能力及全部例行型式试验。
3. 本产品具有稳定、经济、可靠、环保等特点，适用于发电厂、变电站及大型工矿、石化企业。

1. High pressure transformer, use Japanese Toshiba analysis software and our company unique calculation and validation procedures. In order to ensure the performance of product, we design and test to the transformer core, coil, the body of machine, lead wire, oil tank and other parts of machine.
2. Our product SSZ11-40000/110 has passed the short-circuit bearing capacity and all routine type tests of the National Transformer Quality Supervision and Inspection Center.
3. This product has the characteristics of stability, economy, reliability and environmental protection, and is suitable for power plants, substations and large industrial, mining and petrochemical enterprises.

- 全密封绝缘结构，保证人身安全。
- 经济高效，降低网络损耗和运营成本。
- 它不仅用于环网，也可用于终端。
- 低损耗、低噪音、性能优越。
- 低温、过载能力强。
- 变压器采用特殊结构，其突出优点是品质优良。
- Fully sealed and insulated structure can guarantee the security of person.
- Economic and efficient to reduce network loss and operation cost.
- It is not only used for ring network but also terminal.
- Low loss, low noise, superior performance.
- Low temperature, overload ability.
- Transformer adopts special structure and its outstanding advantages is high quality.



- 我公司生产的 35kV（有载）电力变压器是吸收国内外先进技术的基础上，针对我国城乡电网改造自行研制开发的新产品，其产品性能优于 GB/6451-2008《油浸式电力变压器技术参数和要求》，完全符合 GB1094《电力变压器》标准及国际电工委员会推荐标准 IEC60076，该产品具有低损耗、低噪声、免吊心的特点，其在安全性、可靠性、经济性等方面都有很大的提高。
- 该系列电力变压器适用于 35kV、50Hz 输变电系统，在城网改造、工矿企事业及 35kV 变电所中作主变压器之用，可在带负荷的情况下，对变压器实现远距离调压。产品技术性能指标达国内领先水平。
- The 35kV (on load) power transformer produced by our company is a new product developed by ourselves for the transformation of urban and rural power grids on the basis of absorbing the advanced technology at home and abroad. Its performance is superior to the technical parameters and requirements of oil immersed power transformer (GB / 6451-2008), which fully conforms to the GB1094 power transformer standard and iec60076 recommended by International Electrotechnical Commission. This product has The characteristics of low loss, low noise and no lifting center are greatly improved in safety, reliability and economy.
- This series of power transformers are suitable for 35kV, 50Hz power transmission and transformation system. They are used as main transformers in urban power grid reconstruction, industrial and mining enterprises and 35kV substations. They can realize remote voltage regulation for transformers with load. The technical performance index of the product reaches the leading level in China.



非晶合金是一种新型的导磁材料，主要以铁、硅、硼类金属元素所构成，采用快速冷冻凝固生产工艺，非晶合金材料的金属原子排列呈无序非晶状态。具有铁磁性良好、机械性能高、耐腐性能好、制作工艺简单、成材率高等特点。非晶合金在物理性能、化学性能和机械性能等方面于晶态何静都有显著的不同。以非晶合金加工而成的变压器铁心与传统硅钢铁心相比，具有更利于被磁化和去磁等特点，空载损耗降低 80%。

Amorphous alloy is a new type of magnetic conducting material, which is mainly composed of iron, silicon and boron. The metal atoms of amorphous alloy are arranged in disordered amorphous state by rapid freezing and solidification process. It has the characteristics of good ferromagnetism, high mechanical properties, good corrosion resistance, simple manufacturing process and high yield. There are significant differences in physical properties, chemical properties and mechanical properties between amorphous alloys and crystalline alloys. Compared with the traditional silicon steel core, the transformer core made of amorphous alloy is more favorable for magnetization and demagnetization, and the no-load loss is reduced by 80%.

适用范围：

非晶合金变压器具有显著的环保节能优点，符合节能要求发展的趋势，推广和应用该产品，将带来十分良好的经济效益和社会效益，市场前景广阔。

**产品将广泛应用于各类住宅、商业建筑、公共设施、
工矿企业、发电企业及城乡电网。**

Amorphous alloy transformer has obvious advantages of environmental protection and energy saving, which conforms to the development trend of energy saving requirements. The promotion and application of this product will bring very good economic and social benefits, and has a broad market prospect. **Products will be widely used in various types of residential, commercial buildings, public facilities, absenteeism enterprises, power generation enterprises and urban and rural power grids.**

2-4 S13 型油浸式电力变压器 S13 OIL IMMERSED POWER TRANSFORMER

TIANHONG
天宏电力



节能环保、安全可靠，您的信赖之选
城市和农村配电网中心理想的配电设备



S13 型能效三级油浸式配电变压器是我公司在原 S11 配电变压器基础上，通过新材料、新工艺的研究运用及自主创新与技术引进结合的方式，通过对铁芯及线圈结构的优化创新设计，达到降低空载损耗及噪音的目的而自主开发的产品。噪声水平与现行国标 JB/T10088-2004 比较平均下降 20%，产品性能水平达到国内先进水平。

S13 energy-efficient three-stage oil-immersed distribution transformer is my company in the original S11 distribution transformer on the basis of the research and application of new materials, new technologies and independent innovation and technology introduction combination of ways, through the optimization of the core and coil structure of the innovative design, to achieve the purpose of reducing the no-load loss and noise of the independent development of the product. The noise level has been reduced by 20% on average compared with the current national standard JB/T10088-2004, and the performance level of the product has reached the domestic advanced level.



- 非晶合金材料具有铁磁性良好、机械强度高、耐蚀性能好、制作工艺简单、成材率高的特点。以非晶合金加工而成的变压器铁心与传统硅钢铁芯相比，具有更利于被磁化和去磁等特点，空载损耗比 GB/T10228规定值降低70%—80%，可大大降低运行费用，节能效果显著。
- SCBH15系列非晶合金干式变压器是一种新型高效节能变压器产品。产品采用三相五柱或三相三柱式结构，铁芯四周采用框架结构保护，结构紧凑合理，抗短路能力强。低压线圈采用优质铜箔，铜箔两边呈圆弧形，消除因普通铜箔边缘毛刺的质量隐患。高压线圈采用分段圆筒式结构，德国HTT薄绝缘带填料技术，真空压力镜面浇注工艺，强度高，稳定性好，确保局部放电量小于10PC。由于其突出的节能环保特性，具有良好的经济效益和社会效益，被广泛应用于机场、车站、城市电网、高层建筑及发电厂等。
- Amorphous alloy materials have the characteristics of good ferromagnetism, high mechanical strength, good corrosion resistance, simple manufacturing process and high yield. Compared with the traditional silicon steel core, the transformer core made of amorphous alloy is easier to be magnetized and demagnetized. The no-load loss is 70% - 80% lower than the value specified in GB / T10228, which can greatly reduce the operating cost and save energy.
- SCBH15 series amorphous alloy dry-type transformer is a new type of high efficiency and energysaving transformer. The product adopts three-phase five column or three-phase three column structure, the core is protected by frame structure, the structure is compact and reasonable, and the short-circuit resistance is strong. The low-voltage coil adopts high-quality copper foil, both sides of which are arc-shaped, so as to eliminate the quality hidden trouble caused by the edge burr of common copper foil. The high-voltage coil adopts segmented cylinder structure, German htt thin insulation belt packing technology, vacuum pressure mirror casting technology, with high strength and good stability, to ensure that the local discharge is less than 10pc. Because of its outstanding characteristics of energy conservation and environmental protection, with good economic and social benefits, it is widely used in airports, stations, urban power grids, high-rise buildings and power plants.



- **低损耗** 产品空载损耗比 SCB11 型产品降低 20% 以上，节能效果优异，运行经济，免维护。
- **低噪声** 产品噪声水平比现行专业标准 JB/T10088-2004 《6-220KV 级变压器声级》低 10-15 分贝以上。
- **低局放** 树脂混合料采用国外最先进的搅拌方法和真空薄膜脱气两种技术，使混合料搅拌均匀，彻底排除了混合料内的气泡。产品仅有极低的局部放电量。高、低压线圈均在真空和压力下浇注，使树脂绝缘既具有全包封性，又具有层匝间浸渍性。浇注体具有致密的固化结构，阻燃、防爆、不污染环境。
- 缠绕线圈的玻璃纤维等绝缘材料具有自熄特性，不会因短路产生电弧，高热下树脂不会产生有毒有害气体。
- **高机械强度** 带填料的树脂使浇注体内的膨胀系数差异小，固化收缩率小，内应力小，固化物的硬度高，在高、低压线圈的内外表面环氧树脂包封层内，放置有预制成型的加强材料，具有犹如钢筋混凝土一样的致密结构，因而机械强度还大于纯环氧树脂，能承受突发短路电动力作用而无损伤。
- **Low loss:** the product no-load loss is more than 20% lower than that of SCB11 type products, with excellent energy-saving effect, economical operation and maintenance-free.
- **Low noise:** the noise level of the product is more than 10-15 dB lower than the current professional standard JB/T10088-2004 "6-220KV transformer sound level".
- **Low partial discharge:** the resin mixture adopts the most advanced mixing method and vacuum film degassing technology, which makes the mixture mix uniformly and completely excludes the air bubbles in the mixture. The product only has very low partial discharge. High and low voltage coils are cast under vacuum and pressure, so that the resin insulation has both full encapsulation and layer turn-to-turn impregnation. The casting body has a dense cured structure, flame retardant, explosion-proof, and does not pollute the environment.
- The glass fiber and other insulating materials for winding coils have self-extinguishing characteristics, which will not produce arcs due to short circuits, and the resin will not produce toxic and harmful gases under high heat.
- **High mechanical strength:** the resin with filler makes the coefficient of expansion difference within the casting body is small, the curing shrinkage rate is small, the internal stress is small, the hardness of the cured material is high, in the internal and external surfaces of the epoxy resin encapsulation layer of the high-voltage and low-pressure coils, there is a prefabricated reinforcing material placed in the layer, which has the same dense structure as the reinforced concrete, and thus the mechanical strength is greater than that of the pure epoxy resin, and it can withstand the action of sudden short-circuit electric force without any damage.

使用条件:

- 安装高度：海拔不大于 2000 米；
- 电源电压的波形：类似于正弦波；
- 多相电源电压的对称性：多相变压器所连接的电源电压应近似对称；
- 环境温度：-50°C ~+50°C。
- Installation height: altitude not exceeding 2000 meters;
- Waveform of the supply voltage: similar to a sine wave;
- Symmetry of multiphase power supply voltage: The power supply voltage connected to the multiphase transformer should be approximately symmetrical;
- Environmental temperature: -50 °C ~+50 °C .

2-7 特种变压器光伏电站用绕组双分裂干式变压器

SPECIAL TRANSFORMER DOUBLE SPLIT DRY-TYPE TRANSFORMER WITH WINDING FOR PHOTOVOLTAIC POWER STATIO

TIANHONG
天宏电力



- 太阳能作为一种清洁型能源，是目前技术成熟、具有大规模开发条件的可再生能源。而光伏发电系统则利用太阳能电池组经光电转化的低压直流电经直流防雷汇流柜和配电柜，进入光伏并网逆变器进行直交流的转化为低压交流电，再汇入升压变压器，使电压上升到额定电压等级电网电压，完成并网工作。此变压器并入10kV等电压等级电网，具有低损耗、低噪音、抗污染、抗短路能力强等特点，在分布式光伏电站等领域得到广泛应用。
- 此类变压器低压输出两个电压，低压电压可同时或单独运行。各分裂绕组的总容量就是该分裂变压器的额定容量。两个低压绕组的出线均为铜排出线，且在线圈的上部两侧位置，比之常规的轴向上下出线方式，极大的方便了用户接线操作。
- As a kind of clean energy, solar energy is a renewable energy with mature technology and large-scale development conditions. The photovoltaic power generation system uses the photovoltaic conversion of low-voltage direct current of solar cells through the DC lightning protection combiner cabinet and distribution cabinet to enter the photovoltaic grid connected inverter for direct AC conversion into low-voltage alternating current, and then into the step-up transformer to make the voltage rise to the rated voltage level grid voltage and complete the grid connection work. The transformer is incorporated into 10kV power grid with low loss, low noise, anti pollution and strong short-circuit resistance. It is widely used in distributed photovoltaic power plants and other fields.
- These transformers output two voltages at low voltage, which can be operated simultaneously or separately. The total capacity of each split winding is the rated capacity of the split transformer. The outgoing lines of the two low-voltage windings are copper bars, and at the upper two sides of the coil, compared with the conventional axial up-down outgoing line mode, it greatly facilitates the user's wiring operation



ZGS11-(Z)H智能型组合箱变是配电网自动化编程终端最基本的模块组合化、紧凑小型化、集成智能化的理想变电站设备。可达到三相联动，无缺相运行、无瞬间断电。可配远程遥控设备实现四遥功能，可手动、电动操作，免维护，减少维修人员及费用。广泛适用于公园厂区、车站码头、宾馆别墅、住宅小区等场所。

ZGS11-(Z)H intelligent combination box transformer is the most basic module combination, compact and miniaturized, integrated and intelligent ideal substation equipment for distribution network automation programming terminal. It can achieve three-phase linkage, no phase loss operation and no instantaneous power failure. It can be equipped with remote control equipment to realize four remote functions, manual and electric operation, maintenance free, and reduce maintenance personnel and costs. It is widely used in Park, factory area, station wharf, hotel villa, residential area and other places.

使用条件：

- 周围空气温度：-35℃ ~40℃；
 - 海拔高度：≤ 1000m；
 - 户外风速：≤ 35m/s；
 - 相对湿度：日平均不大于 95%，月平均不大于 90%；
 - 污秽等级：II、III、IV类；
 - 地震烈度：不超过 8 度；
 - 安装地点：无火灾、无爆炸危险或剧烈震动、严重污秽、化学腐蚀、地面倾斜角度小于 5 度的场所。
 - 超出上述规定的使用条件下使用时，请用户与本公司协商处理，并在订货时注明。
- Ambient air temperature : -35℃ ~40℃;
 - Altitude : ≤ 1000M;
 - Outdoor wind speed : < 35m/s
 - Relative humidity : daily average not more than 95% , monthly average not more than 90%;
 - Pollution level: Class II , III and IV ;
 - Seismic intensity: no more than 8 degrees;
 - Installation location: places without fire , explosion or violent vibration, serious pollution , chemical corrosion , and ground inclination less than 5 degrees;
 - In case of use beyond the above-mentioned conditions, please consult with our company for handling and indicate when ordering.

2-9 片式散热器 CHIP RADIATOR

TIANHONG
天宏电力



- 片式散热器是用于油浸式变压器、电抗器等变压器类产品的冷却装置，是按照中华人民共和国专业标准 JB/T5347-1999 变压器用片式散热器设计制造的。按连接方式可分为固定式和可拆式两种型式；按冷却方式可分为自冷式、风冷式及强油风冷式三种型式。本厂生产的片式散热器有固定式、可拆式、底吹式各种规格系列，欢迎用户选用。
- Chip radiator is used for oil-immersed transformer, reactor and other transformer products cooling device, is in accordance with the People's Republic of China professional standards JB/T5347-1999 transformer with chip radiator design and manufacture. According to the connection mode can be divided into fixed and detachable two types; according to the cooling mode can be divided into self-cooling type, air-cooled and strong oil air-cooled three types. Our factory produces piece radiator has fixed, folding type, bottom blowing type various specifications series, welcome users to choose.

使用须知：

- PC 型可拆式散热器上集流管上有放气塞作放气用，下集流管上有放油塞作放油用。当变压器注油时，应将每组散热器上的放气塞放开，待放气孔有油溢出时，再将放气塞拧紧。
- 运输、安装、冲洗时不得将散热片的油道碰瘪、损坏。
- 用户如对散热器进行密封试验，其压力不得大于 120kPa。
- 用户如需对散热器进行真空强度试验，应在不充油状态下进行，绝对压强不大于 133Pa，持续时间不大于 10min。
- 散热器装用前，请用户检查塑料盖板或钢盖板是否密封完好，如有损坏致使内部被污秽时需进行清理，以保证内部清洁。
- PC type detachable radiator has a bleeder plug on the upper collector pipe for bleeder, and an oil bleeder plug on the lower collector pipe for oil bleeder. When the transformer is filled with oil, the bleeder plugs on each group of radiators should be released, and then the bleeder plugs should be tightened when oil overflows from the bleeder holes.
- Transportation, installation and flushing shall not deflate or damage the oil channel of the radiator.
- If the user conducts a sealing test on the heat sink, the pressure shall not be greater than 120kPa.
- If the user needs to carry out vacuum strength test on the heat sink, it should be carried out under the state of not filling oil, the absolute pressure is not more than 133Pa, and the duration is not more than 10min.
- Before the radiator is installed, users should check whether the plastic cover or steel cover is well sealed, and if it is damaged so that
- the interior is polluted, it should be cleaned to ensure that the interior is clean.

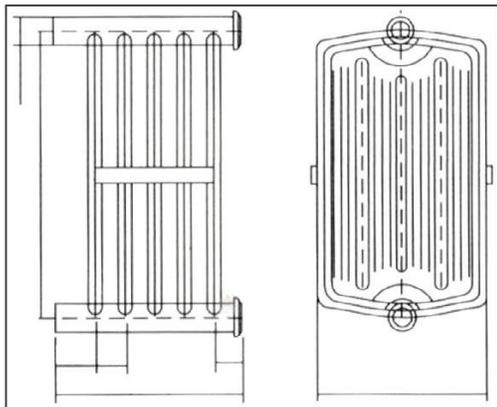


图 1. PG 型片式散热器
Figure 1. Model PG Flake Radiator

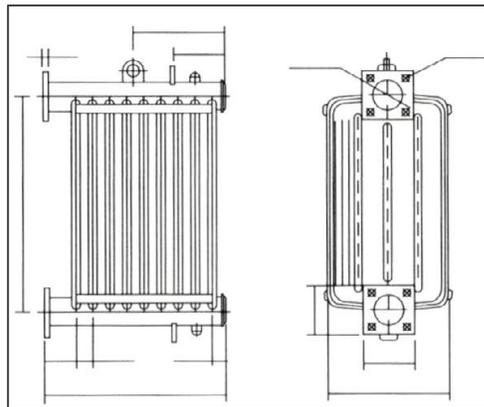


图 2. PC 型片式散热器
Figure 2. PC type chip heat sink

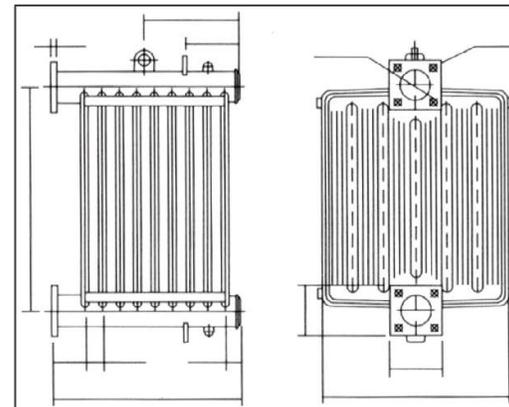


图 3. PC 型片式散热器
Figure 3. PC type plate heat sink

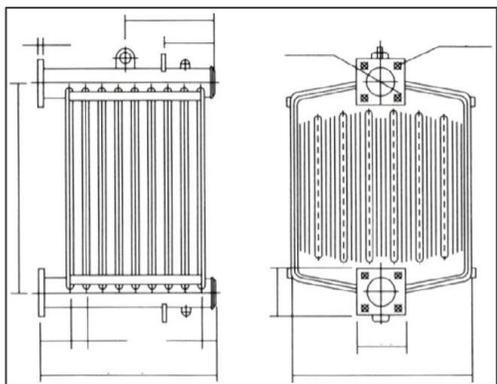


图 4. PC 型片式散热器
Figure 4. PC type chip heat sink

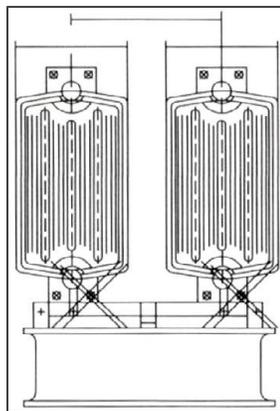


图 5. 底吹式片式散热器
Figure 5. Bottom-blown chip radiator

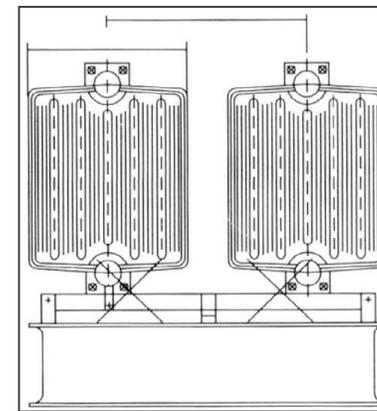


图 6. 底吹式片式散热器
Figure 6. Bottom-blown chip radiator



KYN28A-12开关柜由固定体的柜体和可移开的真空断路器手车组成，固定的开关柜柜分为四个小室:母线室、断路器室、电缆室和低压室。开关柜的基本柜型为进线柜和馈线柜。除基本柜型外，还有其它派生方案，如母线分段柜、计量柜、PT柜、所用变柜等。此外，尚有配置固定式负荷开关、真空接触器手车、隔离手车等方案。开关柜靠墙或面对面安装，可充分满足现场的具体要求。在母线分段系统中，必须有两台专用的开关柜，即带有断路器手车的母线联接柜和隔离柜(也可是PT柜或计量柜)。。

The KYN28A-12 switchgear consists of a fixed cabinet and a removable vacuum circuit-breaker trolley. The fixed switchgear cabinet is divided into four compartments: busbar chamber, circuit-breaker chamber, cable chamber, and low-voltage chamber. The basic cabinet type of the switchgear is the feed-in cabinet and the feeder cabinet. In addition to the basic cabinet type, there are other derivative schemes, such as busbar sectioning cabinet, metering cabinet, PT cabinet, and auxiliary transformer cabinet. Furthermore, there are schemes with fixed load switches, vacuum contactor trolleys, and isolation trolleys. The switchgear can be flush-mounted or face-to-face installed to fully meet the specific requirements of the site. In a busbar sectioning system, there must be two dedicated switchgear cabinets, namely the busbar connection cabinet with a circuit-breaker trolley and the isolation cabinet (which may also be a PT cabinet or a metering cabinet)..

序号	项目		单位	技术参数
1	额定电压 U_r		kV	12
2	额定频率 f_r		Hz	50
3	主母线额定电流 I_r		A	630、1250、1600、2000、2500、3150、4000
4	额定绝缘水平	1min 工频耐受电压 U_d	kV	相间相对地: 42; 隔离断口: 48
		雷电冲击耐受电压 U_p		相间相对地: 75; 隔离断口: 85
5	额定短时耐受电流 I_k (有效值)		kA	25、31.5、40
6	额定峰值耐受电流 I_p (峰值)		kA	63、80、100
7	额定短路持续时间 t_k		S	4
8	分/合闸装置额定电源电压 U_a		V	DC: 110/220; AC: 110/220
9	防护等级		隔室间断路器室门打开时为 IP20、外壳为 IP4X	



装置适用于发电厂、石油、化工、冶金、纺织、高层建筑等行业的配电系统。在大型发电厂、石化系统等自动化程度高，要求与计算机接口的场所，作为三相交流频率为50 (60) Hz、额定工作电压为380 (400、660) V、额定电流为4000A及以下的发、供电系统中的配电、电动机集中控制、无功功率补偿使用的低压成套配电装置。装置的设计符合下列标准: IEC439-1 低压成套开关和控制设备、GB7251 低压成套开关设备、JB/T9661-1999 低压抽出式成套开关设备。

Low pressure draw-out switchgear

The device is suitable for power plant, petroleum, chemical, metallurgy, textile, high-rise building and other industries of power distribution system. In large power plants, petrochemical systems and other places with a high degree of automation and requiring computer interface, As a three-phase AC frequency of 50 (60) Hz, rated operating voltage of 380 (400, 660) V, rated current of 4000A and below in the power supply system of power distribution, motor centralized control, reactive power compensation for the use of low-voltage complete sets of power distribution devices. The design of the device conforms to the following standards: IEC439-1 low-voltage switchgear and control equipment, GB7251 low-voltage switchgear, JB/T9661-1999 low-voltage withdraw-type switchgear.



GGD型交流低压配电柜适用于发电厂、变电站、厂矿企业等电力用户交流50Hz,额定工作电压380V,额定工作电流至31 50A的配电系统,作为动力,照明及配电设备的电能转换,分配与控制之用。GGD型交流低压配电柜是根据能源部主管.上级、广大电力用户及设计部门的要求,本着安全、经济、合理、可靠的原则设计的新型低压配电柜。产品具有分断能力高,动热稳定性好,电力方案灵活,组合方便,系统性、实用性强,结构新颖,防护等级高等特点。可作为低压成套开关设备的更新换代产品使用。

GGD型交流低压配电柜符合IEC439《低压成套开关设备和控制设备》,GB7251《低压成套设备》等标准。

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GGD type AC low-voltage distribution cabinet is suitable for power plants, substations, factories and mining enterprises and other power users AC 50Hz, rated working voltage 380V, rated working current to 350A power distribution system, as power, lighting and distribution equipment for power conversion, distribution and control. GGD type AC low voltage switchboard is under Department of Energy director. The superior, the majority of power users and the requirements of the design department, based on the principles of safety, economy, reasonable and reliable design of the new low-voltage distribution cabinet. The product has the characteristics of high breaking ability, good dynamic and thermal stability, flexible power scheme, convenient combination, systematic and practical, novel structure and high protection level. It can be used as the replacement of low-voltage switchgear.

GGD AC low-voltage distribution cabinet conforms to IEC439 "Low-voltage switchgear and control equipment", GB7251 "low-voltage complete equipment" and other standards.



YB□系列预装式变电站是将高压电器设备，变压器、低压电器设备等组合成紧凑型成套配电装置，用于城市高层建筑、城乡建筑、居民小区、高新技术开发区、中小型工厂、矿山油田以及临时施工用电等场所，作配电系统中接受和分配电能之用。

YB□系列预装式变电站具有成套性强、体积小、结构紧凑、运行安全可靠、维护方便、以及可移动等特点，与常规土建式变电站相比，同容量的箱式变电站占地面积通常为常规变电站的1/10~1/5,大大减少了设计工作量及施工量，减少了建设费用。在配电系统中，可用于环网配电系统，也可用于双电源或放射终端配电系统，是目前城乡变电站建设和改造的新型成套设备。

YB□系列预装式变电站符合GB/T17467-1998《高压/低压预装式变电站》国家标准。

YB□ series pre-installed substation is the combination of high-voltage electrical equipment, transformers, low-voltage electrical equipment into a compact complete set of power distribution devices, used in urban high-rise buildings, urban and rural buildings, residential communities, high-tech development zones, small and medium-sized factories, mining oil fields and temporary construction of electricity and other places, for the distribution system to accept and distribute electricity.

YB□ series preassembled substation has the characteristics of strong complete set, small size, compact structure, safe and reliable operation, easy maintenance, and mobility, etc. Compared with conventional civil substations, box-type substations with the same capacity usually cover an area of only 1/10~1/5 of conventional substations, which greatly reduces the design workload and construction amount, and reduces the construction cost. In the distribution system, it can be used in the ring network distribution system, and can also be used in the dual power supply or radiation terminal distribution system, which is a new complete set of equipment for the construction and transformation of urban and rural substations.

YB □port series preassembled substation conforms to GB/T17467-1998 "High voltage/low voltage preassembled substation" national standard.



1、采用预制式带电可触摸硅橡胶电缆头，全密封、全绝缘、免维护，可靠保证人身安全；

2、结构紧凑，外形小巧美观，不锈钢双层箱体，使用寿命可达二十年以上；

3、在不影响主网运行的前提下实现区域停电检修，减小停电范围；

4、可配-台或多台SF6负荷开关。接线方式灵活多样，分支出线最多可达8回路；

5、可选避雷器、短路故障指示器、限流熔断器等，满足用户各种要求。

1, the use of prefabricated live can touch silicone rubber cable head, fully sealed, fully insulated, maintenance-free, reliable to ensure personal safety;

2, compact structure, small and beautiful appearance, stainless steel double-layer box, service life can reach more than 20 years;

3, without affecting the operation of the main network to achieve regional power outage maintenance, reduce the scope of power outage;

4, can be equipped with one or more SF6 load switches. Flexible wiring mode, branch out line up to 8 loops;

5, optional lightning arrester, short circuit fault indicator, current limiting fuse, etc., to meet various requirements of users.



TIANHONG
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PART 03
设备篇
EQUIPMENT CHAPTER

天宏电力科技有限公司



图 1



图 2



图 3

图1：交换台大包围光纤激光切割机 LASER XCHANGEABLE TABLE

- ◆ 全新封闭式设计，双工作台快速交换，可边加工边下料，速度快、切缝小、断面光滑、操作简便、能耗低，适合大批量连续加工，凸显切割竞争优势。光纤交换台大包围激光切割机。
- ◆ A brand new closed design with dual workbenches for quick exchange, capable of cutting while cutting, fast speed, small cutting seams, smooth cross-section, easy operation, low energy consumption, suitable for large-scale continuous processing, highlighting cutting competitive advantages. Fiber optic switching station large surround laser cutting machine.

图2：品牌激光器 Brand Laser

- ◆ 光纤激光器采用风冷紧凑型结构设计，以半导体光纤作激光发生介质，绿色环保，机械结构简单，光路恒定，基本免维护，切割性能稳定。
- ◆ The fiber laser adopts an air-cooled compact structure design, using semiconductor fibers as the laser generation medium, which is green and environmentally friendly. The mechanical structure is simple, the optical path is constant, basically maintenance free, and the cutting performance is stable.

图3：自动调焦切割头 Automatic Focusing Cutting Head

- ◆ 配备自动调焦切割头，可根据材料厚度自动准确调节焦点，适用多种焦距；高速切割，节省时间。
- ◆ Equipped with an automatic focusing cutting head, it can automatically and accurately adjust the focus according to the material thickness, suitable for various focal lengths; High speed cutting saves time.

EQUIPMENT



- 绕线机分为高压绕线机和低压箔绕机。分别用于电磁线和铜铝的线圈绕制。根据不同的技术要求及工艺要求，按图生产。



- The winding machine is divided into high-voltage winding machine and low-voltage foil winding machine. They are used for winding electromagnetic wires and copper and aluminum coils, respectively. According to different technical requirements and process requirements, the production is carried out according to the drawings.



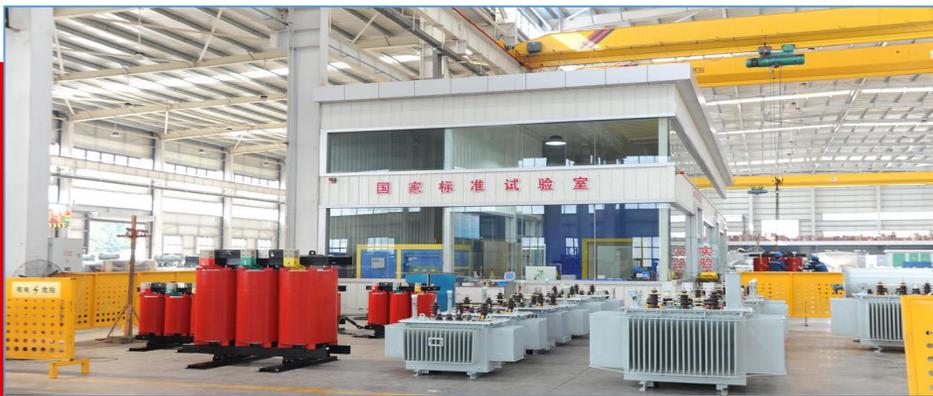
- 真空静态浇筑罐是干式变压器生产设备中尤为重要的设备之一。将树脂与固化剂分别进入预混罐脱气，然后通过物料输送计量系统，将树脂与固化剂按照设定比例及压力同时进入静态混料器，双组份物料静态混料器混合均匀后，通过浇注分配阀进行浇注。该系统配置伺服系统控制双组份物料比例及浇注量，通过浇注分配阀控制浇入产品。用户可以根据浇注工艺进行设置，实现自动浇注。
- 该系统工作可靠，控制稳定，生产效率高，由于配置了静态混料器，可以根据产品需要配置双组份原料，不需要备料，没有双组份物料浪费，大大节省了原料成本，同时减少双组份物料混合时间。
- Vacuum static pouring tank is one of the most important equipments in dry transformer production equipment. The resin and curing agent are respectively put into the premix tank for degassing, and then through the material conveying and metering system, the resin and curing agent are simultaneously put into the static mixer according to the set ratio and pressure. After the static mixer of the two-component material is mixed evenly, it is poured through the pouring distribution valve. The system is equipped with servo system to control two-component material proportion and pouring amount, and to control pouring products through pouring distribution valve. Users can set up according to the pouring process to achieve automatic pouring.
- The system is reliable, stable control, high production efficiency, due to the configuration of static mixer, can be configured according to the product needs to configure two-component raw materials, no need to prepare materials, no two-component material waste, greatly saving the cost of raw materials, while reducing the two-component material mixing time.



- 采用了高刚性、高精度结构的剪切机和卷取机，主轴系统的设计挠度为万分之一，精度公差和形位公差为4-5级。
- 全线布局合理，全部采用电动、气动和液压驱动、光电式接触开关等控制件，操作方便，生产效率高。各安全防护装置灵敏可靠。
- 选用先进的德国西门子公司最新生产的可编程序控制器，实现全线逻辑控制，增加了系统的稳定性和可靠性，并可通过触摸屏进行人机对话，定长剪切和剪切速度显示。辅助自动穿料功能，激光精确检测带料。
- 带有数据传输、打标功能，便于和卷料立体库衔接以及卷料库存管理。
- The shear and coiler with high rigidity and high precision structure are used, and the design deflection of the spindle system is 1 in 10,000, and the accuracy tolerance and form and position tolerance are 4-5 classes.
- All line layout is reasonable, all use electric, pneumatic and hydraulic drive, photoelectric contact switch and other control parts, easy to operate, high production efficiency. Each safety protection device is sensitive and reliable.
- The latest programmable controller produced by the advanced German Siemens company is selected to realize the full line logic control, increase the stability and reliability of the system, and can carry out human-machine dialogue through the touch screen, fixed-length cutting and cutting speed display. Auxiliary automatic feeding function, laser accurate detection of tape material.
- With data transmission, marking function, easy to connect with the reel storage and reel inventory management.



- 设备开卷机液压系统升级改进，保证设备不会有任何渗漏油现象。同时还采用了超声波卷径检测、电磁铁吸附送料和高动态送料系统，使送料加速度可以达到3-5g，大大提升了冲剪单元的工作效率。
- 全线采用中心定位自动集中调宽运行方式适应不同宽度的片料传送，提高剪切质量和可靠性。全线调宽联动，电动集中调宽（可使用显示器来进行调宽操作），编码器位置反馈，位置指示器位置显示。
- 设备整机设计合理，设备整体的安装都非常方便简单。无需地坑和过多的线槽，设备布局合理。
-
- The hydraulic system of the equipment uncoiler is upgraded and improved to ensure that the equipment will not have any leakage of oil. At the same time, it also adopts ultrasonic diameter detection, electromagnet adsorption feeding and high dynamic feeding system, so that the feeding acceleration can reach 3-5g, which greatly improves the working efficiency of the punching and shearing unit.
- The whole line adopts the operation mode of center positioning and automatic centralized width adjustment to adapt to the transfer of different widths of pieces, and improve the cutting quality and reliability. Full line width linkage, electric centralized width adjustment (can use the display to adjust the width operation), encoder position feedback, position indicator position display.
- The design of the whole equipment is reasonable, and the overall installation of the equipment is very convenient and simple. There is no need for pits and excessive grooves, and the equipment layout is reasonable.



- 试验成套设备采用 PLC 作为控制核心，以工业控制计算机作为人机交互界面，具有可靠性高、界面直观、操作简便、保护措施完善等突出优点。
- 变压器试验操作台为平面式结构，其上仅放置工业控制计算机，其他的电气设备、元件均安装于设备间开关柜内，操作部分与电气回路完全隔离。



- The test set equipment uses PLC as the control core, and industrial control computer as the human-computer interface, with the advantages of high reliability, intuitive interface, simple operation, and complete protection measures.
- The transformer test operating table is a flat structure, and only the industrial control computer is placed on it. Other electrical equipment and components are installed in the switchgear cabinets in the equipment room, and the operation part is completely isolated from the electrical circuit.

卧式绕线机 horizontal coil winding machine



- 设备用途：
 - 主要用于绕制高电压、大容量的变压器、电抗器等线圈。
- 主要特点：
 - 具有承载能力大、扭矩大、计数准确的特点，采用软启动、起动平稳无冲击。在每一机械变速档内可保证无级变速恒扭矩传动。配备可逆电子计数器，具有正反计数功能和断电记忆功能，确保绕制的线圈匝数准确。本机操作配备按钮站和脚踏开关两种方式，操作方便，使用安全可靠。
- Equipment use:
 - Mainly used for winding high voltage, large capacity transformers, reactors and other coils.
- Main features:
 - It has the characteristics of large carrying capacity, large torque and accurate counting, and adopts soft starting and smooth starting without impact. Continuously variable speed constant torque transmission is guaranteed in each mechanical shift. Equipped with reversible electronic counter, with positive and negative counting function and power off memory function, to ensure that the coil turns are accurate. The operation of the machine is equipped with two ways of press and switch and foot switch, easy to operate, safe and reliable.

立式绕线机 vertical coil winding machine



- 设备用途:
- LR系列立式绕线机主要用于大型电力变压器线圈绕制，是高压、超高压、连续式、饼式线圈的理想设备。该机按类型可分为地坑式及无地坑式两种。
- 设备特点:
- (1) 本机花盘升降式（地坑式），绕制线圈高度可根据线圈的需要任意调整，操作工作台位置不变，操作简单方便。
- (2) 本机变频控制速度、起速平稳，制动可靠。绕线圈数可自由设定，具有正反计数和断电记忆功能。地坑盖板可根据线圈直径自由伸缩，安全可靠。
- Equipment use:
- LR series vertical winding machine is mainly used for large power transformer coil winding, is the ideal equipment for high voltage, ultra-high voltage, continuous, cake coil. The machine can be divided into two types according to the type of pit and no pit.
- Equipment features:
- (1) This machine flower lifting type (pit type), winding coil height can be arbitrarily adjusted according to the needs of the coil, the position of the operating table is unchanged, the operation is simple and convenient.
- (2) The machine frequency control speed, stable starting speed, reliable braking. The number of winding coils can be set freely, with positive and negative counting and power off memory functions. Pit cover plate can be freely telescoped according to the diameter of the coil, safe and reliable.

220KV 检测中心

220KV Testing Center



- 本试验站建成后常规智能试验区域最大试验能力满足容量63000kVA，110kV及以下电压等级的变压器产品测试，主要完成试验有：绕组对地和绕组间电容测量、绝缘系统电容的介质损耗因数测量、绕组直流电阻测量、电压比测量和联结标号检定、短路阻抗和负载损耗测量、空载损耗和空载电流测量(包含90%和110%空载试验及长时间空载试验雷电冲击试验(包含全波，截波及操作波，现有利用)、外施耐压试验、感应耐压试验、局放试验、线端交流耐压试验、有载分接开关试验(适用于有载调压变压器)温升试验、声级测定、三相变压器零序阻抗测量、频率响应测量(绕组变形)、内装电流互感器变比和极性试验铁芯夹件绝缘检查试验等。



- After the completion of this test station, the maximum test capacity of the conventional intelligent test area can meet the capacity of 63,000 kVA, and it can test transformer products of 110kV and below voltage levels. The main tests performed include: capacitance measurement between windings and between windings, dielectric loss factor measurement of the insulation system, DC resistance measurement of windings, voltage ratio measurement, and connection marking verification, short-circuit impedance and load loss measurement, open-circuit loss and open-circuit current measurement (including 90% and 110% open-circuit tests and long-term open-circuit tests with lightning impulse (including full-wave, interrupted wave, and operating wave, existing utilization), external applied voltage test, induced withstand voltage test, partial discharge test, line-end AC withstand voltage test, on-load tap changer test (applicable to on-load tap-changing transformers), temperature rise test, sound level measurement, three-phase transformer zero-sequence impedance measurement, frequency response measurement (winding distortion), and current transformer ratio and polarity test, iron core clamp insulation test, etc.



- ◆ 机身采用整体焊接及整体加工结构，机身主要部件均采用 ANSYS 有限元分析软件进行分析，确保了机床的可靠性及整机的精度；
- ◆ 数控系统采用电液伺服折弯机专用数控系统，可实现折弯角度图形编程、角度修正补偿，折弯压力自动计算与自动调整，自动计算工作台变形补偿量、工件展开长度、压底折弯压力、开口距离、后挡料自动退让等功能。
- ◆ The machine body adopts an overall welded and machined structure, and the main components of the machine body are analyzed using ANSYS finite element analysis software to ensure the reliability and accuracy of the machine.
- ◆ The numerical control system adopts a dedicated numerical control system for electro-hydraulic servo bending machines, which enables graphical programming of bending angles, angle correction compensation, automatic calculation and adjustment of bending pressure, automatic calculation of workbench deformation compensation, workpiece unfolding length, bottom pressing bending pressure, opening distance, automatic backstop compensation, and other functions.



优质折弯模具
Quality Die



移动前托料架
Mobile Front Support



激光安全保护
Laser Safety Protection



- ◆ 荷兰 DeLem-DA53T 是基本的数控系统，具有高效率的性能。美观现代、流线型铸塑外壳，优雅而实用，允许在底部面板安装用于机床操作的按钮和选择器开关。集成的 DA 数控编程。有液压工序指定功能，可以让机器调整和测试工作减少。按键一次就可以生成数控程序，自动计算所有的轴位置直接进行生产。
- ◆ 数控系统采用先进新技术，高柔性、操作便捷 USB 接口提供了快速备份产品和模具。彩色的 TFT 显示和时尚的用户界面清晰，可为快速编程提供方便。DA-Offline 为离线编程提供解决方案。
- ◆ The Dutch Delem-DA53T is a basic numerical control system with high efficiency. The beautiful, modern, streamlined cast plastic housing is elegant and practical, allowing buttons and selector switches for machine operation to be installed on the bottom panel. The integrated DA-53T numerical control system has a Delem 2D graphical programming design tool for convenient numerical control programming. It has a hydraulic process designation function that allows the machine to adjust and test work to be reduced. The buttons can generate a numerical control program once, automatically calculating all axis positions for direct production. The numerical
- ◆ control system adopts advanced new technologies, with high flexibility and convenient operation. The USB interface provides fast backup of products and molds. The colorful TFT display and stylish user interface are clear and convenient for rapid programming. DA-Offline provides a solution for offline programming.

3-12 光纤激光切割机 Fiber laser cutting machine

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- 光纤激光器是国际上新发展的一种新型光纤激光器输出高能量密度的激光束，并聚集在工件表面上，使工件上被超细焦点光斑照射的区域瞬间熔化和气化，通过数控机械系统移动光斑照射位置而实现自动切割。同体积庞大的气体激光器和固体激光器相比具有明显的优势，已逐渐发展成为高精度激光加工、激光雷达系统、空间技术、激光医学等领域中的重要候选者。
- 光纤激光切割机它既可做平面切割,也可做斜角切割加工,且边缘整齐、平滑,适用于金属板等高精度的切割加工，同时加上机械臂可以进行三维切割代替原本进口的五轴激光。比起普通二氧化碳激光切割机更节省空间和气体消耗量，光电转化率高，是节能环保的新产品，也是世界上领先技术产品之一。
- Fiber laser is a new international development of a new type of fiber laser output high energy density laser beam, and gathered on the surface of the workpiece, so that the workpiece is irradiated by ultra-fine focus spot instant melting and gasification, through the CNC mechanical system to move the spot irradiation position to achieve automatic cutting. Compared with the large volume of gas lasers and solid lasers, it has obvious advantages, and has gradually developed into an important candidate in high-precision laser processing, liDAR systems, space technology, laser medicine and other fields.
- Fiber laser cutting machine It can do plane cutting, also can do oblique cutting processing, and the edge is neat and smooth, suitable for high-precision cutting processing such as metal plate, while coupled with a mechanical arm can be three-dimensional cutting instead of the original imported five-axis laser. Compared with ordinary carbon dioxide laser cutting machine, it saves space and gas consumption, has high photoelectric conversion rate, is a new product of energy saving and environmental protection, and is also one of the world's leading technology products.

3-13 上下料库 Up and down stock



- 数控冲床自动上下料库，简称自动化上下料库，是一种将机器人与数控冲床紧密结合，实现材料自动上下料的系统。其基本原理是将等待加工的原材料放置在上料区域，机器人通过对加工区域进行扫描，自动定位并将所需材料搬运至指定位置，完成上料工作。当加工完成后，机器人将加工床上的成品从床面搬走，放置到下料区域，等待后续操作。
- 上下料库是一种适用于现代化工业生产的必备设备。其自动化、高效、精准的优点，既提高了生产效率，又降低了生产成本，为企业提高竞争力提供了坚实的基础。
- Automatic loading and unloading library of CNC punching machine, referred to as automatic loading and unloading library, is a system that combines robot and CNC punching machine closely to realize automatic loading and unloading of materials. The basic principle is to place the raw materials waiting for processing in the feeding area, and the robot can automatically locate and move the required materials to the designated position by scanning the processing area. When the processing is complete, the robot will remove the finished product from the bed surface and place it in the blanking area, waiting for subsequent operations.
- Loading and unloading warehouse is a kind of necessary equipment suitable for modern industrial production. Its advantages of automation, high efficiency and precision not only improve production efficiency, but also reduce production costs, providing a solid foundation for enterprises to improve competitiveness.



- 数控转塔冲床(NCT)由电脑控制系统、机械或液压动力系统、伺服送料机构、模具库、模具选择系统、外围编程系统等组成。
- 数控转塔冲床(NCT)是通过编程软件（或手工）编制的加工程序，由伺服送料机构将板料送至需加工的位置，同时由模具选择系统选择模具库中相应的模具，液压动力系统按程序进行冲压，自动完成工件的加工。
- 数控转塔冲床(NCT)的喉深是指冲压中心至床身侧板的距离。喉深的大小直接决定加工板材的宽度尺寸大小（即沿床身长度方向加工的板材尺寸）。
- CNC turret press (NCT) is composed of computer control system, mechanical or hydraulic power system, servo feeding mechanism, mold library, mold selection system, peripheral programming system, etc.
- CNC turret punch (NCT) is a processing program prepared by programming software (or manual), the servo feeding mechanism will be sent to the position to be processed, while the mold selection system selects the corresponding mold in the mold library, the hydraulic power system is pressed according to the program, and the processing of the workpiece is automatically completed.
- The throat depth of a CNC turret punch (NCT) is the distance from the punching center to the side plate of the bed. The size of the throat depth directly determines the width size of the processed sheet (that is, the size of the sheet processed along the length of the bed).

3-16 机械手 Manipulator



- 机械手主要由执行机构、驱动机构和控制系统三大部分组成。手部是用来抓持工件（或工具）的部件，根据被抓持物件的形状、尺寸、重量、材料和作业要求而有多种结构形式，如夹持型、托持型和吸附型等。运动机构，使手部完成各种转动（摆动）、移动或复合运动来实现规定的动作，改变被抓持物件的位置和姿势。运动机构的升降、伸缩、旋转等独立运动方式，称为机械手的自由度。为了抓取空间中任意位置和方位的物体，需有6个自由度。自由度是机械手设计的关键参数。自由度越多，机械手的灵活性越大，通用性越广，其结构也越复杂。一般专用机械手有2~3个自由度。控制系统是通过对机械手每个自由度的电机的控制，来完成特定动作。同时接收传感器反馈的信息，形成稳定的闭环控制。控制系统的核心通常是由单片机或dsp等微控制芯片构成，通过对其编程实现所要功能。
- The manipulator is mainly composed of three parts: the actuator, the drive mechanism and the control system. The hand is a part used to hold the workpiece (or tool), according to the shape, size, weight, material and operation requirements of the object to be held and there are a variety of structural forms, such as clamping, holding and adsorption. The motion mechanism enables the hand to complete various rotation (swing), movement or compound movement to achieve the specified action and change the position and posture of the object being held. The independent motion mode of the moving mechanism, such as lifting, expanding and rotating, is called the degree of freedom of the manipulator. In order to grasp objects at any position and orientation in space, six degrees of freedom are required. The degree of freedom is the key parameter of manipulator design. The more degrees of freedom, the greater the flexibility of the manipulator, the wider the versatility, and the more complex its structure. General special manipulator has 2 ~ 3 degrees of freedom. The control system is to complete the specific action by controlling the motor of each degree of freedom of the manipulator. At the same time, the feedback information of the sensor is received to form a stable closed-loop control. The core of the control system is usually composed of micro-control chips such as single-chip microcomputer or dsp, which is programmed to achieve the desired functions.

3-17 折边机 Flanging machine

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- 折边机是对产品的边缘进行处理的机械。如一种采用多工位旋转循环方式的锂离子动力电池自动折叠封装折边机，通过三工位将锂离子动力电池进行折边封装，同时每个工位又采用了不同角度的折边刀体，具有成本低、性能稳定、自动化程度高、调节方便等特点。
- 折边机为简单的弯曲机，既可以是手动的，也可以是机动的。最简单的方法是用有弯曲半径的模型把钢板牢固地固定在机床工作台上。伸出的部分材料放在另一个工作台上，该工作台能沿弯曲半径中心旋转。当活动工作台上时，它把不锈钢弯曲成所需的角度。很明显，当进行弯曲时，不锈钢在工作台上滑动。所以，为防止划伤不锈钢，工作台表面必须平滑。在实际加工过程中，通常用塑料膜保护不锈钢表面。
- Flanging machine is a machine that treats the edge of the product. For example, a lithium-ion power battery automatic folding package folding machine using multi-station rotation cycle mode, through the three-station lithium-ion power battery folding package, while each station and using different angles of the folding knife body, with low cost, stable performance, high degree of automation, easy adjustment and other characteristics.
- The flanging machine is a simple bending machine, which can be either manual or motorized. The simplest method is to use a bending radius model to firmly fix the steel plate on the machine table. The protruding part of the material is placed on another work table that can be rotated around the center of the bending radius. When the movable table rises, it bends the stainless steel into the desired Angle. It is obvious that when bending is performed, the stainless steel slides on the workbench. Therefore, in order to prevent scratching the stainless steel, the surface of the workbench must be smooth. In the actual processing process, the stainless steel surface is usually protected by plastic film.



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PART 04
服务篇

SERVICE CHAPTER

天宏电力科技有限公司



01

电力设备技术研究、销售

02

电力变压器及配件、配电柜、配电开关控制设备、电子元器件制造、销售、维修

03

仪器仪表、焊接设备、五金交电、制冷设备、通讯设备（地面卫星接收设施及无线发射设备除外）、塑料制品、照明设备、电线电缆、汽车及零配件、摩托车及零配件销售

04

家用电器制造、销售、维修

05

电力工程设计、施工

06

自营和代理各类商品及技术的进出口业务（国家禁止或设计行政审批的货物和技术进出口除外，普通货物道路运输

- ◆ 许可项目：变压器供货商、油箱铁芯配件供货商；供电业务、输电、供电、受电电力设施的安装、维修和试验；发电业务、输电业务、供（配）电业务（依法须经批准的项目，经相关部门批准后方可开展经营活动，具体经营项目以审批结果为准）。



◆ 南美 110kv 变压器供货项目 South America 110kv Transformer Supply Project

本项目为天宏在部分市场推行的变压器本地供油试点项目。为进一步降低产品成本，在征得客户许可的情况下，本项目采购阿根廷供应商的变压器油并直接交付到项目所在地，此过程节省了变压器油进入中国的进口关税和进出中国的海运费，可以综合降低变压器成本约 6%。目前支持本业务模式的市场包括：南美洲，西班牙，法国，意大利。

This is a pilot project of transformer oil local supply, vigorously implemented by Tianhong in some markets. In order to further reduce the product cost, with the permission of the customer, the transformer oil from Argentina is purchased and delivered directly to the project site. This process saves the import tariff and sea freight of transformer oil into and out of China, and can comprehensively reduce the transformer cost by about 6%. At present, this business model is available in the markets include South America, Spain, France and Italy.

◆ 东南亚变电站项目 Southeast Asia Substation Project

东南亚变电站项目，要求所有电气设备表面防腐需满足 C4M 等级，我司供应的电气设备严格执行该防腐要求，在 C4M 等级下漆膜厚度达到 200 μ m. 表面防腐一次性通过检验，并制定了完善的包装方案，确保产品的表面防腐层在运输过程中不被损坏。

Southeast Asia Substation Project, it is required that the surface anti-corrosion of all electrical equipment shall meet the C4M level. The electrical equipment supplied by our company shall strictly comply with the anti-corrosion requirements. Under the C4M level, the paint film thickness reaches 200 μ m. The surface anti-corrosion has passed the inspection at one time, and a suitable packaging scheme has been formulated to ensure that the surface anti-corrosion coating of the product is not damaged during transportation.



中国航空工业集团
Aviation Industry
Corporation of China



北京大兴机场
Beijing Daxing Airpor



2022北京冬奥会
2022 Beijing Winter
Olympics



中国酒泉卫星发射中心
China Jiuquan Satellite
Launch Center



中国水利
China Water Resources



武汉五环体育中心
Wuhan Wuhuan Sports
Center



中国人民银行监督中心
People's Bank of China Supervision Center



吉利控股集团
Geely Holding Group



中国石化
Sinopec



中广核集团
China General Nuclear
Power Group



G20(杭州)峰会
G20 (Hangzhou) Summit



立足中国，走向世界 BASED ON CHINA, TO THE WORLD



- ◆ 在强手如林的市场竞争中，只有眼光远大，勇于开拓，才能成为行业中的佼佼者。因此我们一直坚持着“有市场，才有出路”的经营方针，积极开拓市场，目前已经在全国各地建立了稳定的销售渠道。
- ◆ 天宏电力科技有限公司在致力于开拓国内市场时，同时加大对国际市场的关注，产品出口到30多个国家和地区，并取得客户的一致好评。
- ◆ In the fiercely competitive market, only with a broad vision and the courage to explore can one become a leader in the industry. Therefore, we have always adhered to the business policy of "where there is a market, there is a way out", actively exploring the market, and currently have established stable sales channels throughout the country.
- ◆ Tianhong Electric Power Technology is committed to exploring the domestic market while increasing its attention to the international market. Its products are exported to more than 30 countries and regions and have received unanimous praise from customers.

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THANKS

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